NO TIME TO ENJOY THE EXTRA!

AGING AND CONSUMER REACTION TO VOLUME-BASED SALES PROMOTION

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CERTIFICATE OF ORIGINALITY

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(Signed)

Jiexian (Chloe) HUANG **(Name of Student)**

ABSTRACT

The world's population is rapidly aging, which presents firms with a plethora of opportunities and challenges. The question of how to increase the effectiveness of marketing tactics aimed towards senior citizens has gradually been a focus of marketers' attention. Through nine studies, including two incentive-compatible designs, the present research explores how a fundamental sociological factor, aging, affects consumers' reactions to sales promotions. The results show that both chronological and psychological aging decreases consumers' favorability toward products offered with a volume-based promotion (e.g., products with free extra product volume) (Studies 1 and 2), and this effect is driven by a limited time-horizon perspective among aged consumers (Study 3). Two boundary conditions are discovered in Studies 4 and 5. Specifically, the investigated effect is weakened or dismissed when the nature of a volume-based sales promotion is disguised (Study 4) and when the promoted extra product volume can be separated from the focal product (Study 5). Furthermore, the effect of aging on consumer reaction to volume-based promotion is moderated by consumption contexts and product positioning. I find that the observed effect is diminished or dismissed in situations where product judgments are detached from the consideration of consumption time, such as in the case of purchasing for others (Study 6) and when a product is positioned as a family-sized product (Study 7). The current work contributes to the literature on consumer aging, limited time-horizon perspective, and sales promotion, and provides substantial managerial implications.

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CHAPTER 1. INTRODUCTION

Population aging is an emerging global phenomenon, with many countries experiencing a longevity revolution. In the United States, 1 in every five people will be over the age of 65 by 2030 (U.S. Census Bureau 2018). In China, the elderly's population will reach 366 million by 2050 (National Bureau of Statistics of China 2019). Globally, the number of elderly adults is predicted to exceed 1.5 billion by 2050 (United Nations 2020), with one in six individuals aged 65 and older, up from one in 11 in 2019 (United Nations 2019). This longevity revolution, to some extent, symbolizes the success of public health, medical advancements, and social and economic development against diseases (Butler 2009; Butler and Jasmin 2000; United Nations 2019).

Undoubtedly, aged consumers are fast becoming a key segment in the market. In the United States, older adults' spending power will rise from US$4.6 trillion in 2020 to US$6.3 trillion by 2030 (World Data Lab 2020). In China, the purchasing power of older people will triple from US$750 billion in 2020 to US$2.1 trillion by 2030 (Fengler 2021). Globally, the share of older consumption is expected to increase from US$8.7 trillion in 2020 to just under US$15 trillion by 2030 (Fengler 2021). However, on the other hand, population aging poses a number of difficulties for our societies, including a scarcity of working-age population, higher government expenditure on healthcare and pensions, an increase in tax receipt, and a reduction in public spending (Christensen et al. 2009; Pettinger 2019).

Given the prevalence of population aging, in recent years, marketing researchers have begun to focus more on the impact of the growing older consumer

sector on production and consumption (e.g., Amatulli et al. 2018; Carpenter and Yoon 2015; Drolet, Williams, and Lau-Gesk 2007; Eibach, Mock, and Courtney 2010; Fung and Carstensen 2003; Hurd and Rohwedder 2010; Lambert-Pandraud and Laurent 2010; Lambert-Pandraud, Laurent, and Lapersonne 2005; Mohammad and Drolet 2019; Park et al. 2021; Sinha and Wang 2013; Wang and Cole 2015; Williams and Drolet 2005). For example, companies have started to attach more importance to healthcare-related product categories, given that aged consumers are focal users of these products and services (Hurd and Rohwedder 2010). From consumers' perspective, research has found that aged consumers display a greater preference for and are able to remember more information from emotional ads over rational ones (Drolet, Williams, and Lau-Gesk 2007; Sudbury-Riley and Edgar 2016; Williams and Drolet 2005). Older consumers are more likely to favor older brands or companies (Lambert-Pandraud and Laurent 2010; Lambert-Pandraud, Laurent, and Lapersonne 2005), and they would switch their preferences from traditional to contemporary products that younger consumers are generally interested in when they encounter younger-age cues in retail settings (Amatulli et al. 2018).

Despite the increasing research interest in consumer aging, our knowledge remains limited in terms of how consumer aging affects consumers' reaction to marketing practices. I aim to fill this research void. In my current work, I examine an unstudied novel marketing consequence of consumer aging, namely, consumers' reaction to sales promotions. Through nine studies, I show that both chronological and psychological aging decreases consumers' favorability toward products with a volume-based sales promotion (e.g., products with free extra product volume), and this effect is mediated by a limited time-horizon perspective among aged consumers. This is because the extra product quantity provided in a volume-based promotion is

perceived as unnecessary, so aged consumers consider the consumption of these extra product volumes wasteful or inefficient usage of their already-limited time. As a result, they are less interested in products that offer a volume-based sales promotion. Furthermore, the proposed effect of aging on consumers' reaction to volume-based sales promotions is likely to be weakened or dismissed when the nature of volume-based promotions is disguised, when the promoted extra product volume can be separated from the focal product, in situations where product judgments are detached from the consideration of consumption time (e.g., purchasing for others), and when the product is positioned as a family-sized product.

I believe that the findings of my present research will provide critical insights into several research areas. First, the current research augments the emerging marketing literature on consumer aging (e.g., Amatulli et al. 2018; Carpenter and Yoon 2015; Drolet, Williams, and Lau-Gesk 2007; Fung and Carstensen 2003; Hurd and Rohwedder 2010; Lambert-Pandraud and Laurent 2010; Lambert-Pandraud, Laurent, and Lapersonne 2005; Mohammad and Drolet 2019; Park et al. 2021; Sinha and Wang 2013; Wang and Cole 2015; Williams and Drolet 2005) by demonstrating a novel and practically relevant consequence of consumer aging: consumers' reaction to sales promotions. Second, previous literature on consumer aging examined its influence on cognitive function, physical activity, and long-term health. This research not only adds to the broad psychological literature on human aging (e.g., Carstensen, Isaacowitz, and Charles 1999; Lang and Carstensen 2002) by providing additional evidence that aging limits consumers' time-horizon perspective (e.g., Monga and Bagchi 2012; Monga, May, and Bagchi 2017; Sinha and Wang 2013; Tsai and Zhao 2011; Zhao and Xie 2011), but also complements this line of research by presenting the implications of a limited time-horizon perspective on sales promotion in the

marketing context. Third, this research contributes to extant research on sales promotion (e.g., Cai, Bagchi, and Gauri 2015; Chen et al. 2012; Chen and Rao 2007; Fan and Jiang 2018; Hock, Bagchi, and Anderson 2020; Kristofferson et al. 2017; Lee and Ariely 2006; Lee and Tsai 2014; Mishra and Mishra 2011) by identifying understudied differences between volume-based and non-volume-based sales promotions.

Importantly, the current work offers substantive practical implications for marketers by revealing a previously unknown antecedent of sales promotion: consumer aging, which influences the effectiveness of the most common marketing strategies. The findings in this research also present a discussion of the circumstances under which situations of volume-based promotions are more attractive to aged consumers. Specifically, marketers can benefit from volume-based promotions for the increasing number of older consumers by putting the promoted extra product volume in the form of a separate product bonus pack, creating a context to encourage consumers to make a purchase for others, and using family-sized product framing. This study attempts to help marketers better understand the demands and mindsets of the expanding senior consumer segment and to adjust their marketing strategies accordingly.

CHAPTER 2. CONCEPTUAL BACKGROUND

2.1. VOLUME-BASED SALES PROMOTION

Sales promotion refers to the temporary and tangible monetary or nonmonetary incentives intended to change consumers' attitude and trigger purchase behaviors (Blattberg and Neslin 1990; Chandon, Wansink, and Laurent 2000). It is one of the most prevalently used marketing practices. Indeed, more than 50% of a marketing budget usually goes to sales promotion (Blattberg and Briesch 2012). Collectively, companies in the U.S. allocate approximately $1 trillion in promotional spending every year (Nielsen Report 2014), and this allocation is continually increasing (Marketing Communications 2021). Ironically, around 70% of promotions fail to generate revenues from dollars spent on sales promotions (Busignani 2017; Singer and Dickman 2016). Therefore, it is critical for researchers and practitioners to investigate ways to improve the effectiveness of sales promotion practices (Ailawadi et al. 2006; Gómez, Rao, and McLaughlin 2007; Hock, Bagchi, and Anderson 2020).

Generally, there are two types of sales promotions that are frequently implemented by marketers: price-based promotions (e.g., price reduction) and volume-based promotions (e.g., free extra product volume; Chen et al. 2012; Hardesty and Bearden 2003). A price-based promotion offers the same product at a reduced price, such as a 20% discount on the product. On the other hand, a volume-based promotion provides consumers with more products for the same price, such as a 25% extra weight of the product (Mishra and Mishra 2011). Consumers tend to prefer a volume-based promotion to a price-based promotion because people in general prefer

to obtain a surplus of a product or something more (Chen et al. 2012; Mishra and Mishra 2011), and price-based promotions evoke consumers' concerns about product quality (Blattberg and Neslin 1990; Chandran and Morwitz 2006; Madan and Suri 2001; Raghubir and Corfman 1999). However, prior research also demonstrated that this preference for volume-based promotions (vs. price-based promotions) could be altered in some situations (e.g., Cai, Bagchi, and Gauri 2015; Hardesty and Bearden 2003; Khan and Dhar 2010; Kivetz and Zheng 2017; Lee and Ariely 2006; Li, Sun, and Wang 2007; Palazon and Delgado-Ballester 2009; Wertenbroch 1998). For example, a price-based promotion would be more effective when consumers consider buying essential products or purchasing higher volume (Cai, Bagchi, and Gauri 2015). When marketers intend to offer large discounts, consumers favor a price-based promotion (Hardesty and Bearden 2003), especially for those highly price-conscious consumers (Palazon and Delgado-Ballester 2009). Consumers opt for volume-based promotions for utilitarian products, whereas price-based promotions are more preferred for hedonic products (Khan and Dhar 2010; Wertenbroch 1998).

