Indeed a 'silver bullet' – improving the measurement of ageing in consumer behaviour using the characteristic age approach

Robert Zniva & Daniela Weber

View supplementary material ⧉

Published online: 24 Sep 2025.

Submit your article to this journal ⧉

View related articles ⧉

View Crossmark data ⧉

Routledge
Taylor & Francis Group

Indeed a ˈsilver bullet' – improving the measurement of ageing in consumer behaviour using the characteristic age approach

Robert Zniva [a,b] and Daniela Weber [c,d]

aInstitute for Retailing and Data Science, Vienna University of Economics and Business, Vienna, Austria; bDepartment of Business and Tourism, Salzburg University of Applied Sciences, Puch bei Hallein, Austria; cHealth Economics and Policy Division, Vienna University of Economics and Business, Vienna, Austria; dInternational Institute for Applied Systems Analysis (IIASA), Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW, University of Vienna), Laxenburg, Austria

ABSTRACT

The aim of this paper is to elaborate on the status quo of measuring age in older consumer behaviour research and to identify new research avenues by introducing approaches from gerontology and demography. The study is based on a review of 211 papers on the behaviour of consumers at an advanced age. Our findings provide a comprehensive overview of chronological, biological, psychological, social, and multi-theoretical age measures. The results show that ability perspectives have become more prevalent in recent years but have not been able to break the dominance of chronological age. To foster theory development, we propose several actions to encourage a stronger interdisciplinary focus in consumer behaviour research on established, parsimonious, performance-based, and robust measures from gerontology and demography.

Introduction

Persons aged 65 years or over represent one of the fastest-growing subpopulations worldwide, estimated to reach 1.6 billion people by 2050 (United Nations, 2022). Besides its sheer size and expected growth, this subpopulation is a very attractive consumer group due to its prosperity. For instance, in 2020, persons aged 50 or over accounted for half of global consumer spending (AARP, 2022). Given this economic relevance of consumers of advanced age, marketing researchers are interested in how ageing affects the consumer behaviour of older adults, and how these behavioural changes influence ways of doing business.

Consequently, several literature reviews on ageing and consumer behaviour have been written in the past decades, showing the growth of this research field. In the beginning, reviews summarised descriptive studies on the size and growth of the

market of elderly customers (Klippel, 1974), or discussed ageing and decision making in other research areas like gerontology or psychology (Phillips & Sternthal, 1977). In the 1980s, several reviews focused on summarising empirical results from studies, which examined discrepancies in behaviour and/or decision making of consumer groups at different chronological ages (Meadow et al., 1981; Schewe, 1984; Tynan & Drayton, 1985). These reviews showed that measuring changes in behaviour by comparing different chronological age groups does provide a controversial picture. For example, Tongren (1988) demonstrated in his review that results on behavioural differences between chronologically older and younger consumers were not consistent. Therefore, reviews in the 1990s started focusing on aspects of the ageing process other than chronological age. Moschis (1991, 1994) conceptualised a multidimensional view on ageing by reviewing different ageing theories from a biological, psychological and sociological perspective. Gregoire (2003) summarised empirical findings in consumer research based on this newly established multidimensional view and proposed the development of theories of aged consumer behaviour by concentrating on one of these dimensions of ageing (biological, social, and psychological). This proposition is implemented later on in several fields of consumer research as shown by review studies of Yoon et al. (2005); C. Cole et al. (2008); Yoon et al. (2009); Moschis (2012); Zniva and Weitzl (2016); Hettich et al. (2018); Guido et al. (2020); Guido et al. (2021); Berg and Liljedal (2022); Eisend (2022) and Franco (2023).

However, Moschis (2012) also argued in his review study that a focus on a specific aspect of the ageing process may not lead to satisfactory theory building. The complexity of the ageing process, the heavy use of cross-sectional data in studies, and methodological difficulties (for a detailed discussion see C. Cole et al., 2008) leads to the problem that ageing effects cannot be detangled from period or cohort effects. Therefore, he proposed the use of a multi-theoretical, holistic approach in the form of the Life Course Paradigm (Moschis, 2021). Zniva and Weitzl (2016) acknowledged the superiority of such a paradigm as 'gold standard' but also underlined the comprehensive data requirements of the approach. According to their review and also the results of other more recent reviews (Berg & Liljedal, 2022; Eisend, 2022; Franco, 2023; Guido et al., 2020, 2021; Hettich et al., 2018) a focus on one or more age dimension(s) has led to satisfactory theory development especially in an early exploratory stage of research on consumers of advanced age.

Nevertheless, the measurement of ageing and accordingly of ageing dimensions is a complex endeavour. Despite decades of research into older consumers, most studies continue to rely on overly simplistic definitions of chronological age, despite mounting evidence that such measures offer limited explanatory power (Moschis, 2012). For example, Strough et al. (2011) found that differences in decision-making performance across age groups were better explained by cognitive abilities than by chronological age alone, highlighting the limitations of time-based metrics in explaining consumer behaviour. However, even when alternative measures based on ageing dimensions are employed, results from different studies remain difficult to compare or synthesise, and may also contribute to the perpetuation of stereotypes due to the use of insufficiently validated measures of ageing. Sun and Morrison (2007) reported contradictory findings on health and dining behaviour among older adults, likely due to inconsistent age measurement approaches. These examples illustrate how inadequate operationalisations of chronological ageing and age dimensions can distort or obscure actionable insights. Hence, a more

unified approach to measuring ageing, along with a deeper understanding of the inter-relationships between different age dimension measures, is required.

The principal objective of this paper is to respond to this demand. A systematic, method-based review is employed to illustrate how ageing has been conceptualised and operationalised in quantitative consumer behaviour research over a period of more than 40 years. Although ageing is a lifelong process affecting individuals across all life stages (Kornadt et al., 2020), our review focuses on the measurement of ageing in the context of later life stages, chronologically often defined as 50, 55, 60, or 65 years and older (Zniva & Weitzl, 2016). This focus reflects both the dominant practice in the existing consumer behaviour literature and the increasing complexity of ageing processes beyond midlife. In older adulthood, age-related changes in health, cognition, and social roles become more heterogeneous, making the limitations of chronological age particularly salient and highlighting the need for more nuanced, multidimensional approaches (Arnhold et al., 2025; Dohm-Hansen et al., 2024; Rae et al., 2010). Accordingly, the aim of this review is to create a repository of nuanced, multidimensional age measurements that have been used in the field of older consumer behaviour research. In doing so, we identify three fundamental challenges associated with the age measurement methods found and present methodological priorities to address these issues.

We seek to facilitate and enrich future research on the influence of specific aspects of the ageing process by introducing a practically grounded and well-established concept from demography—namely, the characteristic age approach (Ryder, 1975; Sanderson& Scherbov, 2013)—to the field of consumer research. This approach transforms complex age-related traits into a simple, comparable metric. In doing so, it bridges the gap between theoretical insight and managerial applicability. To illustrate the value of this approach, we present a case study using data from the National Institute on Ageing's Health and Retirement Study (HRS). We demonstrate the approach's ability to provide an easily interpretable yet robust measurement and interpretation of complex age dimensions and their associations with relevant behavioural consumer outcomes. Although many of the measures and frameworks discussed are theoretically applicable across the life course, our review and empirical example focus specifically on older consumers, in order to address the empirical and methodological gaps most pertinent to this demographic. In doing so, we aim to support researchers and practitioners in better analysing, interpreting, and addressing the heterogeneity of ageing processes in later life.

Methodology of the review

According to Paul and Criado (2020) and Snyder (2019) we conducted a systematic, method-based review. Systematic reviews can be described as both a research method and a process for identifying and critically appraising relevant studies, as well as for collecting and analysing data from those studies (Liberati et al., 2009). The objective of a systematic review is to locate all empirical evidence that meets pre-defined inclusion criteria in order to address a specific research question or hypothesis. By employing explicit and systematic methods when reviewing articles and the full body of available evidence, bias can be minimised, thereby producing reliable findings from which conclusions may be drawn and informed decisions made (Moher et al., 2009). Within this context, method-based review articles specialise in the investigation of the underlying

methodology – quantitative or qualitative – of the systematically reviewed body of evidence (Paul & Criado, 2020). The objective of the systematic, method-based review at hand is to identify and synthesise quantitative measurement approaches of ageing used to investigate and identify older consumer groups in the field of marketing.

Search and selection process

As a first step in the review, we conducted a rigorous literature search using a range of search terms previously employed in other reviews within the field (e.g. Berg & Liljedal, 2022; Franco, 2023; Guido et al., 2020; Hettich et al., 2018; Zniva & Weitzl, 2016). Specifically, we used the terms 'marketing' or 'consumer behavio(u)r' in combination with established keywords related to ageing and older consumer groups (e.g. age, ag(e) ing, baby boomer, elderly, mature, old, older, retiree, senior). We searched two well-established providers of academic databases using these keywords: ABI/INFORM Global and Trade & Industry (via ProQuest) and Business Source Premier (via EBSCO). Both platforms are recognised as leading resources in business and management research and provide access to thousands of scholarly journals. We screened the ABI/INFORM Global and Trade & Industry databases using the following search query:

> (noft(consumer behavior) OR noft(consumer behaviour) OR noft(marketing)) AND (noft(age) OR noft(ageing) OR noft(aging) OR noft(baby boomer) OR noft(elderly) OR noft(mature) OR noft(old) OR noft(older) OR noft(retiree) OR noft(senior)).

The search was restricted to peer-reviewed and scholarly journal articles, and we excluded full-text content, searching instead all other indexed fields of the records. We applied the same search terms to the Business Source Premier database using this query:

> (AB marketing OR AB consumer behavior OR AB consumer behaviour) AND (AB age OR AB ageing OR AB baby boomer OR AB elderly OR AB mature OR AB old OR AB older OR AB retiree OR AB senior).

Again, we limited the search to peer-reviewed academic journal records and searched only within abstracts.

In all searches, we restricted the publication date range to the period 1980 to 2024. The cut-off year of 1980 was selected based on the view that older consumers were not regarded as a distinct market segment prior to this period (Moschis, 2003), and this threshold has been adopted in previous reviews on older consumers (e.g. Zniva & Weitzl, 2016). In total, we identified 30,254 records through our database queries.

Prior to screening the records, we assessed the academic quality of all identified records. To this end, we included only records from journals listed in the Harzing Journal Quality List (Harzing, 2024). The Journal Quality List is a compilation of 11 well-established academic journal rankings from around the world, including the 2024 ranking from the German Academic Association for Business Research, the Scopus CiteScore 2024, the Erasmus Research Institute of Management Journals Listing 2024–2028, the 2024 British Association of Business Schools Ranking, the META-Rating BWL 2023, the 2022 Foundation Nationale pour l'Enseignement de la Gestion des Entreprises journal ranking, the 2023 Australian Business Deans Council journal ranking, the 2021 Haut Conseil de l'évaluation de la recherche et de l'enseignement supérieur ranking, the 2021 Danish

Ministry ranking, the 2020 Centre National de la Recherche Scientifique ranking, and the 2016 Financial Times 50 Ranking. This list includes a total of 840 journals and is primarily intended to assist academics in identifying journals that meet appropriate scholarly standards. For the purposes of this review, we included only records from journals listed under the subject area 'Marketing' (63 journals). These were deemed to represent journals of sufficient academic reputation for inclusion. Based on this criterion 24,843 records were excluded, leaving 5,411 entries.

We screened the titles and abstracts of all remaining records and selected only those that specifically investigated the consumer behaviour of older adults. Following this procedure, we identified 329 articles for full-text retrieval. Of these, we successfully retrieved 326 full-text articles, which were then assessed for eligibility. Three articles could not be retrieved due to lack of access to the necessary publisher databases and were therefore excluded from the review.

All 326 full-text articles were read and assessed for eligibility. A total of 43 articles were excluded due to either lacking a clear focus on older consumers or not being relevant to the field of consumer behaviour. Thirty-eight studies employed a qualitative empirical design and were therefore excluded from the review. Twenty-eight articles were identified as conceptual papers, either proposing new theoretical frameworks based on existing research or describing the older consumer segment using secondary data. Twenty-three studies were classified as literature reviews and excluded, and 17 articles were found to be comments, research notes, or book reviews. Following this thorough full-text screening, 177 articles were deemed suitable for inclusion in the review (An overview of all excluded articles is provided in the Supplementary Material Table 1).

As a final step to assess the comprehensiveness and completeness of our approach, we manually reviewed the bibliographies of the most recently published reviews on older consumer behaviour (Berg & Liljedal, 2022; Franco, 2023; Guido et al., 2020, 2021; Hettich et al., 2018; Zniva & Weitzl, 2016). We selected all additional articles that met our inclusion criteria in terms of research design and journal quality. Each of these articles was read in full to verify its alignment with the objectives of our review. Following this final step, we identified a total of 211 articles for inclusion. The article selection process and its outcomes are illustrated in Figure 1, which presents a PRISMA flow diagram (Page et al., 2021) adapted for new systematic reviews that include searches of databases, registers, and other sources.

Structured analysis and coding

We used a content analytical approach to examine and summarise all age measures within the selected articles. In a first step, we identified age-related independent, moderator, and mediator variables within the quantitative research studies of all selected articles. In a second step, we categorised all identified measures of ageing based on a categorisation scheme used in previous reviews (Hettich et al., 2018; Moschis, 2012; Zniva & Weitzl, 2016). We did so, because of the previously outlined multidimensional nature of the ageing process. According to Baars (2008), 89) a fundamental issue in this context is the notion of chronological ageing as a causal concept of time. That is to say, the progression of human development is universally observed to occur in accordance with the rhythmic progression of a clock. From a gerontological perspective, however,
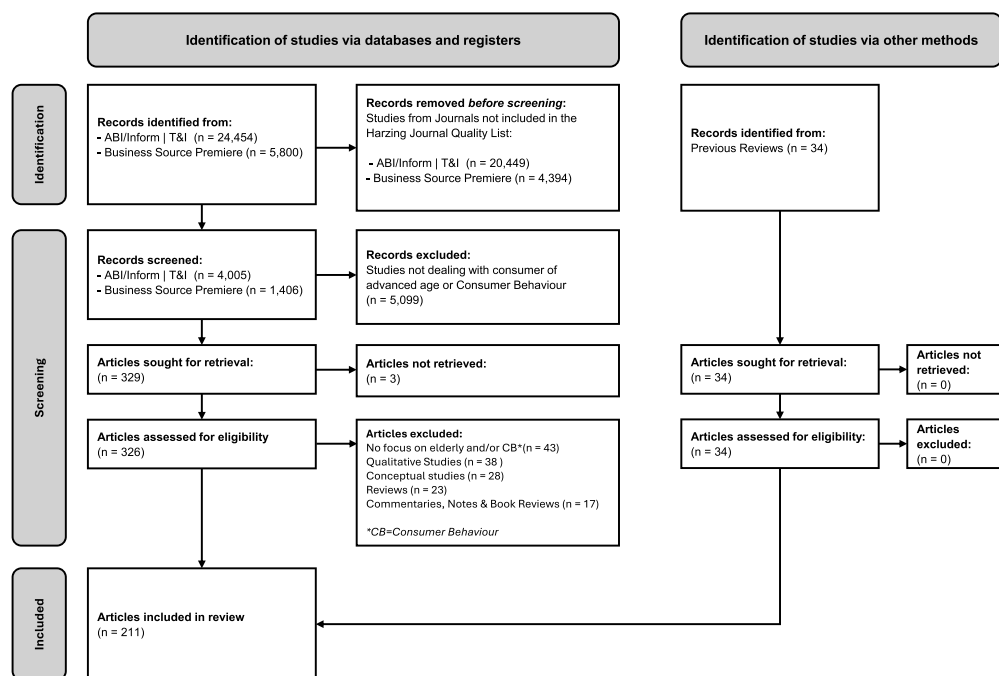
Figure 1. PRISMA flow diagram of the search and selection process.

human development cannot be universally defined; it is determined by an interplay between a person's physical, social, and individual nature within a certain environment. To account for such a context, we use a typical distinction made in social sciences and gerontology to classify age and ageing (e.g.; Settersten and Mayer (1997); Birren and Cunningham (1985) to group identified measures into the following five broad categories:

(1) *Biological ageing*: Refers to 'the changes in human functional capacity resulting from changes in cells and tissues that in turn cause deterioration of the biological system and its subsystems' (Moschis, 1994, p. 196). Typical biological ageing processes are comprised of changes in body systems (e.g. decline in vision and hearing) and age-related chronic conditions and diseases (Gregoire, 2003). These physiological changes affect the way older consumers experience products, services and marketing offerings (Guido et al., 2021).

