Journal of the Academy of Marketing Science (2026) 54:907–924
https://doi.org/10.1007/s11747-026-01160-6

ORIGINAL EMPIRICAL RESEARCH

No time to enjoy the extra! Aging and consumers' responses to volume-based sales promotions

Jiexian Chloe Huang[1] · **Fei Katie Xu**[2] · **Linying Sophie Fan**[3] · **Yuwei Jiang**[4]

Received: 6 November 2024 / Accepted: 20 April 2026 / Published online: 9 May 2026
© The Author(s) 2026

Abstract

Population aging is an increasing global concern with significant implications for consumer behavior. Across six studies—including an incentive-compatible behavioral experiment and a field study—the findings indicate that older consumers exhibit lower purchase intentions toward volume-based promotions (e.g., offers that provide additional free products). This negative effect appears to be driven by a limited future time perspective associated with aging. However, the effect is attenuated when the promotional format of the extra-volume presentation is separable (e.g., buy-one-get-one-free) or when the purchase context reduces personal consumption relevance, such as when buying for others. These findings offer actionable insights for marketers and help close a gap in inclusive marketing by promoting more age-representative strategies. Aligning promotional approaches with older consumers' temporal orientations enhances both equity and effectiveness in consumer engagement.

Keywords Aging · Age-related differences · Older consumers · Volume-based sales promotion · Extra product · Future time perspective

The global population is experiencing an unprecedented demographic shift toward aging. According to the World Health Organization (2024), by 2030, one in six people worldwide will be aged 60 years or older. By 2050, this age group is projected to reach 2.1 billion, accounting for 26% of the global population and nearly doubling the 2024 figure of 1.2 billion, which currently represents 12% of the total (Office for National Statistics, 2024). Notably, in 2018, the number of individuals aged 60 and above surpassed the global population of children under five for the first time. By 2050, this group is expected to outnumber adolescents and youth aged 15 to 24 (United Nations, 2020). This demographic transition is widely attributed to advances in public health, medical innovation, and socioeconomic development, which have extended life expectancy (Butler, 2009; Butler & Jasmin, 2000). Nevertheless, population aging presents complex societal challenges, including a shrinking labor force, rising public expenditures on healthcare and pensions, shifting tax revenues, and increased pressure on fiscal sustainability (Christensen et al., 2009).

Given the projected growth of the aging population, older consumers represent an increasingly valuable market for businesses (Yannopoulou et al., 2023). This demographic is now regarded as one of the most economically powerful segments of the population (Drolet et al., 2019). Individuals aged 50 to 70 account for 27% of annual consumer spending—approximately $7 trillion—across 12 major markets, including China, India, the UK, and the US. They are more

Anne Roggeveen served as Area Editor for this article.

✉ Yuwei Jiang
yuwei.jiang@polyu.edu.hk

Jiexian Chloe Huang
chloe.huang@newcastle.ac.uk

Fei Katie Xu
katie.xu@monash.edu

Linying Sophie Fan
sophie.fan@unsw.edu.au

[1] Newcastle University Business School, Newcastle University, Newcastle upon Tyne, UK

[2] Monash Business School, Monash University, Clayton, VIC 3800, Australia

[3] UNSW Business School, University of New South Wales (UNSW), Sydney, Australia

[4] Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

likely to influence the purchasing decisions of younger consumers than vice versa. This combination of economic and social influence has positioned older adults as key decision-makers across a range of sectors, including healthcare, skincare, leisure, retail, and automotive (Witschi et al., 2023). Consequently, age remains one of the most widely used segmentation criteria in marketing (De Pelsmacker, 2021), and marketers are expected to tailor their strategies to align with the preferences and behaviors of older consumers.

Despite the growing prevalence of the aging population and the recognized significance of age as a market segmentation variable, age has historically been underrepresented in consumer behavior research as a key sociological factor (Campbell et al., 2023). Only a limited number of studies have examined age-related differences in consumer decision-making. Existing research on this topic has focused primarily on how older consumers respond to the product dimension of the marketing mix (e.g., Bae et al., 2021; Bhattacharjee & Mogilner, 2014; Lambert-Pandraud et al., 2005; Lambert-Pandraud & Laurent, 2010; Mogilner et al., 2012). However, comparatively little is known about how aging influences consumers' responses to the other elements of the marketing mix (price, place, promotion).

Addressing this research gap, the present study aims to extend our understanding of older consumers' responses to the marketing mix by examining how aging influences their responses to volume-based sales promotions. Through a series of studies, we find that older (vs. younger) consumers exhibit lower purchase intentions toward volume-based promotions (e.g., products offering additional free product volume). This negative effect appears to be driven by a limited future time perspective associated with aging. Consistent with our conceptual framework, we further demonstrate that this effect is attenuated when the promotional format of the extra-volume presentation is separable (e.g., buy-one-get-one-free) or when the purchase context reduces personal consumption relevance, such as when purchasing for others.

This research makes several valuable theoretical contributions by integrating the literature on aging, future time perspective, sales promotion, and age-related differences in decision-making. It advances the underexplored area of age-related differences in consumer behavior (e.g., Bhattacharjee & Mogilner, 2014; Lambert-Pandraud et al., 2005; Williams & Drolet, 2005) and responds to recent calls for greater attention to aging within the equity, diversity, and inclusion (EDI) domain (e.g., Arsel et al., 2022) by identifying a novel, practical and relevant outcome of aging: diminished responsiveness to volume-based promotions. Furthermore, this study incorporates psychological insights on consumer aging by demonstrating that a limited future time perspective underlies age-related differences in responses to promotional strategies (Carstensen et al., 1999; Lang & Carstensen, 2002). By establishing time perspective as a key mechanism, our research offers a new understanding of how aging shapes promotional effectiveness. It highlights the importance of designing age-sensitive marketing strategies that align with consumers' evolving motivational goals across the lifespan. In addition, this work enriches the sales promotion literature (e.g., Chandon et al., 2000; Fan & Jiang, 2018; Fan et al., 2019, 2024; Mishra & Mishra, 2011) by distinguishing consumers' responses to volume-based versus non-volume-based promotional strategies. Collectively, these findings underscore aging as a fundamental sociological construct influencing consumer reactions to volume-based promotions and highlight the need for future research into additional socio-psychological factors that affect promotional effectiveness.

From a managerial perspective, our findings provide valuable insights for marketers aiming to better understand the needs and mindsets of the growing senior consumer segment. These insights have clear implications for marketing resource allocation, suggesting that firms should tailor the type and framing of promotional offers to the age composition of their target market. This consideration is particularly critical in industries where older consumers form a substantial customer base. Beyond these strategic implications, our research also outlines actionable tactics for practitioners to enhance seniors' responsiveness to volume-based promotions—for instance, by presenting the extra volume in separable rather than non-separable formats, or by framing offers in the context of gifting and social occasions. Together, these strategies can improve both the equity and effectiveness of consumer engagement.

Theoretical framework

The aging consumers

Chronological age—the number of years since a person's birth (Moschis, 2012)—serves as a stable, practical, and universally applicable foundation for consumer segmentation. It is increasingly recognized as a key sociological consideration within the EDI framework (Office for National Statistics, 2024; World Health Organization, 2024). According to the United Nations (UNHCR, 2024), older adults—defined as individuals aged 60 and above—constitute the world's fastest-growing demographic and possess significant economic and social influence (Witschi et al., 2023). Nevertheless, this group continues to experience persistent underrepresentation and marginalization in marketing (Arsel et al., 2022). For instance, research indicates that older adults are featured in advertising far less frequently than their proportion in the population would suggest. When

they do appear, they are often portrayed in stereotypical or negative roles (Eisend, 2022). Such neglect is troubling from both strategic and ethical perspectives, as it undermines efforts toward inclusive marketing and disregards the immense potential of the multi-trillion-dollar "silver economy."

Age is highly operationally relevant for marketers, as most commercial data systems categorize consumers by date of birth. Consequently, prior marketing research has explored age-related differences in consumer decision-making, particularly across the *product* dimension of the marketing mix (see Table 1 for exemplar studies). For instance, studies indicate that older consumers tend to favor traditional products and long-established brands (Lambert-Pandraud & Laurent, 2010), prefer repurchasing familiar brands while considering fewer alternatives (Lambert-Pandraud et al., 2005), derive greater happiness from ordinary experiences (Bhattacharjee & Mogilner, 2014), favor calming over exciting options (Mogilner et al., 2012), and are less inclined to adopt innovations (Bae et al., 2021). In contrast, research addressing the other elements of the marketing mix (price, place, promotion) remains limited. Existing studies suggest, for example, that older consumers are less likely to engage in online shopping (*place*; Lian & Yen, 2014), respond differently to age-related segmentation cues like "senior citizen" discounts (*price*; Tepper, 1994), and react more positively to emotional rather than rational advertising appeals (*promotion*; Williams & Drolet, 2005). This highlights a significant gap in understanding older consumers' responses beyond product choices.

Building on this limited body of work, the present study aims to expand our understanding of older consumers' responses to the marketing mix by examining how aging influences consumers' responses to volume-based sales promotions.