A unique characteristic of volume-based sales promotions is the extra quantity of products they provide to consumers. This extra product volume encourages greater stockpiling and consumption (Chandon and Wansink 2002; Seibert 1996), which can accelerate inventory sales more than price-based promotions do. This is probably the reason why volume-based sales promotions are often preferred and executed by marketers (Chen et al. 2012; Mishra and Mishra 2011). From consumers' perspective, they tend to view volume-based promotions as "gains," and price-based promotions as "reduced losses" (Diamond 1992; Diamond and Johnson 1990). Consequently, consumers feel good after taking advantage of a volume-based promotion because they believe that they are receiving something extra for free (Diamond and Johnson

1990; Diamond and Sanyal 1990). For example, consumers value obtaining additional product volume in a volume-based offer when they make utilitarian purchases rather than hedonic purchases, as they feel entitled to indulge more and have the right to consume these additional amounts (Chitturi, Raghunathan, and Mahajan 2007; Kivetz and Zheng 2017; Okada 2005; Siddiqui, May, and Monga 2017).

2.2. VOLUME-BASED SALES PROMOTION AND THE PERCEPTION OF TIME USAGE

It is important to realize that the extra volumes of the product offered in a volume-based sales promotion might carry negative connotations for some consumers. Volume-based sales promotions provide a greater volume of the product for no additional price (Mishra and Mishra 2011). These add-on product volumes are usually not part of the original purchase plan of consumers; thus, they are likely to perceive these add-on volumes as an extra and non-necessary quantity of the product (e.g., Cai, Bagchi, and Gauri 2015; Kivetz and Zheng 2017; Ong, Ho, and Tripp 1997; Schultz, Robinson, and Petrison 1990). Literally, by definition, “extra” means “beyond or more than what is usual, expected, or necessary” (Dictionary.com).

As Arkes (1996) argued, wastefulness occurs when a person acquires more items than is necessary. Consumers are likely to consider the consumption of these extra product volumes as a waste or an inefficient usage of their time. Consistent with this notion, prior studies have indicated that consumers feel guilt after receiving something extra from vice foods such as chocolate cake, because they feel that these add-on volumes of vice foods are unjustifiable (Kivetz and Zheng 2017; Mishra and Mishra 2011). Hsee and colleagues (2013) demonstrated that consumers actually felt

less satisfied when they received more chocolates than they wanted to consume because extra resources such as time are required to consume such extra chocolates. Moreover, consumers displayed lower purchase intention toward a service (e.g., cloud storage service) that offered excessive quantity over an adequate quantity that could actually be consumed, driven by a feeling of waste evoked by the excessive option (Tao and Wyer 2018).

In the current research, I surmise that the extra volume of product provided in a volume-based promotion could lead to negative reactions among certain groups of consumers. In particular, I conjecture that aged consumers (or consumers who feel that they are aged) would show less favorable attitudes toward products with a volume-based sales promotion (e.g., products with free extra volume) compared to their younger peers, because they perceive the consumption of these extra product volumes as wasteful or inefficient usage of their time.

2.3. AGING AND TIME-HORIZON PERSPECTIVE

Aging is defined as a series of changes that make people gradually more likely to die (Medawar 1952). As an inevitable process of individual decline, aging is reflected by three categories of changes: biological changes (i.e., changes in various functions of the human body), psychological changes (i.e., changes in personality, cognition, and the self), and social changes (i.e., changes in the roles experienced by people; Mathur and Moschis 2005; Moschis 1994; Moschis 2012). Biologically, aging makes human beings more sensitive to glare and prone to blurred vision (Charness, Champion, and Yordon 2010), hearing functions can decline (Emmett and Seshamani 2015), there is reduced acuity in taste and smell (Doty and Kamath 2014), and older

people may experience decreased ability to process information because of impairments to the cognitive system (Salthouse and Babcock 1991). Aging also leads to psychological consequences, such as less satisfaction with one's psychological well-being, including lower self-efficacy and self-esteem (Montepare 2009); on the other hand, some people become more self-defining and thus shift the pursuit of happiness from extraordinary experiences to ordinary experiences of everyday life (Bhattacharjee and Mogilner 2014), place greater emphasis on emotional goals (Carpenter and Yoon 2015; Yoon, Cole, and Lee 2009), and exhibit a higher preference for messages containing information of benefit in product evaluation (Wang and Cole 2015). Aging has various social consequences as well. For example, as individuals age socially, they take on roles associated with retirement and grandparenthood (Moschis 2012) and alter their spending preferences as a result (Burnett 1996; Hurd and Rohwedder 2010), such as increasing spending on their grandchildren (Tootelian and Varshney 2010) or engaging in more impulsive behaviors in the event of the loss of loved ones (Sinha and Wang 2013). Older people also tend to experience greater responsibility for society, which prompts them to behave in a more pro-social way (Park et al. 2021).

When people talk about age, they refer to one's chronological age in terms of the number of years since a person's date of birth. However, apart from the chronological age, adults often experience "senior moments" when they feel older than their actual age (e.g., Amatulli et al. 2018; Eibach, Mock, and Courtney 2010; Guiot 2001; Moschis 1994; Moschis 2012; Park et al. 2021). In fact, society promotes the ideal attractiveness of looking young (Haboush, Warren, and Benuto 2012; Oh 2020). On these occasions, individuals' perception of psychological age may change (Amatulli et al. 2018; Hsu, Chung, and Langer 2010; Park et al. 2021; Stephan et al.

2013). Psychological age, also known as subjective age, is defined as the subjective perception of how old or young an individual feels (Amatulli et al. 2018; Montepare 2009; Park et al. 2021; Settersten Jr and Mayer 1997). In the marketing domain, consumers frequently encounter marketing practices that may alter their perception of psychological age. For example, advertisements for anti-aging commodities such as vitamin supplements, cosmetic surgery, face creams, and physical training regimes make salient the fact of consumers' aging (Calasanti 2007; Clarke and Griffin 2008; Twigg and Majima 2014). Also, marketers prefer to use youthful and physically attractive models in advertisements, which can possibly make consumers feel subjectively older due to a comparison effect (Aronsson 2015; Guiot 2001; Park et al. 2021).

One consequence of aging that particularly relates to this research is that aging changes people's time-horizon perspective, which has been discussed in relation to the socioemotional selectivity theory (Carstensen, Isaacowitz, and Charles 1999). Time monitoring is essential to human functioning (Suddendorf and Corballis 1997), and age serves as a significant determinant of an individual's time-horizon perspective (Mohammad and Drolet 2019). Chronological aging is systematically and inversely related to the amount of time remaining in life (Carstensen 2006; Micu and Chowdhury 2010). Thus, as people get older, they feel that they are getting closer to the end of their lives, resulting in a perception of limited future time (Lang and Carstensen 2002; Mohammad and Drolet 2019; Strough et al. 2016). For example, using a life-span sample of adults in the United States, researchers discovered that older adults indicate the life-span hourglass as half empty compared to younger individuals, who perceive the hourglass as half full. Consequently, older adults believe their time as being limited and are less focused on future opportunities

(Strough et al. 2016). Furthermore, when compared to younger individuals, older adults express more emotionally meaningful and intimate goals on their bucket lists, but less knowledge-seeking and identity-related goals (Chu, Grühn, and Holland 2018). This is because as people age, their time horizons grow shorter, and older adults preferentially invest in what is most important (Carstensen 2006), and where they can get emotional support (Fung and Carstensen 2004).

Similarly, psychological aging can alter individuals' time-horizon perspective. For example, Joubert (1990) discovered that college students perceive time passing more swiftly as they get older by comparing their perceived time-lapse rate when they were half their present age with their predicted time-lapse rate when they were twice their current age. Similarly, Bhattacharjee and Mogilner (2014) found that people with a psychologically older age reported greater happiness gained from ordinary experiences compared to those at a younger psychological age, because psychological aging tends to make individuals perceive their future as being more limited, which shifts their self-defining attributes associated with calmness and peacefulness (Mogilner, Kamvar, and Aaker 2011).

With increased chronological or psychological age, consumers are likely to adopt a limited time-horizon perspective by perceiving their time as "closing in" and passing quickly. As a result, it's crucial for aged consumers to use time wisely and thoughtfully (e.g., Carpenter and Yoon 2015; Carstensen, Isaacowitz, and Charles 1999; Giasson, Liao, and Carstensen 2019). Therefore, given this limited time-horizon perspective, aged consumers tend to reject tasks or consumption activities perceived as wasteful or inefficient usage of their limited time (Baltes 1997; Carpenter and Yoon 2015). Consistent with this argument, previous research has demonstrated that older people are less likely than younger ones to pursue knowledge-related goals such

as learning a new language or obtaining a new skill, owing to the longer time required to accomplish these goals (e.g., Carstensen, Isaacowitz, and Charles 1999; Yoon, Cole, and Lee 2009). Similarly, prior studies showed that compared with younger adults, older people preferred social partners who are familiar rather than novel partners (e.g., Fredrickson and Carstensen 1990; Fung and Carstensen 2003), presumably because such preferences reflect an efficient way to derive greater satisfaction and support from these investments for the elderly.