(2) *Psychological ageing*: Older adults tend to exhibit declines in memory and cognition when compared to younger adults (Moschis, 2012). Although these declines depend strongly on personal and environmental factors and not all facets of cognition are affected equally (Yoon et al., 2009), research results show that they can influence consumer reactions on marketing activities. Furthermore, psychological ageing involves changes in personality and the self (Moschis, 2012). For example, older people tend to have difficulty adapting their self-perception to changes in later life and therefore think, feel and act younger than they

chronologically are. These changes influence responses to products and retail offerings (Guido et al., 2021; Moschis & Mathur, 2006).

(3) *Social ageing*: Refers 'to changes in social relationships that define social status within a society (e.g. family) and in social roles that people assume at different stages in life' (Mathur et al., 2017, p. 35). As a result of role enactment, older people assume their new roles as e.g. grandparents or retirees and develop new needs for products and services (Moschis, 2012).

(4) *Multi-theoretical ageing approaches*: Due to the strong interdependence between the different dimensions of ageing an additional category of holistic approaches to the measurement of ageing was introduced. These approaches combine different facets of ageing and are typically based on three theoretical models: (1) the Multi-Theoretical Model of Cognition, (2) the Dialectic Framework and (3) the Life-Course Paradigm (for a full discussion see Moschis, 2012). Papers representing a multi-theoretical measurement approach on ageing which cannot be conceptually detangled in unique measures of different age dimensions are categorised in this holistic category.

(5) *Chronological ageing*: For completeness, we also consider chronological age, defined as a homogenous process induced by the mere passage of time after birth (Glenn, 1974). Advancement in chronological age is typically associated with an increase in the individuality and diversity of consumers (T. R. Cole, 1983). Therefore, it has little explanatory power to detangle differences of consumer behaviour within an aged consumer group (Moschis, 2012) but is still needed to generally differentiate the behaviours of older consumers from younger consumer groups. It is considered to be the most widely used ageing measure in consumer behaviour research (Zniva & Weitzl, 2016).

Figure 2 graphically illustrates the interrelationship between the categorised ageing measurement types. It represents the individual ageing process as being shaped by both internally and externally triggered processes of a biological, psychological, and social nature. In this context, chronological age is conceptualised as a meta-measure that summarises – more or less accurately – all processes across the three ageing dimensions in a single continuous number. Multi-theoretical approaches are depicted as interrelations or overlaps between the biological, psychological, and social dimensions of age. An overview of all identified articles, including their corresponding age categorisation, is provided in the Supplementary Materials Table 2.

The measurement of ageing in consumer behaviour research

In the following sections, we present the results of the methodological review in the form of a repository comprising all identified age-related measures. Although not the primary focus of the present investigation, we begin with the category of chronological age, as it has traditionally been recognised as the most established measure in research on older consumer behaviour. We then discuss biological age measures, which can be grouped into indicators of health status, physical ability, and biological life events. This is followed by a discussion of psychological age, encompassing measures related to the self (e.g. subjective age), as well as cognitive and memory-related assessments. Social age, conceptualised through age-related social roles and social activity, represents the third
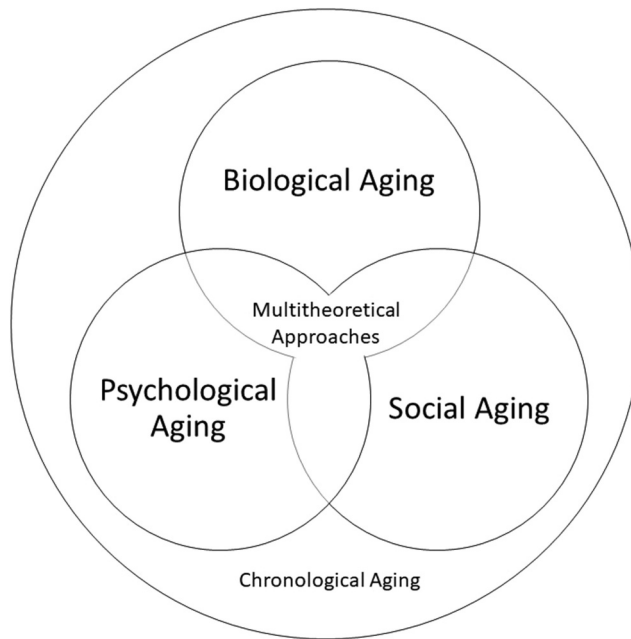
Figure 2. Graphical representation of investigated age categories and associated interrelations.

dimension examined in our review. Finally, we conclude by presenting multi-theoretical approaches identified in the reviewed studies, which integrate elements from two or more age dimensions.

Assessment of chronological age

Virtually all identified quantitative studies (210 out of 211) used *chronological age* to some extent; however, we could cluster those studies into three groups. One group of 75 studies investigated the influence of chronological age by examining and comparing the consumer responses of chronologically older and younger consumers. Another group of 84 studies defined a chronologically older consumer group and investigated within this group chronological and/or non-chronological age influences. The remaining 51 studies were non-comparative, solely investigating chronologically defined older consumers. Studies dealing exclusively with consumer responses of elderly people run the risk of misinterpretation. There, chronological age is suspected to cause consumer responses without any empirical evidence as strongly criticised by Tongren (1988). Non-comparative studies remain an ongoing matter and can be seen regularly in published research (e.g. Zniva & Weitzl, 2016). Our study confirms and extends those results (see Figure 3). Even in the last four years, eleven studies meeting our standards in terms of journal quality, methodological approach and thematic focus could be classified as non-comparative, indicating no proof of a chronological age effect.

Reviewing the different definitions of chronological old age, we can see that the most common cut-off points are 65 years (46 studies) and 55 years (42 studies) followed by 50 years (34 studies), 60 years (33 studies), 40 years (eight studies) and 45 years (two studies). The
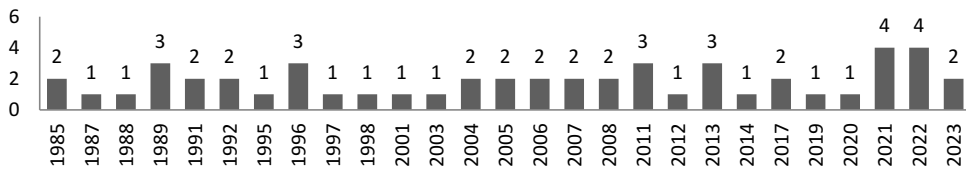
Figure 3. Number of non-comparative studies per year (n = 51 articles).

results confirm previous findings by Tongren (1988), Zniva and Weitzl (2016) and Berg and Liljedal (2022) on the use and measurement of chronological age measures. The variation in cut-off points confirms the already outlined weak explanatory power of the measure. Baars (2008) argues in this context that we age at the same time bodily (biologically), socially and personally (psychologically) and all ageing takes place in specific contexts that co-constitute its outcomes. This interaction between individual ageing and environment also serves as an explanation for the variety of chronological age definitions. Researchers cannot fully include all constantly changing interrelated processes and contexts in one chronological definition and therefore have to choose either a common age boundary accepted in the investigated society (environmental and historical perspective) or an age boundary appropriate for the investigated consumers (individual perspective).

Table 1 gives an overview of all stated reasons for choosing a specific chronological old age definition using the two introduced perspectives. The Table shows that a multitude of explanations for choosing a certain age limit exist. Relatively younger chronological age limits seem to be driven more by individual perspectives, whereas older chronological age limits are shaped mostly by an environmental and historical perspective.

Table 1. Stated reasons for chronological age limits.

Limit	Reasons	Sources
40+	**Environmental & Historical** - Definition of baby boomer generation **Individual** - Start age for most transitional life events	Worsley et al. (2011); S. F. Ong et al. (2009)
45+	**Individual** - Start age for most transitional life events	Mathur et al. (1999)
50+	**Environmental & Historical** - Typical age limit in the literature or theory - Typical limit for marketers to define old age - Typical limit in general to define old age - Age limit used by organisations (e.g. AARP) - Age before official retirement age - Official definition of specific age cohort **Individual** - Age limit used for age-related services - Largest contributors to charity or volunteering - Wealth of older consumer group - Youngest Old embrace digital divide	Bae et al. (2021); Arenas-Gaitán et al. (2020); Eastman et al. (2020); Asebedo et al. (2019); Moliner-Tena et al. (2018) Sudbury-Riley and Edgar (2016); Sudbury-Riley and Edgar (2014); Sudbury Riley et al. (2012); Kohlbacher and Chéron (2012); Jahn et al. (2012); Moschis and Ong (2011); Sudbury and Simcock (2009a, 2009b); Mathur (1996); Tepper (1994)
55+	**Environmental & Historical** - Typical age limit in the literature. - Age limit used by organisations (e.g. WHO, Census) - To compare young-old with old-old. - Definition of specific cohorts (e.g. Baby Boomers) **Individual** - Most old people accept the age limit. - People with the age limit share similar values. - To investigate active older people. - Growth and wealth of older consumer group.	Rajaobelina et al. (2021); H. J. Lee and Lyu (2019); Marjanen et al. (2016); Altobello Nasco and Hale (2009); S. F. Ong et al. (2008); Laukkanen et al. (2007); Y.-K. Kim et al. (2005); Yang et al. (2005); Vuori and Holmlund-Rytkönen (2005); S. Kim et al. (2003); Moschis et al. (2003); Sherman et al. (2001); Mathur et al. (1998); Keillor et al. (1996); Burnett (1996a); Gentry et al. (1995); Burt and Gabbott (1995); Moschis et al. (1993); Smith and Moschis (1985)

Table 1. (Continued).

Limit	Reasons	Sources
60+	**Environmental & Historical** - Typical age limit in the literature. - Retirement age in the country investigated - Largest share in population - High population growth rate **Individual** - People with the age exhibit stable shopping behaviour	Schwendtner et al. (2024); Mason et al. (2023); Jung and Jung (2022); Chéron and Kohlbacher (2018); Parida et al. (2016); Teller et al. (2013); Singh et al. (2012)
65+	**Environmental & Historical** - Typical age limit in the literature. - Typical societal definition of elderly. - Age limit used by governmental organisations. - Retirement age in the country investigated. - Digital Divide **Individual** - Age limit where older people still buy all products.	Berg et al. (2023); Zhang et al. (2022);Suarez-Alvarez et al. (2021); Kohijoki (2011); Iyer and Eastman (2006); Miller et al. (1998); Milliman and Erffmeyer (1989); Gilly and Zeithaml (1985)

Strongly associated with the measurement of chronological age and the described interrelationship of individual ageing and environment is the notorious age-period-cohort problem. Technically, a cross-sectional quantitative study measuring chronological age cannot detect the true origin of the observed effects. Differences can be caused by chronological ageing itself, historical events influencing all cohorts equally (period effect) or historic events influencing specific cohorts (cohort effect). A mixture of age-period-cohort effects is also possible. To empirically detect the true nature of observed differences in chronological age, a longitudinal data set and age-period-cohort models are needed (for a discussion of models see Reither et al., 2015 or Bell & Jones, 2015). Interestingly, of all the identified studies a minority analysed longitudinal data sets (Asebedo et al., 2019; Bearden & Wilder, 2007; Dominko & Verbič, 2022; Fan & Zick, 2004; Jung & Jung, 2022; H. Kim & Lyons, 2008; Kohijoki, 2011; Marjanen et al., 2019; Mathur et al., 2008; Shen, 2019) and only a few of them addressed an age-period-cohort perspective in their analysis.

Assessment of biological age measures

Biological age measures were used in 27 of the identified studies (12.8%). Based on our analysis, we divided measures of biological ageing into three subgroups: (1) measures assessing a self-reported global health status, (2) measures of self-reported health-related activities, and (3) self-reported biological/health events.

Generic measures of health (see Table 2) were mostly single-item measures (seven measures) and typically rated health on four-, five-, and seven-point scales ranging from (extremely) poor to excellent health statuses. Three of the single-item measures presented were developed by the authors of the respective studies. The other four single-item measures were derived from studies related to marketing or gerontology. However, more recent studies have relied on multi-item scales derived from fields such as medicine (McDowell, 2006) or psychology (Barak, 1998). Based on our results, we identified one study by Sirgy et al. (1991) that used a self-developed multi-item scale integrating behavioural tasks (e.g. 'I work hard at staying in good physical shape'), which led to

Table 2. Self-reported generic health measures.

Measure	Study
Three statements measured on a five-point scale adapted from Barak (1998)	König and Larsen (2017)
I am perfectly satisfied with my health/I never felt better in my life/I am quite content with my state of health	
(Reported Cronbach´s Alpha=0.74)	
Five statements from McDowell (2006)	Parida et al. (2016)
Items not indicated	
(Reported Cronbach´s Alpha=0.77)	
Statement rated on a five-point scale adapted from Pampalon et al. (1994).	Le Serre and Chevalier (2012)
I feel in …	
extremely poor health/not that good health/fair health/good health/excellent health	
Statement rated on a four-point scale designed by the authors.	Kohlbacher and Chéron (2012)
Respondents were asked to rate their state of health as …	
Well/Fairly well/Somewhat well/Poor	
Statement rated on a five-point scale also used in the Health Retirement Study (HRS)	Shen (2019, 2020);
Respondents were asked to rate their state of health as …	Worsley et al. (2011);
Excellent/Very good/Good/Fair/Poor	H. Kim and Lyons (2008)
Statement rated on a seven-point scale	DeLorme et al. (2006)
Respondents were asked to rate their health …	
from '1' Unhealthy to '7' Extremely healthy	
Statement rated on a four-point scale	Vuori and Holmlund-Rytkönen (2005)
Respondents were asked to rate their state of health as …	
Good/Satisfactory/Adequate/Poor	
Eight statements developed by authors	Sirgy et al. (1991)
I am in good physical condition./I frequently think about my health./I work hard at staying in good physical shape./I worry that I am not as healthy as I should be./Being active is a good way to stay healthy./I pay very close attention to my health./I exercise regularly./I pay close attention to my diet.	
Statement rated on a four-point scale developed by Maddox and Douglass (1973)	Sirgy et al. (1991)
How would you rate your health at the present time?	Smith and Moschis (1985)
Poor/Fair/Good/Excellent	
Statement rated on a five-point scale from the Health and Retirement Study (HRS)	Bearden and Wilder (2007)
Poor/Fair/Good/Very Good/Excellent	
Statement rated on a four-point scale developed by K. S. Markides and Martin (1979)	Burnett (1989, 1996a; 1996b);
Respondents were asked to rate their state of health as …	
Poor/Fair/Good/Excellent	Smith and Moschis (1985)

psychological insights (e.g. 'I worry that I am not as healthy as I should be') into health statuses.

Measures of health-related activities (see Table 3) were based on the physical ability of respondents, indicating that reduced ability corresponds with older biological age. Once again, a mix of self-developed measures and measures derived from previous literature was observed. Based on all identified studies, two streams can be classified. On the one hand, physical ability was measured by assessing the capability to perform specific daily tasks such as using a phone and/or shopping for groceries (Burnett, 1996b; Hare, 2003; Leung et al., 2011; Lim & Kim, 2011). On the other hand, implemented measures assessed physical ability itself in terms of the ability to see, hear, or move (C. A. Cole & Houston, 1987; Shen, 2020).

Finally, to measure biological life events (see Table 4), respondents were asked about events they had experienced (e.g. assistance in day-to-day living), generic health conditions (e.g. eye problems that cannot be corrected with glasses), or specific illnesses (e.g. cancer) (Gwinner & Stephens, 2001; H. Kim & Lyons, 2008; Mathur & Moschis, 2005; F. S. Ong & Moschis, 2009; Preston, 1968). Results were most often presented as an

Table 3. Self-reported health measures based on physical ability.

Measure	Study
Two questions based on data from the Health and Retirement Study (HRS)	Shen (2020)
Is your eyesight excellent, very good, good, fair, or poor	
using glasses or corrective lenses as usual?/Is your hearing excellent, very good, good, fair, or poor using a hearing aid as usual?	
Seven activities developed by Leung et al. (2011) based on IADLs (Instrumental Activities of Daily Life)	Parida et al. (2016)
Phone use/Shopping/Meal preparation/Ordinary housework/Transport/Managing medications/ Managing finance	
Health index developed by C. A. Cole and Houston (1987)	D. Kim et al. (2016)
Eyesight/Hearing/Mobility	
(Reported Cronbach´s Alpha=0.92)	
Two statements designed by authors	Lim and Kim (2011)
Shopping in stores is difficult for me./Activities (e.g. transportation, walking in stores, waiting in line) involved in shopping are difficult for me.	
Statement rated on a scale with 3 categories	Hare (2003)
Respondents were asked to indicate how their health status limits their food shopping …	
Always/Sometimes/Never	
Question taken from the Janis-Field Feeling of Inadequacy Scale	Burnett (1996b)
Respondent were asked to indicate to what extent a physical or mental disability limited their ability to shop	
from '1' Severe Limitations to '7' No Limitations	

Table 4. Health measures based on biological life events.