Volume-based sales promotion

Sales promotion refers to a temporary, tangible monetary or nonmonetary incentive designed to influence consumer attitudes and stimulate purchase behavior (Chandon et al., 2000; Fan et al., 2024). It is among the most widely used marketing tools, with more than 50% of marketing budgets typically allocated to promotional activities (Blattberg &

Table 1 Examples of empirical marketing research examining the impact of age-related differences

Studies	Relevance (Marketing Mix)	Age Group Examined	Methodology	Key Findings
Bae et al. (2021)	Product	Consumers aged 50+	Survey	Older consumers are less inclined to adopt innovative offerings.
Bhattacharjee and Mogilner (2014)	Product	Older vs. younger consumers	Online and lab experiments	Older consumers derive greater happiness from ordinary experiences, whereas younger consumers find similar levels of happiness in extraordinary experiences.
Lambert-Pandraud et al. (2005)	Product	Older vs. younger consumers	Archival data analysis	Older consumers are more likely to repurchase the same brand and consider fewer alternatives when buying new cars.
Lambert-Pandraud and Laurent (2010)	Product	Older vs. younger consumers	Survey	Older consumers tend to stay loyal to traditional products and long-established brands, whereas younger consumers are more likely to switch to newer alternatives.
Mogilner et al. (2012, Study 3)	Product	Older vs. younger consumers	Online experiments	Older consumers tend to favor calming options, whereas younger consumers are more inclined toward exciting ones.
Lian and Yen (2014)	Place	Older vs. younger consumers	Survey	Older consumers demonstrate lower online shopping intentions compared to younger consumers.
Williams and Drolet (2005)	Promotion (advertising)	Older vs. younger consumers	Field experiments	Older consumers prefer and better recall emotional appeals.
Tepper (1994)	Price & Promotion (sales promotion)	Consumers aged 50+	Interview and experiments	Older consumers exhibit different levels of responsiveness to age segmentation cues such as "senior citizen" discounts.
This research	Price & Promotion (sales promotion)	Older vs. younger consumers	Survey, online and field experiments	Older consumers exhibit lower purchase intentions toward volume-based promotions (e.g., offers providing additional free product) compared to younger consumers.

Briesch, 2012). In the United States alone, companies collectively invest approximately $1 trillion annually in sales promotions, a figure that continues to rise (Statista, 2024). However, despite this significant investment, an estimated 70% of promotions fail to generate a positive return (Repsly, 2024). As such, understanding the effectiveness of sales promotion strategies remains a critical concern for both researchers and practitioners (Gómez et al., 2007; Hock et al., 2020).

Marketers commonly employ two types of promotional strategies: price-based promotions (e.g., discounts) and volume-based promotions (e.g., additional product quantity; Chen et al., 2012). A price-based promotion offers the same product at a reduced price, such as a 20% discount. In contrast, a volume-based promotion provides consumers with an additional product at no extra cost, such as 25% extra volume (Mishra & Mishra, 2011). Consumer preferences for these two formats vary depending on contextual factors. For example, light users tend to favor price-based promotions due to concerns about product perishability (Ong et al., 1997); however, such promotions may be less effective when applied to low-priced, non-essential products (Cai et al., 2016). Product category also plays a role: volume-based promotions are typically preferred for healthy items (Mishra & Mishra, 2011) and stock-up goods such as powdered milk (Li et al., 2007).

A defining characteristic of volume-based sales promotions is the additional quantity of the product offered to consumers, which encourages stockpiling and increases consumption (Chandon & Wansink, 2002), thereby accelerating inventory turnover more effectively than price-based promotions. This effectiveness may explain why such promotions are often preferred and implemented by marketers (Chen et al., 2012; Mishra & Mishra, 2011). Unlike price discounts, which can lower perceived product quality (Raghubir, 2004) and erode reference prices over time (Greenleaf, 1995), volume-based promotions help maintain perceived value, as consumers tend to view them as a gain—something "extra" or "free"—rather than a loss (Diamond, 1992). This perception elicits more positive consumer responses (Diamond & Sanyal, 1990).

Aging and consumers' responses to volume-based sales promotion: The role of future time perspective

From a consumer value perspective, price-based promotions enhance perceived value by framing the benefit as an immediate and salient economic gain at the point of purchase. This explicit price reduction highlights "here-and-now" savings, as consumers directly observe a reduction in the monetary sacrifice required for the same product (Blattberg & Briesch, 2012; Grewal et al., 1998). In contrast, volume-based promotions frame value as unfolding over time by shifting the realization of benefits to the post-purchase consumption stage. Such promotions implicitly cue extended usage duration and future consumption benefits, because the additional quantity must be consumed over time before its value is fully realized (Hardesty & Bearden, 2003; Soman, 1998). For example, while a price discount on a daily-use item (e.g., a reduced price for a bottle of shampoo) delivers immediate financial relief at checkout, a "pay the same for extra quantity" promotion emphasizes extended usage duration and the future utility derived from prolonged consumption.

It is important to recognize that the increased product quantity offered through volume-based sales promotions may carry negative connotations for some consumers, particularly those with a limited future time perspective—a temporal orientation that often results from aging. Future time perspective refers to how individuals perceive the remaining time in their lives, which in turn influences their priorities and decision-making (Carstensen et al., 1999). Compared to younger adults, older adults are more likely to view their future as limited rather than expansive (Carstensen & Lang, 1997). According to socioemotional selectivity theory, a limited future time perspective leads older individuals to prioritize emotional satisfaction, stability, and the maintenance of well-being over future-oriented goals such as knowledge acquisition, exploration, and long-term planning (Carstensen, 2006; Carstensen et al., 1999).

Although volume-based promotions offer additional product quantity at no extra cost (Chen et al., 2012), the surplus often exceeds consumers' original purchase intentions, leading to perceptions of excess or unnecessary quantity at the point of purchase (Ong et al., 1997; Schultz et al., 1990). These additional quantities are typically valued for their potential future utility. For instance, volume-based promotions are generally preferred for healthy products, which may be associated with long-term health maintenance (Mishra & Mishra, 2011), and for stock-up items intended for future use (Li et al., 2007). As such, volume-based promotions primarily offer delayed rather than immediate benefits. However, older consumers—who typically adopt a limited future time perspective—tend to prioritize immediate rewards and emotional satisfaction at the time of purchase. Because the benefits of volume-based promotions are realized post-purchase rather than instantly, such offers may be less appealing to older individuals. Therefore, we propose that aging consumers typically adopt a limited future time perspective, which in turn reduces their responsiveness to volume-based promotions. Accordingly, the hypotheses are formally stated as follows:

H1 The effectiveness of volume-based promotional strategies decreases among older consumers.

H2 The effect of aging on consumers' responses to volume-based promotions is mediated by a limited future time perspective among older consumers.

Moderation effect: When the extra volume is presented in a separable format

We next examine the moderating role of promotional format separability—that is, whether the additional free quantity is presented within the same packaging (non-separable) or as a separate package (separable)—on the relationship between aging and consumers' responses to volume-based promotions. As previously discussed, non-separable volume-based promotions (e.g., additional free quantity integrated into a single package) are typically valued for their potential future utility (Li et al., 2007; Mishra & Mishra, 2011). However, this delayed benefit may conflict with the preferences of older consumers, who, due to a limited future time perspective, tend to prioritize immediate gratification and emotionally meaningful experiences (Carstensen, 2006; Carstensen et al., 1999). Consequently, older adults are likely to be less responsive to non-separable volume-based promotions.

In contrast, a separable promotional format—such as a "buy-one-get-one-free" (BOGOF) offer—which clearly distinguishes the primary product from the promotional addition. This separability could heighten the perceived immediacy of value for separable volume-based promotions and offset the negative perception of needing "extra" time to consume the additional quantity. For example, it may implicitly suggest alternative uses for the additional product, such as sharing or engaging in shared consumption. In such cases, the promotion may be perceived as providing immediate social or emotional value, rather than offering purely future-oriented utility. This perception aligns with socioemotional goals prioritized by older adults, such as maintaining social relationships and gaining satisfaction through acts of generosity and social connection (Mogilner et al., 2011; Ratner & Hamilton, 2015). Therefore, we propose that when the promotional format is separable (vs. non-separable), the negative associations linked to volume-based promotions among older consumers will be attenuated, thereby enhancing older consumers' responsiveness to such offers. Stating this hypothesis formally:

H3 The effect of aging on consumers' responses to volume-based promotions is attenuated when the promotional format of the extra-volume presentation is separable (vs. non-separable).

Moderation effect: When purchasing for others (vs. for self)

In addition to examining how marketers can design separable promotional formats (e.g., buy-one-get-one-free) to engage aging consumers in volume-based promotional offers, we also explore, from the consumer's perspective, whether there are specific contexts in which older consumers may be more receptive to such promotions. As previously hypothesized, older adults often perceive the additional quantity in volume-based promotions as less valuable due to a limited future time perspective, which leads them to prioritize immediate emotional rewards over delayed utility. However, this evaluation may change under certain conditions—particularly when purchasing for others.

When purchasing for others (e.g., as gifts), consumers typically make decisions with little regard for their own personal consumption, since they are not the end users of the product. This psychological detachment reduces the salience of delayed utility and instead accentuates the emotional value associated with the act of giving. Additionally, quantity is often evaluated ordinally, with larger amounts generally perceived as more favorable (Liu et al., 2020). When buying for others, consumers tend to maximize perceived utility for the recipient (Ruth et al., 1999), and the extra quantity provided by volume-based promotions can help mitigate social risks, such as appearing ungenerous or "losing face" (Fu et al., 2025). These factors may enhance the perceived immediacy and social relevance of volume-based promotions, allowing them to better align with older consumers' socioemotional goals by offering immediate emotional value. Therefore, in the context of purchasing for others, older consumers are likely to evaluate volume-based promotions more positively, as the delayed utility becomes less salient. In contrast, the emotional value derived from the act of giving becomes more prominent. Stating this formally:

H4 The effect of aging on consumers' responses to volume-based promotions is attenuated when the product is purchased for others (vs. for oneself).

Overview of studies

Six studies were conducted to investigate how aging influences consumers' responses to volume-based sales promotions. Study 1a, employing a correlational design, finds that

chronological age has a negative effect on consumer evaluations of products with volume-based promotions, while attitudes toward price-based promotions remain unaffected. Study 1b replicates these findings through a between-group comparison of younger and older adults, showing that older individuals report lower purchase intentions for volume-based promotions, with no significant differences for price-based promotions. Study 1c, a field study that enhances external validity, further confirms that older adults exhibit reduced purchase intentions toward volume-based promotions. Study 2 provides direct evidence for the proposed underlying mechanism by demonstrating that a limited future time perspective associated with aging drives the negative effect on consumers' responses to volume-based promotions. Consistent with the conceptual framework, the observed negative effect is attenuated when the promotional format of the extra-volume presentation is separable (e.g., buy-one-get-one-free), as demonstrated in an incentive-compatible, real-behavior setting (Study 3), and when the purchase context reduces personal consumption relevance, such as when purchasing for others (Study 4).