CHAPTER 3. THE CURRENT RESEARCH

Based on the streams of literature mentioned above, in my current work, I propose that both chronological or psychological aging will trigger a limited time-horizon perspective among aged consumers, which in turn lowers their favorability toward volume-based sales promotions. This is because the consumption of these extra product volumes provided in the volume-based sales promotions is considered a waste or inefficient use of their limited time, which triggers negativity among aged consumers. Stating these hypotheses formally:

H1: Chronological or psychological aging decreases consumers' favorability toward products with a volume-based sales promotion.

H2: The effect of aging on consumers' reaction to volume-based sales promotions is driven by the limited time-horizon perspective among aged consumers.

I have posited that the "extra" product volumes provided in the volume-based promotion are not part of the original purchase plan of consumers; thus, aged consumers see consuming these add-on product volumes as wasteful or inefficient usage of their time. If, however, these "extra" product volumes can be separated from the focal product (e.g., in the form of a separate product bonus pack), consumers should be able to consume these "extra" product volumes in a different context, or consumers can give these "extra" product volumes to others. For example, consumers

prefer deals when the extra product volumes can be separated from the focal product (e.g., buy one get one free of liquid laundry detergent; Sinha and Smith 2000). Probably consumers can use the additional detached package for a variety of purposes, such as gifting it to a friend (e.g., Garcia-Rada et al. 2021; Liu and Baskin 2021) or taking it on a trip. In this vein, if "extra" product volumes can be separated from the focal product, consuming these add-on product volumes will not be seen as wasteful or inefficient usage of their time. Therefore, if consumers are either chronologically older or feel subjectively older, they can still enjoy the benefits of the extra product volumes, thereby not becoming less favorable to volume-based promotions. Stating this formally:

> **H3**: The effect of aging on consumers' reaction to volume-based promotion is attenuated when the promoted extra product volume can be separated from the focal product (vs. non-separated).

With a value equivalent to other personal resources such as money and social relationships, the time has its unique characteristics. Whereas other resources can be easily exchanged among people, it is impossible to do so in regard to time (Monga and Bagchi 2012; Monga, May, and Bagchi 2017; Zhao and Xie 2011). The amount of time is bounded by one's life span; an hour today cannot be stored and used tomorrow. Everyone has their own time, which cannot be exchanged (Hansdóttir and Halldórsdóttir 2008). Given that time is an intrapersonal resource (Gino and Mogilner 2014; Sinha and Wang 2013), if the observed effect is indeed driven by aged consumers perceiving their own future time as being limited, I would expect the effect to disappear when product judgments are detached from the consideration of

consumption time. In a gifting context, for example, gift-givers usually evaluate a gift option without considering its consumption time (because gift-givers do not consume the gift themselves). In such situations, product judgments are detached from the consideration of consumption time; thus, I expect the effect to be eliminated. Stating this formally:

> **H4:** The effect of aging on consumers' reaction to volume-based promotions is attenuated when the product is to be consumed by others (vs. by the self).

Another assumption that can divert aged consumers' attention away from their limited and valuable time is pushing them to concentrate on specific product features. Product positioning is a common method used by companies to communicate with target consumers in order to convey the intended benefits of a product (Kotler and Keller 2016; Maggard 1976). For example, marketers can position food as healthy by adding an eco-label (e.g., Atkinson and Rosenthal 2014) or labeling it as an organic, local, or even fair-trade product (e.g., Dallas, Liu, and Fitzsimons 2016; Schuldt, Muller, and Schwarz 2012; Schuldt and Schwarz 2010), thereby enhancing consumers' perception of food healthiness. This strategy effectively makes consumers focus on the positioned attribute of a product rather than giving equal consideration to all of the products' features (Noseworthy and Trudel 2011; Zhao, Dahl, and Hoeffler 2014). Following this logic, if a product is positioned as a family-sized product, consumers would expect to share the product with other family members rather than consume it alone. In such a case, aged consumers should consider a family-sized product that can be enjoyed with others, allowing them to emphasize their restricted

time less. Therefore, I expect the negative effect of aging on consumers' reaction to volume-based promotions to be diminished or dismissed. Stating this formally:

> **H5:** The effect of aging on consumers' reaction to volume-based promotions is attenuated when the product is positioned as a family-sized product.

These possibilities are investigated in nine studies. Studies 1 and 2 demonstrate that (chronological and psychological) aging lowers consumers' favorability of products with a volume-based sales promotion, but not attitudes toward products with other types of promotions (e.g., price-based sales promotion). Study 3 confirms that the investigated effect is driven by a limited time-horizon perspective among aged consumers. Studies 4 and 5 reveal two boundary conditions by showing that the investigated effect will be weakened or dismissed when the nature of the volume-based promotion is disguised and when the promoted extra product volume can be separated from the focal product. Finally, Studies 6 and 7 explore the nature of the investigated effect by testing two additional moderators: consumption context and product positioning. I find that the negative effect of consumer aging on consumer reaction to volume-based promotion is diminished or dismissed in situations where product judgments are detached from the consideration of consumption time, such as in the case of purchasing for others (Study 6) and when the product is positioned as a family-sized product (Study 7). I document my manipulations and every hypothesis-related measurement. Additional data analyses (e.g., pretests, analyses with data exclusion, analyses without control variables) are reported in the appendices.

I incorporate into my studies various operationalizations of aging, including consumers' chronological age, and I manipulate psychological age. For studies in

which I manipulate psychological age, following past aging research (e.g., Amatulli et al. 2018; Horn and McArdle 1992; Park et al. 2021; Stephan et al. 2013), I recruited participants within a certain range of chronological age to control for the potential impact of chronological age. I nevertheless included a wide range of consumer ages across the studies to validate the generalizability of my findings (see Appendix A for the list of participants' age ranges in all studies).

CHAPTER 4. STUDIES

4.1. STUDY 1A

Through an online survey, Study 1A tested whether there is a negative correlation between consumers' chronological age and their attitudes toward volume-based sales promotion, but not between their age and their attitudes toward price-based sales promotion.

4.1.1. Method

One hundred and ninety-five adult US consumers (M_{age} = 36.05, SD = 11.40; 47.2% female) from Amazon Mechanical Turk (MTurk) participated in this study. I randomly assigned participants to either the volume-based or the price-based promotion condition.

In the study, I first asked participants to answer several demographic questions about matters such as gender, age, education, income, and marital status. They then read and evaluated a toothpaste ad. In the volume-based promotion condition, the toothpaste in the ad had a tag of "25% more weight," and the ad indicated that the volume of the toothpaste had been increased from 4 oz to 5 oz, with its price ($4.00) remaining unchanged. In the price-based promotion condition, the toothpaste in the ad had a tag of "20% price discount," and the ad indicated that the price of the toothpaste had been decreased from $4.00 to $3.20, with its volume (4 oz) remaining unchanged (see Appendix B for the advertisements used in Study 1A). The promotions in both

conditions were carefully designed so that the unit price of the toothpaste before and after the promotion was exactly the same across conditions. After reading the ad, participants were asked to provide their attitudes toward the promoted toothpaste with two items, on 9-point scales ("bad/good" and "unfavorable/favorable"; r = .86, p < .001; Gorn, Jiang, and Johar 2008; Williams and Drolet 2005).

4.1.2. Results

I conducted regression analyses with chronological age and promotion type (volume-based promotion = 0, price-based promotion = 1) as the independent variables, product attitude as the dependent variable, and other demographic variables (i.e., gender, education level, income, marital status) as control variables. The results yielded significant main effects of chronological age (b = -.06, SE = .02, t(185) = -3.55, p < .001) and promotion type (b = -2.37, SE = .89, t(185) = -2.65, p = .009) on product attitude. More importantly, there was a significant interaction between chronological age and promotion type (b = .07, SE = .02, t(185) = 3.03, p = .003; see Table 1). Consistent with my expectation, the participants' chronological age negatively predicted their attitudes toward the product in the volume-based promotion condition (b = -.08, SE = .02, t(86) = -4.04, p < .001). This effect, however, was not significant in the price-based promotion condition (b = .03, SE = .02, t(93) = 1.38, p = .171). In addition, removing the control variables from the regression did not change the reported results significantly (see Appendix C for additional data analyses without control variables in Study 1A).

Table 1

STUDY 1A: RESULTS OF REGRESSION WITH PRODUCT ATTITUDE AS DEPENDENT VARIABLE

Variables	B	SE	t
Interaction: Age × Promotion type	.07	.02	3.03**
Age	-.06	.02	-3.55***
Promotion type	-2.37	.89	-2.65**
Gender	.24	.26	.91
Education level	-.50	.20	-2.46*
Household income	.20	.08	2.52*
Marital status 1 (dummy coded)	.20	.40	.48
Marital status 2 (dummy coded)	.42	.36	1.17
Marital status 3 (dummy coded)	-.21	.65	-.32
Intercept	9.60	.82	11.66***

	Volume-based Promotion Condition			Price-based Promotion Condition		
Variables	B	SE	t	B	SE	t
Age	-.08	.02	-4.04***	.03	.02	1.38
Gender	.28	.41	.69	.24	.33	.73
Education level	-.41	.33	-1.26	-.43	.25	-1.71
Household income	.32	.12	2.62**	.07	.10	.73
Marital status 1 (dummy coded)	.94	.63	1.49	-.51	.50	-1.01
Marital status 2 (dummy coded)	.96	.53	1.81	-.23	.47	-.49
Marital status 3 (dummy coded)	1.13	.90	1.26	-2.10	.93	-2.26*

Intercept	9.06	1.09	8.34***	7.63	.98	7.81***

Gender was measured with a dummy variable coded 1 for female or 0 for male.
Education level was coded with four levels, from 1 (did not finish high school) to 4 (postgraduate degree).
Household income was coded with eight levels, from 1 (= < $15,000) to 8 (= > $150,000).
Marital status variables were dummy-coded with "single" as the reference group.
Marital status 1 was coded as "single but in a serious relationship" = 1.
Marital status 2 was coded as "married" = 1.
Marital status 3 was coded as "widowed/separated/divorced" = 1.
* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

4.1.3. Discussion

The results of Study 1A support my basic assumption that aging influences consumers' reaction to volume-based sales promotions. Specifically, I find that participants' chronological age negatively predicted their attitudes toward a product with a volume-based promotion, but not their attitudes toward a product with a price-based promotion. However, one may suspect that the observed effect exists due to a demanding effect in which I placed demographic variables, including age, before the key dependent variables (i.e., consumers' attitudes toward products). Therefore, in the following study, I would counterbalance the design sequence between demographic factors and the critical dependent measurement to rule out the possibility of the demanding effect. Meanwhile, I would provide external validity for my investigation regarding the effect of aging on consumers' responses to volume-based promotions.