Measure	Study
Index developed by Mathur and Moschis (2005)	Mecredy et al. (2022); S. F. Ong et al. (2009); Mathur and Moschis (2005)
Respondents were asked to indicate if they had personally experienced five biological/health events …	
Lengthy hospitalization or rehabilitation/Hearing impairment/Needing assistance in day-to-day living/Diagnosis of a chronic condition or long-term illness/Eye problem that cannot be corrected with glasses	
Physical Health was measured by asking respondents to indicate whether they had ever been diagnosed and/or treated for 12 chronic conditions or illnesses	F. S. Ong and Moschis (2009)
Conditions or illnesses were not indicated	
Index based on data from the Health and Retirement Study (HRS)	H. Kim and Lyons (2008)
Respondents were asked if they suffer from any of these eight types of chronic health condition …	
Diabetes/cancer/lung disease/heart condition/stroke/high blood pressure/ psychiatric problems/arthritis	
Index based on Preston (1968)	Gwinner and Stephens (2001)
Respondents were asked if they currently suffer from different chronic health problems …	
e.g. heart trouble, cancer, stroke, paralysis and high blood pressure	

index, with higher scores indicating the experience of a larger number of events and, therefore, an older biological age status.

Assessment of psychological age measures

Psychological age measures were applied in 46 studies (21.8%) of the analysed articles and can be divided into two subgroups, namely measures of self-perceived age and measures of cognitive performance.

Identified measures of self-perceived age demonstrate a vast array of different approaches. The most prominent self-perceived age measurement approach in the

investigated literature is so-called cognitive age developed by Barak and Schiffman (1981) (see Table 5). Cognitive age is a subjective and personal age construct closely related to self-concept theory. Rosenberg (1979) defines self-concept as the entirety of an individual's thoughts and feelings about themselves. Self-concept is learned, purposeful,

Table 5. Measures of subjective age.

Measure	Study
14 statements rated on seven-point Likert scale ('a lot younger than my age' (1)'a lot older than my age' (7)) developed by Montepare (1996) *My capacity to remember things is most like that of people who are . . . /My motivation to learn new things is most like that of people who are . . . /My capacity to learn things is most like that of people who are . . . /My capacity to adapt to new situations is most like people who are . . . /Right now I feel . . . /My physical appearance is most like that of people who are . . . /My physical senses, such as my eyesight, are most like those of people who are . . . /My physical abilities are most like those of people who are . . . /My physical activities are most like those of people who are . . . /My medical health is most like that of people who are . . . /When I'm with my family I feel . . . /When I'm at work/school I feel . . . /When I'm with my male/female friends I feel . . . /When I'm with my partner/ spouse I feel . . .*	Park et al. (2021)
Ten statements rated on seven-point Likert scale ('very untrue' (1) to 'very true' (7)) developed by Lang and Carstensen (2002) *Many opportunities await me in the future./I expect that I will set many new goals in the future./My future is filled with possibilities./Most of my life lies ahead of me./My future seems infinite to me./I could do anything I want in the future./There is plenty of time left in my life to make new plans./I have the sense that time is running out./ There are only limited possibilities in my future./As I get older, I begin to experience time as limited*	Chaouali et al. (2021); Kuppelwieser and Klaus (2020, 2021); Park et al. (2021)
Four statements rated on a five-point Likert scale ('strongly agree' (1) to 'strongly disagree' (5)) developed by Shipp et al. (2009) *I think about what my future has in store./I think about times to come./I focus on my future./I imagine what tomorrow will bring for me.*	Eastman et al. (2020)
Four statements rated in age decades (20ties/30ties/ 40ties/50ties/60ties/70ties/80ties/90ties) developed by Barak and Schiffman (1981) or Barak (1987). *I feel as though I am in my . . . /I look as though I am in my . . . /I do most things as though I am in my . . . /My interests are mostly those of a person in their . . .* *(Reported Cronbach´s Alpha: 0.79* (Wolf et al., 2014)/0.87 (Kohlbacher & Chéron, 2012)/0.78 (Lee, 2011)/>0.85 (Sudbury Riley et al. 2012)/0.94 (S. F. Ong et al., 2009)/ 0.89 Sudbury and Simcock (2009b)/0.92 (Moschis & Mathur, 2006)/0.92 (Weijters und Geuens 2006)/0.95 (Mathur & Moschis, 2005)/0.88 (Gwinner & Stephens, 2001)/0.86 (Szmigin & Carrigan, 2000)/0.83 0.82 (Sirgy et al., 1991)/0.81 (Smith & Moschis, 1985))	Bardey et al. (2024); Mecredy et al. (2022); Kuppelwieser and Klaus (2021); Arenas-Gaitán et al. (2020); Kuppelwieser and Klaus (2020); Chaouali and Souiden (2019); Sthienrapapayut et al. (2018); Sudbury-Riley and Edgar (2016); Sudbury-Riley et al. (2015); Wolf et al. (2014); Sudbury Riley et al. (2012); Kohlbacher and Chéron (2012); Lee (2011); S. F. Ong et al. (2009); Sudbury and Simcock (2009a, 2009b); Moschis and Mathur (2006); Weijters and Geuens (2006); Mathur and Moschis (2005); Gwinner and Stephens (2001); Szmigin and Carrigan (2000); Wilkes (1992); Sirgy et al. (1991); Smith and Moschis (1985)
One statement rated in years adapted from Barak and Schiffman (1981) *How old do you feel right now?*	Amatulli et al. (2018); Amatulli et al. (2015); Guido et al. (2014)

(*Continued*)

Table 5. (Continued).

Measure	Study
Two statements rated in years adapted from Barak and Gould (1985) *What age do you feel most of the time?/How old do people who do not know your age think you are?*	Chéron and Kohlbacher (2018)
Six statements rated in age decades (20ties/30ties/40ties/ 50ties/60ties/70ties/80ties/90ties) developed by Barak and Schiffman (1981) *I feel as though I am in my . . ./I look as though I am in my . . ./My health is as though I'm in my . . ./I do most things as though I were in my . . ./My interests are mostly those of a person in his/her . . ./I think as though I am in my . . ..*	Teller et al. (2013); Mathur et al. (1998)
Four statements rated in years adapted from Barak and Schiffman (1981) *I feel as though I am [. . .] years old/In terms of physical appearance, I look as I am [. . .] years old/Usually, I do most of the things as if I were [. . .] years old/My interests are those of a person of [. . .] years old*	Le Serre et al. (2017); König and Larsen (2017); Le Serre and Chevalier (2012); Van Auken and Barry (2009); Guiot (2001)
Four statements rated in years developed by Le Serre and Chevalier (2012) or Barak et al. (1988) *I would like to feel as though I were [. . .]/I would like to look as though I were [. . .]/I would like to do things as though I were in my [. . .]/I would like my interests to be those of someone in his/her [. . .]*	Le Serre et al. (2017); Le Serre and Chevalier (2012); Van Auken and Barry (2009); Guiot (2001)
Statement rated with three categories (Young/Middle-Aged/Old) developed by Cavan et al. (1949) *Respondents were asked to indicate how they feel . . .*	Sudbury-Riley et al. (2015); Sudbury and Simcock (2009a)
Four statements adapted from Barak and Schiffman (1981) rated on a seven-point semantic differential ('young' (1) to 'old' (7)) *I generally feel . . . (only one dimension indicated)*	Van Auken and Barry (2009)
Four statements adapted from Barak et al. (1988) rated on a seven-point semantic differential ('young' (1) to 'old' (7)) *I would like to feel . . . (only one dimension indicated)*	Van Auken and Barry (2009)
Four statements adapted from Barak and Schiffman (1981) rated on a seven-point Likert scale ('disagree' (1) to 'agree' (7)) *I generally feel old . . . (only one dimension indicated)*	Van Auken and Barry (2009)
Four statements adapted from Barak et al. (1988) rated on a seven-point Likert scale ('disagree' (1) to 'agree' (7)) *I would like to feel old . . . (only one dimension indicated)*	Van Auken and Barry (2009)
Statement rated with three categories developed by authors *Respondents were asked to indicate how they feel . . .* *My chronological age corresponds to how I feel/I feel older than my chronological age/I feel younger than my chronological age*	Vuori and Holmlund-Rytkönen (2005)
Statement rated with three categories (Young/Middle-Aged/Older/Elderly) developed by Bultena and Powers (1978) *Respondents were asked to indicate how they feel . . .*	Tepper (1994)

unique, stable, and consistent (Sirgy, 1982). Its stability means it changes only in response to significant environmental shifts, behavioural adjustments, or functional challenges within one's environment (Crain & Bracken, 1994). Due to its stability self-perceived age often differs compared to actual chronological age (Kaufman & Elder, 2002). Typically, the cognitive age measurement approach by Barak and Schiffman (1981) combines the age a person feels, the age a person thinks they look, the age a person perceives themself to

act like, and the age a person perceives to reflect their interests. Cognitive age is measured in either years (six studies), age decades (20 studies) or seven-point Likert scales (one study). When measured in age decades (e.g. 50s, 60s, 70s) the midpoint value of any indicated decade serves as score of the associated cognitive age dimension (response 50s is recoded to be 55 years) and the mean of recoded midpoints over all four dimensions serves as the composite score of the measurement approach. Measurement approaches using seven-point Likert scales ranged from 'disagree' to 'agree' or from 'old' to 'young' (Van Auken & Barry, 2009).

Although originally proposed with four dimensions (feel-age, look-age, do-age and interest-age), several identified versions of cognitive age differed in the number of investigated dimensions and associated items. On the upper end of investigated dimensions Teller et al. (2013) and Mathur et al. (1998) implemented a six-dimensional version adding health-age and think-age to the original four dimensions of Barak and Schiffman (1981). This approach can be traced back most likely to an unpublished work by Clark (1994) and used the indication of age decades recorded in the associated midpoints as measurement points. On the lower end of dimensionality of the cognitive age construct, the construct was decimated to a single-item measure where only feel-age was indicated in years (Amatulli et al., 2015, 2018; Guido et al., 2014). In between these two extremes the study of Chéron and Kohlbacher (2018) investigated cognitive age using the two dimensions of feel-age and look-age.

Another self-perceived age measure used in reviewed articles was ideal age. Ideal age represents the age a person wants to feel (Barak, 1987) and can be described as 'an individual's ideal age-role self-concept – the age he/she considers to be a person's ideal age' (Barak & Gould, 1985, p. 53). In total, four studies employed the ideal age measurement approach to investigate the age at which respondents would prefer to feel, appear, behave, and maintain interests (Guiot, 2001; Le Serre & Chevalier, 2012; Le Serre et al., 2017; Van Auken & Barry, 2009). Typically, the construct was measured in years but also usage of seven-point Likert scales ranging from 'disagree' to 'agree' or from 'old' to 'young' were identified (Van Auken & Barry, 2009).

Age identity represents the third self-perceived age approach and categorises the feel-age of a person into counter age categories (e.g. young, middle-aged, old) (Cavan et al., 1949). Sudbury-Riley et al. (2015), Sudbury and Simcock (2009a) and Tepper (1994) used this approach to assess self-perceived ages of their respondents.

A fourth form of self-perceived age identified in the review is closely related to the concept of youth age which can be described as 'the number of years a person perceives themself to be younger (or older) than his/her chronological age, i.e. the discrepancy between a respondent's chronological and cognitive age ' (Barak & Gould, 1985, p. 53). Although not measured in years feel-age measures by Vuori and Holmlund-Rytkönen (2005) and Park et al. (2021) investigated if respondents felt older or younger than their chronological age. The most comprehensive approach in this context was implemented by Park et al. (2021). A total of 14 items developed by Montepare (1996) of self-perceived physical, psychological and social age were conducted by these authors.

A final and relatively new measure of self-perceived age in older consumer research is Future Time Perspective (FTP). Kuppelwieser and Klaus (2020, 2021) demonstrate that FTP has a better explanatory power in older consumer behaviour than traditional cognitive or chronological age measures. According to Social Selectivity Theory (SST) changes in

individuals' motivations and behaviours are triggered by the ability to monitor time. The older a person gets the more limited the time horizon becomes. People with limited time horizons tend to be more present-oriented and pursue positive emotional short-term goals (Carstensen et al., 2011). FTP was measured with the temporal focus scale (Shipp et al., 2009) and the FTP scale developed by Lang and Carstensen (2002) and was also implemented recently in studies by Chaouali et al. (2021) and Park et al. (2021).

In comparison to self-perceived age, only six studies used measures of cognition and memory (see Table 6) to assess psychological ageing. The authors identified two types of measurement: self-reported measures of cognition and memory (Leung et al., 2005) and objective psychological tests of cognitive speed and working memory capacity (C. A. Cole & Balasubramanian, 1993; Johnson & Cobb-Walgren, 1994; Shen, 2020; Thoma & Wechsler, 2021; Wechsler, 2000).

Parida et al. (2016) is the only identified study to use a self-reported measure of cognitive functioning, based on a shortened version of the World Health Organization' Quality of Life questionnaire (WHOQOL-BREF) employed by Leung et al. (2005). Respondents used three, not explicitly specified, items measuring thinking, learning,

Table 6. Measures of cognition and memory.

Measure	Study
Working memory measure based on Jones and Macken (2015)	Thoma and Wechsler (2021)
Participants hear a sequence of digit numbers and repeat them verbally after the experimenter in reverse order, with increasingly longer sequences in each trial. This procedure is repeated until failure to repeat correctly. The observed digit span corresponds to the longest sequence of accurately reported numbers.	
Memory measure	Shen (2020)
A composite score obtained from scores in an immediate recall task and a delayed recall task. In each task, the interviewer reads out 10 words and asks the respondent to recall as many as possible. The number of correct recalls over 10 is the score for that task.	
Processing speed digit symbol/block test developed by Wechsler (2000)	Lambert-Pandraud et al. (2017)
The respondent must associate, as quickly as possible, numbers with their corresponding symbols.	
Three items developed by Leung et al. (2005)	Parida et al. (2016)
Items not indicated	
Digit Symbol Substitution Test	Johnson and Cobb-Walgren (1994)
Paper-and-pencil procedure which consists of a key containing a pair of digits (1, 2, 3, ..., 9) and symbols (e.g. Δ, Λ, O), and a series of randomly ordered digits, below which is an empty box. Subjects must write the appropriate symbol below each digit and complete as many pairs as possible in 90 seconds.	
Established procedure to measure verbal working-memory capacity.	C. A. Cole and Balasubramanian (1993)
60 unrelated sentences are compiled, 13–16 words in length, using common words. An example sentence is: When I finally reached the seaside, I took a breath of the fresh air. Each sentence is typed on a 3 x 5 index card in large type. These cards are divided into three sets of 20 cards each. Within each set, the cards are arranged in trials. The first trial has two sentences, the second trial has three sentences, the third trial has four sentences, and so on. Each pair of consecutive trials is separated by an index card containing the word RECALL. The cards are presented in a sequence, one card at a time; each time a card is shown, the subject reads aloud the sentence contained on it. As soon as the participant has finished reading the sentence on the first card, the researcher places a second card with a new sentence on top of the first. The procedure continues until a card with the word RECALL on it appears. At that point the participant has to recall the last word of each of the preceding sentences in that trial. (In the example above, the subject would have to remember the word 'air'). The number of sentences in a given trial increases as long as the previous trial is correct. The number recorded for each set is the maximum number of words correctly recalled. A set terminates as soon as the subject makes a mistake in recalling a word.	

memory, and concentration to assess their self-reported cognitive and memory performance.

All other identified measurement approaches represented objective measures (existing and measurable, independent of potential comparison with peers) and can be divided into measures of cognitive speed and measures of working memory capacity. Measures of cognitive speed typically present respondents with a set of pairs of digits and symbols. Afterwards, respondents are provided with a list of randomly ordered digits and are required to find, as quickly as possible, the missing appropriate symbols according to the previously presented set of pairs. Cognitive performance is either measured by the number of correctly identified pairs within a specific period of time (e.g. 90 seconds) or by the time taken to correctly identify all missing appropriate symbols. This approach was implemented by Lambert-Pandraud et al. (2017) and Johnson and Cobb-Walgren (1994) to investigate older consumers.

Measures of working memory performance comprise immediate and delayed recall tasks. Typically, respondents are asked to memorise word lists, parts of sentences, or a sequence of digit numbers. The tests vary in complexity and in the assessment of the presented information. While Shen (2020) assessed the number of immediately and delayed recalled words from a previously presented word list, studies by Thoma and Wechsler (2021) and C. A. Cole and Balasubramanian (1993) presented respondents with cognitive stimuli in consecutive order, with growing complexity, and identified when respondents began to make recall errors.