In Studies 1b through 4, age was operationalized categorically by distinguishing younger and older consumer groups, following prior research that adopts age-based groupings to examine systematic differences in aging-related consumption behavior (Fung & Carstensen, 2003; Mogilner et al., 2011; Williams & Drolet, 2005). Specifically, the older group comprised individuals aged 60 years and above, consistent with the United Nations' definition of older adulthood (UNHCR, 2024) and prior research documenting reliable motivational and temporal shifts beyond this age threshold (Carstensen, 2006). The younger group included participants aged 18 to 25, a range selected to capture a relatively homogeneous early-adulthood cohort and to minimize confounds related to subjective age. Prior research suggests that subjective age perceptions shift around the mid-twenties, such that individuals over age 25 increasingly perceive themselves as younger than their chronological age, whereas those under 25 are more likely to perceive themselves as older (Rubin & Berntsen, 2006). In addition, these two age groups are comparable in that both are less likely to be responsible for large households or family provisioning, thereby reducing potential confounds related to household size and purchasing responsibility (Williams & Drolet, 2005; U.S. Census Bureau, 2022). Together, this operationalization was intended to maximize theoretical contrast between age groups while maintaining comparability on key life-stage characteristics relevant to consumption behavior.

To implement this design, the focal age ranges were specified a priori at the recruitment stage, with participants aged 18 to 25 recruited for the younger group and those aged 60 and above recruited for the older group. In the online studies (Studies 1b, 2, 3, and 4), we used Prolific's prescreening function to recruit participants from these two focal age groups. Two separate recruitment links were posted at different timeslots on the same day to target the younger and older groups, respectively, and participants' age was measured again within the survey to verify eligibility. In the field study (Study 1c), we similarly recruited participants from the same focal age groups by approaching younger and older respondents directly and balancing recruitment for the two groups across days over a three-week period.

Study 1a

Study 1a employed an online survey to investigate whether a negative correlation exists between consumers' chronological age and their attitudes toward volume-based sales promotions, but not between age and attitudes toward price-based sales promotions.

Method

One hundred ninety-five adult U.S. consumers (47.2% female; M_{age} = 36.05, SD = 11.40; age range = 18–77) recruited via Amazon Mechanical Turk, participated in this study. Age was measured in years and treated as a continuous variable in the analyses. No participants were excluded on the basis of age. Participants were randomly assigned to either a volume-based or a price-based promotion condition.

Participants first answered several demographic questions (e.g., gender, age, education, income, and marital status) and then viewed a toothpaste advertisement. In the *volume-based promotion* condition, the ad featured a tag reading "25% more weight," indicating that the toothpaste volume had increased from 4 oz to 5 oz, while the price remained at $4.00. In the *price-based promotion* condition, the ad displayed a tag stating "20% price discount," indicating that the price had been reduced from $4.00 to $3.20, while the volume remained constant at 4 oz. The unit price of the toothpaste was held constant before and after the promotion across both conditions (see Web Appendix A for the ads used in the study).

After viewing the ad, participants rated their attitudes toward the promoted toothpaste using two 9-point scale items ("bad/good" and "unfavorable/favorable"; $r = 0.86$, $p < 0.001$; Gorn et al., 2008; Williams & Drolet, 2005).

Results

A multiple regression analysis was conducted to examine the effects of age (measured in years, treated as a

Table 2 Results of the regression with product attitude as the dependent variable (Study 1a)

Variables	Coefficient (unstandardized B)	SE	t	*p*-value
Mean-centered Age × Promotion type	0.07	0.02	3.03	***0.003***
Mean-centered Age	-0.06	0.02	-3.55	***<0.001***
Promotion type	0.20	0.26	0.77	*0.440*
Gender	0.24	0.26	0.91	*0.366*
Education	-0.50	0.20	-2.46	***0.015***
Income	0.20	0.08	2.52	***0.013***
Marital (In Relationship)	0.20	0.40	0.48	*0.629*
Marital (Married)	0.42	0.36	1.17	*0.242*
Marital (Divorced)	-0.21	0.65	-0.32	*0.747*

Variables	Volume-based Promotion				Price-based Promotion			
	B	SE	t	*p*-value	B	SE	t	*p*-value
Mean-centered Age	-0.08	0.02	-4.04	***<0.001***	0.03	0.02	1.38	*0.171*
Gender	0.28	0.41	0.69	*0.492*	0.24	0.33	0.73	*0.466*
Education	-0.41	0.33	-1.26	*0.213*	-0.43	0.25	-1.71	*0.091*
Income	0.32	0.12	2.62	***0.010***	0.07	0.10	0.73	*0.471*
Marital (In Relationship)	0.94	0.63	1.49	*0.141*	-0.51	0.50	-1.01	*0.314*
Marital (Married)	0.96	0.53	1.81	*0.073*	-0.23	0.47	-0.49	*0.626*
Marital (Divorced)	1.13	0.90	1.26	*0.212*	-2.10	0.93	-2.26	***0.026***

Gender was dummy-coded (0 = male, 1 = female). Promotion type was coded as 0 = volume-based, 1 = price-based. Age was mean-centered. Education and income were treated as continuous variables. Marital status was dummy-coded into three categories: in a relationship, married, and divorced (reference group = single)

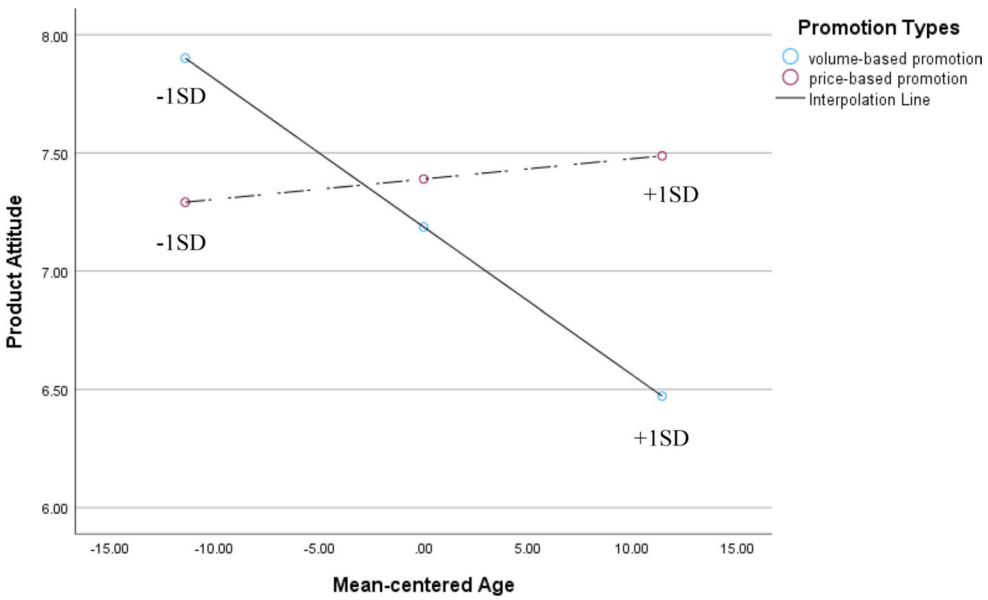


Fig. 1 Interaction between mean-centered age and promotion type on product attitude (Study 1a)

continuous variable, and mean-centered), promotion type (0 = volume-based; 1 = price-based), and their interaction on product attitude, controlling for demographic variables including gender, education, income, and marital status. Results showed that age was a significant negative predictor of product attitude (unstandardized B = -0.06, SE = 0.02, t(185) = -3.55, $p < 0.001$). Notably, the interaction between age and promotion type was also significant (unstandardized B = 0.07, SE = 0.02, t(185) = 3.03, $p = 0.003$; see Table 2).

Follow-up regression analyses (see Table 2) and the plotted results (see Fig. 1) confirmed that age had a negative predicted product attitude in the volume-based promotion condition (unstandardized B = -0.08, SE = 0.02, t(86) = -4.04, $p < 0.001$), indicating that product attitude decreases significantly with increasing age. However, this effect was not significant in the price-based promotion condition (unstandardized B = 0.03, SE = 0.02, t(93) = 1.38, $p = 0.171$, ns), suggesting that product attitude remains relatively stable across age.

Additionally, removing the control variables (i.e., demographic variables) from the regression analyses in this study did not alter all significant results. In the subsequent studies,

we included demographic variables as controls and reported the results with covariates. Across all studies, the exclusion of control variables did not meaningfully affect the outcomes (see Web Appendix B for a summary of results with and without controls).

Discussion

Study 1a offered initial support for our core hypothesis that aging influences consumers' responses to volume-based promotions. Specifically, participants' chronological age negatively predicted their attitudes toward the product under a volume-based promotion, but not under a price-based promotion. In Study 1b, we aimed to replicate these findings using a between-group design to further demonstrate how aging affected consumers' responses to volume-based versus non-volume-based promotional strategies.

Study 1b

Unlike Study 1a, which was correlational, Study 1b established a causal relationship by examining the predicted effect through a between-group comparison of younger and older adults. Specifically, we assessed consumers' behavioral purchase intentions toward products under volume-based versus non-volume-based promotions.

