



# Aging Is in the Eye of the Beholder

## Views on Aging in Everyday Life Captured via Photographs

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**Abstract:** *Background:* Psychological views on aging are often captured by self-report quantitative questionnaires. By default, these measures base the assessment on predefined categories and focus on explicit cognitions. Digital technology, such as smartphones is always at hand in everyday life and offers options for ecological momentary assessment of views on aging. *Aims:* We aimed to systematically study differences in contents and the relative importance of views on aging in different age groups across the life span. By our study, we provide proof of concept for a photo-based assessment method that allows both qualitative and quantitative analyses. *Method:* We asked young (20–30-yr-old), young-old (50–69-yr-old), and old-old (70-plus-yr-old) participants ( $N = 37$ ) to take photographs on what aging means to them. We subjected the resultant 376 photos to a mixed-method content analysis. *Results:* Seventy-plus participants took more complex, slightly less positive, and more ambivalent pictures. Younger participants' pictures addressed physical changes, whereas 50–69-year-old adults predominantly dealt with issues of lifestyle and engagement. Photos of the 70+ adults had a high prevalence of living environment features. *Limitations:* Data from this proof-of-concept study should be confirmed in a larger sample, clarifying also the role of further sociodemographic variations (e.g., gender, income). *Conclusion:* Using photographs to capture images of aging provides insights into the occurrence, the accentuations, and the relative importance of multidimensional and multidirectional views on aging in everyday life across different age groups. The variation in both quantity and quality across different age groups indicates domain-specific foci and hints at age-specific discourses on age and aging. Digital devices, such as smartphones, allow for a highly flexible, nonsuggestive, and virtually nonverbal assessment of views on aging. Findings inform endeavours to promote healthy aging as well as strategies to increase intergenerational dialogue.

**Keywords:** views on aging, images of aging, assessment, photographs, life span

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Views on aging are defined as people's conceptions about aging and older people that manifest both on the individual as well as on the societal level and that reflect in affect, cognition, and behavior (Klusmann & Kornadt, 2020). Negative views on aging might be based on or reproduced through negative age stereotypes that shape social contexts which in turn reinforce age-discriminatory behavior and age discrimination but also hinder self-directed development on the individual level (cf. Kornadt, Kessler, et al., 2020; Rothermund et al., 2021). Concrete examples are lower levels of prospective preparatory behavior for age-related changes, such as actively providing for one's financial situation in old age or working to maintain personal relations in old age (Kornadt et al., 2015). In addition, beliefs about personal agency and self-efficacy (Klusmann et al., 2019), health-enhancing activities, as well as functionality and health are consistently lower in those with negative views (Westerhof et al., 2023). What is more, negative views on

aging seem to be more prominent than positive views – scientific evidence such as linguistic analyses on large printed text databases across 200 years impressively show an increased negativity of age stereotypes (Mason et al., 2015; Ng et al., 2015). Interestingly, the detrimental developmental trajectories imposed by negative views on aging already start at younger ages (Bowen et al., 2020; Klusmann et al., 2019; Kornadt et al., 2015).

The study of views on aging, addressing age stereotypes and self-perceptions of aging, has mostly been based on quantitative assessment instruments (for a review see Klusmann et al., 2020). There is some debate about the validity and applicability of instruments to assess views on aging in different age groups across the life span and whether measures sufficiently consider the multidimensionality of views on aging. Both the factorial validity and measurement invariance across different age groups for some commonly used views on aging questionnaires are controversial (Jung

& Siedlecki, 2018; Jung et al., 2021). It was found that ratings of views on aging became increasingly negative from younger to older cohorts (Beyer et al., 2017; Klusmann et al., 2019; Kornadt & Rothermund, 2011; Miche, Elsässer, et al., 2014). There are also differences by target: People ascribe negative stereotypes to their peers, but self-evaluations are shown to be highly positive and largely consistent across age groups (Bowen et al., 2020). When studying future selves in different life domains and asking people about what will be when they “are older”, there were neither clear negative nor positive trends across age groups (Kornadt, Hess, et al., 2020). A further methodological problem is, that “age” and “aging” or “getting older” can imply different semantic categories for a 70-year-old in contrast to a 30-year-old or a child, for example (Klusmann et al., 2020). It is generally assumed that views on aging develop from childhood and are internalized in personal values and norms throughout life (Levy, 2009; Rothermund & Brandtstädter, 2003). In addition, the life phase of being young-old is qualitatively different from being old-old, in particular with regard to one’s personal situation and life contexts (e.g., Baltes & Smith, 2003).

Views on aging are not static, however, they are both drivers and products of the lifelong developmental dynamics of a person interacting with contexts and experiences (Klusmann & Kornadt, 2020; Kornadt, Kessler, et al., 2020). Hence, views on aging not only change in quantitative terms, that is, the degree to which people agree to negative or positive statements, but also imply qualitative changes. In contrast to questionnaires, qualitative methods such as interviews or diaries leave more room for introducing individual age-differentiated topics (cf. Miche, Wahl, et al., 2014). However, these are often limited in terms of their use in large representative studies, given their complexity and resource intensity. In sum, we know little about the quantity, prevalence, and relative importance of views on aging in different age groups across the life span, both as regards the differential meaning of distinct domains as well as in terms of the age-specificity of issues and contents (Kornadt, Kessler, et al., 2020).

The valence dichotomy of “positive” and “negative” views on aging is common and has guided past studies (including ours). Aging, however, is multidirectional, that is, it includes both gains and losses in multiple domains, and this should be reflected in our conceptions and assessments of views on aging (Sabatini et al., 2020). From a gerontological perspective, views on aging are adaptive if they make people better exploit their developmental potentials. Although negative in valence, beliefs that old age comes with limited physical, cognitive, and social capacities can make people act preventively in terms of both health as well as finance (Kornadt, Hess, et al., 2020). Also, they could engage in active compensation, search for ways to achieve cognitive

stimulation or be encouraged to make new social contacts or strengthen family ties. Conversely, the basically positive idea that old people are perfectly capable of volunteering and working until very late could be highly motivating for some but could lead to fear of failure and social withdrawal in others (Rothermund et al., 2021). Whether views on aging are adaptive and hence instrumental for making use of resources and potential thus seems more decisive than pure valence.