Assessment of social age measures

Social age measures were applied in 17 identified articles (8%) and can be categorised in two groups. The first group are measures of age-related social roles.

Thirteen studies measured retirement status, four studies examined grandparenthood, and two studies additionally explored widowhood and household composition. Typically, respondents indicated whether they occupied a specific status or role using a single-item measure, mostly a categorical variable (see Table 7). In terms of retirement, two exceptions were identified. Stammerjohan et al. (2007) determined retirees by asking about their employment status, working hours, and income, following a definition of retirement strongly influenced by existing laws in the country of investigation. Hopkins et al. (2006) specifically focused on the impact of retirement on self-perception and developed a retirement lifestyle scale. Using 15 statements rated on a seven-point scale, they identified four dimensions of retirement lifestyles: (1) Old Age Style: Retirees perceive retirement as the end of their former life; (2) Continuation Style: Retirees continue in retirement what they had done throughout their previous life; (3) Disruption Style: Retirees lose direction in retirement and feel frustrated by the situation, and (4) New Start Style: Retirees view retirement as a new opportunity to live the life they always wanted.

The second group comprises measures of social activity (see Table 8). These measures account for the frequency and quality of social contact in older age. A distinction was identified in terms of the addressee of social interactions. Some measures focus on specific peer groups, while others are more general in nature. Mecredy et al. (2022) assessed the quality of social relationships across three

Table 7. Measures of age-related social roles.

Measure	Study
Sociological age developed by Carstensen (1992). Relations to family members, friends, and colleagues at work are measured in terms of interaction frequency, emotional connectedness, and satisfaction. The items are measured on a 7-point-Likert-type scale. (Reported global goodness-of-fit indices resulting from a confirmatory factor analysis: CFI=.955, TLI=.943, RMSEA=.064, SRMR=.042)	Mecredy et al. (2022)
Different age-related roles were assessed *Empty or full nest/Grandparenthood/Widowhood/Retirement*	Sudbury-Riley (2016), Bearden and Wilder (2007)
Only respondents who were retired were selected for the study.	Wolf et al. (2014); Bearden and Wilder (2007)
Statement rated on four categories (Working/Retired/Unemployed/Housewife) *Respondents were asked to indicate their work status . . .*	Sudbury Riley et al. (2012)
Only respondents who were grandparents were invited to join the study.	Tootelian and Varshney (2010); Walker and Macklin (1992)
Three items determined retirement. A retiree receives non-work income, reports themselves to be retired and reports less than 10 paid hours worked last week. *Participants were asked to provide . . .* *their retirement date (month/year)/occupation/hours worked for pay in the previous week*	Stammerjohan et al. (2007)
15 statements rated on a seven-point scale to determine retirement lifestyle on four dimensions *Old-Age Style: I see retirement as primarily an ending./With retirement comes a heightened awareness of death./Now that I'm retired, I feel left out of things.* *Continuation Style: Retirement is a time for me to continue my preretirement activities./My post-retirement life is actually just a continuation of my pre-retirement life./My pre-retirement life is very similar to my post-retirement life.* *Disruption-Style: I felt as though I had no sense of direction – a bit 'lost'./My hobbies do not completely satisfy me./I feel frustrated in my attempt to find activities to substitute for work./Since I retired, I am unsure as to what to do with my time./At the time of retirement I was at a loss as to how to proceed.* *New Start Style: Retirement gives me an opportunity to live a life more like the one I always wanted./Retirement is a time for me to do what I want./Retirement has given me the opportunity to explore my dreams./I see retirement as an opportunity to engage in other activities.* (Reported Cronbach´s Alpha=0.87 (Old Age Style/0.73 (Continuation Style)/0.75 (Disruption Style)/0.70 (New Start Style))	Hopkins et al. (2006)
Statement rated with three categories (Employed full-time/Employed part-time/Currently retired) *Respondents were asked to indicate their work status . . .*	Montgomery et al. (1998); Moschis et al. (1993); Burnett (1989)
Statement rated with three categories (Full-time employed/Part-time employed/Retired/Unemployed) *Respondents were asked to indicate their work status . . .*	J. Lee and Geistfeld (1999)
Dichotomous variable (Currently retired/Currently not retired) *Respondents were asked to indicate their retirement status . . .*	Burnett (1996a); Burnett (1991)

different peer groups (family members, friends, and work colleagues), whereas König and Larsen (2017) measured sociality across all possible types of relationships. Both approaches consider interaction frequency, emotional quality, and satisfaction with relationships. In contrast, Miller et al. (1998) solely measured the frequency of social activities in and with public institutions as an indicator of social activity in later life.

Table 8. Measures of social activity.

Measure	Study
Sociological age developed by Carstensen (1992). Relations to family members, friends, and colleagues at work are measured in terms of interaction frequency, emotional connectedness, and satisfaction. The items are measured on a 7-point-Likert-type scale. (Reported global goodness-of-fit indices resulting from a confirmatory factor analysis: CFI=.955, TLI=.943, RMSEA=.064, SRMR=.042)	Mecredy et al. (2022)
Three statements adapted from Wilkes (1992) *I have a very active social life/I like to be around and involve myself with other people/I enjoy having people around*	König and Larsen (2017)
Three statements developed by the authors. *The scale items asked the respondent the number of voluntary associations they participated in as a member, the level of their participation in church-related activities, and the level of their involvement in community activities.* (Reported Cronbach´s Alpha=0.72)	Miller et al. (1998)

Assessment of multi-theoretical age approaches

Multi- theoretical or holistic age measurement approaches were applied by 12 studies investigated (5.7%). They can be divided into studies evaluating the impact of life events on older consumer behaviour and studies combining several age-related changes in one multidimensional measurement approach. Life events (see Table 9) were typically measured using indices based on the self-reported experience of transitional events (e.g. Chiriboga, 1989; Cohen, 1988; Schewe & Balazs, 1992; Tausig, 1982) and cover typically several ageing dimensions in one measurement approach.

Multidimensional measurement approaches can be distinguished in the gerontographics approach and the measurement of the awareness of age-related change (see Table 10). The gerontographics approach is based on the life course perspective and combines ageing processes, life circumstances (historical and geographical) and life-changing events into one self-reported measurement/segmentation approach (Moschis, 1992). The concept attempts to capture the internalisation of age-related changes on multiple dimensions (biophysical and psychological, social and spiritual), arguing that only internalised and accepted changes affect behaviour. The measurement approach was implemented in different industries and was tested multiple times against other conventional measurement approaches. It is strongly correlated to several of the already introduced measures of biological, psychological and social ageing (Sthienrapapayut et al., 2018).

Another holistic measure is the awareness of age-related change approach (Kaspar et al. 2019). It refers to the overall experiences that make a person aware that their behaviour, performance level or ways of experiencing life have changed as a consequence of growing older (Diehl & Wahl, 2010) and was recently introduced by Bae et al. (2021) into consumer behaviour research.

In summary, the results of the review show that chronological age remains the most commonly used measure of ageing in consumer behaviour research. Alternative measures account for approximately 49% of all investigated articles and exhibit significant variation. Figure 4 summarises the usage of alternative, non-chronological ageing measures by decade, from 1980 to 2020. A steady increase in the use of non-chronological age measures over the investigated period can be observed. Furthermore, a mix of self-perceived and objective measures has been identified, with measures of self-perception dominating the assessment of alternative age measures used in consumer behaviour research.

Table 9. Measurement of life events.

Measure	Study
Index of 10 transitional life events *Respondents were asked if they had experienced . . .* *Marriage/divorce or separation/birth or adoption of first child/last child move out of household/* *marriage of an adult child/birth of first grandchild/retirement/lost job or forced to retire/spouse* *retiring or ending work/death of spouse or parent*	S. F. Ong et al. (2009)
Index of 17 transitional life events *Respondents were asked if they had experienced a list of 17 events in the last 12 months and also* *had to indicate how stressful these events were on a three-point scale. Events were not* *indicated*	S. F. Ong et al. (2009)
Index of 15 (anticipated) to 17 (experienced) life events *Respondents were asked if they have experienced or anticipated . . .* *Moving to a different place/Birth or adoption of a child/Divorce or separation/Last child moved out* *of household/Death of spouse/Death of a parent or close family member/Birth of first* *grandchild/Retirement (at own will)/Lost job/business or forced to retire/Started work for the* *first time or after not working for a long time/Reduction in hours of employment or giving up* *employment (at own will)/Changed jobs, same or different type/Financial status a lot worse* *than usual/More responsibility for aged relative/Chronic illness or condition diagnosed/Serious* *injury, illness or major surgery/Community crisis or disaster (hurricane, crime, fire, flood,* *earthquake, etc.)/Mother or father was put in a nursing or retirement home*	Mathur et al. (2008)
Index of 11 transitional life events based on previous research on life events (e.g. Chiriboga, 1989; Cohen, 1988; Schewe & Balazs, 1992; Tausig, 1982) *Respondents were asked if they have experienced . . .* *Marriage/divorce/separation/birth or adoption of first child/first child moving out of household/* *last child moved out of household/marriage of other child/birth first grandchild/retirement (at* *own will)/spouse retiring or ending work/retirement (forced)*	Mathur and Moschis (2005)
Index of 25 life events *Respondents were asked if they have experienced . . .* *Moved to a different place/Married/Birth or adoption of first child/Divorce or separation/Last child* *moved out of household/Death of spouse/Death of parent or close family member/Birth of first* *grandchild/Major conflict with family member/Retirement (at own will)/Lost job/business or* *forced to retire/Started work for the first time or after not working for a long time/Reduction in* *hours of employment or giving up employment (at own will)/Significant success at work or* *personal life/Change jobs, same or different type/Major improvements in financial status/* *Financial status a lot worse than usual/Family member's health a lot worse than usual/More* *responsibility for aged relative/Gained a lot of weight/Chronic illness or condition diagnosed/* *Serious injury, illness or major surgery/Community crisis or disaster (hurricane, crime, fire, flood,* *earthquake, etc.)/Stopped smoking/Mother or father was put in a nursing or retirement home*	Mathur et al. (1999)
25 life events were measured to segment the older consumer group *Events not indicated*	Silvers (1997)

Taken together, these findings reveal not only a diverse set of age measurement approaches, but also suggest that different conceptualisations or dimensions of age – be they psychological, biological, or social – can yield distinct insights into consumer behaviour. For instance, biological age affects physical access to goods and services (e.g. shopping ability), psychological age influences decision-making confidence, brand preferences, or emotional needs, and social age shapes role-based consumption patterns such as grandparenting or retirement-related purchases. Despite this potential, the relationship between these alternative age measures and specific behavioural outcomes remains underexplored. Chronological age continues to dominate as a classification variable, yet it often fails to explain these more nuanced behavioural differences – differences that alternative age measures are better equipped to capture. The following sections aim to address this gap by exploring how different measures of age influence the interpretation of consumer behaviour, with a particular focus on the example of dining out in later life

Table 10. Other holistic measures.

Measure	Study
Awareness of age-related change refers to the overall experiences that make a person aware that their behaviour, performance level or ways of experiencing life have changed as a consequence of growing older. Five items developed by Kaspar et al. (2019) *There are few people I can rely on when I have problems/I feel tired easily/I have difficulties concentrating on something/I think that my learning abilities are slowing down/I often feel rejected* (Reported Cronbach´s Alpha=0.85)	Bae et al. (2021)
Gerontograhics approach based on ageing processes, life circumstances and life-changing events. Developed out of originally 136 questions. *10 items of the approach are published*: *Nowadays, I find that I rely more on my spirituality and faith/Staying in good health is more important to me than improving my appearance./I sometimes think about the mark I will leave on this world./I often think of things I want to pass on to my loved ones./Nowadays, I value relationships with my loved ones more than I did 10 years ago./I must admit that sometimes I feel and think as other people of my age./I can still physically do most things as well today as I did earlier in life./I admit that I have lost some of my stamina in recent years./I am concerned with my ability to take care of myself when I get older./I sometimes think that the prime years of life may be behind me.*	Sthienrapapayut et al. (2018); Moschis et al. (2011); Moschis and Weaver (2009); Moschis et al. (2004); Moschis et al. (2003); Moschis (1992)
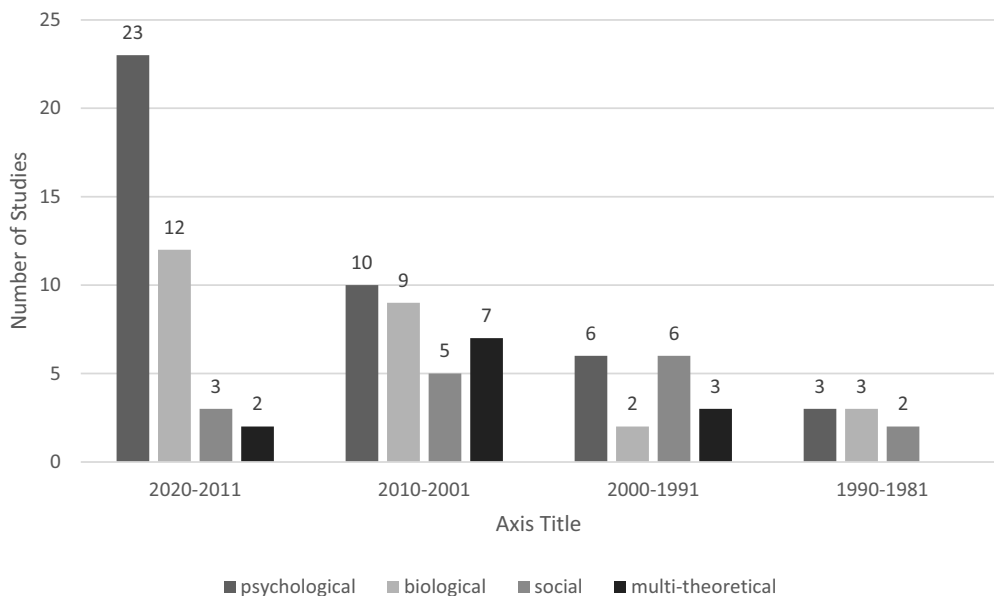
Figure 4. Alternative measures of ageing (n=77 articles).

Methodological issues and future research

In contrast to previous literature reviews which dealt with the conceptualisation of ageing while focusing mainly on its influence on different cognitive, affective and behavioural aspects of the consumer (e.Guido et al., 2021; Hettich et al., 2018; Moschis, 2012), this current review examines ageing measurement itself in the field of consumer behaviour research. Based on the presented comprehensive overview on quantitative measures associated with the ageing process we conclude that alternative age perspectives became more prevalent in recent years but still could not break the dominance of the chronological age approach. We believe that this situation is caused by methodological issues in the measurement of biological, psychological and social age. According to our analysis, three basic challenges associated with alternative age-measurement-methods in consumer research can be identified: (1) a relatively weak link to existing, validated, gerontological, and demographic measurement approaches, (2) a strong focus on subjective measures, and (3) a high complexity in data analysis and presentation of results. In the following, we discuss these issues and develop priorities for future research projects.

Reviewing the identified studies, we found a multitude of measurement approaches within each observed age dimension. Measures differed widely from single-item to multi-item scales and were partly self-developed and partly conceptualised from previous research efforts. Most measures seem to be thoroughly developed, nevertheless our analysis highlights that research in consumer behaviour rarely connects with scientific fields closer associated with the process of ageing, like gerontology or demography. Gerontology can be defined as 'the study of biological, psychological, and social aspects of ageing' (Grabinski, 2007, p. 230). Demography of ageing ' … focuses on the older members of a population as well as the processes and consequences of population ageing ' (Land & Lamb, 2017, p. 226). Both disciplines offer a wide array of well-developed measurement approaches of different facets of the ageing process. However, only a few studies in consumer research implemented measures from these disciplines (e.g. Eastman et al., 2020; Kuppelwieser & Klaus, 2020; Mathur et al., 1999). We believe that a stronger interdisciplinary focus of consumer behaviour research on established measures from gerontology and demography will foster a holistic theory development and strengthen the parsimony and rigidness of measures.

Clear priorities for future research

Based on our analysis, we identify three urgent priorities, which outline what future research must do to meaningfully advance the measurement of ageing in consumer behaviour. Each is grounded in our systematic findings and reflects both methodological necessity and conceptual opportunity.

Priority 1: Embed Future Quantitative Measures of Age and Ageing Process in Interdisciplinary Foundations

To improve construct validity and comparability, consumer research must adopt and adapt ageing measurement tools from allied fields – particularly gerontology and demography. These disciplines offer rigorously validated, widely tested instruments for

capturing the biological, psychological, and social dimensions of ageing. Leveraging these tools will strengthen theoretical foundations, align consumer behaviour research with real-world ageing processes, and reduce redundancy in measurement development.