4.2. STUDY 1B

The objective of Study 1B was twofold: to replicate the negative effect between consumers' chronological age and their reactions to volume-based

promotions with incentive-compatible real choice behaviors, and to control for order effects by using a counterbalanced design.

4.2.1. Method

Two hundred adults (M_{age} = 36.28, SD = 12.94; 63.5% female) recruited from Prolific platform took part in this study. I randomly assigned participants to conditions of a 2 (apple flavor with regular size + pineapple flavor with extra volume vs. pineapple flavor with regular size + apple flavor with extra volume) × 2 (demographic variables first vs. demographic variables last) between-subjects factorial design.

Participants were first asked to finish a filler task, in which I wanted to increase the reality of my study, so that they would be given an opportunity to enter an actual lucky draw as a token of thanks for their participation. Then the participants responded to demographic questions such as gender and age. Later, they were invited to take part in a lucky draw. I provided them with two bags of dried fruits as their lucky draw options. These two bags of dried fruits varied in both flavor and bag size (see Appendix D for products used in Study 1B). I counterbalanced the order of dried fruit flavors to eliminate its impact on my data pattern. One was a bag of dried apples in regular size, whereas the other was a bag of dried pineapples with extra volume. A separate test confirmed that these two dried fruit flavors were equally liked and consumed with the same frequency in the same subject pool, and there was no difference in the willingness of participants to receive each of these dried fruits as their prize if they won in the lucky draw (see Appendix E for products pretest analyses in Study 1B). Besides, the sequence of demographic questions and the lucky

draw task were also counterbalanced, whose purpose was to avoid the demanding effect introduced by asking demographic questions such as age first.

After participants selected their preferred bag of dried fruit as their potential lucky draw reward, they also indicated their level of hunger on a nine-point scale (i.e., "How hungry are you feeling right now?" 1 = "not hungry at all," 9 = "very hungry"), which is a common control variable, followed previous research that studied real food choices (e.g., Nenkov and Scott 2014; Parker and Lehmann 2014; Yamim, Mai, and Werle 2020).

4.2.2. Results

I conducted a logistic regression analysis with the dried fruit choice (0 = regular size, 1 = extra volume size) as the dependent variable, age as the independent variable, and hunger level as the control variable. The results revealed a significant effect of chronological age on consumers' choice of product with a volume-based promotion (b = -.05, SE = .01, Wald = 16.01, $p < .001$, Exp (B) = .95; see Table 2), showing that the participants who were getting older were less likely to choose a product with a volume-based promotion. This effect held even when the control variable was removed from the regression (see Appendix F for additional data analyses without control variables in Study 1B).

Table 2

STUDY 1B: RESULTS OF REGRESSION WITH DRIED FRUITS CHOICE AS DEPENDENT VARIABLE

Variables	B	SE	Wald	*p*-value	Exp(B)
Age	-.05	.01	16.01	*.000*	.95
Hunger level	.10	.07	1.85	*.174*	1.10
Intercept	1.56	.59	7.08	*.008*	4.76

Hunger level was coded with 9 levels, from 1 (not hungry at all) to 9 (very hungry).

4.2.3. Discussion

Studies 1A and 1B provide converging evidence that as people get older, they become less keen on products with volume-based promotions. Still, the limitation of these two studies is that their findings are correlational in nature. To validate the proposed causal relationship between aging and consumers' reactions to volume-based sales promotions, I would next conduct controlled online experiments in the following studies.

4.3. STUDY 2A

To establish the causal relationship in the observed effect, in Study 2A, I manipulated consumers' psychological age and investigated whether those who feel psychologically older would demonstrate a less favorable attitude toward products with a volume-based sales promotion, but not their attitudes toward the products with a price-based sales promotion.

Past research has indicated that individuals' psychological age is not a fixed state and can be situationally changed (e.g., Amatulli et al. 2018; Hsu, Chung, and Langer 2010; Park et al. 2021; Stephan et al. 2013). Importantly, chronological and

psychological ages have been shown to have similar impacts on individuals' time-horizon perspectives (e.g., Bhattacharjee and Mogilner 2014; Carpenter and Yoon 2015; Carstensen, Isaacowitz, and Charles 1999; Sinha and Wang 2013). Thus, I manipulated participants' psychological age in Study 2A. To control for the potential influence of participants' chronological age, following past aging research (e.g., Amatulli et al. 2018; Horn and McArdle 1992; Park et al. 2021; Stephan et al. 2013), I only invited participants within a limited range of ages to take part in the studies in which I manipulated psychological age (see Appendix A for the list of participants' age ranges in all studies).

4.3.1. Method

Two hundred and thirty-two adult US consumers in their thirties (i.e., aged 30–39) from the MTurk platform (M_{age} = 33.56, SD = 2.85; 43.5% female) participated in this study. They were randomly assigned to conditions of a 2 (psychological age: older vs. younger) × 2 (promotion type: volume-based vs. price-based) between-subjects factorial design.

To manipulate psychological age, I first asked the participants to finish a writing task (adapted from study 1, Guido, Amatulli, and Peluso 2014; see Appendix G for psychological age manipulations used). Specifically, participants recalled and wrote about a recent circumstance that made them feel either older or younger than their actual age. After this task, to validate the effectiveness of the age manipulation, participants indicated how old they felt at that moment (in years; adapted from Amatulli et al. 2018; Hughes, Geraci, and De Forrest 2013; Weiss and Lang 2012).

Next, in a purportedly unrelated task, the participants read a shampoo ad. In the volume-based promotion condition, the shampoo in the ad was promoted with a tag saying "More Volume Now," and the ad indicated that the volume of the shampoo had been increased from 12 fl oz to 15 fl oz, with its price ($2.49) remaining unchanged; meanwhile in the price-based promotion condition, the product was promoted with a tag that said "Lower Price Now," and the ad indicated that the price of the shampoo had been decreased from $2.49 to $1.99, with its volume (12 fl oz) remaining unchanged (see Appendix H for advertisements used in Study 2A). Similar to Study 1A, the promotions in both conditions were carefully designed so that the unit price of the shampoo before and after the promotion was almost the same across conditions. After participants read the ad, I asked them to provide their attitudes toward the promoted shampoo with three items ("bad/good," "unfavorable/favorable," and "negative/positive"; $\alpha = .94$; Gorn, Jiang, and Johar 2008; Williams and Drolet 2005), all on 9-point scales. Finally, participants completed an attention check question, in which they indicated which psychological age manipulation task they had done, to make sure that the participants paid attention to the instructions (Baskin et al. 2014; D'Angelo, Diehl, and Cavanaugh 2019; Hildebrand et al. 2017). This attention-check question was included in this and subsequent online studies conducted on Amazon Mechanical Turk (MTurk) (Studies 3, 4, 5, and 6), but I would use the full data samples in my reported analyses because excluding these people had no effect on the overall data pattern of the results as I reported (see Appendix I for additional data analyses with data exclusion in Study 2A).

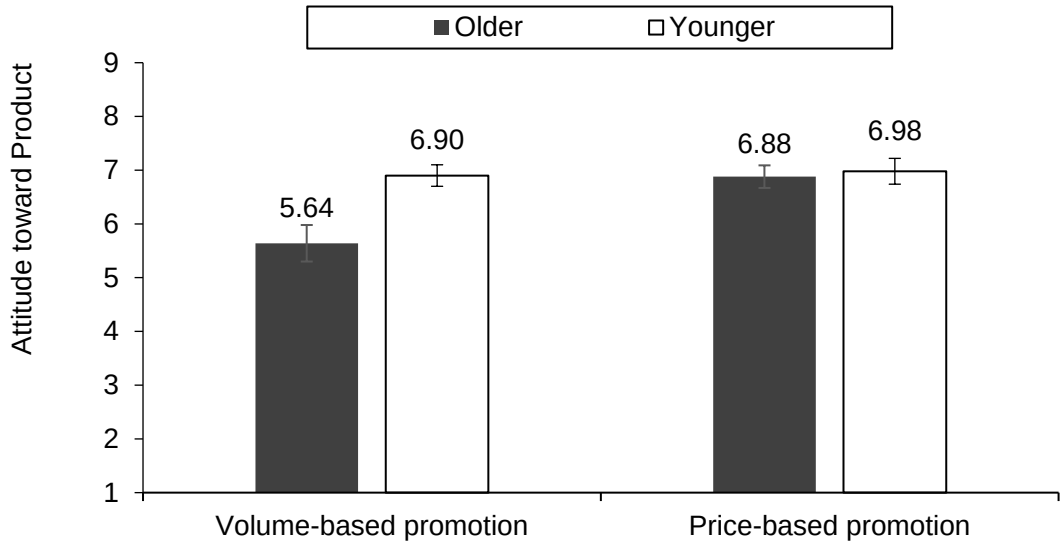
4.3.2. Results

To validate the effectiveness of the age manipulation, I first computed an age-discrepancy index by deducting the participants' chronological age from their felt-age. This measurement represents the discrepancy between one's actual age and felt-age (e.g., Amatulli et al. 2018; Guido, Amatulli, and Peluso 2014; Westerhof and Barrett 2005) such that the bigger the discrepancy, the older one feels, compared to his/her actual age. As expected, participants indicated a higher old-aging index in the older condition (M = .82, SD = 10.97) than those in the younger condition (M = -6.50, SD = 7.75; t(230) = 5.87, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

Consistent with my expectation, a 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 228) = 7.29, $p = .007$) and promotion type (F(1, 228) = 6.78, $p = .010$) on product attitude, qualified by a significant psychological age × promotion type interaction (F(1, 228) = 5.37, $p = .021$, $\eta_p^2 = .02$; see Figure 1). Similar to the findings in Study 1A, when the product was under a volume-based sales promotion, participants in the older condition displayed less favorable product attitudes (M = 5.64, SD = 2.55) than those in the younger condition (M = 6.90, SD = 1.53; F(1, 228) = 12.49, $p < .001$, $\eta_p^2 = .05$). However, when there was a price-based sales promotion, no difference was found between participants in the older and younger conditions (M_{older} = 6.88, SD = 1.66 vs. $M_{younger}$ = 6.98, SD = 1.83, respectively; F(1, 228) = .07, $p = .787$).