Here, we describe the development of a photo-based views on aging measure that has been designed to be open and nonsuggestive regarding contents (e.g., domains, dimensions) and valence (e.g., quantification, valuation, direction). The measure aims to capture the individual point of view while at the same time allowing for quantifications and generalizations, such as comparisons between age groups. The measure is based on the photovoice method, a low-threshold approach that was originally conceived for needs assessment in participatory action research (Wang et al., 1996). Photovoice is an established participatory research method with high ecological validity that has been successfully used with different age groups and populations up to very old age (Mysyuk & Huisman, 2020). It has proliferated over the past three decades and is usually implemented for health promotion research and practice (Seitz & Orsini, 2022). Photovoice was intended to circumvent barriers such as literacy and language issues that commonly prevent hard-to-reach target groups from participating in projects and scientific studies. In the psychological views on aging research, photographs have already been used as stimulus materials to trigger age-stereotypic ratings using natural pictures of older adults (Isaacs & Bearison, 1986; Kotter-Grühn & Hess, 2012) or applying morphing procedures (Sorokowski et al., 2017), but have not yet been applied to capture individual views on aging.

## Objectives

The main objective of this proof-of-concept study is to investigate whether user-generated photographs are a viable method to assess the nature and characteristics of views on aging across different age groups over the life span. Further, the study aims to provide answers to the questions of whether and how the prevalence and quality of views on aging vary across younger and older age groups. Specifically, this is clarified by studying the content of images and their distribution across different groups to learn about possible shifts in focus and prioritization. Here, young-old adults should be differentiated from old-old adults. Hence, age-differential diversity, dimensionality (i.e., domains), and directionality (i.e., valence), as well as adaptivity of the views on aging should be examined.

## Method

### Participants and Procedures

Potential participants of three different target age groups, that is, 20–30 years (younger group), 50–69 years of age (young-old group), or 70+ years of age (old-old group) were approached on the streets in different parts of a city in North-Western Germany. Participants were informed about the study's aim of collecting images of aging ("Altersbilder") via photographs and an appointment was made for a first face-to-face meeting. During this meeting, the participants gave written informed consent and received instructions to photograph "what aging means to them" over the next 5–8 days using either their own smartphone or camera or a single-use camera provided. Participants were instructed to not take photographs where persons are recognizable to avoid violating the right to the protection of one's image. Pictures showing parts of the body or taken from behind were permitted, as they do not allow for identification. Group views at public events or the photographing of personal pictures published in media such as newspapers, books, or advertising materials were also admissible (pictures collected were only used for the purpose of this study and not made publicly available). Apart from this, participants were completely free in their selection of motifs. Participants were further asked to compose a title or headline describing the intent or idea behind each photo.

After the 1-week data collection, participants submitted a USB or memory card containing the pictures or they returned the single-use camera which then was processed. In either case, photos were electronically stored in pseudonymized form to ensure privacy protection. The same applied to accompanying comments that were submitted with the photos either on paper or electronically. In a second face-to-face meeting approximately one week after submission of their photos, participants received copies of all of their photographs and were asked to review the combination of pictures and comments to clarify any ambiguous or incomplete entries.

Written informed consent was obtained prior to data collection and procedures were run in compliance with relevant laws and institutional guidelines for conducting scientific studies involving human participants, particularly the Ethical Principles of Psychologists and Code of Conduct of the German Psychological Society and the American Psychological Association. Given that photographs were captured completely anonymously, the local ethical review board (University of Bremen) declared the study being exempt. The study also conforms to the Declaration of Helsinki.

### Data Analyses

For photo analysis, a combination of grounded theory (Glaser, 2002) and constant comparative analysis with iterative comparison until theoretical saturation was used. In total,  $n = 376$  photos ( $N = 150$  of the younger,  $N = 130$  of the young-old, 50–69-year-old group,  $N = 96$  of the old-old, 70+ group) were submitted and subjected to qualitative and quantitative data analyses. First of all, roughly half of the photos ( $n = 175$ , i.e., 46.5% of all photos) were subjected to a bottom-up categorization by a panel of two experts and two laypersons following the analytical approach of Grounded Theory. Subsequent constant comparative analyses resulted in seven main and 22 subcategories. Categories with corresponding anchor examples were defined (see Table 1), and all photos were subsequently categorized according to the coding scheme. Multiple coding was possible, that is, photos could be categorized in more than one main category along with a corresponding subcategory. However, the primary main category and the appropriate primary subcategory were coded for each photo. In addition to pure valence, it is important to consider whether views on aging are functional and adaptive, that is, instrumental for making use of resources and potential. Hence, valence (with the nominal categories of *positive*, *negative*, *ambivalent*, or *neutral*) as well as degree of adaptivity (with the nominal categories of *adaptive*, *maladaptive*, *not accessible*) were rated for each picture.

Intercoder reliability was ensured by having rated a 20% random subsample ( $N = 76$ ) based on the coding scheme of the photos by two independent reviewers. Krippendorff's Alpha with 95% confidence interval was used as criterion, resulting in highly satisfactory agreement scores of KALPHA [95% CI] = .92 [.83; .98] on the level of the main categories, KALPHA [95% CI] = .80 [.69; .89] on the level of the subcategories, KALPHA [95% CI] = .88 [.78; .96] for valence ratings, and KALPHA [95% CI] = .80 [.77; .97] for adaptivity ratings. Possible age-group differences in terms of quantity, dimensionality, or directionality of views on aging were examined by chi-square difference tests.

## Results

At study entry, the total sample for this study comprised  $n = 39$  participants (27 women, 12 men). Two men in the older age group did not submit any photos (drop-out), resulting in a final sample size of  $N = 37$  participants (27 women, 10 men). There were 16 participants in the group of 20–30-year-olds, 13 participants in the group aged 50–69 years, and 8 participants in the group aged 70+ years.