For example, longitudinal research infrastructures such as the Health and Retirement Study (HRS) – which represents the entire US population aged 50 and older (Sonnega et al., 2014) – or its harmonised global counterparts, including the English Longitudinal Study of Ageing (ELSA) (Steptoe et al., 2013), the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2013), and the China Health and Retirement Longitudinal Study (CHARLS) (Zhao et al., 2014), provide an arsenal of robust, standardised instruments to assess functional, cognitive, and social aspects of ageing. Yet despite their availability and openness, these data and measures remain underutilised in consumer behaviour research (e.g. H. Kim & Lyons, 2008; Shen, 2019, 2020).

Priority 2: Introduce Performance-Based Indicators – such as cognitive or physical functioning tests – that are distinct from both self-perception and chronological age in Consumer Behaviour Research

Subjective ageing measures – such as perceived age or self-assessed health – reflect personal identity and lived experience. However, they often diverge substantially from performance-based indicators, such as objectively measured memory function or physical ability. This discrepancy has been well-documented in gerontology, particularly in relation to psychological and biological ageing (e.g. Crumley et al., 2014; Rickenbach et al., 2015).

For example, studies using memory recall or executive function tests (e.g. Shen (2020); Thoma and Wechsler (2021) reveal behavioural patterns that chronological or subjective age measures may fail to detect. Rickenbach et al. (2015), using data from the Midlife in the United States Study (MIDUS) and HRS, found that self-assessments of memory were only weakly correlated with actual memory change ($r = 0.12$ and $r = 0.22$, respectively). Similarly, two meta-analyses (Beaudoin & Desrichard, 2011; Crumley et al., 2014) reported low correlations between subjective and objective cognitive performance ($r = .06$ to $.15$), highlighting the limitations of relying on self-reports alone.

In consumer behaviour research, this gap can produce biased or misleading insights. Spitzer and Weber (2019), using data from 19 European countries, found that discrepancies between subjective and performance-based age indicators are moderated by age, education, gender, and regional development – demonstrating how overreliance on self-perception may obscure meaningful behavioural predictors such as financial risk-taking or decision quality. Similarly, older consumers who feel younger may overestimate their cognitive or physical capabilities, misaligning perceived and actual behaviour.

To address this, researchers should systematically incorporate performance-based indicators alongside subjective measures – especially when age is used to explain or predict consumer decisions. This dual approach enables more accurate modelling by accounting for both identity and ability, ensuring that ageing is captured not only as it is felt, but also as it is functionally experienced.

Priority 3: Translate Complexity into Parsimonious, Comparable Metrics

To move beyond the limitations of chronological age, future research must develop concise, interpretable ageing measures that preserve multidimensional depth while enabling meaningful comparison across populations and time. One promising path is the characteristic-based age approach, such as α-ages (Sanderson & Scherbov, 2013), which translates traits like physical strength or cognitive function into equivalent years of chronological age.

This approach maintains the simplicity and intuitive understanding of age-in-years, while reflecting real differences in functional status or behavioural potential. For example, our empirical illustration (see subsequent section) using HRS data demonstrated that older adults with higher dining-out frequency were cognitively 8.5 years 'younger' than their peers, even though their chronological age was identical. Such translation enables more accurate consumer segmentation and avoids the pitfalls of overcomplicated models or oversimplified proxies. Researchers should adopt similar parsimony-oriented tools to express ageing as both a continuous and behaviourally meaningful construct.

α-ages in consumer research

To integrate the catholicity of chronological age with more rigid, complex, multifaceted and performance-based ageing measures, the authors propose an interdisciplinary concept from demography, the so-called 'characteristic-based age'. The characteristic-based age approach offers a nuanced understanding of ageing by incorporating individual characteristics rather than solely relying on chronological age. This method emphasises multifaceted individual characteristics such as health, functional abilities as well as socio-economic factors, providing a more comprehensive view of the impact of ageing on individuals and populations and recognising the variability in ageing experiences.

The concept was introduced by Ryder (1975), who emphasised the importance of individual characteristics next to chronological age to better reflect the heterogeneity of ageing experiences. Almost a decade later, it was finally Siegel and Davidson (1984) who operationalised this idea by defining old age based on remaining life expectancy, establishing a dynamic measure that adjusts to changes in longevity and mortality patterns. Building upon this concept and the further development, more recent literature (e.g. by Sanderson & Scherbov, 2013) refined it further by considering a multifaceted perspective by including health status, cognitive functioning, or physical functioning, which offers a more holistic perspective on population ageing. In more detail, Warren Sanderson and Sergei Scherbov developed a characteristic-based age approach called α-ages, which can be applied to any characteristic of ageing such as functional abilities (i.e. cognitive functioning or physical functioning), self-perceived biological, cognitive or social age measures or biomarkers within any research field. The authors basically suggest to convert differences between populations into the more practical and straightforward chronological age measure (Sanderson et al., 2014).

In a more formal way, any characteristics can be written as a function $C(a,t)$ of chronological age (a) and time (t). If this function $C(a,t)$ is continuous and monotonic in 'a', it can be inverted to obtain the so called α-ages $\alpha_{k,t}$; thus the chronological age associated with a particular value k, of the selected characteristic at time (t). In a nutshell, it refers to how specific traits are associated with different age groups. Moreover, one can easily convert for example the difference in health of two subpopulations into single years

of age. For instance, the difference in health of satisfied and less satisfied senior consumers could be converted into single years of age.

The method proposed by Sanderson and Scherbov (2013) can be applied in marketing and consumer behaviour as well. Using the methodology, we can address different ageing experiences and changes in later life and convert the differences in ageing dimensions into single years of chronological age. Moreover, consumers can be measured by means of their physical functioning or cognitive functioning, applying different measurement approaches, as α-ages enable also comparisons and compositions of several characteristics. We believe through the implementation of α-ages, differences in ageing measures can be explained using a well-introduced easy-to-understand and comparable (also over time) age measure.

To illustrate the advantages of the characteristic age approach the authors present an empirical example. We investigate a common phenomenon of interest, the dining-out behaviour of older consumers.

According to previous studies dining-out is associated with psychological and biological ageing processes. D. Kim and Jang (2019) used a self-reported measure of biological health and psychological health to investigate differences between chronologically young and old consumers. They conclude that a good condition in mental and physical health leads to a higher dining-out frequency among older consumers. A result quite contrary to Sun and Morrison (2007), who found that less subjective perceived health actually increased the frequency of dining-out. Using data from the Health and Retirement Study (HRS) conducted on adults aged at least 50 years and living in the United States (National Institute on Ageing, 2007), the authors try to shed light on this discrepancy in previous research results, by applying the characteristic-based age approach. The HRS (Health and Retirement Study) is sponsored by the National Institute on Ageing (grant number NIA U01AG009740) and is conducted by the University of Michigan. Ethical approval for the Health and Retirement Study (HRS) data collection protocols were obtained from the University of Michigan Institutional Review Board. Further ethical approval for the presented secondary data analysis was not required.

We compare characteristic-based ages across older adults (aged 50 years or older) in the United States in 2022. Distinguishing older consumers by their out-of-home food consumption we split them into two subgroups using the median as the cut-off point; those with higher than the median versus those with lower than the median out-of-home food consumption. Our findings indicate disparities in psychological as well as biological ageing between the two consumer groups. Biological age was measured using the objective performance measure of hand-grip strength, which was conducted with a dynamometer on both hands. Psychological ageing, in turn, was measured with a performance-based episodic memory test, for which participants had to immediately recall as many words as possible out of 10 that were read out. Data of 5,634 respondents for hand-grip strength and 7,996 respondents for the memory test was analysed. Characteristics-based ages were calculated using linear regression models separately for hand-grip strength and episodic memory and additionally differentiated by gender as in particular hand-grip strength is known to vary by gender (see Figure 5 and Table 11).

Findings show that older adults from the higher (above median) out-of-home food consumption subgroup significantly are about 8.5 years younger cognitively than their counterparts with low (below media) out-of-home food consumption. Accordingly, men
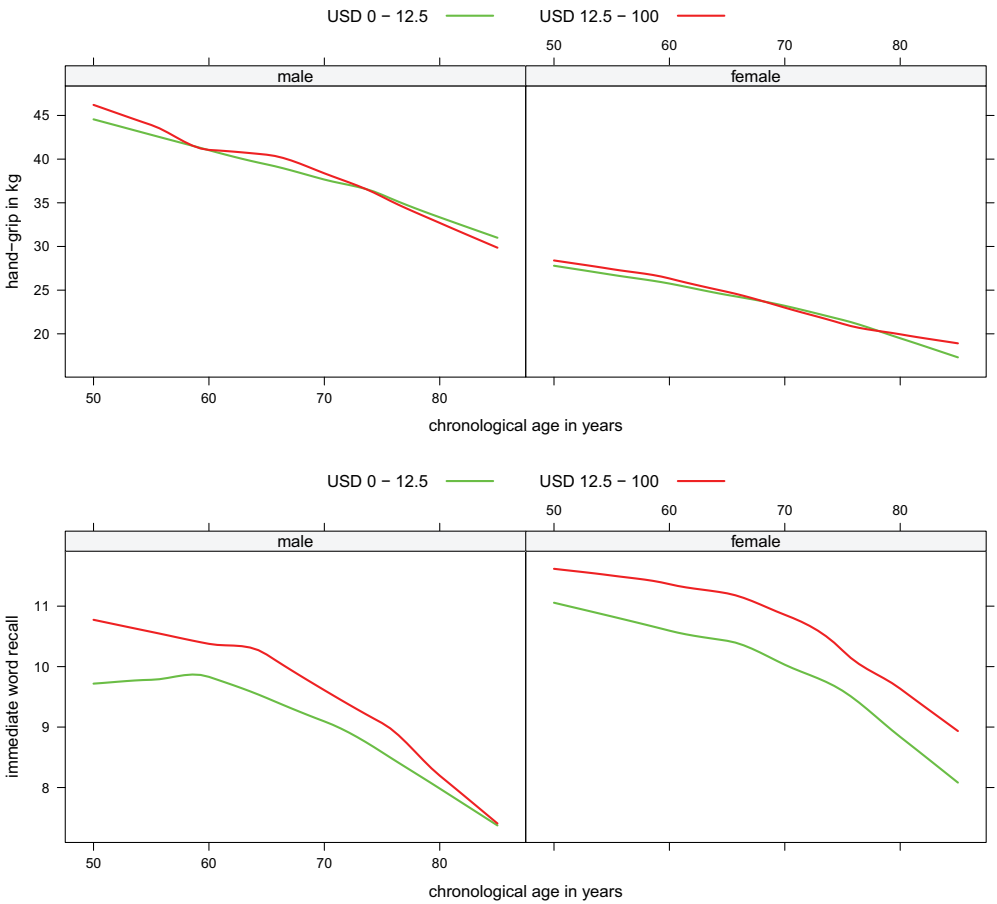
Figure 5. Men´s and woman´s age trajectories of hand-grip strength and immediate recall by spending on out-of-home food consumption.

Table 11. Alpha-ages for biological age (i.e. hand-grip strength) and psychological (i.e. episodic memory) of 60-year-old men and women with out-of-home food consumption below the median.

	Women	Men
Hand-grip strength	59.05	58.93
Memory	51.57	51.73

and women with a chronological age of 60 years with high out-of-home food consumption have the same psychological age as their counterparts from the low out-of-home consumption group aged only about 51.5 years (see Table 11). The non-significant gap in consumer behaviour for biological ageing is converted to about 1 chronological age year for men and women.

These results demonstrate that the impact of age on consumer behaviour – here, dining out – depends fundamentally on how age is measured. While no significant behavioural differences were detected in relation to biological age, psychological age showed a strong relationship: cognitively younger individuals dined out more frequently. This supports the central argument of our review: that the measurement of age is not neutral, but significantly shapes the conclusions we draw about consumer behaviour. Chronological age, while convenient and commonly used, often obscures the nuanced effects captured by more refined, performance-based measures of psychological or biological ageing. For instance, relying solely on chronological age may overlook cognitive vitality in older adults that helps explain higher engagement in food-related experiences. Thus, characteristic-based age measures not only offer methodological improvements but also reveal otherwise hidden patterns in consumer behaviour.

The findings support and contradict previous research results. The proposed effect of psychological ageing is supported, showing that mental health is strongly correlated with out-of-home food consumption. However, the effect of previous studies of biological ageing was not supported. Based on the results neither a positive nor a negative effect of health on out-of-home food consumption could be verified. A possible explanation for this result could be related to Social Selectivity Theory (SST). According to the theory persons with a limited time horizon are more present-oriented and pursue positive emotional short-term goals. Biological or physical ageing may have a stronger influence on the perception of a limited time horizon, than psychological age in this context. A lower performance-based biological age could lead to stronger cognitive understanding of the limitation of time horizon, compared to people experiencing age-related deficiencies in exactly these cognitive functions. Therefore, the short-term emotional goal of going out to eat outweighs the associated physical discomfort and biologically older people dine out as much as biologically younger ones.

Conclusion

In this study, we investigate the measurement of ageing in consumer behaviour research from a methodological perspective. As a first step, we conducted a systematic, and method-based review of 211 articles published in peer-reviewed journals between 1980 and 2024. Using a content analytical approach, we identified quantitative measures of ageing and categorised them, based on theoretical considerations from gerontology, into (1) biological, (2) psychological, (3) social, (4) multi-theoretical, and (5) chronological age measurement approaches.

The results of the review show that chronological age remains the most commonly applied measure in older consumer behaviour research. Alternative measures account for approximately 37% of the studies reviewed and exhibit significant variation across ageing dimensions. Measures of biological age were primarily self-developed and rarely derived from fields such as medicine, demography, or gerontology. Measures of psychological age were dominated by subjective perspectives (e.g. all variants of self-perceived age, such as cognitive age or FTP) and rarely integrated more performance-based measures, such as cognitive performance. Social ageing was measured by examining social roles and associated lifestyles. Holistic age measures focused on life events and the life-course paradigm. All identified alternative age measures varied widely, ranging from single-

item to multi-item approaches. Even theoretically identical constructs were measured inconsistently.

Theoretical implications

Based on our analysis, we conclude that alternative age perspectives have become more prevalent in recent years but have not yet supplanted the dominance of the chronological age approach. We attribute this to a weak connection with gerontological and demographic research, a strong focus on subjective measures, and the complexity of analysing and presenting non-chronological ageing measures. To address these challenges, we propose strengthening the conceptual and methodological ties between consumer research and age-related disciplines. We also recommend fostering research using performance-based age measures and investigating differences between subjective and performance-based measures of ageing. Furthermore, we encourage future research to adopt approaches like the 'characteristic age' approach, which translates complex measures of ageing into a commonly understood format, such as chronological age numbers.

The presented case, based on performance-based measures of memory and health from the Health and Retirement Study (HRS), illustrates the advantages of the characteristic age approach. Drawing on contradictory findings from D. Kim and Jang (2019) and Sun and Morrison (2007), we tested whether dining-out behaviour is associated with objectively measured psychological and biological ageing processes using data from the HRS, which surveyed adults aged 50 years and older in the United States (National Institute on Ageing, 2007). Applying the characteristic age approach, we found that older adults (men and women aged 60 years and above) in the higher (above-median) out-of-home food consumption subgroup were cognitively about 8.5 years younger than their counterparts with lower (below-median) out-of-home food consumption. However, we found no significant association between biological age, measured via hand-grip strength, and dining-out behaviour. We provided a theoretical explanation for these contradictory findings based on Social Selectivity Theory (SST), which posits that age-related mental health deficits limit out-of-home food consumption, while advanced physical ageing processes encourage such activities due to a more limited time horizon.

Based on the example and our findings, we encourage future research to follow our approach. A broad implementation of the characteristic age approach would facilitate the comparison of ageing measures across different subgroups and contexts. It would also enable the evaluation of measurement properties of various subjective and performance-based age measures across different ageing dimensions, thus reducing bias and stereotypes in representations of complex ageing processes and their multifaceted impacts on consumers' lives. In this context, the findings of the literature review can serve as a repository of previously implemented alternative age measurement approaches in older consumer behaviour research and as a tool for identifying biased measures and their influence on stereotypical outcomes.

Managerial implications

For marketing practitioners, our findings underscore that relying solely on chronological age as a segmentation variable can be misleading. Instead, firms should explore ways to incorporate functional and psychological assessments into their understanding of older customers. For example, a cognitive assessment proxy (e.g. memory and cognition of product attributes) could be more predictive of (digital) product adoption or success of marketing communication measures than analysis based on chronological age brackets alone. Similarly, physical functioning might better predict service delivery needs in hospitality or retail settings (e.g. seating comfort, ease of access). Managers can also benefit from applying characteristic-based age metrics to segment customers not just by age, but by capacity – helping design more personalised and inclusive products, services, and communication strategies.