Method

Study 1b employed a 2 (age group: older vs. younger adults) × 2 (promotion type: volume-based vs. price-based) between-subjects factorial design. A total of 400 adult U.S. consumers participated in this preregistered study (https://aspredicted.org/j4ky-q37n.pdf) via Prolific on the same day. Although Prolific's prescreening function was used to recruit participants from the focal age groups (i.e., aged 18–25 for the younger group and aged 60 or above for the older group), 11 participants were excluded because their self-reported age did not meet the pre-specified eligibility criterion for the recruitment link they accessed (e.g., respondents aged 26–59 who entered either focal-age link, or respondents whose reported age fell within one focal category but who completed the other category's link), resulting in a final sample of 389 participants. This exclusion criterion was applied consistently across studies (i.e., Studies 1b–4). To assess the robustness of the findings, we reran the analyses including participants whose self-reported age did not match the recruitment link they accessed but did fall within one of the focal age ranges, reassigning them to the appropriate age group based on self-reported age. The substantive pattern of results remained unchanged (see Web Appendix D for robustness checks on age-based exclusion and reclassification). The final sample in this study comprised two distinct groups: 197 older adults (56.3% female; median age = 66; age range = 60–89) and 192 younger adults (54.7% female; median age = 23; age range = 18–25).

Participants completed a consumption task in which they imagined considering the purchase of a bottle of liquid hand soap presented with either a volume-based or a price-based promotion. Unlike the advertisements used in Study 1a, the promotional design in Study 1b was adapted from prior literature to ensure that the benefit magnitude (25%) was held constant across conditions (Mishra & Mishra, 2011). Specifically, in the *volume-based promotion* condition, the ad included a tag reading "25% more liquid" and stated: "Get the 15 fl. oz. bottle of liquid hand soap for $4.80 (25% more liquid than the regular 12 fl. oz. bottle)." In the *price-based promotion* condition, the ad featured a tag reading "25% off price" and stated: "Get the 15 fl. oz. bottle of liquid hand soap for $3.60 (25% off its regular price of $4.80)" (see Web Appendix A for the ads used in the study).

After viewing the ad, participants reported their purchase intentions using two 9-point scale items: "How likely are you to purchase this product?" and "How interested are you in purchasing this product?" ($r = 0.93$, $p < 0.001$; Chen et al., 2017). Finally, participants completed the same set of demographic questions as in Study 1a, with two additional items—household size and employment status—to examine whether these factors might influence the observed effects.

Results

While controlling for gender, education, income, marital status, household size, and employment status, a 2 × 2 ANOVA revealed significant main effects of age group ($F(1, 379) = 4.21$, $p = 0.041$) and promotion type ($F(1, 379) = 12.95$, $p < 0.001$) on purchase intention, qualified by a significant age group × promotion type interaction ($F(1, 379) = 11.32$, $p = 0.001$, $\eta_p^2 = 0.03$; see Fig. 2). Replicating our earlier findings, under the volume-based promotion condition, older adults reported significantly lower purchase intentions ($M = 4.21$, $SD = 2.78$) than younger adults ($M = 5.81$, $SD = 2.40$; $F(1, 379) = 13.36$, $p < 0.001$, $\eta_p^2 = 0.03$). However, under the price-based promotion condition, there was no significant difference in purchase intentions between older ($M = 6.17$, $SD = 2.68$) and younger participants ($M = 5.70$, $SD = 2.34$; $F(1, 379) = 0.24$, $p = 0.627$, ns).

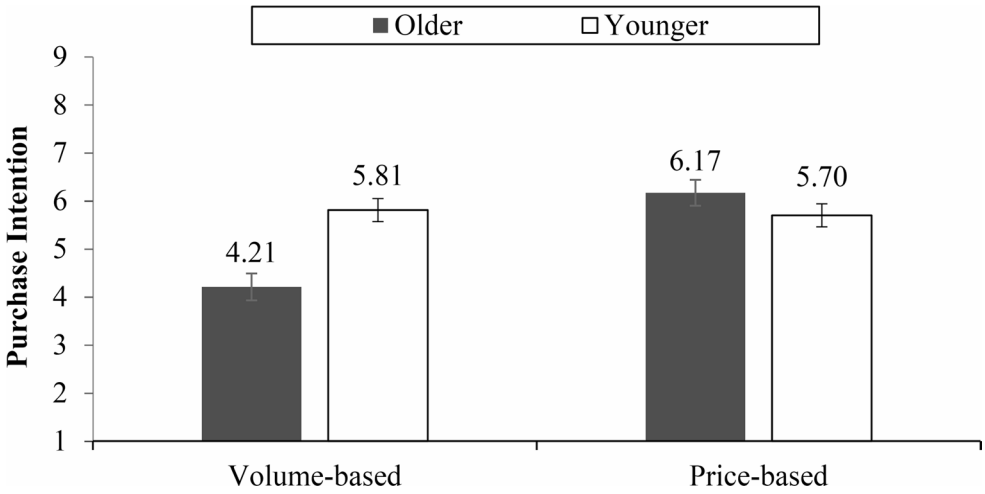


Fig. 2 Mean purchase intention as a function of age group and promotion type (Study 1b)

Discussion

Studies 1a and 1b provided convergent evidence—using a correlational design and a between-groups design, respectively—that older (vs. younger) consumers exhibit reduced responses to products with volume-based promotions. In contrast, no significant age-related differences were observed in response to price-based promotions. The absence of an age effect for price-based promotions also argues against the alternative explanation that aging leads consumers to develop a general negativity toward all types of sales promotions. Consistent with our earlier theorizing, this asymmetric pattern can be understood through differences in promotional framing. Price-based promotions provide immediate benefits by enabling consumers to pay a lower price for the same product, whereas volume-based promotions delay benefit realization because consumers must spend additional time consuming the extra quantity. Importantly, it is the promotional framing rather than the product's inherent consumption cycle that differentiates the immediacy of benefits. Although the products used in our studies (e.g., toothpaste and hand soap) are consumed over time regardless of promotion type, the benefits of promotions differ in terms of immediacy (i.e., paying a lower price now—*price-based* promotions vs. the additional quantity benefit that can only be fully realized after finishing the product—*volume-based* promotions).

Study 1c

Building on the findings from Studies 1a and 1b, Study 1c employed a field study to further examine the core hypothesis that aging influences consumers' responses to volume-based promotions in a real-world context, thereby demonstrating its practical applicability and enhancing the external validity of the effect.

Method

A total of 200 adult consumers participated in this preregistered study (https://aspredicted.org/7vp6-93wr.pdf), which was conducted over a three-week period on a university campus in Hong Kong. Five participants who did not follow the study instructions (i.e., who did not complete the study) were excluded, leaving a final sample of 195 participants. These participants comprised two distinct groups: 98 older adults (36.7% female; median age = 72; age range = 65–83) and 97 younger adults (50.5% female; median age = 21; age range = 18–24).

Participants who expressed interest in the study were first asked to complete a set of multiple-choice filler questions about their buying behaviors (see Web Appendix C for the filler questions used in the study). Upon completion, they received a cash reward of HKD 20 (approximately USD 2.55). They were then informed that they had the opportunity to purchase a product featuring a volume-based promotion—a tube of toothpaste with a sticker reading "20% more product"—priced at HKD 20 (approximately USD 2.55; see Web Appendix A for the product used in the study), using their reward. Participants were asked to indicate whether they would purchase the product. Basic demographic information, such as age and gender, was also collected.

Results

A binary logistic regression was conducted with actual purchase (dummy-coded: 0 = no, 1 = yes) as the dependent variable, age group (dummy-coded: 0 = younger, 1 = older) as the independent variable, and gender as a control variable.

Results revealed a significant effect of age group on toothpaste purchase behavior (B = -0.78, SE = 0.34, Wald = 5.17, $p = 0.023$, Exp(B) = 0.46). As expected, participants in the older group were significantly less likely to make an actual purchase (19.4%) compared to those in the younger group (33.0%).

Discussion

Across Studies 1a to 1c, we demonstrated that age-related differences in consumers' responses are specific to volume-based promotions, with no significant differences observed for non-volume-based promotions. Converging evidence from an online correlational survey, a between-subjects comparison, and a field study consistently indicated that aging diminishes consumers' responsiveness to products offered with volume-based promotions but not to other non-volume-based promotions (e.g., price promotions). In the subsequent study, we investigated the underlying mechanism driving this effect.

Study 2

We propose that a limited future time perspective, commonly associated with aging, leads consumers to prioritize immediate satisfaction and emotional well-being over future-oriented goals (Carstensen, 2006; Carstensen et al., 1999). Consequently, older adults may find volume-based sales promotions less appealing, as the additional product quantity offered is typically valued for its potential future utility (e.g., Li et al., 2007; Mishra & Mishra, 2011). This mismatch between the delayed benefits of such promotions and the age-related motivational shift may account for older consumers' reduced responsiveness to these promotions. In this study, we investigate the underlying mechanism that drives the observed effect.

Method

A total of 300 adult U.S. consumers participated in this pre-registered study (https://aspredicted.org/yjsd-j5my.pdf) via Prolific on the same day. Three participants were excluded (i.e., their self-reported age did not meet the pre-specified eligibility criterion for the recruitment link they accessed), resulting in a final sample of 297 participants. These participants comprised two distinct groups: 148 older adults (48.0% female; median age = 65; age range = 60–80) and 149 younger adults (48.3% female; median age = 22; age range = 18–25).

Participants completed a consumption task in which they were asked to imagine considering the purchase of a product featuring a volume-based promotion—a bottle of shampoo with a tag reading "more volume now," indicating an increase in volume from 12 fl. oz to 15 fl. oz—priced at $4.84 (see Web Appendix A for the ad stimuli used in the study). After viewing the advertisement, participants reported their purchase intentions using two 9-point scale items ($r = 0.90$, $p < 0.001$), as in Study 1b. Next, we assessed participants' future time perspective using three 9-point scale items: "There are only limited possibilities in my future," "There are not many opportunities awaiting me in the future," and "There is not much time left in my life to make new plans" (Carstensen & Lang, 1997; 1 = "very untrue," 9 = "very true"; $\alpha = 0.92$).