Figure 1

STUDY 2A: MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND PROMOTION TYPE



4.3.3. Discussion

Through the lens of psychological age, the results of Study 2A indicate that consumers who feel subjectively older exhibit less favorable attitudes toward products with a volume-based sales promotion, but not toward products with a price-based sales promotion. In the next study, I would look at the proposed causal relationship between aging and consumers' reactions to volume-based promotions through actual choice behaviors.

4.4. STUDY 2B

In Study 2B, I intended to replicate the findings in previous studies and examine the impact of aging on consumers' reaction to volume-based sales promotion through an incentive-compatible behavioral study.

4.4.1. Method

One hundred and fifty-five undergraduates at a specific age range (i.e., aged 17–23) recruited from a large university (M_{age} = 19.61, SD = 1.31; 72.3% female) took part in this study. I randomly assigned participants to one of two conditions (psychological age: older vs. younger).

First, to manipulate participants' psychological age, I invited them to finish the identical writing task and the same manipulation check question that I used in Study 2A. Participants were then given an opportunity to select a free bag of candies as a token of thanks for their participation. They were presented with two candy bags varying in both candy flavor and bag size (see Appendix J for products used in Study 2B). Two flavors of candies (strawberry and peach) were provided, and I pretested these two candy flavors to make sure that they were equally liked in the same subject pool (see Appendix K for products pretest analyses in Study 2B). In addition, I counterbalanced the order of candy flavor to eliminate its impact on the data pattern. More importantly, the two candy bags also varied in size. One was a regular candy bag with 50g of candies inside, whereas the other had 65g of candies inside, framed as a bag with a volume-based promotion (i.e., a bag with extra candy volume: it had a tag saying "30% More").

After participants chose their preferred candy bag, as common control variables for studies with real food choice, the participants also indicated their hunger level as used in Study 1B and dietary constraints (i.e., "Do you have any eating constraints related to sugar/glucose intake?" 0 = "no," 1 = "yes").

4.4.2. Results

Similar to Study 2A, I computed an age-discrepancy index by deducting the participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition (M = 5.70, SD = 11.53) than those in the younger condition (M = .21, SD = 4.08; t(153) = 3.86, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

I conducted a logistic regression with candy choice (0 = regular size, 1 = extra volume size) as the dependent variable, aging manipulation (0 = younger condition, 1 = older condition) as the independent variable, and, eating constraints and hunger level as control variables. The results revealed a significant effect of psychological age on consumers' choice of product with a volume-based promotion (b = -.72, SE = .34, Wald = 4.67, $p = .031$, Exp (B) = .49; see Table 3). As expected, participants in the older condition were less likely to choose the candy bag with extra volume (41.5%) than were those in the younger condition (57.5%). This effect held even when control variables were removed from the regression.

Table 3

STUDY 2B: RESULTS OF REGRESSION WITH CANDY CHOICE AS DEPENDENT VARIABLE

Variables	B	SE	Wald	*p*-value	Exp(B)
Psychological age	-.72	.34	4.67	*.031*	.49
Eating constraints	.43	.62	.47	*.494*	1.53

Hunger level	-.08	.07	1.23	*.268*	.93
Intercept	.64	.41	2.42	*.120*	1.90

Psychological age was dummy-coded with "younger condition" as the reference group.
Eating constraints was dummy-coded with "no" as the reference group.
Hunger level was coded with 9 levels, from 1 (not hungry at all) to 9 (very hungry).

4.4.3. Discussion

With both chronological and psychological age, Studies 1A and 2A provide corroborative evidence that, compared with younger counterparts, consumers who feel (chronologically or psychologically) older display less preference for products with a volume-based sales promotion but not toward products with a price-based sales promotion. The null effect of aging on price-based promotions also speaks against the alternative explanation that getting older or feeling older simply makes consumers show a general negativity toward all types of sales promotions. Besides, Studies 1B and 2B bolster the external validity of the negative effect of aging on consumers' reactions to volume-based promotions in incentive-compatible real consumer choice contexts. I planned to investigate the underlying mechanism of this observed effect in the following studies.

4.5. STUDY 3

I theorized that (chronologically and psychologically) older consumers would perceive a limited future timespan and, thus, they would see consuming "extra" product volume provided in a volume-based sales promotion as wasteful or inefficient usage of their time, which in turn leads to a less favorable attitude toward products

with a volume-based sales promotion. Study 3 tests this proposed mechanism directly through mediation.

4.5.1. Method

One hundred and seventy-five adult US consumers in their twenties (i.e., aged 20–29) recruited via MTurk platform (M_{age} = 26.14, SD = 2.29; 44.0% female) participated in this study. I randomly assigned participants to one of two conditions (psychological age: older vs. younger).

First, to manipulate participants' psychological age, they were asked to complete the identical writing task and the same manipulation check question as used in Studies 2A and 2B. Next, I measured the participants' perception of future time limitation with three questions ("I have the sense time is running out," "I begin to experience time as limited," and "My future seems finite to me"; α = .88; adapted from Lang and Carstensen 2002), all on 9-point scales (1 = strongly disagree, 9 = strongly agree). After that, participants read the same toothpaste ad as I used in Study 1A, featuring the volume-based sales promotion. Then they evaluated the toothpaste on the same three attitudinal measures that I used in Study 2A (α = .96). Finally, participants completed an attention-check question as used in Study 2A, by indicating which psychological age condition they were assigned to. In this study, I would continue to utilize the entire data samples in my reported analyses because leaving these people out did not alter the overall data pattern of the results as I reported (see Appendix L for additional data analyses with data exclusion in Study 3).

4.5.2. Results

Similar to previous studies, I computed an age-discrepancy index by deducting participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition (M = 2.91, SD = 8.63) than those in the younger condition (M = -2.98, SD = 6.69; t(173) = 5.04, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

Replicating my previous findings, participants indicated less favorable attitudes toward the product with a volume-based sales promotion in the older condition (M = 6.42, SD = 2.35) compared to those in the younger condition (M = 7.01, SD = 1.48; t(173) = -1.97, $p = .050$, d = .30). I also found a significant effect of aging on the perception of future time limitation. Participants in the older condition perceived their future time as being more limited (M = 6.14, SD = 2.19) than those in the younger condition did (M = 5.28, SD = 2.16; t(173) = 2.60, $p = .010$, d = .40). Importantly, I conducted bootstrap analyses with 5,000 samples (PROCESS Model 4; Hayes 2013) using psychological age as the independent variable, the perception of future time limitation as the mediator, and consumers' attitude toward the product with a volume-based sales promotion as the dependent variable. The bootstrapping results confirmed the mediating role of perceived future time limitation in the negative effect of aging on consumers' reactions to the volume-based promotion (b = .15, SE = .09; 95% CI = .0171 to .3938).

4.5.3. Discussion

Study 3 confirmed that the effect of aging on consumers' reaction to volume-based sales promotions is indeed mediated by the perception of limited future time. Consistent with my hypothesis, consumers' perceptions of their future time become more limited or constrained as they age, and as a consequence, they exhibit less favorable attitudes toward products with a volume-based sales promotion because the extra product volumes require additional time to consume.

4.6. STUDY 4

I demonstrated in previous studies that aged consumers perceive their future time as being limited, and because time is needed to consume the "extra" product volume provided in the volume-based sales promotion, the extra product was perceived as unnecessary and wasteful. Consequently, aging leads to less favorable consumer attitudes toward products with a volume-based sales promotion. However, past research has shown that aging is negatively associated with materialism (e.g., Belk 1985; Burroughs and Rindfleisch 2002; Richins and Dawson 1992) and older people tend to exhibit a lower need for material possessions than their younger peers (La Ferle and Chan 2008). Thus, one could argue that the observed effect happens because aged consumers simply do not like any large-sized product (which may symbolize material possession); it does not matter whether the big product volume is the company's original design or due to a volume-based sales promotion. To investigate this possible explanation, in Study 4, I included a big-sized condition into the comparison to test whether the effect is driven by the "extra" volume from a volume-based sales promotion or, more generally, from the greater product volume.

4.6.1. Method

Three hundred and forty-one adult US consumers in their thirties (i.e., aged 30–39) recruited via MTurk platform (M_{age} = 33.80, SD = 3.05; 33.1% female) took part in this study. They were randomly assigned to conditions of a 2 (psychological age: older vs. younger) × 2 (ad type: volume-based promotion vs. big-size) between-subjects factorial design.