**Table 1.** Coding scheme with category definitions and anchor examples

No.	Main categories	No.	Subcategories	Category definition	Anchor examples
1	Physical changes	1_1	Aging as natural process	Pictures of aging processes in nature or of the time-course of life	Old tree; overgrowing plant; worn-out shoes
		1_2	Appearance changes	Changes in physical appearance; body images	Grey hair; (laughing) wrinkles; (withering) flowers
		1_3	Functional changes	Quantitative and qualitative changes in sensory and motor functions without referring to the issue of illness	Shoes with hook-and-loop (touch) fastener (instead of shoelaces); glasses
		1_4	Illness	States of illness; illness processes; treatments or health care institutions	Pills; bed-pan; wheelchair
		1_5	Death & dying	Pictures directly or indirectly addressing one's own or other people's death and dying	Empty side of double bed; photo of deceased persons; cemetery; empty house; dead plants
2	Living environment	2_1	Mobility	Reachability of and transportation means to facilities for life maintenance or family and friends	Vehicles or signs of public transport; rollators/4-wheeled walkers
		2_2	Infrastructure	Availability of facilities to manage everyday life and to fulfill basic needs	Pharmacy; medical practice; shops; senior homes
		2_3	Aids in everyday life	Tools to cope with functional limitations	Glasses; magnifying glasses; trolleys
3	Competencies	3_1	Education & mental stimulation	Activities targeting cognitive stimulation, learning, and ongoing personal development	Books; course manuals; writing desk
		3_2	Craft & technology	Practicing artisan hobbies; dealing with technical equipment and (new) devices	Needle and thread; (photo) cameras; tablet
4	Resilience	4_1	Personal control	Expressions of self-efficacy and control; coping strategies, self esteem	Steering wheel; lifeline
		4_2	(Positive) old age personality	Personality traits including openness, wisdom, tolerance, generativity, spirituality	Encyclopedia; view out of window; cartoons
		4_3	Experience of time	Issues of restricted life time; freedom to use time/ have more time	Clocks; ancient photos; sunset
5	Social embeddedness	5_1	Loneliness	Emptiness in everyday life; lack of social contact	Empty bench; mailbox
		5_2	Festivities & traditions	Social gatherings as part of large social events and conventions	Wedding symbols; historic buildings
		5_3	Family & friends	Contact with children and grandchildren, friends and social groups such as associations or clubs	Baby bump; phone; collection of shoes
		5_4	Love	Growing old together with spouse; taking (social) care of each other	Hand-in-hand; twisted branches; rings
6	Lifestyle & engagement	6_1	Prosperity & old-age poverty	(Desire for) high living standard/wealth in old age; (fear of) insufficient financial resources in old age	Coins; bank account statements; villa; Porsche (car)
		6_2	Experience and enjoyment of nature	Move and linger in nature, rest, relaxation	Sea; mountains; forest; rivers; plants
		6_3	Being active & healthy behavior	Stimulating activities such as travel, sports, exercise, health behavior (including eating behavior)	Tennis rackets; bicycle; picture postcards
		6_4	Cultural experience and enjoyment	Cultural activities and events, consumed or practiced oneself	Paintings; concert tickets; posters; music instruments
		6_5	Pleasure & faineance	Enjoy (well-deserved) retirement; rest after work/ life's work is done	Deck-chair; log-fire; café(s); ice cream
7	Life review	No subcategories	Memories	Drawers; record player; buildings	

## Contents and Quantity of Images of Aging

The most frequently applied categories were *Physical Changes* ( $n = 143$ ; 38%) and *Lifestyle & Engagement* ( $n = 141$ ; 37.5%), which also were the most prevailing main categories (see Table 2). Next were issues of *Social Embeddedness* ( $n = 97$ ; 25.8%), *Resilience* ( $n = 104$ ; 27.7%), *Living Environment* ( $n = 90$ ; 23.9%), and *Competencies* ( $n = 46$ ; 12.2%). *Life Review* was an issue in the 70+-year-old group: Twenty-three of the 26 photos (6.9%) assorted to this category came from the 70+ group. The ranking was slightly different as regards primary codings. While almost one-third of the photos primarily addressed *Lifestyle & Engagement* ( $n = 111$ ; 29.5%), photos primarily on *Physical Changes* made up only about one-fifth ( $n = 84$ ; 22.3%). *Social Embeddedness* ( $n = 71$ ; 18.9%) and *Living Environment* ( $n = 53$ ; 14.1%) as primary issues both had about the same frequency; *Resilience* ( $n = 32$ ; 8.5%) along with *Competencies* ( $n = 25$ ; 6.6%) did not reach 10% for primary codings, which qualifies them as typical secondary codings adjacent to other subjects. *Life Review* was not a primary category.

*Personal Control* ( $n = 72$ ; 19.2%) was the most common among the subcategories, which emphasizes the importance of underlying psychological processes. *Functional Changes* ( $n = 57$ ; 15.2%), *Infrastructure* ( $n = 58$ ; 15.4%), *Family & Friends* ( $n = 50$ ; 13.3%), and *Active and Healthy Behavior* ( $n = 52$ ; 13.8%) also exceeded 10% when considering results of multiple codings. *Active and Healthy Behavior* was of the highest relevance among the subcategories when only primary codings were considered ( $n = 39$ ; 10.4%).

## Age Group Differences Among Images of Aging

Table 2 shows the prevalence of images of aging in the photographs differentiated across the three age groups. In absolute terms, most photos ( $N = 150$ ) were taken from the 20–30-year-old group, followed by the 50–69-year-old group ( $N = 130$ ). However, the photos of the 70+ group displayed an increased density or agglomeration of information. That is, their photos were more likely to fall into multiple categories: The average number of codings per picture (calculated from the frequencies of subcategory codings) increased from 1.59 and 1.57 among the 20–30-year- and the 50–69-year-old groups, respectively, to 2.14 in the 70+ group (i.e., the 96 photos were coded 205 times in total).

To allow for comparisons regarding the prevalence of images of aging not only across categories within each age group but also across age groups, the relative frequencies of categories were weighted by the average codings per picture for each age group (i.e., adjusted scores). Table 3 shows the ranking of main categories and subcategories, respectively. Profiles of the three age groups differed

substantially: *Physical Changes* was the most addressed issue in the photos by the young group, whereas *Lifestyle & Engagement* was most prevalent in the young-old (50–69 yrs) group. In the old-old (70+ yrs) group, in contrast, characteristics of the *Living Environment* were the top category. The differences existed in relative importance across the age groups (rank order), but also in absolute terms (absolute frequencies). The particular importance of the *Living Environment* for the old-old group was substantiated by a significant Chi-square difference,  $\chi^2(2) = 32.49$ ,  $p < .001$ . Likewise, *Life Review* was only addressed in the images of the 70+ age group,  $\chi^2(2) = 58.21$ ,  $p < .001$ . Issues of *Resilience* had a higher prevalence in the pictures taken by the old-old, but also in those taken by the young group (20–30 yrs), as compared to those taken by the young-old (50–69 yrs),  $\chi^2(2) = 6.05$ ,  $p = .05$ .