Additionally, we examined three alternative explanations that could account for the observed effect. The first is materialism, based on the notion that materialistic values tend to decline with age, prompting older consumers to prioritize non-material goals—such as emotional satisfaction and personal relationships—over the accumulation of goods (Belk, 1985). Accordingly, a lower desire for material possessions may reduce older consumers' responsiveness to volume-based promotions that emphasize additional product quantities. Materialism was measured using nine 9-point scale items, including "I admire people who own expensive homes, cars, and clothes" and "Buying things gives me a lot of pleasure" (Richins, 2004; 1 = "strongly disagree," 9 = "strongly agree"; $\alpha = 0.85$).

The second alternative explanation is financial constraint. Research suggests that older individuals possess substantial economic resources relative to younger consumers (Drolet et al., 2019), which may reduce their purchase intentions toward volume-based promotions, as they have greater financial flexibility and less need to rely on promotional offers. We measured perceived financial constraint using two 9-point scale items (Malika et al., 2022; 1 = "strongly disagree," 9 = "strongly agree"; $r = 0.87$, $p < 0.001$).

Finally, we examined perceived wastefulness as another potential explanation. Older adults may be more mindful of waste and view excess purchases as burdensome in terms of time, energy, and storage—factors that could diminish the appeal of volume-based promotions (Diamantopoulos et al., 2003). Perceived wastefulness was assessed using a single 9-point scale item (Nguyen et al., 2023; 1 = "strongly disagree," 9 = "strongly agree"). At the end of the survey, participants completed the same set of demographic questions used in Study 1b.

Results

Controlling for gender, education, income, marital status, household size, and employment status, we first replicated findings from prior studies: older adults reported

significantly lower purchase intentions for the product featuring a volume-based promotion (M = 4.16, SD = 2.32) compared to younger adults (M = 5.43, SD = 2.04), F(1, 289) = 10.12, $p = 0.002$, $\eta_p^2 = 0.03$). As expected, age was also significantly associated with future time perspective, with older adults perceiving their future as more limited (M = 3.21, SD = 1.75) than younger adults (M = 5.85, SD = 2.09), F(1, 289) = 77.54, $p < 0.001$, $\eta_p^2 = 0.21$).

We also examined the relationship between age and three alternative explanations: materialism, perceived financial constraint, and perceived wastefulness. Older adults reported significantly lower levels of materialism (M = 3.92, SD = 1.43) than younger adults (M = 5.18, SD = 1.20), F(1, 289) = 22.88, $p < 0.001$). Similarly, they reported lower perceived financial constraint (M = 2.67, SD = 2.17) compared to younger participants (M = 4.50, SD = 2.11), F(1, 289) = 27.45, $p < 0.001$). In addition, older adults were less likely than younger adults to view purchases made through volume-based promotions as wasteful (M_{older} = 2.43, SD = 1.66 vs. $M_{younger}$ = 3.21, SD = 1.88), F(1, 289) = 7.49, $p = 0.007$).

Interestingly, although older adults viewed such purchases as less wasteful, they still reported lower purchase intentions. This suggests that perceived wastefulness does not account for the observed age-related decline in responsiveness to volume-based promotions. Therefore, we excluded perceived wastefulness as a potential alternative explanation in the subsequent mediation analyses.

Next, controlling for all demographic variables, we conducted a mediation analysis using bootstrapping procedures with 5,000 samples (PROCESS Model 4, Percentile CI method; Hayes, 2013). In this model, age group was entered as the independent variable, purchase intention as the dependent variable, and future time perspective, materialism, and perceived financial constraint as parallel mediators. The results revealed a significant indirect effect through our proposed mediator, future time perspective (B = -0.43, SE = 0.11; 95% CI [-0.6547, -0.2253]). In contrast, the indirect effects via materialism (B = -0.02, SE = 0.05; 95% CI [-0.1196, 0.0819]) and perceived financial constraint (B = -0.09, SE = 0.06; 95% CI [-0.2025, 0.0194]) were not significant. These findings suggest that the impact of aging on reduced responsiveness to volume-based promotions is mediated by future time perspective, but not by materialism or financial constraints.

Discussion

Study 2 demonstrated that the effect of aging on consumers' responses to volume-based promotions is mediated by future time perspective. Consistent with our theorizing, aging leads consumers to perceive their future as more limited, which, in turn, reduces their responsiveness to products offered through volume-based promotions. In addition, we ruled out several alternative explanations, including materialism, perceived financial constraints, and perceived wastefulness.

Study 3

Previous studies have consistently shown that aging reduces consumer responsiveness to volume-based promotions. In this study, we examine a marketer-driven strategy designed to increase older consumers' willingness to purchase products offered through such promotions. We propose that separable promotional formats (e.g., buy-one-get-one-free), which clearly differentiate the main product from the promotional addition, may enhance the appeal of these offers to older consumers. Such separability could strengthen perceptions of immediate value in volume-based promotions and mitigate the impression that additional time is needed to consume the extra quantity. It may also cue alternative consumption possibilities, such as distributing the surplus or using it in shared contexts. Thus, separable formats can shift the perceived value of the additional quantity from future utility to immediate social and emotional benefits. This reframing aligns with the socioemotional goals prioritized by older adults, such as maintaining social relationships and deriving satisfaction from generosity and connection (Mogilner et al., 2011; Ratner & Hamilton, 2015). In this study, conducted in an incentive-compatible, real-behavior setting, we test whether separable (vs. non-separable) promotional formats can mitigate the negative effects of aging on responses to volume-based promotions.

Method

Study 3 employed a 2 (age group: older vs. younger adults) × 2 (extra volume presentation: separable vs. non-separable) between-subjects factorial design. A total of 400 adult U.S. consumers participated in this preregistered study (https://aspredicted.org/vk6f-n28k.pdf) via Prolific on the same day. Thirteen participants were excluded (i.e., their self-reported age did not meet the pre-specified eligibility criterion for the recruitment link they accessed), resulting in a final sample of 387 participants. These participants comprised two distinct groups: 189 older adults (65.6% female; median age = 66; age range = 60–88) and 198 younger adults (55.6% female; median age = 23; age range = 18–25).

Participants first completed a filler task—a picture evaluation exercise in which they assessed two images based on quality and lighting. This task was included to enhance the perceived realism of the study. Following this, participants were randomly assigned to either a separable or a

non-separable promotion condition. They were informed that, as a token of appreciation for their participation, they would be entered into a lucky draw. The winner would have the opportunity to purchase a bottle of shampoo featuring a volume-based promotion from a partnering retailer. In the *separable* condition, the ad displayed two identically sized bottles of shampoo, accompanied by a tag reading "more volume now" and the message "buy one bottle, get one extra bottle free." In the *non-separable* condition, the ad featured a single large bottle of shampoo with the same tag but included the message "buy one bottle, get an extra 12 fl. oz free." In both conditions, the total product volume increased from 12 fl. oz to 24 fl. oz, and the price was set at $4.84 (see Web Appendix A for the ad stimuli used in the study). Participants were then asked if they would like to enter the lucky draw. Finally, they completed the same set of demographic questions used in Studies 1b and 2.

Results

We conducted a logistic regression analysis, controlling for all demographic variables, to examine the moderating effect of extra volume presentation format on the relationship between age group and the likelihood of entering the lucky draw. There was significant a main effect of age group (B = 0.84, SE = 0.35, Wald = 5.73, $p = 0.017$, Exp(B) = 2.32), as well as a significant interaction between age group and promotional format (B = -1.52, SE = 0.48, Wald = 10.01, $p = 0.002$, Exp(B) = 0.22; see Fig. 3), indicating that the effect of age on consumer response varied depending on the presentation format of the volume-based promotion.

A simple contrast analysis under the non-separable condition revealed a significant effect of age group (B = 1.68, SE = 0.46, Wald = 13.53, $p < 0.001$, Exp(B) = 5.35), such that older adults (19.1%) were significantly less likely than younger adults (56.6%) to opt into the lucky draw. In contrast, under the separable condition, the effect of age group was not significant (B = 0.16, SE = 0.41, Wald = 0.15, $p = 0.697$, ns), suggesting no significant difference between older (42.1%) and younger (51.5%) adults in lucky draw participation in this condition.

Discussion

Study 3 demonstrated that the negative effect of aging on consumers' responses to volume-based sales promotions is attenuated when the promotional format of the extra-volume presentation is separable (vs. non-separable). This finding offers a practical implication for marketers seeking to better engage older consumers with volume-based promotions. In the subsequent study, we investigated another moderator of the proposed effect from the consumer's perspective.