First, to manipulate participants' psychological age, I invited them to finish the identical writing task and the same manipulation check question that I used in Studies 2 and 3. Then, in a purportedly unrelated task, participants read an ad for a bag of almond snacks (see Appendix M for advertisements used in Study 4). In the volume-based promotion condition, the bag of almonds in the ad featured a tag reading "25% more weight now," and the ad indicated that the net weight of the product was "8 OZ + 2 OZ"; whereas in the big-sized condition, the ad only indicated that the net weight of the product was 10 OZ. After reading the ad, participants completed the same three-item product attitude measure as employed in previous studies (α = .92). Finally, participants answered an attention-check question that I used in Studies 2A and 3, in which they indicated which psychological age manipulation task they had done. In this study, I also use the entire data samples in my reported analyses because the elimination of these people had no impact on the overall data pattern of the results as I reported (see Appendix N for additional data analyses with data exclusion in Study 4).

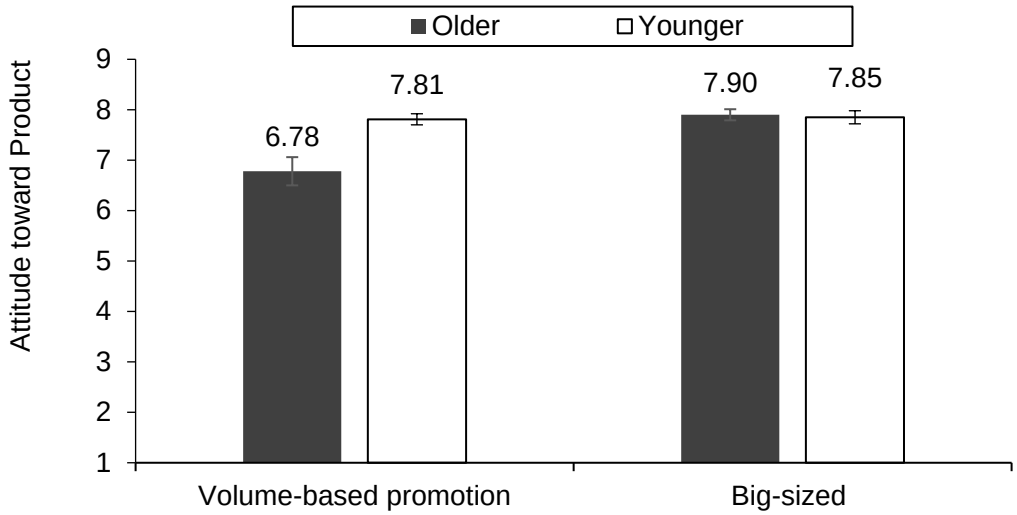
4.6.2. Results

Similarly to earlier studies, I computed an age-discrepancy index by deducting participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition (M = .18, SD = 12.48) than those in the younger condition (M = -5.80, SD = 8.74; t(339) = 5.13, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

A 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 337) = 8.24, $p = .004$) and ad type (F(1, 337) = 11.27, $p = .001$), qualified by a psychological age × ad type interaction (F(1, 337) = 10.03, $p = .002$, $\eta_p^2 = .03$; see Figure 2). Consistent with my expectation, participants in the older condition exhibited less favorable product attitudes toward the product with a volume-based promotion (M = 6.78, SD = 2.58) than did those in the younger condition (M = 7.81, SD = 1.03; F(1, 337) = 18.60, $p < .001$, $\eta_p^2 = .05$). However, the impact of psychological age on consumers' product evaluation was eliminated in the big-sized condition ($M_{older} = 7.90$, SD = 1.06 vs. $M_{younger} = 7.85$, SD = 1.13, respectively; F(1, 337) = .04, $p = .836$).

Figure 2

STUDY 4: MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND AD TYPE



4.6.3. Discussion

Study 4 showed that the negative effect of aging on consumers' reaction to volume-based sales promotions only exists when it is salient to consumers that there is extra product volume provided in a volume-based sales promotion. I did not observe the same effect on a large-sized product without a volume-based promotion, supporting my conjecture that the effect is driven by consumers perceiving the time needed to consume the "extra" product volume provided in the volume-based sales promotion as unnecessary and wasteful, but not by a general negative attitude toward large product size. In addition, the present study excludes another possibility for the examined effect, which is that the smaller volume is perceived to be fresher and therefore more suitable to meet the requirements of the aging consumer. If this is true, including a big-size condition in Study 4 would not allow me to confirm this boundary condition. On the contrary, I would expect to find that elderly consumers do not enjoy big-sized products as well.

4.7. STUDY 5

Study 5 was designed to test another boundary condition. I assumed that the "extra" product volumes provided in the volume-based sales promotion were not part of the consumers' original purchase plans, so they viewed consuming these add-on product volumes as a waste of time or inefficient usage of time. What if consumers could see the benefits of "excess" product quantities? That is, if these "extra" product volumes can be isolated from the focal product, for example, in the form of a separate product bonus pack, consumers can give the additional bonus package to another person or take it on a trip. Based on this assumption, I predicted that the negative effect of aging on consumers' reactions to volume-based sales promotions should be weakened when the promoted extra product volume can be separated from the focal product (e.g., buy-one-get-one-free).

4.7.1. Method

Two hundred and ninety-five eligible US adult consumers in their thirties (i.e., aged 30–39) participated in this study via MTurk platform (M_{age} = 33.99, SD = 2.73; 55.9% female). They were randomly assigned to conditions of a 2 (psychological age: older vs. younger) × 2 (promotion form: volume-based promotion vs. buy-one-get-one-free) between-subjects factorial design.

First, I asked participants to finish the same recall task of psychological age and the identical manipulation check as used in previous studies. After that, as a purportedly unrelated task, participants read a chewing gum ad. In the volume-based promotion condition, the ad indicated that the package of chewing gum formerly

contained 60 pieces, but the promoted package had been increased in size to 120 pieces for the same price. However, in the buy-one-get-one-free condition, the ad stated that a package of chewing gum once had 60 pieces, but that consumers can now obtain two 60-piece packages for the same price (see Appendix O for advertisements used in Study 5). Then participants provided their product evaluation using the same three attitudinal measures that I employed in previous studies ($\alpha = .94$). Finally, similar to previous studies, participants answered an attention-check question, in which they indicated which psychological age manipulation task they had done. But I would continue to use the total data sample in my reported analyses because excluding these people did not alter the overall data pattern of the results as I reported (see Appendix P for additional data analyses with data exclusion in Study 5).

4.7.2. Results

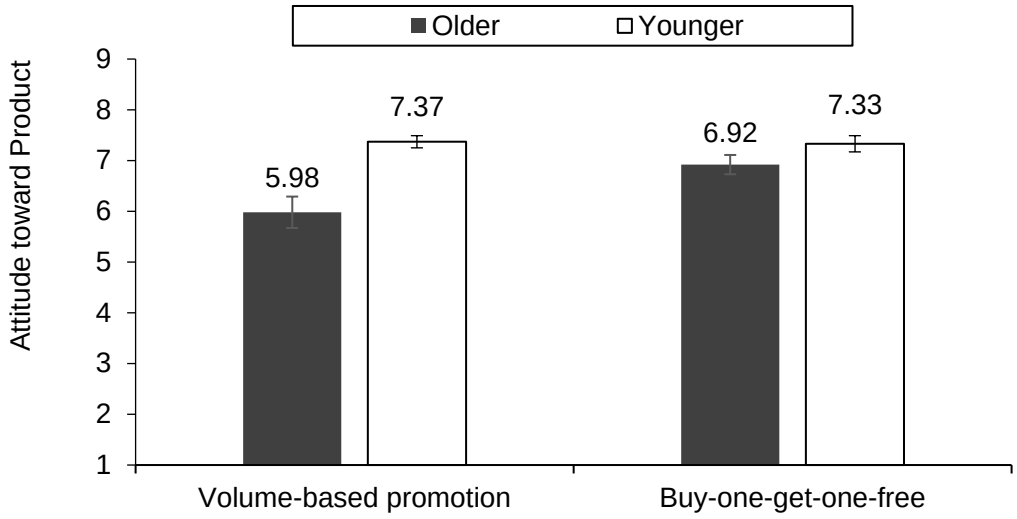
Similarly to earlier studies, I computed an age-discrepancy index by deducting participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition ($M = 2.93$, $SD = 12.32$) than those in the younger condition ($M = -5.01$, $SD = 7.25$; $t(293) = 6.76$, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

A 2 × 2 ANOVA yielded significant main effects of psychological age ($F(1, 291) = 19.67$, $p < .001$) and promotion form ($F(1, 291) = 4.86$, $p = .028$), qualified by a psychological age × promotion form interaction ($F(1, 291) = 5.79$, $p = .017$, $\eta_p^2 = .02$; see Figure 3). Replicating the findings from previous studies, the results demonstrated that participants in the older condition displayed less favorable attitudes

toward the product with a volume-based promotion (M = 5.98, SD = 2.55) than did those in the younger condition (M = 7.37, SD = 1.06; F(1, 291) = 22.11, $p < .001$, $\eta_p^2 = .07$). However, the observed negative impact of psychological age on consumers' product evaluation was diminished in the buy-one-get-one condition ($M_{older} = 6.92$, SD = 1.74 vs. $M_{younger} = 7.33$, SD = 1.37, respectively; F(1, 291) = 2.19, $p = .140$).

Figure 3

STUDY 5: MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND PROMOTION FORM



4.7.3. Discussion

The results of Study 5 demonstrate a boundary condition for the negative effect of aging on consumers' reactions to the volume-based sales promotions. Suppose that these "extra" product volumes could be separated from the focal product, for example, in the form of a separate product bonus pack (i.e., buy-

one-get-one-free). In that case, consumers are likely to use this additional bonus package for other purposes, such as gifting it to others or taking it on a trip, which would not occupy the limited future time introduced by people getting older or feeling older.