Finally, a standardised representation of multidimensional age measures also helps professional market research. Alpha Ages enable the testing of a wide variety of subjective and performance-based measures, thereby allowing the investigation of methodological strengths and weaknesses of various concepts and their effects on practice. The review also presents an exhaustive collection of measures and can therefore help to professionalise measurement in practice, as time resources are typically scarce for researching such measures thoroughly.

All in all, the implications presented here can serve to better understand ageing in all its nuances and ultimately to combat age stereotypes in marketing and communications more effectively. Focusing on age dimensions and thus on the essential changes triggered by objectively measurable ageing processes allows researchers to examine these changes and measure them independently of subjective conventions.

Limitations and future directions

This study, while comprehensive, is not without limitations. First, our review focuses exclusively on quantitative studies, which may overlook valuable qualitative insights into older consumers' lived experiences and nuanced perspectives on ageing. Second, although we advocate for performance-based age measures, these often require access to specialised datasets or physical testing instruments (e.g. memory assessments, grip-strength devices), which may limit their applicability in general consumer research settings – despite the availability of established, low-cost survey tools. Third, our empirical illustration is based on US data (HRS), which may not be generalisable to other cultural, healthcare, or institutional contexts. Fourth, despite the methodological rigour of our review, the typical limitations of review studies apply, including the possibility of omitting relevant literature. Expanding the number of databases, refining search terms, and incorporating qualitative studies could offer a more holistic view of the research field. Additionally, exploring older consumer behaviour in other areas of business research (e.g. finance, logistics, innovation, tourism), as well as in gerontology and demography, may yield further valuable insights. Fifth, the categorisation of ageing processes, although grounded in established literature, represents only one interpretative framework. Sixth, the case study presented is intended to illustrate the explanatory power of the characteristic age approach; it does not constitute an exhaustive investigation into the effects of biological and psychological ageing on dining-out

behaviour. Future research could expand on these findings by employing longitudinal models and examining differences between subjective and performance-based measures of ageing.

Despite its limitations, we believe this review provides a rigorous and timely contribution to the understanding of the measurement of ageing in consumer behaviour research. By introducing the characteristic age approach, we aim to foster a more integrated and multidimensional conceptualisation of ageing across disciplines and methodologies. Furthermore, we seek to enhance the rigour and practical utility of alternative age measures, strengthening their application and interpretability. Ultimately, our goal is to improve the validity of age measurement and challenge the perpetuation of empirically supported yet unjustified age stereotypes. Future research should employ approaches such as the Alpha Ages to better understand how age stereotypes emerge. It should also investigate whether previous approaches to measuring ageing processes contribute to the formation or reinforcement of stereotypes, or instead help to uncover and confront them.

Disclosure statement

Notes on contributors

Robert Zniva is a Lecturer and Adjunct Researcher at the Institute for Retailing and Data Science at WU Vienna. Furthermore, he is Professor for Retailing and Marketing and Head of Research at the Department of Business and Tourism at the Salzburg University of Applied Sciences. His research focuses on the effects of ageing processes and technology on consumers and retail environments.

Daniela Weber is an Assistant Professor in the Health Economics and Policy Division at WU Vienna, where she leads the OEAW-funded project *Aging Health Capital*. Her research examines the impact of individual, regional, and country-specific factors on health capital. She is also a Research Scholar at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, where she leads the WWTF-funded project *Cognitive Health in an Ageing Society*.

ORCID

Robert Zniva 🆔 http://orcid.org/0000-0003-2212-2933
Daniela Weber 🆔 http://orcid.org/0000-0001-7873-0458

References

AARP. (2022). AARP report finds that older population makes significant and growing contributions to global economy. https://press.aarp.org/2022-11-10-AARP-Report-Finds-that-Older-Population -Makes-Significant-and-Growing-Contributions-to-Global-Economy

Altobello Nasco, S., & Hale, D. (2009). Information search for home, medical, and financial services by mature consumers. *The Journal of Services Marketing*, *23*(4), 226–235. https://doi.org/10.1108/08876040910965566

Amatulli, C., Guido, G., & Nataraajan, R. (2015). Luxury purchasing among older consumers: Exploring inferences about cognitive age, status, and style motivations. *Journal of Business Research*, *68*(9), 1945–1952. https://doi.org/10.1016/j.jbusres.2015.01.004

Amatulli, C., Peluso, A. M., Guido, G., & Yoon, C. (2018). When feeling younger depends on others: The effects of social cues on older consumers. *Journal of Consumer Research*, *45*(4), 691–709. https://doi.org/10.1093/jcr/ucy034

Arenas-Gaitán, J., Villarejo Ramos, A. F., & Peral-Peral, B. (2020). A posteriori segmentation of elderly internet users: Applying PLS-POS. *Marketing Intelligence & Planning*, *38*(3), 340–353. https://doi.org/10.1108/MIP-01-2019-0057

Arnhold, T., Szenkurök, V., & Weber, D. (2025). Mapping inequalities in the health of older adults around the world: Heterogeneities in cognitive and physical functioning. *Vienna Yearbook of Population Research*, 23. https://doi.org/10.1553/p-mcm9-5b3b

Asebedo, S. D., Wilmarth, M. J., Seay, M. C., Archuleta, K., Brase, G. L., & MacDonald, M. (2019). Personality and saving behavior among older adults. *The Journal of Consumer Affairs*, *53*(2), 488–519. https://doi.org/10.1111/joca.12199

Baars, J. (2008). *Problematic foundations: Theorizing time, age and ageing* (2nd ed., pp. 87–99). Handbook of Theories of Ageing.

Bae, H., Jo, S. H., & Lee, E. (2021). Why do older consumers avoid innovative products and services? *The Journal of Services Marketing*, *35*(1), 41–53. https://doi.org/10.1108/JSM-10-2019-0408

Barak, B. (1987). Cognitive age: A new multidimensional approach to measuring age identity. *The International Journal of Ageing and Human Development*, *25*(2), 109–128. https://doi.org/10.2190/RR3M-VQT0-B9LL-GQDM

Barak, B. (1998). Inner-ages of middle-aged prime-lifers. *The International Journal of Ageing and Human Development*, *46*(3), 189–228. https://doi.org/10.2190/Q9X5-8R56-EU39-BEND

Barak, B., & Gould, S. (1985). Alternative age measures: A research agenda. ACR North American Advances, NA-12. http://acrwebsite.org/volumes/6357/volumes/v12/NA-12

Barak, B., & Schiffman, L. G. (1981). Cognitive age: A nonchronological age variable. ACR North American Advances, NA-08. http://acrwebsite.org/volumes/5867/volumes/v08/NA-08

Barak, B., Stern, B. B., & Gould, S. J. (1988). *Ideal age concepts: An exploration*. ACR North American Advances.

Bardey, A., Radclyffe-Thomas, N., Tassell, C., Labruère Chazal, C., & Pejsak, N. (2024). 'Older people are not allowed to be old anymore': Representation, stereotyping and psychological impact of ageism in the fashion media. *Journal of Macromarketing*, 02761467241302462. https://doi.org/10.1177/02761467241302462

Bearden, W. O., & Wilder, R. P. (2007). Household life-cycle effects on consumer wealth and well-being for the recently retired. *Journal of Macromarketing*, *27*(4), 389–403. https://doi.org/10.1177/0276146707307142

Beaudoin, M., & Desrichard, O. (2011). Are memory self-efficacy and memory performance related? A meta-analysis. *Psychological Bulletin*, *137*(2), 211–241. https://doi.org/10.1037/a0022106

Bell, A., & Jones, K. (2015). Should age-period-cohort analysts accept innovation without scrutiny? A response to Reither, Masters, Yang, Powers, Zheng and Land. *Social Science and Medicine*, *128*, 331–333. https://doi.org/10.1016/j.socscimed.2015.01.040

Berg, H., & Liljedal, K. T. (2022). Elderly consumers in marketing research: A systematic literature review and directions for future research. *International Journal of Consumer Studies*, *46*(5), 1640–1664. https://doi.org/10.1111/ijcs.12830

Berg, H., Liljedal, K. T., Söderlund, M., & Daunfeldt, S. O. (2023). Happy to see you: The positive effects of in-store service encounters on the satisfaction of older consumers. *The International Review of Retail, Distribution & Consumer Research*, *33*(5), 479–493. https://doi.org/10.1080/09593969.2023.2229074

Birren, J. E., & Cunningham, W. R. (1985). Research on the psychology of ageing: Principles, concepts and theory. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of ageing* (2nd ed., pp. 3–34). Van Nostrand Reinhold Co.

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., Schaan, B., Stuck, S., Zuber, S., & on behalf of the SHARE Central Coordination Team. (2013). Data resource profile: The survey of health, ageing and retirement in Europe (SHARE). *International Journal of Epidemiology*, *42*(4), 992–1001. https://doi.org/10.1093/ije/dyt088

Bultena, G. L., & Powers, E. A. (1978). Denial of ageing: Age identification and reference group orientations1. *Journal of Gerontology*, *33*(5), 748–754. https://doi.org/10.1093/geronj/33.5.748

Burnett, J. J. (1989). Retirement versus age: Assessing the efficacy of retirement as a segmentation variable. *Journal of the Academy of Marketing Science*, *17*(4), 333–343. https://doi.org/10.1007/BF02726644

Burnett, J. J. (1991). Assessing the patronage behaviour of the retired male: A comparison with chronological age. *The International Review of Retail, Distribution & Consumer Research*, *1*(5), 585–606. https://doi.org/10.1080/09593969100000024

Burnett, J. J. (1996a). Direct marketing usage by older men: Chronological age versus retirement. *Journal of Direct Marketing*, *10*(2), 56–66. https://doi.org/10.1002/(SICI)1522-7138(199621)10:2<56::AID-DIR7>3.0.CO;2-Y

Burnett, J. J. (1996b). Comparing the patronage selection criteria of the elderly: Chronological age versus dependency. *The International Review of Retail, Distribution & Consumer Research*, *6*(3), 243–257. https://doi.org/10.1080/09593969600000023

Burt, S., & Gabbott, M. (1995). The elderly consumer and non-food purchase behaviour. *European Journal of Marketing*, *29*(2), 43–57. https://doi.org/10.1108/03090569510080941

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Ageing*, *7*(3), 331–338. https://doi.org/10.1037/0882-7974.7.3.331

Carstensen, L. L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, G. R., Brooks, K. P., & Nesselroade, J. R. (2011). Emotional experience improves with age: Evidence based on over 10 years of experience sampling. *Psychology and Ageing*, *26*(1), 21–33. https://doi.org/10.1037/a0021285

Cavan, R. S., Burgess, E. W., Havighurst, R. J., & Goldhamer, H. (1949). *Personal adjustment in old age*. Science Research Associates, Inc.

Chaouali, W., & Souiden, N. (2019). The role of cognitive age in explaining mobile banking resistance among elderly people. *Journal of Retailing & Consumer Services*, *50*, 342–350. https://doi.org/10.1016/j.jretconser.2018.07.009

Chaouali, W., Souiden, N., & Ringle, C. M. (2021). Elderly customers' reactions to service failures: The role of future time perspective, wisdom and emotional intelligence. *The Journal of Services Marketing*, *35*(1), 65–77. https://doi.org/10.1108/JSM-08-2019-0318

Chéron, E., & Kohlbacher, F. (2018). Older consumers' adoption of innovation in Japan: The mediating role of cognitive age. *Journal of International Consumer Marketing*, *30*(4), 244–259. https://doi.org/10.1080/08961530.2018.1436481

Chiriboga, D. A. (1989). The measurement of stress exposure in later life. In K. S. Markides & C. L. Cooper (Eds.), *Ageing stress and health* (pp. 13–41). Wiley and Sons.

Clark, S. D. (1994). *The impact of physical fitness participation on mature female consumers: A study of selected perceptions and behavior* [unpublished doctoral dissertation]. City University of New York.

Cohen, L. H. (1988). *Life events and psychological functioning: Theoretical and methodological issues* (Vol. 90). SAGE Publications, Incorporated.

Cole, C. A., & Balasubramanian, S. K. (1993). Age differences in consumers' search for information: Public policy implications. *Journal of Consumer Research*, *20*(1), 157–169. https://doi.org/10.1086/209341

Cole, C. A., & Houston, M. J. (1987). Encoding and media effects on consumer learning deficiencies in the elderly. *Journal of Marketing Research*, *24*(1), 55–63. https://doi.org/10.1177/002224378702400105

Cole, C., Laurent, G., Drolet, A., Ebert, J., Gutchess, A., Lambert-Pandraud, R., Mullet, E., Norton, M. I., & Peters, E. (2008). Decision making and brand choice by older consumers. *Marketing Letters*, *19*(3), 355–365. https://doi.org/10.1007/s11002-008-9058-x

Cole, T. R. (1983). The 'enlightened' view of ageing: Victorian morality in a new key. *The Hastings Center Report*, *13*(3), 34–40. https://doi.org/10.2307/3561620

Crain, M. R., & Bracken, B. A. (1994). Age, race, and gender differences in child and adolescent self-concept: Evidence from a behavioral acquisition, context-dependent model. *School Psychology Review*, *23*(3), 496–511. https://doi.org/10.1080/02796015.1994.12085728

Crumley, J. J., Stetler, C. A., & Horhota, M. (2014). Examining the relationship between subjective and objective memory performance in older adults: A meta-analysis. *Psychology and Ageing*, *29*(2), 250–263. https://doi.org/10.1037/a0035908

DeLorme, D. E., Huh, J., & Reid, L. N. (2006). Perceived effects of direct-to-consumer (DTC) prescription drug advertising on self and others: A third-person effect study of older consumers. *Journal of Advertising*, *35*(3), 47–65. https://doi.org/10.2753/JOA0091-3367350304

Diehl, M. K., & Wahl, H. W. (2010). Awareness of age-related change: Examination of a (mostly) unexplored concept. *Journals of Gerontology, Series B: Psychological Sciences & Social Sciences*, *65* (3), 340–350. https://doi.org/10.1093/geronb/gbp110

Dohm-Hansen, S., English, J. A., Lavelle, A., Fitzsimons, C. P., Lucassen, P. J., & Nolan, Y. M. (2024). The 'middle-aging' brain. *Trends in Neurosciences*, *47*(4), 259–272. https://doi.org/10.1016/j.tins.2024.02.001

Dominko, M., & Verbič, M. (2022). The effect of subjective well-being on consumption behavior. *The Journal of Consumer Affairs*, *56*(2), 876–898. https://doi.org/10.1111/joca.12457

Eastman, J. K., Modi, P., & Gordon-Wilson, S. (2020). The impact of future time perspective and personality on the sustainable behaviours of seniors. *Journal of Consumer Policy*, *43*(2), 275–294. https://doi.org/10.1007/s10603-019-09440-1

Eisend, M. (2022). Older people in advertising. *Journal of Advertising*, *51*(3), 308–322. https://doi.org/10.1080/00913367.2022.2027300

Fan, J. X., & Zick, C. D. (2004). The economic burden of health care, funeral, and burial expenditures at the end of life. *The Journal of Consumer Affairs*, *38*(1), 35–55. https://doi.org/10.1111/j.1745-6606.2004.tb00464.x

Franco, P. (2023). Older consumers and technology: A critical systematic literature review. *AMS Review*, *13*(1), 92–121. https://doi.org/10.1007/s13162-023-00256-4

Gentry, J. W., Kennedy, P. F., & Macintosh, G. (1995). Marketing implications of the expected role of physicians in family decisions concerning the institutionalization of the elderly. *Psychology and Marketing*, *12*(7), 647–662. https://doi.org/10.1002/mar.4220120707

Gilly, M. C., & Zeithaml, V. A. (1985). The elderly consumer and adoption of technologies. *Journal of Consumer Research*, *12*(3), 353–357. https://doi.org/10.1086/208521

Glenn, N. D. (1974). Ageing and conservatism. *Annals of the American Academy of Political and Social Science*, *415*(1), 176–186. https://doi.org/10.1177/000271627441500113

Grabinski, C. J. (2007). Careers in ageing. In J. E. Birren (Ed.), *Encyclopedia of gerontology* (pp. 230–239). Elsevier. https://doi.org/10.1016/B0-12-370870-2/00030-5

Gregoire, Y. (2003). *The impact of ageing on consumer responses: What do we know?* ACR North American Advances.