Inspecting the subcategory rankings confirmed distinct profiles among the three age groups: Photos taken by the younger adults mostly focused on the issue of *Personal Control*, which remained an issue in the older age groups' photos as well, particularly in the old-old group,  $\chi^2(2) = 6.11$ ,  $p = .05$ . This was followed by the diametrically opposed issues of *Pleasure & Recreation* on the one hand – which was a relevant issue in the young groups' photos only – and *Functional Changes* and *Illness* on the other hand. *Active Behavior* was the predominant issue in the photos of the 50–69-year-old group, dropping to rank five among the photos of the 70+ group. Among the old-old, contextual issues of *Infrastructure* were most important, and also prevailed in absolute terms compared to the other two age groups,  $\chi^2(2) = 30.14$ ,  $p < .001$ . The second most common issue *Family & Friends* among the photos of the young-old were replaced by *Personal Control* in the photos of the old-old (see Table 3).

Significant differences in absolute frequencies substantiated that *Aging as Natural Process* was almost no issue in the pictures of the 50–69-year-olds,  $\chi^2(2) = 7.74$ ,  $p = .02$ , nor was *Loneliness*,  $\chi^2(2) = 6.43$ ,  $p = .04$ . *Family & Friends*, however, was addressed more frequently than in the other two groups,  $\chi^2(2) = 7.22$ ,  $p = .03$ . Furthermore, while *Love* was addressed in photos of the young group and still in those of the 50–69-year-old group, it was no longer an issue in the photos of the old-old group,  $\chi^2(2) = 9.29$ ,  $p = .01$ .

## Valence and Degree of Adaptivity Among Images of Aging

Overall, positive images of aging (61.4%) outweighed negative images of aging, and the degree of adaptivity (74.5%) was consistently high (see Table 4). This was at least in part due to the fact that the 70+ participants, in particular, addressed physical changes in a very resource- and coping-oriented way (i.e., as *Functional Changes*), instead of framing these matters as signs of *Illness*. The distinction

**Table 2.** Descriptive statistics for images of aging across categories and across age groups

Main categories		N (%) incl. multiple codings		N (%) as primary category		20–30 yrs % <sub>adj</sub> (%)		50–69 yrs % <sub>adj</sub> (%)		70+ yrs % <sub>adj</sub> (%)	
1	Physical changes	143	(38.0)	84	(22.3)	25.3	(40.1)	21.1	(33.1)	19.5	(41.6)
2	Living environment	90	(23.9)	53	(14.1)	7.6	(12.0)	14.7	(23.1)	20.5	(43.8)
3	Competencies	46	(12.2)	25	(6.6)	9.3	(14.7)	5.9	(9.3)	5.9	(12.5)
4	Resilience	104	(27.7)	32	(8.5)	18.0	(28.6)	13.2	(20.7)	16.6	(35.5)
5	Social embeddedness	97	(25.8)	71	(18.9)	15.6	(24.7)	17.2	(27.0)	12.2	(26.0)
6	Lifestyle & engagement	141	(37.5)	111	(29.5)	23.6	(37.4)	27.5	(43.1)	14.2	(30.3)
7	Life review	26	(6.9)	0	(0)	0.8	(1.3)	0.5	(0.8)	11.2	(24.0)
Subcategories											
1_1	Aging as natural process	18	(4.8)	14	(3.7)	3.8	(6.0)	0.5	(0.8)	3.9	(8.3)
1_2	Appearance changes	20	(5.3)	17	(4.5)	5.0	(8.0)	2.4	(3.8)	1.5	(3.1)
1_3	Functional changes	57	(15.2)	19	(5.1)	6.7	(10.7)	10.8	(16.9)	9.3	(19.8)
1_4	Illness	32	(8.5)	23	(6.1)	6.7	(10.7)	5.4	(8.5)	2.4	(5.2)
1_5	Death & dying	16	(4.3)	11	(2.9)	3.0	(4.7)	2.0	(3.1)	2.4	(5.2)
2_1	Mobility	12	(3.2)	8	(2.1)	2.5	(4.0)	1.0	(1.5)	2.0	(4.2)
2_2	Infrastructure	58	(15.4)	31	(8.2)	3.3	(5.3)	9.8	(15.4)	14.7	(31.3)
2_3	Aids in everyday life	20	(5.3)	14	(3.7)	1.7	(2.7)	4.0	(6.2)	3.9	(8.3)
3_1	Education & mental stimulation	30	(8.0)	12	(3.2)	5.9	(9.3)	4.9	(7.7)	3.0	(6.3)
3_2	Craft & technology	16	(4.2)	14	(3.7)	3.4	(5.4)	1.0	(1.6)	2.9	(6.2)
4_1	Personal control	72	(19.2)	12	(3.2)	12.6	(20.0)	8.3	(13.1)	12.2	(26.1)
4_2	(Positive) old age personality	12	(3.2)	6	(1.6)	2.1	(3.3)	2.4	(3.8)	1.0	(2.1)
4_3	Experience of time	20	(5.3)	14	(3.7)	3.3	(5.3)	2.4	(3.8)	3.4	(7.3)
5_1	Loneliness	15	(4.0)	10	(2.7)	3.0	(4.7)	0.5	(0.8)	3.4	(7.3)
5_2	Festivities & traditions	10	(2.7)	10	(2.7)	2.1	(3.3)	1.5	(2.3)	1.0	(2.1)
5_3	Family & friends	50	(13.3)	34	(9.1)	4.7	(7.4)	11.3	(17.7)	7.8	(16.6)
5_4	Love	22	(5.9)	17	(4.5)	5.9	(9.3)	4.0	(6.2)	0.0	(0.0)
6_1	Prosperity & old-age poverty	20	(5.3)	18	(4.8)	4.2	(6.7)	2.9	(4.6)	2.0	(4.2)
6_2	Experience and enjoyment of nature	22	(5.9)	18	(4.8)	3.8	(6.0)	4.4	(6.9)	2.0	(4.2)
6_3	Being active & healthy behavior	52	(13.8)	39	(10.4)	6.7	(10.7)	11.8	(18.5)	5.9	(12.5)
6_4	Cultural experience and enjoyment	18	(4.8)	12	(3.2)	1.7	(2.7)	4.9	(7.7)	2.0	(4.2)
6_5	Pleasure & recreation	29	(7.7)	23	(6.1)	7.1	(11.3)	3.4	(5.4)	2.4	(5.2)