4.8. STUDY 6

I hypothesized that the impact of aging on consumers' reaction to volume-based sales promotions should be attenuated when the consumption of these "extra" product volumes is detached from the consideration of consumption time, such as in the case of purchasing for others. Study 6 tests this possibility. I expect that when a purchase is considered for oneself, aging will lead to a more negative attitude toward products with a volume-based sales promotion. However, this effect should be weakened or eliminated when consumers are considering purchasing the product for someone else.

4.8.1. Method

Three hundred and eighty adult US consumers in their twenties (i.e., aged 20–29) recruited via MTurk platform (M_{age} = 25.76, SD = 2.62; 55.5% female) participated in this study. They were randomly assigned to conditions of a 2 (psychological age: older vs. younger) × 2 (consumption context: self-purchasing vs. other-purchasing) between-subjects factorial design.

To manipulate psychological age, participants in the younger and older conditions first completed the same writing task and the identical manipulation check

as used in Studies 2–5. Afterwards, in a purportedly unrelated task, I asked participants to imagine that they were making a purchasing decision of almond snacks either for themselves (the self-purchasing condition) or for a friend (the other-purchasing condition). Participants then read an almond ad featuring a volume-based sales promotion (see Appendix Q for advertisements used in Study 6). They evaluated the product on the same three-item product attitude measure that I employed in previous studies ($\alpha = .97$). Finally, similar to previous studies, participants completed an attention-check question in which they indicated which psychological age condition they were assigned to. In this study, I also utilized the entire data samples in my reported analyses as excluding the people who failed the attention-check question did not alter the overall data pattern of results as I reported (see Appendix R for additional data analyses with data exclusion in Study 6).

4.8.2. Results

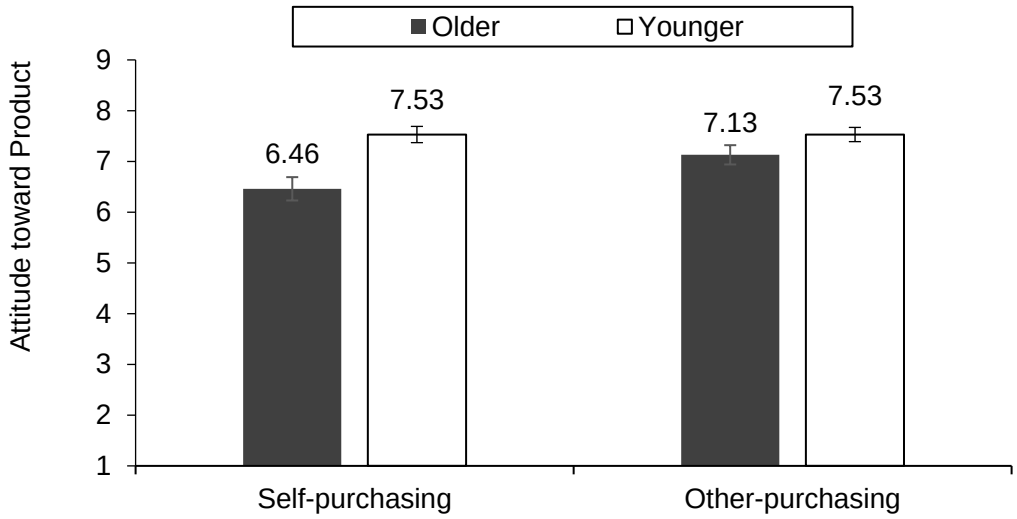
Similar to previous studies, I computed an age-discrepancy index by deducting participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition ($M = 6.83$, $SD = 11.29$) than those in the younger condition ($M = -1.28$, $SD = 8.16$; $t(378) = 8.02$, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

A 2 × 2 ANOVA yielded a significant main effect of psychological age ($F(1, 376) = 15.50$, $p < .001$) and a marginally significant main effect of consumption context ($F(1, 376) = 3.25$, $p = .072$), qualified by a marginally significant interaction between psychological age and consumption context ($F(1, 376) = 3.28$, $p = .071$, η_p^2

= .01; see Figure 4). Replicating the findings from previous studies in the self-purchasing condition, participants in the older condition reported less favorable attitudes toward products with a volume-based sales promotion (M = 6.46, SD = 2.38), compared to those in the younger condition (M = 7.53, SD = 1.44; F(1, 376) = 16.26, $p < .001$, $\eta_p^2 = .04$). However, in the other-purchasing condition, consumers' reactions to the volume-based sales promotion did not differ across the older condition (M = 7.13, SD = 1.71) and the younger condition (M = 7.53, SD = 1.45; F(1, 376) = 2.30, $p = .131$).

Figure 4

STUDY 6: MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND CONSUMPTION CONTEXT



4.8.3. Discussion

Study 6 offered additional evidence for the underlying process that I proposed. I found that the previously observed effect of aging on consumers' reaction to volume-based sales promotions diminished when the consumption of these "extra" product volumes was detached from the consideration of consumption time, such as in the case of purchasing for others. In that case, even if the "extra" product volumes still needed additional time to consume, given that the product was purchased for someone else, aged consumers did not lower their product evaluation.

4.9. STUDY 7

In Study 7, I planned to test another moderator, product positioning, of the negative effect of aging on consumers' reaction to volume-based sales promotions. I propose that encouraging aged consumers to pay greater attention to certain product features, such as a family-sized product, will lead them to believe that the goods will be shared or enjoyed with other family members. In such circumstances, aged consumers would be less concerned with their limited time and thus not lower their preference for products with a volume-based sales promotion. Therefore, in this study, I expected that aged consumers will decrease their purchase intentions for products with a volume-based promotion. However, this effect should be weakened or eliminated when the product is positioned as a family-sized product.

4.9.1. Method

Three hundred and ninety-seven adult US consumers in their thirties (i.e., aged 30–39) recruited from Prolific platform (M_{age} = 34.20, SD = 2.83; 68.3% female) took

part in this study. They were randomly assigned to conditions of a 2 (psychological age: older vs. younger) × 2 (product positioning: regular volume-based promotion vs. family-sized volume-based promotion) between-subjects factorial design.

To manipulate psychological age, participants in the younger and older conditions first completed the identical writing task and the same manipulation check as used in Studies 2–6. Then, in a purportedly unrelated task, participants read an ad for a bag of almond snacks (see Appendix S for advertisements used in Study 7). In the regular volume-based promotion condition, the bag of almonds in the ad only featured a volume-based promotion. In the family-sized volume-based promotion condition, in addition to a volume-based promotional offer, the ad had a message saying, "perfect for the whole family", positioned as a family-sized product. After reading the ad, participants indicated their purchase intention on a 9-point scale (1 = very unlikely, 9 = very likely; adapted from Hodges and Chen 2021).

4.9.2. Results

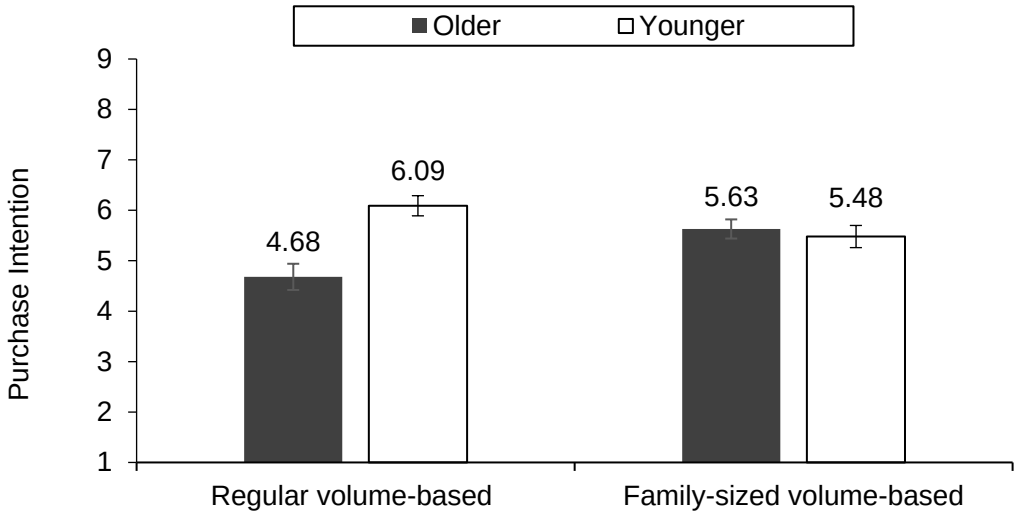
Similar to previous studies, I computed an age-discrepancy index by deducting participants' chronological age from their felt-age. As expected, participants indicated a higher old-aging index in the older condition (M = 3.06, SD = 11.40) than those in the younger condition (M = -4.09, SD = 6.66; t(395) = 7.62, $p < .001$), suggesting that participants in the older condition actually felt older than those in the younger condition.

A 2 × 2 ANOVA revealed a significant main effect of psychological age (F(1, 393) = 8.28, $p = .004$) and a null effect of product positioning on consumers' purchase intention regarding the featured product. More importantly, I found a significant

psychological age × product positioning interaction effect on consumers' purchase intention for the product with a volume-based promotion ($F(1, 393) = 12.89$, $p < .001$, $\eta_p^2 = .03$; see Figure 5). Consistent with my expectation, participants in the older condition indicated less purchase intention for the product with a volume-based promotion ($M = 4.68$, $SD = 2.57$), compared to those in the younger condition ($M = 6.09$, $SD = 1.98$; $F(1, 393) = 20.55$, $p < .001$, $\eta_p^2 = .05$). However, the negative effect of psychological age on consumers' purchase intention was diminished when the product was positioned as a family-sized product ($M_{older} = 5.63$, $SD = 1.93$ vs. $M_{younger} = 5.48$, $SD = 2.15$, respectively; $F(1, 393) = .26$, $p = .611$).