Study 4

This study investigates an alternative condition under which older consumers may respond more favorably to volume-based sales promotions. Building on the promotional format strategy examined in Study 3—which approached the issue from a marketer's perspective—we now shift to a consumer-centered view by focusing on the consumption context. Specifically, we hypothesize that the negative effect of aging on consumers' responses to volume-based promotions is attenuated when aging consumers purchase products for others (vs. for themselves). In such cases, consumers are likely to disengage from personal consumption considerations, thereby reducing the salience of delayed utility typically associated with volume-based promotions (Li et al., 2007; Mishra & Mishra, 2011). Instead, the emotional value of giving becomes more prominent. Furthermore, the additional product quantity may serve a dual function: reinforcing a sense of social assurance (Fu et al., 2025; Liu et al., 2020) and enhancing perceived utility for the recipient

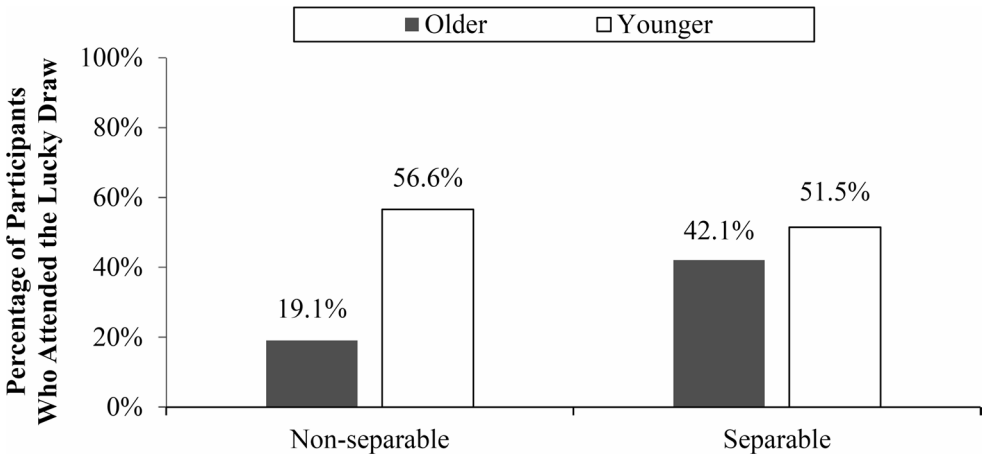


Fig. 3 Participants' lucky draw participation as a function of age group and extra volume presentation (Study 3)

(Ruth et al., 1999). Collectively, these effects heighten the perceived immediacy and social relevance of the promotion, leading to more positive responses among older consumers.

Method

Study 4 employed a 2 (age group: older vs. younger adults) × 2 (consumption context: self-purchasing vs. other-purchasing) between-subjects factorial design. A total of 400 adult U.S. consumers participated in this preregistered study (https://aspredicted.org/dgzx-ssbh.pdf) via Prolific on the same day. Twenty-seven participants were excluded (i.e., their self-reported age did not meet the pre-specified eligibility criterion for the recruitment link they accessed), resulting in a final sample of 373 participants. These participants comprised two distinct groups: 191 older adults (60.2% female; median age = 67; age range = 60–88) and 182 younger adults (51.6% female; median age = 23; age range = 18–25).

Participants completed a consumption task in which they made a purchasing decision for almond snacks either for themselves (*self-purchase* condition) or for a friend (*other-purchase* condition). They were then shown a volume-based promotional advertisement for almonds, which included the tag "25% more" and stated: "Get the 15 oz pack of Blue Diamond Almonds for $5.99 (25% more than the regular 12 oz pack)" (see Web Appendix A for the ad stimuli used in the study). After viewing the ad, participants reported their purchase intentions using two 9-point scale items ($r = 0.89$, $p < 0.001$), as employed in prior studies. Finally, they completed a set of demographic questions identical to those used in earlier studies.

Results

While controlling for all demographic variables, a 2 × 2 ANOVA revealed significant main effects of age group ($F(1, 363) = 6.12$, $p = 0.014$) and consumption context ($F(1, 363) = 21.61$, $p < 0.001$) on purchase intention, qualified by a significant age group × consumption context interaction ($F(1, 363) = 14.27$, $p < 0.001$, $\eta_p^2 = 0.04$; see Fig. 4). Replicating our earlier findings, in the self-purchase condition, older adults reported significantly lower purchase intentions ($M = 5.40$, $SD = 2.58$) than younger adults ($M = 7.11$, $SD = 2.05$; $F(1, 363) = 18.13$, $p < 0.001$, $\eta_p^2 = 0.05$). However, in the other-purchasing condition, there was no significant difference in purchase intentions between older ($M = 7.37$, $SD = 1.58$) and younger participants ($M = 7.18$, $SD = 1.74$); $F(1, 363) = 0.30$, $p = 0.586$, ns).

Discussion

Study 4 introduced an additional moderator to the observed effect. Specifically, we found that the negative impact of aging on consumers' responses to volume-based promotions disappeared when consumers purchased products for others. In such contexts, psychological detachment from the relevance of personal consumption reduced the salience of the delayed utility typically associated with volume-based promotions. Instead, this detachment enhanced the emotional value derived from the act of giving, enabling older consumers to perceive greater utility in the additional quantity of products benefiting others. Consequently, this shift satisfied aging consumers' preference for immediate emotional gratification and reinforced their social connections.

General discussion

This research investigates how aging—as a key sociological factor within the equity, diversity, and inclusion (EDI) domain—affects consumers' responses to promotional marketing strategies. Across six studies, we demonstrate that aging reduces consumers' reactions to volume-based

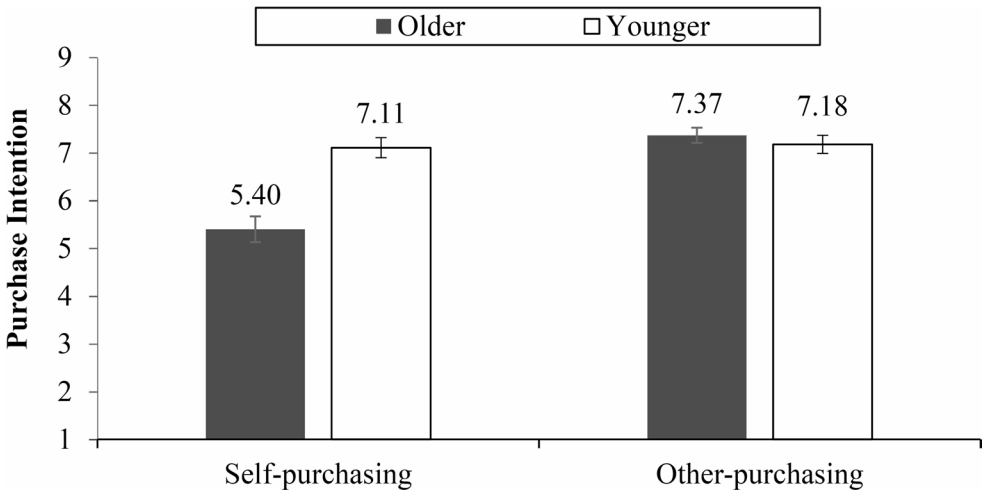


Fig. 4 Mean purchase intention as a function of age group and consumption context (Study 4)

promotions, while responses to other types of promotions (e.g., price-based promotions) remain unaffected. This effect is robustly supported by a correlational survey (Study 1a), a between-group comparison of older and younger consumers (Study 1b), and a field experiment (Study 1c) that establishes the real-world applicability of the core hypothesis. Study 2 offers direct evidence for the proposed underlying mechanism, demonstrating that a limited future time perspective associated with aging contributes to the reduced effectiveness of volume-based promotions. In line with our conceptual framework, the negative effect is attenuated when the promotional format of the extra-volume presentation is separable (e.g., buy-one-get-one-free), as shown in an incentive-compatible behavioral experiment (Study 3), and when the purchase context diminishes personal consumption relevance, such as when buying for others (Study 4).

Theoretical contributions and practical implications

Our research advances the underexplored area of age-related differences in consumer behavior (e.g., Bhattacharjee & Mogilner, 2014; Williams & Drolet, 2005) and addresses recent calls for greater attention to aging within the Equity, Diversity, and Inclusion (EDI) domain (Arsel et al., 2022). While previous studies have investigated age-related differences across various elements of the marketing mix, this body of literature has predominantly concentrated on the *product* dimension. For example, prior research has found that older consumers tend to prefer traditional products and long-established brands, favor calming options and ordinary experiences, and are generally less receptive to innovative or novel offerings (e.g., Bae et al., 2021; Bhattacharjee & Mogilner, 2014; Lambert-Pandraud et al., 2005; Lambert-Pandraud & Laurent, 2010; Mogilner et al., 2012). In contrast, the other elements of the marketing mix have received comparatively limited attention. Notable exceptions include findings that older consumers are less likely to engage in online shopping (*place*; Lian & Yen, 2014), respond differently to age-related segmentation cues such as "senior citizen" discounts (*price*; Tepper, 1994), and react more positively to emotional rather than rational advertising appeals (*promotion*; Williams & Drolet, 2005). Our study advances this line of inquiry by examining promotional strategies, a central yet relatively understudied component of the marketing mix. Specifically, we find that aging diminishes consumers' responsiveness to volume-based promotions, leading to less favorable attitudes, lower behavioral intentions, and reduced actual purchase behavior—even when such offers provide objectively superior value. These findings highlight a critical yet often overlooked aspect of inclusive marketing and suggest promising directions for future research at the intersection of aging and other promotional tactics. For instance, building on Brewer et al.'s (1981) insights regarding older individuals as members of a superordinate social category (e.g., grandparents, elder politicians), it is plausible to hypothesize that aging may enhance receptivity to hierarchical loyalty programs (e.g., Breugelmans et al., 2015; Chaabane & Pez, 2017), as older consumers might anticipate differentiated treatment based on seniority.

This research further integrates psychological insights on consumer aging by demonstrating that a limited future time perspective underlies age-related differences in responses to promotional strategies (Carstensen et al., 1999; Lang & Carstensen, 2002). Socioemotional selectivity theory (SST) posits that as individuals age, they increasingly perceive time as finite and shift their goals from future-oriented pursuits to emotionally meaningful and present-focused experiences (Carstensen, 2006). Consequently, older adults tend to prioritize immediate rewards and emotional satisfaction at the point of purchase, in contrast to younger consumers. As a result, they perceive volume-based promotions—which typically offer additional product quantity intended for future use—as less valuable. These promotions emphasize delayed utility and post-purchase benefits (e.g., Li et al., 2007; Mishra & Mishra, 2011), which may conflict with the temporal priorities of older consumers. This mismatch diminishes the perceived efficiency and appeal of such promotions, even when they provide objectively superior value. By identifying time perspective as a key mechanism, our research offers new insights into how aging shapes promotional effectiveness and underscores the importance of designing age-sensitive marketing strategies that align with consumers' evolving motivational goals across the lifespan.