Note. yrs = years; %<sub>adj</sub> = adjusted percent scores (weighted by the codings per picture for each age group, i.e. 1.59, 1.57, and 2.14 for the 20-30-yr-, 50-69-yr-, and 70+ yr-old-group, respectively).

**Table 3.** Rank order of images of aging categories across age groups

Rank of main categories	20–30 yrs	(% <sub>adj</sub> )	50–69 yrs	(% <sub>adj</sub> )	70+ yrs	(% <sub>adj</sub> )
1	Physical changes	25.3	Lifestyle & engagement	27.5	Living environment	20.5
2	Lifestyle & engagement	23.6	Physical changes	21.1	Physical changes	19.5
3	Resilience	18.0	Social embeddedness	17.2	Resilience	16.6
4	Social embeddedness	15.6	Living environment	14.7	Lifestyle & engagement	14.2
5	Competencies	9.3	Resilience	13.2	Social embeddedness	12.2
6	Living environment	7.6	Competencies	5.9	Life review	11.2
7	Life review	0.8	Life review	0.5	Competencies	5.9
Rank of subcategories	20–30 yrs	(% <sub>adj</sub> )	50–69 yrs	(% <sub>adj</sub> )	70+ yrs	(% <sub>adj</sub> )
1	Personal control	12.6	Being active & healthy behavior	11.8	Infrastructure	14.7
2	Pleasure & recreation	7.1	Family & friends	11.3	Personal control	12.2
3	Functional changes	6.7	Functional changes	10.8	Functional changes	9.3
4	Illness	6.7	Infrastructure	9.8	Family & friends	7.8
5	Being active & healthy behavior	6.7	Personal control	8.3	Being active & healthy behavior	5.9
6	Education & mental stimulation	5.9	Illness	5.4	Aids in everyday life	3.9
7	Love	5.9	Education & mental stimulation	4.9	Aging as natural process	3.9
8	Appearance changes	5.0	Cultural experience and enjoyment	4.9	Experience of time	3.4
9	Family & friends	4.7	Experience and enjoyment of nature	4.4	Loneliness	3.4
10	Prosperity & old-age poverty	4.2	Love	4.0	Education & mental stimulation	3.0
11	Aging as natural process	3.8	Aids in everyday life	4.0	Craft & technology	2.9
12	Experience and enjoyment of nature	3.8	Pleasure & recreation	3.4	Illness	2.4
13	Craft & technology	3.4	Prosperity & old-age poverty	2.9	Pleasure & recreation	2.4
14	Infrastructure	3.3	Appearance changes	2.4	Death & dying	2.4
15	Experience of time	3.3	Experience of time	2.4	Cultural experience and enjoyment	2.0
16	Death & dying	3.0	(Positive) old age personality	2.4	Experience and enjoyment of nature	2.0
17	Loneliness	3.0	Death & dying	2.0	Prosperity & old-age poverty	2.0
18	Mobility	2.5	Festivities & traditions	1.5	Mobility	2.0
19	(Positive) old age personality	2.1	Craft & technology	1.0	Appearance changes	1.5
20	Festivities & traditions	2.1	Mobility	1.0	(Positive) old age personality	1.0
21	Aids in everyday life	1.7	Aging as natural process	0.5	Festivities & traditions	1.0
22	Cultural experience and enjoyment	1.7	Loneliness	0.5	Love	0.0

Note. yrs = years; %<sub>adj</sub> = adjusted percent scores (weighted by the codings per picture for each age group, i.e. 1.59, 1.57, and 2.14 for the 20–30-yr-, 50–69-yr-, and 70+ yr-old-group, respectively).

**Table 4.** Valence and adaptivity of images of aging across main categories and across age groups

	Codings N	Valence (%)				Adaptivity (%)		
		Positive	Negative	Neutral	Ambivalent	Adaptive	Maladaptive	Not assessable
Main categories								
Physical changes	143	28.7	46.2	9.1	16.1	51.7	37.8	10.5
Living environment	90	54.4	27.8	0	17.8	75.6	23.3	1.1
Competencies	46	82.6	6.5	0	10.9	95.7	4.3	0
Resilience	104	42.3	34.6	7.7	15.4	62.5	26.9	10.6
Social embeddedness	97	79.4	15.5	0	5.2	86.6	13.4	0
Lifestyle & engagement	141	89.4	7.8	0.7	2.1	93.6	6.4	0
Life review	26	30.8	15.4	23.1	30.8	53.8	15.4	30.8
Age groups								
20–30 yrs	150	60.7	22.0	8.7	8.7	74.0	17.3	8.7
50–69 yrs	130	66.9	26.2	0.8	6.2	77.7	21.5	0.8
70+ yrs	96	55.2	24.0	6.3	14.6	70.8	20.8	8.3
Total	376	61.4	23.9	5.3	9.3	74.5	19.7	5.9

Note. yrs = years.

of valence and adaptivity allowed further insight into the global characteristics of images of aging, even though the ratings of images of aging as either positive or negative versus adaptive or maladaptive were highly correlated,  $r = .86$ .