Guido, G., Amatulli, C., & Peluso, A. M. (2014). Context effects on older consumers' cognitive age: The role of hedonic versus utilitarian goals. *Psychology and Marketing*, *31*(2), 103–114. https://doi.org/10.1002/mar.20679

Guido, G., Amatulli, C., & Sestino, A. (2020). Elderly consumers and financial choices: A systematic review. *Journal of Financial Services Marketing*, *25*(3), 76–85. https://doi.org/10.1057/s41264-020-00077-7

Guido, G., Pichierri, M., Rizzo, C., Chieffi, V., & Moschis, G. (2021). Information processing by elderly consumers: A five-decade review. *The Journal of Services Marketing*, *35*(1), 14–28. https://doi.org/10.1108/JSM-09-2019-0368

Guiot, D. (2001). Antecedents of subjective age biases among senior women. *Psychology and Marketing*, *18*(10), 1049–1071. https://doi.org/10.1002/mar.1043

Gwinner, K. P., & Stephens, N. (2001). Testing the implied mediational role of cognitive age. *Psychology and Marketing*, *18*(10), 1031–1048. https://doi.org/10.1002/mar.1042

Hare, C. (2003). The food-shopping experience: A satisfaction survey of older Scottish consumers. *International Journal of Retail & Distribution Management*, *31*(5), 244–255. https://doi.org/10.1108/09590550310472415

Harzing, A.-W. (2024). *Journal quality list* (70th ed.). http://www.harzing.com

Hettich, D., Hattula, S., & Bornemann, T. (2018). Consumer decision-making of older people: A 45-year review. *Gerontologist*, *58*(6), e349–e368. https://doi.org/10.1093/geront/gnx007

Hopkins, C. D., Roster, C. A., & Wood, C. M. (2006). Making the transition to retirement: Appraisals, post-transition lifestyle, and changes in consumption patterns. *Journal of Consumer Marketing*, *23*(2), 87–99. https://doi.org/10.1108/07363760610655023

Iyer, R., & Eastman, J. K. (2006). The elderly and their attitudes toward the internet: The impact on internet use, purchase, and comparison shopping. *Journal of Marketing Theory & Practice*, *14*(1), 57–67. https://doi.org/10.2753/MTP1069-6679140104

Jahn, S., Gaus, H., & Kiessling, T. (2012). Trust, commitment, and older women: Exploring brand attachment differences in the elderly segment. *Psychology and Marketing*, *29*(6), 445–457. https://doi.org/10.1002/mar.20533

Johnson, R. L., & Cobb-Walgren, C. J. (1994). Ageing and the problem of television clutter. *Journal of Advertising Research*, *34*(4), 54–62. https://doi.org/10.1080/00218499.1994.12466962

Jones, G., & Macken, B. (2015). Questioning short-term memory and its measurement: Why digit span measures long-term associative learning. *Cognition*, *144*, 1–13. https://doi.org/10.1016/j.cognition.2015.07.009

Jung, K., & Jung, J. (2022). Lifestyle segmentation of older Koreans: A longitudinal comparison of segments and life satisfaction. *Asia Pacific Journal of Marketing & Logistics*, *34*(1), 3–30. https://doi.org/10.1108/APJML-10-2021-0713

Kaspar, R., Gabrian, M., Brothers, A., Wahl, H. W., & Diehl, M. (2019). Measuring awareness of age-related change: Development of a 10-item short form for use in large-scale surveys. *Gerontologist*, *59*(3), e130–e140. https://doi.org/10.1093/geront/gnx213

Kaufman, G., & Elder, G. H., Jr. (2002). Revisiting age identity: A research note. *Journal of Ageing Studies*, *16*(2), 169–176. https://doi.org/10.1016/S0890-4065(02)00042-7

Keillor, B. D., Parker, R. S., & Erffmeyer, R. C. (1996). The evaluative criteria of the elderly in a retail experience: Product-related vs. store-related factors. *Journal of Marketing Management (10711988*, *6*(2), 61–71.

Kim, D., & Jang, S. (. (2019). Senior consumers' dining-out behaviors: The roles of physical, psychological and economic health. *International Journal of Contemporary Hospitality Management*, *31*(8), 3134–3148. https://doi.org/10.1108/IJCHM-09-2018-0751

Kim, D., Mishra, S., Wang, Z., & Singh, S. N. (2016). Insidious effects of syntactic complexity: Are ads targeting older adults too complex to remember? *Journal of Advertising*, *45*(4), 509–518. https://doi.org/10.1080/00913367.2016.1262301

Kim, H., & Lyons, A. C. (2008). No pain, no strain: Impact of health on the financial security of older Americans. *The Journal of Consumer Affairs*, *42*(1), 9–36. https://doi.org/10.1111/j.1745-6606.2007.00092.x

Kim, S., Kim, H., & Gon Kim, W. (2003). Impacts of senior citizens' lifestyle on their choices of elderly housing. *Journal of Consumer Marketing*, *20*(3), 210–226. https://doi.org/10.1108/07363760310472245

Kim, Y.-K., Kang, J., & Kim, M. (2005). The relationships among family and social interaction, loneliness, mall shopping motivation, and mall spending of older consumers. *Psychology and Marketing*, *22*(12), 995–1015. https://doi.org/10.1002/mar.20095

Klippel, R. E. (1974). Marketing research and the aged consumer: The need for a new perspective. *Journal of the Academy of Marketing Science*, *2*(1), 242–248. https://doi.org/10.1007/BF02729517

Kohijoki, A.-M. (2011). The effect of ageing on consumer disadvantage in grocery retail services among the Finnish elderly. *Journal of Retailing & Consumer Services*, *18*(4), 370–377. https://doi.org/10.1016/j.jretconser.2011.04.003

Kohlbacher, F., & Chéron, E. (2012). Understanding 'silver' consumers through cognitive age, health condition, financial status, and personal values: Empirical evidence from the world's most mature market Japan. *Journal of Consumer Behaviour*, *11*(3), 179–188. https://doi.org/10.1002/cb.382

König, T. M., & Larsen, V. (2017). An intergenerational perspective on life satisfaction and its drivers: A comparison between 18-29-year-old and 50+ consumers in Germany. *Journal of Strategic Marketing*, *25*(3), 258–274. https://doi.org/10.1080/0965254X.2017.1299788

Kornadt, A. E., Kessler, E. M., Wurm, S., Bowen, C. E., Gabrian, M., & Klusmann, V. (2020). Views on ageing: A lifespan perspective. *European Journal of Ageing*, *17*, 387–401. https://doi.org/10.1007/s10433-019-00535-9

Kuppelwieser, V. G., & Klaus, P. (2020). Revisiting the age construct: Implications for service research. *Journal of Service Research*, *1094670520975138*(3), 372–389. https://doi.org/10.1177/1094670520975138

Kuppelwieser, V. G., & Klaus, P. (2021). Revisiting the age construct: Implications for service research. *Journal of Service Research*, *24*(3), 372–389. https://doi.org/10.1177/1094670520975138.

Lambert-Pandraud, R., Laurent, G., Mullet, E., & Yoon, C. (2017). Impact of age on brand awareness sets: A turning point in consumers' early 60s. *Marketing Letters*, *28*(2), 205–218. https://doi.org/10.1007/s11002-016-9407-0

Land, K. C., & Lamb, V. L. (2017). Demography of ageing. In S. R. Quah (Ed.), *International encyclopedia of public health* (pp. 226–232). Academic Press. https://doi.org/10.1016/B978-0-12-803678-5.00101-6

Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Ageing*, *17*(1), 125. https://doi.org/10.1037/0882-7974.17.1.125

Laukkanen, T., Sinkkonen, S., Kivijärvi, M., & Laukkanen, P. (2007). Innovation resistance among mature consumers. *Journal of Consumer Marketing*, *24*(7), 419–427. https://doi.org/10.1108/07363760710834834

Lee, H. J., & Lyu, J. (2019). Exploring factors which motivate older consumers' self-service technologies (SSTs) adoption. *The International Review of Retail, Distribution & Consumer Research*, *29*(2), 218–239. https://doi.org/10.1080/09593969.2019.1575261

Lee, J., & Geistfeld, L. V. (1999). Elderly consumers' receptiveness to telemarketing fraud. *Journal of Public Policy & Marketing*, *18*(2), 208–217. https://doi.org/10.1177/074391569901800207

Lee, Y. A. (2011). Clothing as an environment for older adults' successful ageing. *International Journal of Consumer Studies*, *35*(6), 702–710. https://doi.org/10.1111/j.1470-6431.2010.00989.x

Le Serre, D., & Chevalier, C. (2012). Marketing travel services to senior consumers. *Journal of Consumer Marketing*, *29*(4), 262–270. https://doi.org/10.1108/07363761211237335

Le Serre, D., Weber, K., Legohérel, P., & Errajaa, K. (2017). Culture as a moderator of cognitive age and travel motivation/perceived risk relations among seniors. *Journal of Consumer Marketing*, *34*(5), 455–466. https://doi.org/10.1108/JCM-02-2014-0869

Leung, D. Y. P., Leung, A. Y. M., & Chi, I. (2011). An evaluation of the factor structure of the instrumental activities of daily living involvement and capacity scales of the minimum data set for home care for elderly Chinese community dwellers in Hong Kong. *Home Health Care Services Quarterly*, *30*(3), 147–159. https://doi.org/10.1080/01621424.2011.592421

Leung, K. F., Wong, W. W., Tay, M. S. M., Chu, M. M. L., & Ng, S. S. W. (2005). Development and validation of the interview version of the Hong Kong Chinese WHOQOL-BREF. *Quality of Life Research*, *14*(5), 1413–1419.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Moher, D., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta analyses of studies that evaluate health care interventions: Explanation and elaboration. *Annals of Internal Medicine*, *151*(4), W–65. https://doi.org/10.7326/0003-4819-151-4-200908180-00136

Lim, C. M., & Kim, Y. K. (2011). Older consumers' TV home shopping: Loneliness, parasocial interaction, and perceived convenience. *Psychology and Marketing*, *28*(8), 763–780. https://doi.org/10.1002/mar.20411

Maddox, G. L., & Douglass, E. B. (1973). Self-assessment of health: A longitudinal study of elderly subjects. *Journal of Health & Social Behavior*, *14*(1), 87–93. https://doi.org/10.2307/2136940

Marjanen, H., Kohijoki, A.-M., & Saastamoinen, K. (2016). Profiling the ageing wellness consumers in the retailing context. *The International Review of Retail, Distribution & Consumer Research*, *26*(5), 477–501. https://doi.org/10.1080/09593969.2016.1206950

Marjanen, H., Kohijoki, A.-M., Saastamoinen, K., & Engblom, J. (2019). Old dogs learning new tricks? The effect of age and generation on shopping behaviour. *The International Review of Retail, Distribution & Consumer Research*, *29*(5), 549–567. https://doi.org/10.1080/09593969.2019.1664613

Markides, K. S., & Martin, H. W. (1979). A causal model of life satisfaction among the elderly1. *Journal of Gerontology*, *34*(1), 86–93. https://doi.org/10.1093/geronj/34.1.86

Mason, M. C., Zamparo, G., & Pauluzzo, R. (2023). Amidst technology, environment and human touch. Understanding elderly customers in the bank retail sector. *International Journal of Bank Marketing*, *41*(3), 572–600. https://doi.org/10.1108/IJBM-06-2022-0256

Mathur, A. (1996). Older adults' motivations for gift giving to charitable organisations: An exchange theory perspective. *Psychology and Marketing*, *13*(1), 107–123. https://doi.org/10.1002/(SICI)1520-6793(199601)13:1<107:AID-MAR6>3.0.CO;2-K

Mathur, A., & Moschis, G. P. (2005). Antecedents of cognitive age: A replication and extension. *Psychology and Marketing*, *22*(12), 969–994. https://doi.org/10.1002/mar.20094

Mathur, A., Moschis, G. P., & Lee, E. (1999). Stress and consumer behavior. *Journal of Marketing Practice: Applied Marketing Science*, *5*(6/7/8), 233–247. https://doi.org/10.1108/EUM0000000004572

Mathur, A., Moschis, G. P., & Lee, E. (2008). A longitudinal study of the effects of life status changes on changes in consumer preferences. *Journal of the Academy of Marketing Science*, *36*(2), 234–246. https://doi.org/10.1007/s11747-007-0021-9

Mathur, A., Ong, F. S., Fatt, C. K., Rakrachakarn, P., & Moschis, G. P. (2017). Beyond cognitive age: Developing a multitheoretical measure of age and its assessment. *Journal of Marketing Analytics*, *5*(1), 31–43. https://doi.org/10.1057/s41270-017-0011-9

Mathur, A., Sherman, E., & Schiffman, L. G. (1998). Opportunities for marketing travel services to new-age elderly. *The Journal of Services Marketing*, *12*(4), 265–277. https://doi.org/10.1108/08876049810226946

McDowell, I. (2006). *Measuring health: A guide to rating scales and questionnaires*. Oxford University Press.

Meadow, H. L., Cosmas, S. C., & Plotkin, A. (1981). *The elderly consumer: Past, present, and future*. ACR North American Advances.

Mecredy, P., Wright, M., Feetham, P., & Stern, P. (2022). Re-examining age-related loyalty for low-involvement purchasing. *European Journal of Marketing*, *56*(7), 1773–1798. https://doi.org/10.1108/EJM-06-2021-0440

Miller, N. J., Kim, S., & Schofield-Tomschin, S. (1998). The effects of activity and ageing on rural community living and consuming. *The Journal of Consumer Affairs*, *32*(2), 343–368. https://doi.org/10.1111/j.1745-6606.1998.tb00413.x

Milliman, R. E., & Erffmeyer, R. C. (1989). Improving advertising aimed at seniors. *Journal of Advertising Research*, *29*(6), 31–36. https://doi.org/10.1080/00218499.1989.12467676

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, *151*, 264–269. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Moliner-Tena, M. A., Fandos-Roig, J. C., Estrada-Guillén, M., & Monferrer-Tirado, D. (2018). Younger and older trust in a crisis situation. *International Journal of Bank Marketing*, *36*(3), 456–481. https://doi.org/10.1108/IJBM-01-2017-0018

Montepare, J. M. (1996). Variations in adults' subjective ages in relation to birthday nearness, age awareness, and attitudes toward ageing. *Journal of Adult Development*, *3*(4), 193–203. https://doi.org/10.1007/BF02281963

Montgomery, R. D., Taylor, R. D., & Mitchell, M. A. (1998). The impact of retirement, occupation, and activity on the cognitive processes of the elderly. *Journal of Marketing Management (10711988)*, *8*(2), 52–65.

Moschis, G., Curasi, C., & Bellenger, D. (2004). Patronage motives of mature consumers in the selection of food and grocery stores. *Journal of Consumer Marketing*, *21*(2), 123–133. https://doi.org/10.1108/07363760410525687

Moschis, G. P. (1991). *Approaches to the study of consumer behavior in late life*. ACR North American Advances.

Moschis, G. P. (1992). Gerontographics: A scientific approach to analyzing and targeting the mature market. *The Journal of Services Marketing*, *6*(3), 17–26. https://doi.org/10.1108/08876049210035890

Moschis, G. P. (1994). Consumer behavior in later life: Multidisciplinary contributions and implications for research. *Journal of the Academy of Marketing Science*, *22*(3), 195–204. https://doi.org/10.1177/0092070394223001

Moschis, G. P. (2003). Marketing to older adults: An updated overview of present knowledge and practice. *Journal of Consumer Marketing*, *20*(6), 516–525. https://doi.org/10.1108/07363760310499093

Moschis, G. P. (2012). Consumer behavior in later life: Current knowledge, issues, and new directions for research. *Psychology and Marketing*, *29*(2), 57–75. https://doi.org/10.1002/mar.20504

Moschis, G. P. (2021). The life course paradigm and consumer behavior: Research frontiers and future directions. *Psychology and Marketing*, *38*(11). https://doi.org/10.1002/mar.21586

Moschis, G. P., Bellenger, D., & Curasi, C. F. (2003). Financial service preferences and patronage motives of older consumers. *Journal of Financial Services Marketing*, *7*(4), 331–340. https://doi.org/10.1057/palgrave.fsm.4770097

Moschis, G. P., Ferguson, J. L., & Zhu, M. (2011). Mature consumers' selection of apparel and footwear brands and department stores. *International Journal of Retail & Distribution Management*, *39*(10), 785–801. https://doi.org/10.1108/09590551111162266

Moschis, G. P., & Mathur, A. (2006). Older consumer responses to marketing stimuli: The power of subjective age. *Journal of Advertising Research*, *46*(3), 339. https://doi.org/10.2501/S0021849906060326

Moschis, G. P., Mathur, A., & Smith, R. B. (1993). Older consumers' orientations toward age-based marketing stimuli. *Journal of the Academy of Marketing Science*, *21*(3), 195–205. https://doi.org/10.1177/0092070393213003

Moschis, G. P., & Ong, F. S. (2011). Religiosity and consumer behavior of older adults: A study of subcultural influences in Malaysia. *Journal of Consumer Behaviour*, *10*(1), 8–17. https://doi.org/10.1002/cb.342

Moschis, G. P., & Weaver, S. T. (2009). Segmenting demand for long-term care insurance among mature consumers. *Services Marketing Quarterly*, *31*(1), 106–115. https://doi.org/10.1080/15332960903408542

National Institute on Ageing. (2007). *The health and retirement study*. National Institutes of Health.