Moreover, our findings enrich the literature on sales promotions (e.g., Chandon et al., 2000; Fan & Jiang, 2018; Fan et al., 2019, 2024; Mishra & Mishra, 2011) by identifying distinct consumer responses to volume-based versus non-volume-based promotional strategies. Although previous research has revealed several factors that can influence consumers' attitudes toward different types of promotions (e.g., Cai et al., 2016; Diamond, 1992; Li et al., 2007; Ong et al., 1997; Raghubir, 2004), our understanding of the comparative effectiveness of different types of sales promotions remains limited. Although volume-based promotions offer additional product quantity at no extra cost, such promotions may carry negative connotations for older consumers, whereas price-based promotions do not exert comparable negative effects on their decision making. Price-based promotions deliver immediate economic benefits at the point of purchase by allowing consumers to pay a lower price for the same product, whereas volume-based promotions delay benefit realization because the incremental value of the extra quantity can only be realized through additional

consumption over time. Older consumers, who typically adopt a more limited future time perspective, tend to prioritize immediate rewards and emotional satisfaction at the point of purchase. Because the benefits of volume-based promotions are realized only after purchase rather than instantaneously, these offers may be less appealing to older individuals.

Finally, this research provides important implications for marketers and policymakers seeking to enhance promotional effectiveness and advance inclusive marketing. Our findings show that volume-based promotions—one of the most widely used promotional strategies—are less effective among older consumers, a demographic that is both expanding and economically significant (Drolet et al., 2019). This reduced effectiveness arises because a limited future time perspective, commonly associated with aging, shifts priorities away from delayed utility and toward immediate, emotionally meaningful benefits. As a result, older consumers often view volume-based promotions as inefficient or misaligned with their consumption goals. These insights underscore the need for firms to tailor both the type and framing of promotional offers according to the age composition of their target markets. Aligning promotional formats with the temporal and emotional priorities of different consumer segments is particularly critical in industries where older adults represent a core market—such as healthcare, skincare, leisure, retail, and automotive—given their considerable economic power and social influence (Witschi et al., 2023). More broadly, our findings contribute to the growing conversation on inclusive marketing by highlighting the limitations of one-size-fits-all approaches. As older adults increasingly serve as key decision-makers across sectors, managers are encouraged to recognize age-related motivational and psychological shifts, particularly the preference for emotionally meaningful and immediately accessible benefits.

Importantly, our results identify actionable ways to improve the appeal of volume-based promotions among older consumers. Study 3 demonstrates that presenting the extra volume in separable rather than non-separable formats can increase perceived value. In our design, we operationalized separable formats using conditional promotions (e.g., buy-one-get-one-free). We expect that other types of separable formats, such as multiple-unit pricing (e.g., three bottles of shampoo for $10), will produce similar attenuation of the observed effect. By implicitly suggesting flexible or alternative uses for the additional product—such as sharing or joint consumption—separable formats align more closely with the goals of older consumers, who increasingly emphasize emotional well-being and social connectedness. In line with these findings, we also suggest that framing promotional products as suitable for sharing—for example, using labels like "family-size" or "party-size"—can tap into socioemotional goals such as maintaining relationships and gaining emotional rewards through acts of giving and shared experiences (Mogilner et al., 2011; Ratner & Hamilton, 2015), thereby increasing consumer engagement with volume-based promotions.

Moreover, Study 4 demonstrates that the negative effect of aging on responses to volume-based promotions diminishes when purchases are made for others. Marketers can leverage this insight by framing promotional offers in the context of gifting or social occasions, such as festivals or holidays, to encourage purchases intended for others. Such framing may enhance the appeal of volume-based promotions by aligning them with the relational and prosocial motivations of older consumers. We further speculate that when larger product sizes are not explicitly framed as promotional offers—that is, when no indication of additional free product is present— older consumers may interpret the product as part of its standard design rather than as a marketing incentive. In such cases, the motivational conflict linked to a limited future time perspective may be less pronounced, potentially attenuating the age-related differences in responsiveness to volume-based promotions.

Limitations and future research directions

In our field experiment, Study 1c, unlike Studies 1a and 1b, we did not include a direct comparison between volume-based and price-based promotions. As a result, although the findings from this field study are consistent with our theorizing about responses to volume-based promotions, the design does not allow us to determine whether the observed effects are specific to volume-based promotions. Accordingly, the purpose of Study 1c is to provide field-based support for the predicted pattern underlying our focal theorizing in a naturalistic setting, rather than to draw broader conclusions about the relative effectiveness of volume-based versus price-based promotions in such a setting. Future research could strengthen this evidence by incorporating a direct comparison of promotion types in field settings.

Although Study 4 examined the influence of gift-giving context (i.e., purchasing for oneself vs. for others) on the proposed effect, it did not investigate whether the recipient's age might moderate this effect. We expect the results would remain largely unchanged, as consumers often disengage from their own consumption concerns when purchasing for others, thereby reducing the salience of delayed utility typically linked to volume-based promotions. Prior research suggests that in gift-giving contexts, consumers are motivated to maximize perceived utility (Ruth et al., 1999). Larger quantities are often viewed more favorably (Liu et

al., 2020), which also helps mitigate social risks, such as appearing ungenerous (Fu et al., 2025). Taken together, these considerations imply that the recipient's age may exert limited influence on the observed effect, and the attenuating role of gift-giving contexts is likely to remain robust. Nonetheless, we acknowledge that recipient age is an intriguing factor worth exploring, and future research should examine its potential moderating role.

The present research focuses primarily on frequently purchased utilitarian products (e.g., toothpaste, hand soap, shampoo, almonds). Such products are generally acquired for practical, functional purposes and are often purchased with efficiency and necessity in mind. As a result, the effects documented here may not extend to hedonic products, which are characterized by enjoyment, sensory pleasure, indulgence, and emotional gratification. Hedonic products may carry more immediate emotional value, potentially offsetting the negative perception of needing "extra" time to consume the additional quantity documented in the current studies. Future research could examine whether the immediate rewards associated with hedonic products, in conjunction with a limited future time perspective, diminish the extent to which older consumers avoid products that imply extended future consumption.

In the current research, future time perspective (FTP) was examined as a naturally occurring, age-related variable. Older consumers exhibited a more limited FTP, which mediated their reduced responsiveness to volume-based promotions. Given that the purpose of the current research is to examine how aging influences consumers' responses to marketing promotions, we did not experimentally manipulate FTP among younger consumers who naturally hold a more expansive future time perspective. This is an important theoretical question to see whether FTP can shift not only with age but also situationally. Future studies can use established FTP-manipulation paradigms (e.g., asking participants to imagine having only a limited amount of time left, or simulating shorter time horizons) and then examine whether younger consumers in a limited-FTP state respond to volume-based promotions more like older adults.

Given global demographic trends toward population aging and the increasing financial influence of older adults (Witschi et al., 2023), it is more important than ever for marketers to understand and cater to the preferences, values, and decision-making patterns of this growing segment. This research provides a foundation for future studies on consumer aging. It underscores the need for more equitable and effective marketing strategies that are specifically tailored to the needs of older consumers.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11747-026-01160-6.

Acknowledgments Not applicable.

Authors' contributions The first author developed the research concept, designed the methodology, performed the data analyses, and contributed to writing the original draft. The second author assisted with the data analyses and partially contributed to writing the original draft. The third author partially contributed to the methodology design and edited the manuscript. The fourth author reviewed and edited the manuscript and provided supervision.

Funding Open access funding provided by The Hong Kong Polytechnic University. This research was supported by the National Natural Science Foundation of China Grant [72425015] awarded to Yuwei Jiang.

Data availability Data are available upon request/reasonable request.

Declarations

Ethics approval and consent to participate This study has received ethical approval from the University Ethics Committee associated with the first author's affiliation.

Competing interests The authors declare no conflicts of interest.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Arsel, Z., Crockett, D., & Scott, M. L. (2022). Diversity, equity, and inclusion (DEI) in the Journal of Consumer Research: A curation and research agenda. *Journal of Consumer Research*, *48*(5), 920–933.

Bae, H., Jo, S. H., & Lee, E. (2021). Why do older consumers avoid innovative products and services? *Journal of Services Marketing*, *35*(1), 41–53.

Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research*, *12*(3), 265–280.

Bhattacharjee, A., & Mogilner, C. (2014). Happiness from ordinary and extraordinary experiences. *Journal of Consumer Research*, *41*(1), 1–17.

Blattberg, R. C., & Briesch, R. A. (2012). Sales promotions. In Ö. Özer & R. Phillips (Eds.), *The Oxford handbook of pricing management* (pp. 585–619). Oxford University Press.

Breugelmans, E., Bijmolt, T. H., Zhang, J., Basso, L. J., Dorotic, M., Kopalle, P., Minnema, A., Mijnlieff, W. J., & Wünderlich, N. V. (2015). Advancing research on loyalty programs: A future research agenda. *Marketing Letters*, *26*(2), 127–139.

Brewer, M. B., Dull, V., & Lui, L. (1981). Perceptions of the elderly: Stereotypes as prototypes. *Journal of Personality and Social Psychology*, *41*(4), 656–670.

Butler, R. N. (2009). *The longevity revolution: The benefits and challenges of living a long life*. Hachette UK.

Butler, R. N., & Jasmin, C. (2000). *Longevity and quality of life: Opportunities and challenges*. Springer.

Cai, F., Bagchi, R., & Gauri, D. K. (2016). Boomerang effects of low price discounts: How low price discounts affect purchase propensity. *Journal of Consumer Research*, *42*(5), 804–816.

Campbell, C., Sands, S., McFerran, B., & Mavrommatis, A. (2023). Diversity representation in advertising. *Journal of the Academy of Marketing Science, 53*(2), 588–616.

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, *312*(5782), 1913–1915.

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, *54*(3), 165–181.