There were domains with prevailing negative and mostly destructive views on aging in the images, as opposed to domains where positive and predominantly adaptive views prevailed. Specifically, *Lifestyle & Engagement* (89.4% resp. 93.6%), closely followed by *Competencies* (82.6% resp. 95.7%) and *Social Embeddedness* (79.4% resp. 86.6%) were domains in which positive and highly adaptive views on aging, respectively, were expressed. In the domain *Living Environment*, positive aspects still held the majority (54.4%) and here, in particular, issues were addressed in a highly adaptive way (75.6% in total). Nevertheless – in terms of valence – a meaningful amount had been categorized as ambivalent (17.8%), entailing also negative aspects along with positive ones. By contrast, the domain of *Resilience* entailed substantial amounts of aspects categorized as negative (34.6%) and ambivalent (15.4%), although these were still outweighed by positive aspects (42.3%). What is indicated here by the clearly higher proportions of adaptive images (62.5%) becomes even more evident in the domain of *Physical Changes*. Here, as much as 46.2% of the pictures were categorized as negative compared to only 28.7% positive and 16.1% neutral pictures. This is also the domain with the highest number of photos coded as maladaptive (37.8%), but most pictures were still rated as entailing adaptive views on aging (51.7%). *Life Review* stands out as having the most evenly distributed images as regards valence (positive and ambivalent pictures were 30.8% each). Still, the degree of adaptivity of the pictures in *Life Review* is relatively high (53.8%).

Comparing valence and degree of adaptivity of the photos (see Table 4) across age groups revealed that views on aging were more ambivalent (14.6%) and somewhat less positive (55.2%) in the 70+ group than in the two other groups,  $\chi^2(6) = 14.5$ ,  $p = .02$ . Similarly, pictures were also coded as adaptive slightly less often (70.8%),  $\chi^2(4) = 9.9$ ,  $p = .04$ , but maladaptivity ratings were not higher in the 70+ group (20.8%) compared to the 50–69-year-old group (21.5%). This also reflects the profiles of the different age groups across the distinct domains. The photos of the oldest group were the least negative in the domain of *Physical Changes* (40%). At the same time, their pictures were rated about a tenth less positive in the domains of *Social Embeddedness* (68.0%) and *Lifestyle & Engagement* (79.3%) than in the total sample. For *Resilience*, pictures submitted by the old-old were rated the least adaptive, albeit still exceeding 50% (52.9%). In sum, all pictures remain mostly positive and adaptive up to the highest age group, although there are some slight decreases on the overall high level.

## Discussion

### Summary of Core Findings

This proof-of-concept study examined whether user-generated photographs can be used to assess views on aging. Our results suggest that the resulting images of aging are multidimensional and multidirectional and, furthermore, age-specific. All domains (except for life review, which was most prevalent in the photos of the 70+ group) were addressed by all age groups, but the prevalence of the topics varied significantly across the three studied age groups. Old age was only depicted as a time of pleasure



and recreation in younger adults' pictures. In the photos of the young-old (50–69 yrs) activity and health behavior were most important, whilst photos of the old-old (70+ yrs) focused on matters of living environment. Of note is, that this old-aged group usually addressed physical changes from a productive resource perspective.

The images of aging captured by the photographs were predominantly positive in four out of the seven domains. Positivity was highest in *Lifestyle & Engagement* (89.4%) and lowest in *Physical Changes* (28.7%), which had the highest ratings in negativity (46.2%). Coherent findings emerged for adaptivity: Almost three-quarters of the photos were rated as addressing age and aging in a functional, adaptive, that is, active, vigorous, vital, or potential-oriented way (e.g., in the sense of “I cannot run, but instead I take long walks through nature” or “I listen to audiobooks instead of reading them myself”). Although there are marginal decreases on the overall high level, pictures remain predominantly positive and adaptive up to the highest age group of 70+ years. Thus, “negative” issues in images of aging might not be straightforwardly equated with the idea that these are fatalistic or dysfunctional.

## Complexity: Views on Aging are Multidimensional

The resulting categories suggest that unidimensional conceptualizations of attitudes towards aging (e.g., Lawton, 1975; Löckenhoff et al., 2009) or simple positive-negative dichotomies (e.g., Kogan, 1961) might be an oversimplification of subjective views on aging. Instead, they reflect prominent domain-specific, multidimensional approaches (see Klusmann et al., 2020; Spuling et al., 2020). The main categories align with several domains of Tuckman and Lorge's instrument (1953), that is, “physical” issues align with *Physical Changes*, “mental deterioration” with *Competencies*, “insecurity”, “personality traits”, and “issues of time” with the subcategories of *Resilience*, “family” with *Social Embeddedness*, and “activities and interests” with *Lifestyle & Engagement*. The Expectations Regarding Aging questionnaire (ERA-38; Sarkisian et al., 2002) concentrates on issues collated in the *Physical Changes* category in our study, such as general health, mental health, cognitive function, fatigue, and functional independence. The Aging Cognitions scales (AgeCog; Steverink et al., 2001) address “physical losses” and “social losses” and resemble our domains of *Physical Changes* and *Social Embeddedness* – that different to the AgeCog, however, had a clear positive focus in our study. The third subscale “ongoing development” intersects with *Competencies*. Our findings on issues of *Resilience*, particularly given its subcategories of *Personal control* and *Personality*, indicate to also consider the originally

included domain of “self-knowledge and control” (Klusmann et al., 2019). The domain of *Competencies* plays an important role in the widespread Stereotype Content Questionnaire (Fiske et al., 2002).

Our findings are also in line with findings in the context of the Awareness of Age-Related Changes concept (AARC; Diehl & Wahl, 2010). Five of our seven domains resemble domains of AARC which were used to assort experiences of aging from a diary study with 70+ participants (Miche, Wahl, et al., 2014). Notably, percentages of reports were similar to those of the corresponding 70+ year-old age group in our study and appeared in the same rank order starting with “health and physical functioning” (*Physical Changes*) followed by “social cognitive and socioemotional functioning” (*Resilience*), “lifestyle and engagement” (*Lifestyle & Engagement*), “interpersonal relation” (*Social Embeddedness*), and “cognitive functioning” (*Competencies*).

In sum, our findings also hint at relevant topics not included in existing quantitative measures, such as issues of *Lifestyle & Engagement* in AgeCog or *Social Embeddedness* in ERA-38. More recent domain-specific approaches, in contrast, have examined these domains even more differentiated by separating “leisure activities and engagement” from “work and employment” and “family and partnership” from “friends and acquaintances” (Kornadt & Rothermund, 2011). Characteristics of the environmental context, however, are commonly not addressed in views on aging questionnaires (Klusmann et al., 2020). Our findings on the absolute and relative importance of the category *Living environment* (20.5%) support recent attempts to integrate the role of context into conceptualizations of aging (cf. Wahl & Gerstorf, 2018). Issues of *Life Review* (11.2%) were always tied to issues of relevance in one of the other domains and thus seem to act as a reference frame, which seems particularly important in the 70+ group.