Ong, F. S., & Moschis, G. P. (2009). Stress, coping, and well-being: A study of ethnic differences among older adults. *Journal of International Consumer Marketing*, *21*(3), 219–229. https://doi.org/10.1080/08961530802202933

Ong, S. F., Kitchen, J. P., & Jama, A. T. (2008). Consumption patterns and silver marketing: An analysis of older consumers in Malaysia. *Marketing Intelligence & Planning*, *26*(7), 682–698. https://doi.org/10.1108/02634500810916663

Ong, S. F., Lu, Y., Abessi, M., & Phillips, D. R. (2009). The correlates of cognitive ageing and adoption of defensive-ageing strategies among older adults. *Asia Pacific Journal of Marketing & Logistics*, *21*(2), 294–305. https://doi.org/10.1108/13555850910950095

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E.McDonald, S., & Whiting, P. (2021). The prisma, 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery*, *88*, 105906. https://doi.org/10.1016/j.ijsu.2021.105906

Pampalon, R., Saucier, A., Berthiaume, N., Ferland, P., Couture, R., Fortin, L., Lacroix, D., & Kirouc, R. (1994). *Des indicateurs de besoins pour l'allocation interrégionale des ressources* (Indicators of needs for inter-regional allocations of resources). French Ministry for Health and Social Service.

Parida, V., Mostaghel, R., & Oghazi, P. (2016). Factors for elderly use of social media for health-related activities. *Psychology and Marketing*, *33*(12), 1134–1141. https://doi.org/10.1002/mar.20949

Park, J., Kim, D., & Hyun, H. (2021). Understanding self-service technology adoption by 'older' consumers. *The Journal of Services Marketing*, *35*(1), 78–97. https://doi.org/10.1108/JSM-10-2019-0420

Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? *International Business Review*, *29*(4), 101717. https://doi.org/10.1016/j.ibusrev.2020.101717

Phillips, L. W., & Sternthal, B. (1977). Age differences in information processing: A perspective on the aged consumer. *Journal of Marketing Research*, *14*(4), 444–457. https://doi.org/10.1177/002224377701400402

Preston, C. E. (1968). Subjectively perceived agedness and retirement1. *Journal of Gerontology*, *23*(2), 201–204. https://doi.org/10.1093/geronj/23.2.201

Rae, M. J., Butler, R. N., Campisi, J., de Grey, A. D., Finch, C. E., Gough, M., Martin, G. M., Vijg, J., Perrott, K. M., & Logan, B. J. (2010). The demographic and biomedical case for late-life interventions in aging. *Science Translational Medicine*, *2*(40).

Rajaobelina, L., Brun, I., Line, R., & Cloutier-Bilodeau, C. (2021). Not all elderly are the same: Fostering trust through mobile banking service experience. *International Journal of Bank Marketing*, *39*(1), 85–106. https://doi.org/10.1108/IJBM-05-2020-0288

Reither, E. N., Land, K. C., Jeon, S. Y., Powers, D. A., Masters, R. K., Zheng, H., Hardy, M. A., Keyes, K. M., Fu, Q., Hanson, H. A., Smith, K. R., Utz, R. L., & Claire Yang, Y. (2015). Clarifying hierarchical age-period-cohort models: A rejoinder to Bell and Jones. *Social Science and Medicine*, *145*, 125–128. https://doi.org/10.1016/j.socscimed.2015.07.013

Rickenbach, E. H., Agrigoroaei, S., & Lachman, M. E. (2015). Awareness of memory ability and change: (in)accuracy of memory self-assessments in relation to performance. *Journal of Population Ageing*, *8*(1–2), 71–99. https://doi.org/10.1007/s12062-014-9108-5

Rosenberg, M. (1979). *Conceiving the self*. Basic Books.

Ryder, N. B. (1975). Notes on stationary populations. *Population Index*, *41*(1), 3–28. https://doi.org/10.2307/2734140

Sanderson, W. C., & Scherbov, S. (2013). The characteristics approach to the measurement of population ageing. *Population & Development Review*, *39*(4), 673–685. https://doi.org/10.1111/j.1728-4457.2013.00633.x

Sanderson, W. C., Scherbov, S., & Dowd, J. B. (2014). Measuring the speed of ageing across population subgroups. *PLOS ONE*, *9*(5), e96289. https://doi.org/10.1371/journal.pone.0096289

Schewe, C. D. (1984). *Buying and consuming behavior of the elderly findings from behavioral research*. ACR North American Advances.

Schewe, C. D., & Balazs, A. L. (1992). Role transitions in older adults: A marketing opportunity. *Psychology and Marketing*, *9*(2), 85–99. https://doi.org/10.1002/mar.4220090202

Schwendtner, T., Amsl, S., Teller, C., & Wood, S. (2024). Shopping behaviour of elderly consumers: Change and stability during times of crisis. *International Journal of Retail & Distribution Management*, *52*(13), 1–15. https://doi.org/10.1108/IJRDM-01-2023-0029

Settersten, R. A., & Mayer, K. U. (1997). The measurement of age, age structuring, and the life course. *Annual Review of Sociology*, *23*(1), 233–261. https://doi.org/10.1146/annurev.soc.23.1.233

Shen, A. (2019). Marketing preventive health to baby boomers: What if unhealthy lifestyles are attributable to the counterculture? *Journal of Macromarketing*, *39*(2), 151–165. https://doi.org/10.1177/0276146719835290

Shen, A. (2020). Ageing, PEOU, and adoption of communication technology. *Journal of Consumer Marketing*, *37*(2), 139–147. https://doi.org/10.1108/JCM-12-2018-2973

Sherman, E., Schiffman, L. G., & Mathur, A. (2001). The influence of gender on the new-age elderly's consumption orientation. *Psychology and Marketing*, *18*(10), 1073–1089. https://doi.org/10.1002/mar.1044

Shipp, A. J., Edwards, J. R., & Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: The subjective experience of the past, present, and future. *Organisational Behavior & Human Decision Processes*, *110*(1), 1–22. https://doi.org/10.1016/j.obhdp.2009.05.001

Siegel, J. S., & Davidson, M. (1984). *Demographic and socioeconomic aspects of ageing in the United States*. Current population reports no. 43; series P-23. US Government Printing Office.

Silvers, C. (1997). Smashing old stereotypes of 50-plus America. *Journal of Consumer Marketing*, *14*(4), 303–309. https://doi.org/10.1108/07363769710188554

Singh, J., Riley, F. D., Hand, C., & Maeda, M. (2012). Measuring brand choice in the older customer segment in Japan. *International Journal of Market Research*, *54*(3), 347–368. https://doi.org/10.2501/ijmr-54-3-347-368

Sirgy, M. J. (1982). Self-concept in consumer behavior: A critical review. *Journal of Consumer Research*, *9*(3), 287–300. https://doi.org/10.1086/208924

Sirgy, M. J., Mentzer, J. T., Rahtz, D. R., & Meadow, H. L. (1991). Satisfaction with health care services consumption and life satisfaction among the elderly. *Journal of Macromarketing*, *11*(1), 24–39. https://doi.org/10.1177/027614679101100103

Smith, R. B., & Moschis, G. P. (1985). A socialization perspective on selected consumer characteristics of the elderly. *The Journal of Consumer Affairs*, *19*(1), 74–95. https://doi.org/10.1111/j.1745-6606.1985.tb00345.x

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Sonnega, A., Faul, J. D., Ofstedal, M. B., Langa, K. M., Phillips, J. W., & Weir, D. R. (2014). Cohort profile: The health and retirement study (HRS). *International Journal of Epidemiology*, *43*(2), 576–585. https://doi.org/10.1093/ije/dyu067

Spitzer, S., & Weber, D. (2019). Reporting biases in self-assessed physical and cognitive health status of older Europeans. *PLOS ONE*, *14*(10), e0223526. https://doi.org/10.1371/journal.pone.0223526

Stammerjohan, C. A., Capella, L. M., & Taylor, R. D. (2007). Retirement and transition phenomena in the family purchase process. *Psychology and Marketing*, *24*(3), 225–251. https://doi.org/10.1002/mar.20159

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, *110*(15), 5797. https://doi.org/10.1073/pnas.1219686110

Sthienrapapayut, T., Moschis, G. P., & Mathur, A. (2018). Using gerontographics to explain consumer behaviour in later life: Evidence from a Thai study. *Journal of Consumer Marketing*, *35*(3), 317–327. https://doi.org/10.1108/JCM-02-2017-2083

Strough, J., Karns, T. E., & Schlosnagle, L. (2011). Decision-making heuristics and biases across the life span. *Annals of the New York Academy of Sciences*, *1235*(1), 57–74. https://doi.org/10.1111/j.1749-6632.2011.06208.x

Suarez-Alvarez, L., Suarez-Vazquez, A., & Del Río-Lanza, A. B. (2021). Companion cocreation: Improving health service encounters of the elderly. *The Journal of Services Marketing*, *35*(1), 116–130. https://doi.org/10.1108/JSM-09-2019-0367

Sudbury, L., & Simcock, P. (2009a). A multivariate segmentation model of senior consumers. *Journal of Consumer Marketing*, *26*(4), 251–262. https://doi.org/10.1108/07363760910965855

Sudbury, L., & Simcock, P. (2009b). Understanding older consumers through cognitive age and the list of values: A U.K.-based perspective. *Psychology and Marketing*, *26*(1), 22–38. https://doi.org/10.1002/mar.20260

Sudbury-Riley, L. (2016). The baby boomer market maven in the United Kingdom: An experienced diffuser of marketplace information. *Journal of Marketing Management*, *32*(7–8), 716–749. https://doi.org/10.1080/0267257X.2015.1129985

Sudbury-Riley, L., & Edgar, L. (2016). Why older adults show preference for rational over emotional advertising appeals: A UK brand study challenges the applicability of socioemotional selectivity theory to advertising. *Journal of Advertising Research*, *56*(4), 441–455. https://doi.org/10.2501/JAR-2016-048

Sudbury-Riley, L., Hofmeister-Toth, A., & Kohlbacher, F. (2014). A cross-national study of the ecological worldview of senior consumers. *International Journal of Consumer Studies*, *38*(5), 500–509. https://doi.org/10.1111/ijcs.12126

Sudbury Riley, L., Kohlbacher, F., & Hofmeister, A. (2012). A cross-cultural analysis of pro-environmental consumer behaviour among seniors. *Journal of Marketing Management*, *28*(3–4), 290–312. https://doi.org/10.1080/0267257X.2012.658841

Sudbury-Riley, L., Kohlbacher, F., & Hofmeister, A. (2015). Baby boomers of different nations: Identifying horizontal international segments based on self-perceived age. *International Marketing Review*, *32*(3–4), 245–278. https://doi.org/10.1108/IMR-09-2013-0221

Sun, Y.-H. C., & Morrison, A. M. (2007). Senior citizens and their dining-out traits: Implications for restaurants. *Special Issue on Self-Catering Accommodations*, *26*(2), 376–394. https://doi.org/10.1016/j.ijhm.2006.03.003

Szmigin, I., & Carrigan, M. (2000). The older consumer as innovator: Does cognitive age hold the key? *Journal of Marketing Management*, *16*(5), 505–527. https://doi.org/10.1362/026725700785046038

Tausig, M. (1982). Measuring life events. *Journal of Health & Social Behavior*, *23*(1), 52–64. https://doi.org/10.2307/2136389

Teller, C., Gittenberger, E., & Schnedlitz, P. (2013). Cognitive age and grocery-store patronage by elderly shoppers. *Journal of Marketing Management*, *29*(3–4), 317–337. https://doi.org/10.1080/0267257X.2013.766627

Tepper, K. (1994). The role of labeling processes in elderly consumers' responses to age segmentation cues. *Journal of Consumer Research*, *20*(4), 503–519. https://doi.org/10.1086/209366

Thoma, D., & Wechsler, J. (2021). Older and more personal: Stronger links between brand-name recall and brand-related autobiographical memories in older consumers. *Psychology and Marketing*, *38*(9), 1384–1392. https://doi.org/10.1002/mar.21533

Tongren, H. N. (1988). Determinant behavior characteristics of older consumers. *The Journal of Consumer Affairs*, *22*(1), 136–157. https://doi.org/10.1111/j.1745-6606.1988.tb00217.x

Tootelian, D. H., & Varshney, S. B. (2010). The grandparent consumer: A financial 'goldmine' with gray hair? *Journal of Consumer Marketing*, *27*(1), 57–63. https://doi.org/10.1108/07363761011012958

Tynan, A. C., & Drayton, J. (1985). The methuselah market part II: Decision making and the older consumer. *Journal of Marketing Management*, *1*(1–2), 213–221. https://doi.org/10.1080/0267257X.1985.9963986

United Nations. (2022). World population prospects, 2022: Summary of results. UN DESA/POP/2022/TR/NO. 3.

Van Auken, S., & Barry, T. E. (2009). Assessing the nomological validity of a cognitive age segmentation of Japanese seniors. *Asia Pacific Journal of Marketing & Logistics*, *21*(3), 315–328. https://doi.org/10.1108/13555850910973810

Vuori, S., & Holmlund-Rytkönen, M. (2005). 55+ people as internet users. *Marketing Intelligence & Planning*, *23*(1), 58–76. https://doi.org/10.1108/02634500510577474

Walker, M. M., & Macklin, C. M. (1992). The use of role modeling in targeting advertising to grandparents. *Journal of Advertising Research*, *32*(4), 37–44. https://doi.org/10.1080/00218499.1992.12466840

Wechsler, D. (2000). *Echelle d'intelligence de Wechsler pour adultes*.

Weijters, B., & Geuens, M. (2006). Evaluation of age-related labels by senior citizens. *Psychology and Marketing*, *23*(9), 783–798. https://doi.org/10.1002/mar.20129

Wilkes, R. E. (1992). A structural modeling approach to the measurement and meaning of cognitive age. *Journal of Consumer Research*, *19*(2), 292–301. https://doi.org/10.1086/209303

Wolf, F., Sandner, P., & Welpe, I. M. (2014). Why do responses to age-based marketing stimuli differ? The influence of retirees' group identification and changing consumption patterns. *Psychology and Marketing*, *31*(10), 914–931. https://doi.org/10.1002/mar.20743

Worsley, T., Chun Wang, W., & Hunter, W. (2011). Baby boomers' reasons for choosing specific food shops. *International Journal of Retail & Distribution Management*, *39*(11), 867–882. https://doi.org/10.1108/09590551111177972

Yang, Z., Zhou, N., & Chen, J. (2005). Brand choice of older Chinese consumers. *Journal of International Consumer Marketing*, *17*(4), 65–81. https://doi.org/10.1300/J046v17n04_04

Yoon, C., Cole, C. A., & Lee, M. P. (2009). Consumer decision making and ageing: Current knowledge and future directions. *Journal of Consumer Psychology*, *19*(1), 2–16. https://doi.org/10.1016/j.jcps.2008.12.002

Yoon, C., Laurent, G., Fung, H. H., Gonzalez, R., Gutchess, A. H., Hedden, T., Lambert-Pandraud, R., Mather, M., Park, D. C., Peters, E., & Skurnik, I. (2005). Cognition, persuasion and decision making in older consumers. *Marketing Letters*, *16*(3), 429–441. https://doi.org/10.1007/s11002-005-5903-3

Zhang, Y., Su, J., Guo, H., Lee, J. Y., Xiao, Y., & Fu, M. (2022). Transformative value co-creation with older customers in e-services: Exploring the influence of customer participation on appreciation of digital affordances and well-being. *Journal of Retailing & Consumer Services*, *67*, 103022. https://doi.org/10.1016/j.jretconser.2022.103022

Zhao, Y., Hu, Y., Smith, J. P., Strauss, J., & Yang, G. (2014). Cohort profile: The China Health and Retirement Longitudinal Study (CHARLS). *International Journal of Epidemiology*, *43*(1), 61–68. https://doi.org/10.1093/ije/dys203

Zniva, R., & Weitzl, W. (2016). It's not how old you are but how you are old: A review on ageing and consumer behavior. *Management Review Quarterly*, *66*(4), 267–297. https://doi.org/10.1007/s11301-016-0121-z