Carstensen, L. L., & Lang, F. R. (1997). Social relationships in context and as context: Social support and the maintenance of competence in old age. Commentary. In S. L. Willis, K. W. Schaie, & M. D. Hayward (Eds.), *Societal mechanisms for maintaining competence in old age* (pp. 207–222). Springer.

Chaabane, A. M., & Pez, V. (2017). Make me feel special: Are hierarchical loyalty programs a panacea for all brands? The role of brand concept. *Journal of Retailing and Consumer Services*, *38*, 108–117.

Chandon, P., & Wansink, B. (2002). When are stockpiled products consumed faster? A convenience–salience framework of postpurchase consumption incidence and quantity. *Journal of Marketing Research*, *39*(3), 321–335.

Chandon, P., Wansink, B., & Laurent, G. (2000). A benefit congruency framework of sales promotion effectiveness. *Journal of Marketing*, *64*(4), 65–81.

Chen, C. Y., Lee, L., & Yap, A. J. (2017). Control deprivation motivates acquisition of utilitarian products. *Journal of Consumer Research*, *43*(6), 1031–1047.

Chen, H., Marmorstein, H., Tsiros, M., & Rao, A. R. (2012). When more is less: The impact of base value neglect on consumer preferences for bonus packs over price discounts. *Journal of Marketing*, *76*(4), 64–77.

Christensen, K., Doblhammer, G., Rau, R., & Vaupel, J. W. (2009). Ageing populations: The challenges ahead. *The Lancet*, *374*(9696), 1196–1208.

De Pelsmacker, P. (2021). *Marketing communications* (7th ed.). Pearson UK.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research*, *56*(6), 465–480.

Diamond, W. D. (1992). Just what is a dollar's worth? Consumer reactions to price discounts vs. extra product promotions. *Journal of Retailing*, *68*(3), 254–270.

Diamond, W. D., & Sanyal, A. (1990). The effect of framing on the choice of supermarket coupons. In M. E. Goldberg, G. Gorn, & R. W. Pollay (Eds.), *Advances in consumer research* (Vol. 17, pp. 488–493). Association for Consumer Research.

Drolet, A., Jiang, L., Mohammad, P., A., & Davis, C. (2019). The influence of aging on consumer decision-making. *Consumer Psychology Review*, *2*(1), 3–16.

Eisend, M. (2022). Older people in advertising. *Journal of Advertising*, *51*(3), 308–322.

Fan, L., Huang, Z., Chu, X. Y., & Jiang, Y. (2024). Stick to my guns: The impact of crowding on consumers' responsiveness to sale promotions. *Journal of the Academy of Marketing Science*, *52*(3), 914–933.

Fan, L., & Jiang, Y. (2018). Don't surprise me: How social relationships shape consumers' attitudes toward probabilistic selling. *Journal of the Association for Consumer Research*, *3*(3), 440–450.

Fan, L., Li, X., & Jiang, Y. (2019). Room for opportunity: Resource scarcity increases attractiveness of range marketing offers. *Journal of Consumer Research*, *46*(1), 82–98.

Fung, H. H., & Carstensen, L. L. (2003). Sending memorable messages to the old: Age differences in preferences and memory for advertisements. *Journal of Personality and Social Psychology*, *85*(1), 163–178.

Fu, T., Wang, Y., Jiang, J., & Meng, L. L. (2025). Wallet sore, gifts galore: The impact of financial constraints on quantity–quality tradeoffs in gift-giving. *Journal of Business Research*, *186*, 114998.

Gómez, M. I., Rao, V. R., & McLaughlin, E. W. (2007). Empirical analysis of budget and allocation of trade promotions in the US supermarket industry. *Journal of Marketing Research*, *44*(3), 410–424.

Gorn, G. J., Jiang, Y., & Johar, G. V. (2008). Babyfaces, trait inferences, and company evaluations in a public relations crisis. *Journal of Consumer Research*, *35*(1), 36–49.

Greenleaf, E. A. (1995). The impact of reference price effects on the profitability of price promotions. *Marketing Science*, *14*(1), 82–104.

Grewal, D., Monroe, K. B., & Krishnan, R. (1998). The effects of price-comparison advertising on buyers' perceptions of acquisition value, transaction value, and behavioral intentions. *Journal of Marketing*, *62*(2), 46–59.

Hardesty, D. M., & Bearden, W. O. (2003). Consumer evaluations of different promotion types and price presentations: The moderating role of promotional benefit level. *Journal of Retailing*, *79*(1), 17–25.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis* (1st ed.). The Guilford Press.

Hock, S. J., Bagchi, R., & Anderson, T. M. (2020). Promotional games increase consumer conversion rates and spending. *Journal of Consumer Research*, *47*(1), 79–99.

Lambert-Pandraud, R., & Laurent, G. (2010). Why do older consumers buy older brands? The role of attachment and declining innovativeness. *Journal of Marketing*, *74*(5), 104–121.

Lambert-Pandraud, R., Laurent, G., & Lapersonne, E. (2005). Repeat purchasing of new automobiles by older consumers: Empirical evidence and interpretations. *Journal of Marketing*, *69*(2), 97–113.

Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Aging*, *17*(1), 125.

Lian, J. W., & Yen, D. C. (2014). Online shopping drivers and barriers for older adults: Age and gender differences. *Computers in Human Behavior*, *37*, 133–143.

Li, S., Sun, Y., & Wang, Y. (2007). 50% off or buy one get one free? Frame preference as a function of consumable nature in dairy products. *The Journal of Social Psychology*, *147*(4), 413–421.

Liu, P. J., McFerran, B., & Haws, K. L. (2020). Mindful matching: Ordinal versus nominal attributes. *Journal of Marketing Research*, *57*(1), 134–155.

Malika, M., Maheswaran, D., & Jain, S. P. (2022). Perceived financial constraints and normative influence: Discretionary purchase decisions across cultures. *Journal of the Academy of Marketing Science*, *50*(2), 252–271.

Mishra, A., & Mishra, H. (2011). The influence of price discount versus bonus pack on the preference for virtue and vice foods. *Journal of Marketing Research*, *48*(1), 196–206.

Mogilner, C., Aaker, J., & Kamvar, S. D. (2012). How happiness affects choice. *Journal of Consumer Research*, *39*(2), 429–443.

Mogilner, C., Kamvar, S. D., & Aaker, J. (2011). The shifting meaning of happiness. *Social Psychological and Personality Science*, *2*(4), 395–402.

Moschis, G. P. (2012). Consumer behavior in later life: Current knowledge, issues, and new directions for research. *Psychology & Marketing*, *29*(2), 57–75.

Nguyen, O. D. Y., Bucic, T., Ngo, L. V., & Oppewal, H. (2023). Disposal-based scarcity: How overstock reduction methods influence consumer brand perceptions and evaluations. *Journal of the Academy of Marketing Science*, *51*(6), 1305–1326.

Office for National Statistics (2024). *Improving the visibility of older people in global statistics*. Retrieved May 27, 2025 from https://blog.ons.gov.uk/2024/10/01/improving-the-visibility-of-older-people-in-global-statistics/

Ong, B. S., Ho, N., F., & Tripp, C. (1997). Consumer perceptions of bonus packs: An exploratory analysis. *Journal of Consumer Marketing*, *14*(2), 102–112.

Raghubir, P. (2004). Coupons in context: discounting prices or decreasing profits? *Journal of Retailing*, *80*(1), 1–12.

Ratner, R. K., & Hamilton, R. W. (2015). Inhibited from bowling alone. *Journal of Consumer Research*, *42*(2), 266–283.

Repsly (2024). *The amount of money you could be losing due to poor promotion execution will shock you*. Retrieved October 4, 2024 from https://www.repsly.com/blog/the-amount-of-money-you-could-be-losing-to-poor-promotion-execution

Richins, M. L. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research*, *31*(1), 209–219.

Rubin, D. C., & Berntsen, D. (2006). People over forty feel 20% younger than their age: Subjective age across the lifespan. *Psychonomic Bulletin & Review*, *13*(5), 776–780.

Ruth, J. A., Otnes, C. C., & Brunel, F. F. (1999). Gift receipt and the reformulation of interpersonal relationships. *Journal of Consumer Research*, *25*(4), 385–402.

Schultz, D. E., Robinson, W. A., & Petrison, L. (1990). *Sales promotion essentials*. NTC Publishing Group.

Soman, D. (1998). The illusion of delayed incentives: Evaluating future effort–money transactions. *Journal of Marketing Research*, *35*(4), 427–437.

Statista (2024). *Marketing in the United States – Statistics & facts*. Retrieved October 4, 2024 from https://www.statista.com/topics/8972/marketing-in-the-united-states/

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

UNHCR (2024). *Older persons*. Retrieved May 27, 2025 from https://emergency.unhcr.org/protection/persons-risk/older-persons

United Nations (2020). *Shifting demographics*. Retrieved May 27, 2025 from https://www.un.org/en/un75/shifting-demographics

U.S. Census Bureau (2022). *America's families and living arrangements.* Retrieved January 10, 2026 from https://www.census.gov/data/tables/2022/demo/families/cps-2022.html

Williams, P., & Drolet, A. (2005). Age-related differences in responses to emotional advertisements. *Journal of Consumer Research*, *32*(3), 343–354.

Witschi, P., Bharadwaj, A., Barrios, G., & Stringer, J. (2023). *Don't overlook your mature consumers*. Retrieved May 27, 2025 from https://www.bcg.com/publications/2023/marketing-to-mature-consumers

World Health Organization (2024). *Ageing and health*. Retrieved May 27, 2025 from https://www.who.int/news-room/fact-sheets/detail/ageing-and-health

Yannopoulou, N., Manika, D., Chandrasapth, K., Tajvidi, M., & Wells, V. (2023). What we do know and don't know about marketing communications on mature consumers. *European Journal of Marketing*, *57*(8), 1969–1995.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.