## Valence: Images of Aging are Multidirectional and Highly Adaptive

The images of aging collected by the photographs did not primarily address losses and deficits, but photos clearly addressed potentials and gains that come with age and aging (cf. Montepare et al., 2014). Positive aspects dominated four of the seven domains with nearly 90% in *Lifestyle & Engagement* closely followed by *Competencies* (82.6%) and *Social Embeddedness* (79.4%). For *Living Environment* (54.4%) the amount of positively valenced pictures was above 50%, whilst for *Resilience* it was lower (42.3%), and the proportion of photos with negative valence was more than one-third (34.6%). In *Life Review* 30% of the pictures were ambivalent. The only domain with a higher amount of negatively as opposed to positively valenced

pictures was the domain of *Physical Changes* (46.2% vs. 28.7%). For the degree to which photos were rated as adaptive, that is, instrumental for making use of resources and potentials, the findings were even clearer. Overall, 74.5% of the pictures were rated as addressing age and aging in an adaptive way.

Furthermore, there was no increase in negative views on aging across age groups. The pictures taken in the highest age group (70+ yrs) were somewhat less positive than those of the young and young-old groups, but the majority were positive (55.2%) and adaptive to a large extent (74.5%). Also, the distinction between valence and adaptivity showed that addressing eventual negative aspects does not mean that views on aging are automatically dysfunctional. Furthermore, domain-specific variations in both valence and adaptivity appeared. Hence our findings underline that the common dichotomization of views on aging as (generally) positive versus negative runs the risk of oversimplification (cf. Kornadt, Kessler, et al., 2020).

Our findings are in line with studies suggesting less pessimistic beliefs about aging than one might expect, both in older as well as in younger age groups (Kruse & Schmitt, 2006; Lineweaver et al., 2018; Villar & Fabà, 2012). In a study by Hummert et al. (1994), people added positive characteristics of older adults (75%) to the pool of traits by Schmidt and Boland (1986), which overemphasized the negative side of age stereotypes. Likewise, more recent studies found positive social representations of older adults using closed and open-ended questions (Macia et al., 2015), highly positive statements about 50+ workers (Finkelstein et al., 2013), strong positivity bias in young older adults' spontaneous descriptions of future aged selves (Remedios et al., 2010), and highly active and vigorous role models typically even older than the stereotype holder (Horton et al., 2008). Too positive and unrealistic oversubscriptions were shown to be aversive, however, (Cope et al., 2018; Fung et al., 2015). Jönson (2012) argued that images of active and self-conscious "new old" (p. 201) cohorts reinforce negative stereotypes about passive and frail old people and hinder identification with belonging to the group of old people.

## Age-Related Heterogeneity: Views on Aging Differ Across Age Groups

Our findings indicate that representations of aging might become more complex with increasing age. Younger adults took more photos on an absolute level, but information density increased in the pictures taken by the older adults as indicated by more codings per photo on a mean level. This is in line with the study by Hummert et al. (1994), in which middle-aged and older adults reported more diverse age

stereotypes. In our study all domains were represented in the photos of all three age groups, but the relative frequency with which these were addressed varied substantially.

One key contribution of the photographic method introduced in this study is that it reveals such differences in the prevalence and relative importance of issues addressed among images of aging. Such differences cannot be detected using questionnaires in which participants indicate agreement on closed response scales (cf. Klusmann et al., 2020). The main topic of images of aging of the young participants on the level of main categories was *Physical Changes*, which was still the second most important for the other two age groups. The most prevailing issue among the images of aging of the young-old group (50–69 yrs) was *Lifestyle & Engagement*, while the old-old, 70+ group addressed *Living Environment* the most. Concerning more specific subcategories, young adults dealt mostly with issues of (prevailing but precarious) *Personal Control*, which is somewhat less important in the young-old group (fifth most) but rises again to be a prevalent domain (second most) in the old-old group. The significance of this topic is substantiated by a large body of research (Infurna & Okun, 2015; Neupert & Allaire, 2012; Robinson & Lachman, 2017). *Functional Changes* were consistently on rank three across all age groups. *Illnesses* – mainly as fear objects – were only substantially addressed in the pictures of the young age group. It is noteworthy that such deficit-oriented images of physical changes were not prevalent in the young-old or the old-old group. This is in line with results on detailed domain-specific valence ratings in the study of Kornadt and Rothermund (2011). Here, "physical and mental fitness, health and appearance" was the domain with the least positive ratings in general, but older cohorts had less negative ratings in this domain than younger cohorts.

*Family & Friends* are the second most and the fourth most important topic identified in the pictures of the 50–69 and 70+-year-old participants, respectively, at least in part from the perspective of feared or actual loneliness or in conjunction with questions of barriers for contact. The negative effects associated with loneliness, such as quality of life, subjective and objective health, and even mortality are evident (Berg-Weger & Morley, 2020; Hämmig, 2019). This topic is barely noticed in the photos of the 20–30-year-old group, however. *Being Active & Healthy Behavior* was the central theme in the images of the 50–69-year-old group participants, which is in line with scientific findings on the pertinent role in this young-old age group and seems to be tied to their still expansive future time perspective (Klusmann & Notthoff, 2018; Ziegelmann & Knoll, 2015). Activities and health behavior can only be pursued if the social and environmental conditions allow

for such engagement (Drewelies et al., 2018; Evers et al., 2012; Portegijs et al., 2017; Van Cauwenberg et al., 2016). This links to the finding that in the old-old group, the highest amount of photos was rated as dealing with matters of *Infrastructure*. The importance of environmental facilities and the age-friendliness of one's surroundings and neighborhoods for health and well-being in old age, and also for views on aging in particular, is substantiated by a large body of evidence (Doyle et al., 2018; Wahl & Gerstorf, 2018; Wolff et al., 2018; Wurm, et al., 2014). Similar to the results of our study, primary issues in this regard are quality of transportation, accessibility to shops, health care, recreational areas, and social spaces.

Despite the different priorities among domains and issues across the age groups, overall profiles of the photos characterized by positive valence and high degrees of adaptivity were similar (despite somewhat less positive and less adaptive photos of the old-old). The differential importance of the topics, however, has far-reaching implications when it comes to diverse matters of aging.

## Implications for Future Research

In the course of digitalization, there is great potential to expand the method piloted here and use it for representative studies. Smartphones are increasingly available and usable in everyday life in all age groups in order to capture the experience of aging, being old and old people in everyday life and real-time in photos. The rapid development of artificial intelligence (AI) provides methodological possibilities to ensure qualitative and quantitative categorization in a new dimension and on a much larger scale. The proof of concept provided can now be expanded in such a way that views on aging in various everyday living environments can also be surveyed in a representative manner. An AI model could be trained starting with the materials of this study and enable existing views on aging to be analyzed in a large sample. This would allow to differentiate the occurrence of views on aging in different living environments. Thus, existing views on aging could also be compared in environments in which age discrimination is often found, for example in health care and the workplace (Rothermund et al., 2021). This will make it possible to derive generally valid statements about the occurrence and relative importance of views on aging and identify points of reference for effective interventions.

## Practical Implications

The results of our study suggest that participant-generated photographs of “what aging means for me” can be used to explore and analyze multidimensional, multi-valenced, and

age-differentiated views on aging. At the same time, this method is highly interactive, more open, and less language-dependent than questionnaires, and, with the methods suggested in this paper, highly practicable.

Photos could be used as a tool to stimulate both individual and societal dialogues on aging in manifold contexts, both in analog as well in digital formats such as for example, social media. The photos allow things to be seen from the viewpoint of people, literally through the eyes of the beholder. The images could be a starting point for reflections on age stereotypes, both in laypersons as well as in professionals. Examples of relevant settings are health care where ageist stereotypes hinder treatment or the work context (Rothermund et al., 2021). The “stories” told by the photos will evoke expectations, fears, and hopes, could help to clear up common ageist misconceptions and beliefs, and might raise awareness for age-discriminatory thought and action. Knowing more about the different points of view and the different priorities of topics might help to overcome both inter- and intragenerational communication barriers (Anderson et al., 2005; Giles et al., 2008). As such, photos could also serve as a basis for societal dialogues between scientists, media, professionals, and the general public (cf. Brand et al., 2016; Hogan & Warren, 2012). Promoting dialogue both on restricted views on aging that suffer blind spots and do not sufficiently consider the whole breaths of diversity in aging, old age, and older people but also to sensitize for ageist thought, speech, and action is a central leverage against ageism (Klusmann & 40 co-authors, 2023).

A recent small sample study using photovoice with 66–89-year-old people found that among active participation in society importantly contributing to purpose and meaning in life a subtheme on technology emerged (Heinz et al., 2023). In the age of digitalization, making new digital tools and devices available and using them contributes to integration and maintained contact within and between generations and ultimately ensures the maintenance and promotion of psychosocial health. This might be facilitated by participatory and visual elements and even more so when generations benefit from each other, such as in intergenerational digital cultural heritage discussions, for example (Quinton et al., 2023).

## Limitations

Our sample was self-selected, which is likely to over-represent active and interested adults. While this will impact the generated photographs and themes, it does not necessarily impact the usefulness of the approach per se. However, it needs to be borne in mind that the contents generated in the photographs are subjective choices by participants and thus related to individual and social characteristics. Results

derived from this proof-of-concept study should be confirmed in a larger sample, also clarifying the role of further sociodemographic variations (e.g., gender, income, full range of age groups).

The method holds the risk of underreporting or overreporting. The finding that relatively few photos addressed cognitive changes or activities could result from the fact that subjects of physical capabilities and activities might be more “visible” and “catchable” for an image. Future studies may test reliability and discriminant validity by correlating results to those obtained by different measures (e.g., implicit association tests or commonly used self-report questionnaires). The question of whether a method really reliably reflects what is in the minds of people, however, cannot be answered in its entirety for any method. Lastly, all methods, be they quantitative, qualitative, or behavioral, only provide “images” of reality.

The photography-based method produces a relatively large amount of data, and the qualitative coding procedures leave room for interpretation. However, data is less complex and also more straightforwardly interpretable than that of open-question interview studies. Combining this method with smartphones and apps allowing for direct user-friendly uploads, it could also provide a much greater potential for representative, large sample studies.

## Conclusion and Outlook

This study provides a proof of concept for using photographs as a database to literally assess images of aging. Domains that were identified using a bottom-up approach seem valid and also hint at where instruments leave out aspects, that is, matters of context and ontogenetic history, in particular. In contrast to survey methods, the measure presented here does not specify any topics and hence allows for a straightforward assessment of the frequency and relative importance of issues. It clearly revealed significant differences between domains in absolute terms, but also in relative importance when comparing the photos of the young (20–30 yrs), the young-old (50–69 yrs), and the old-old (70+ yrs) participants.

Application of the photo method allows assessing the natural occurrence of views on aging in people’s natural living environments and hence is of high ecological validity. Since the smartphone and camera can easily accompany people in their everyday lives, there is hardly any other method equally high in accessibility and usability. In terms of the recent research focus on awareness of aging, it can capture whether and in how far people perceive and experience aging (e.g., when, where, and how people take notice, realize, and understand age cues). Furthermore, through its highly open approach, it is equally well applicable in younger and older age groups. By precluding extensive

linguistic explanation, it might help to overcome bias caused by different understandings in different target groups and can be directly applied within groups of diverse educational and cultural backgrounds. Hence, it seems also highly suitable for running international studies.

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**Conflict of Interest**

The German Research Foundation (DFG) had no involvement in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. The authors declare that they have no conflicts of interest.

**Publication Ethics**

Written informed consent was obtained prior to data collection and procedures were run in compliance with relevant laws and institutional guidelines for conducting scientific studies involving human participants, particularly the Ethical Principles of Psychologists and Code of Conduct of the German Psychological Society and the American Psychological Association. Given that photographs were captured completely anonymously, the local ethical review board (University of Bremen) declared the study being exempt. The study also conforms to the Declaration of Helsinki.

**Open Science**


The authors are not willing to share the data/materials. Data violates rights to one's own image.

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