Figure 5

STUDY 7: MEAN PURCHASE INTENTION AS A FUNCTION OF PSYCHOLOGICAL AGE AND PRODUCT POSITIONING



4.9.3. Discussion

Study 7 provided additional evidence for the proposed underlying mechanism through measuring consumers' purchase intention and supported the notion that product positioning moderates the effect of aging on consumers' reactions to volume-based promotions. Specifically, I found that aged consumers would not display a lower intention to purchase a product with a volume-based promotion when it was positioned as a family-sized product.

CHAPTER 5. GENERAL DISCUSSION

5.1. SUMMARY

With the increasing trend and importance of population aging around the world, the older age group has increasingly developed into a significant market segment that is grabbing marketers' and researchers' attention. The present research explores how this fundamental sociological factor, aging, influences consumers' responses to promotional marketing practices. Across nine studies, I show that both chronological and psychological aging lowers consumers' favorability toward products with a volume-based sales promotion (e.g., products with free extra product volume), but not toward other types of promotions (e.g., price-based sales promotion; Studies 1A and 2A). The negative effect of aging on consumers' reaction to volume-based promotion is consequential for the actual product choices that consumers make (Study 1B and 2B), and is found to be mediated by a limited time-horizon perspective induced by aged consumers (Study 3). However, this observed effect is weakened or dismissed when the nature of the volume-based sales promotion is disguised (Study 4), and when the promoted extra product volume can be separated from the focal product (e.g., in the form of a separate product bonus pack; Study 5). Moreover, consistent with the proposed mechanism of limited time-horizon perspective, I found that the investigated effect is diminished or dismissed in situations where product judgments are detached from the focal product (Study 6), and when the product is positioned as a family-sized product (Study 7).

5.2. THEORETICAL CONTRIBUTIONS

My research contributes to the growing body of knowledge about consumer aging (e.g., Amatulli et al. 2018; Carpenter and Yoon 2015; Drolet, Williams, and Lau-Gesk 2007; Eibach, Mock, and Courtney 2010; Fung and Carstensen 2003; Hurd and Rohwedder 2010; Lambert-Pandraud and Laurent 2010; Lambert-Pandraud, Laurent, and Lapersonne 2005; Mohammad and Drolet 2019; Park et al. 2021; Sinha and Wang 2013; Wang and Cole 2015; Williams and Drolet 2005). The extant literature on this topic focuses on the natural consequences of people's cognitive functions (e.g., Hughes and Touron 2018; Stephan et al. 2016), individuals' psychological changes and well-being (e.g., Hughes and Touron 2021; Larsen et al. 2021), and their reactions to modern consumptions, such as a stronger preference for traditional (vs. contemporary) products (Lambert-Pandraud and Laurent 2010; Lambert-Pandraud, Laurent, and Lapersonne 2005; Mohammad and Drolet 2019; Yoon, Cole, and Lee 2009), and a lower likelihood of trying innovative activities such as online shopping (e.g., Iyer, Reisenwitz, and Eastman 2008; Lambert-Pandraud and Laurent 2010). Different from prior research (e.g., Amatulli et al. 2018; Park et al. 2021), to my limited knowledge, my current work is the first to demonstrate the effects of both chronological and psychological aging on consumers' reaction to promotional marketing practices. By systemically looking at the mechanism underlying this effect, my work reveals how and why consumer aging can influence consumers' reactions to sales promotions. Specifically, I show that chronological and psychological aging induces a limited time-horizon perspective among consumers, which subsequently leads to less favorable attitudes toward products with a volume-based sales promotion (e.g., products with free extra product volume). This effect

occurs because the extra product volume offered in the volume-based sales promotion is perceived as unnecessary; thus, aged consumers consider the consumption of these extra product volumes as wasteful or inefficient usage of their already-limited time. The unfavorable reaction not only lowers consumers' evaluation of a product offered with a volume-based sales promotion, but also decreases their likelihood of purchasing the product, even when the promoted product is a better deal than a regular product without a promotion attached.

Furthermore, the findings of the present research further extend our understanding of the broad psychological literature on human aging (e.g., Carstensen, Isaacowitz, and Charles 1999; Lang and Carstensen 2002) by providing more evidence that aging limits individuals' time-horizon perspective. Limited time horizon has been found to grow with chronological age (Carpenter and Yoon 2015; Mohammad and Drolet 2019; Yoon, Cole, and Lee 2009). For example, elderly individuals are prone to view their future as being more limited or constrained (vs. expansive) than their younger counterparts (Lang and Carstensen 2002). As a consequence, older people often place a greater emphasis on emotional and meaningful goals (Carstensen 2021; Carstensen, Isaacowitz, and Charles 1999), and cherish familiar social partners more (e.g., Fredrickson and Carstensen 1990; Lang and Carstensen 1994). The current research also adds to the literature on time perspective (e.g., Monga and Bagchi 2012; Monga, May, and Bagchi 2017; Sinha and Wang 2013; Tsai and Zhao 2011; Zhao and Xie 2011), and it represents an important step in exploring how time-horizon perspectives can also be shaped by psychological aging. When consumers feel older than their actual age, due to such factors as poor physical performance (e.g., Stephan et al. 2013), alienation from youth culture (e.g., Eibach, Mock, and Courtney 2010), being surrounded by a group of younger people

(e.g., Amatulli et al. 218; Park et al. 2021), and changes of social roles, they tend to perceive their future time as being constrained or limited (vs. expansive), which subsequently affects their purchasing decisions.

Additionally, the current research adds to the existing knowledge regarding sales promotions (e.g., Cai, Bagchi, and Gauri 2015; Chen et al. 2012; Chen and Rao 2007; Fan and Jiang 2018; Hock, Bagchi, and Anderson 2020; Kristofferson et al. 2017; Lee and Ariely 2006; Lee and Tsai 2014; Mishra and Mishra 2011). Although previous research has revealed several factors that can influence consumers' attitude toward different types of promotions (e.g., Cai, Bagchi, and Gauri 2015; Hardesty and Bearden 2003; Khan and Dhar 2010; Kivetz and Zheng 2017; Lee and Ariely 2006; Li, Sun, and Wang 2007; Palazon and Delgado-Ballester 2009; Wertenbroch 1998), our understanding of the comparative effectiveness of diverse types of sales promotions is still in its infancy. In the current research, I investigate an important and fundamental sociological construct, aging, which can reduce consumers' preference for volume-based sales promotions. Specifically, I find that the extra product volumes provided in such promotions are not part of the original purchase plans of consumers and are perceived as unnecessary. Therefore, aged consumers regard the consumption of these extra product volumes as a waste or an inefficient usage of their already-limited time.

5.3. LIMITATIONS AND FUTURE RESEARCH

The current study showed that both chronological and psychological aging display less likelihood towards products with a volume-based promotion (e.g., products with free extra product volume). Among the studies that manipulate

consumers' psychological age (Studies 2 to 7), I have only included the comparison between psychologically older and younger conditions. One might raise the question of whether the effect is driven by the younger or the older side. It is possible that the lower favorability of volume-based promotion among psychologically older consumers may be due to the higher favorability of volume-based promotion among psychologically younger consumers. Nonetheless, I am concerned that this will not be the case. Though I did not include a control condition in the current research, prior literature indicates that people tend to feel psychologically younger after the age of twenty-five, so it is reasonable to predict that the effect in the control condition is similar to the effect in the psychologically younger condition. In most of my studies, I primarily used samples from people over the age of twenty-five. I would, however, encourage future studies to look into the effect by having a control condition.

The empirical findings of Studies 1 and 2 demonstrate that aged consumers decrease their favorability toward volume-based promotions, but not the general negativity of aging on any type of sales promotion, such as a null effect of aging on price-based promotions. Nevertheless, it is also possible that older consumers, either chronologically or psychologically, have fewer preferences for untested sales promotions. For example, Tepper (1994) discovered that older consumers who associate the elderly with social stigma are more likely to reject senior citizen discounts. There are still other unstudied sales promotions in which consumer aging may play a role. For instance, Brewer, Dull, and Lui (1981) demonstrated that the elderly in general constitute a superordinate category (e.g., grandparents and elder statesmen). Thus, there is also the possibility that the feeling of getting older could boost consumers' acceptance of hierarchical loyalty programs (e.g., Breugelmans et al. 2015; Chaabane and Pez 2017) because seniority leads consumers to believe that

they should be treated differently and deserve to be respected by others, when compared to other younger consumers, particularly those with a high subjective socioeconomic status (e.g., Avlund et al. 2003; Singh-Manoux, Marmot, and Adler 2005; Vauclair et al. 2015). As may be seen, this research opens the door for researchers to further investigate the relationship between consumer aging and marketing promotions.

Future work could also further extend the concept of consumer age to brand age. Brand age refers to a consumer's perception of a specific brand's age within a certain category, in which consumers typically consider brand age to be older or younger (Guillory 2012). Whether the perception of brand age as older (vs. younger) impacts consumers' behaviors, such as the consumption of virtue (vs. vice) remains to be seen. As established by Aaker (1997), consumers have a natural propensity to view brands as people, and so regard an old brand as an aged person. In addition, society encourages individuals to respect the elderly (Brewer, Dull, and Lui 1981; Reed 1991); hence, it is plausible that consumers would behave appropriately in the presence of an older brand and thereby engage in more consumption of virtues. I believe that this would be another fruitful area for further work.

The underlying mechanism in this study is the limited time-horizon perspective induced by aged consumers, who consider that consuming the extra product volumes supplied in the volume-based promotions as wasteful or inefficient usage of their already-limited time, and hence favor volume-based promotion less. One could raise the concern that chronological or psychological aging may cause people to have less self-control and, thus, they feel the constraints imposed by volume-based promotions, resulting in their being less favorable toward products with volume-based sales promotions. This alternative explanation, however, is not

supported by the research data. Previous research has demonstrated that large packages are judged to be detrimental to self-control (Coelho do Vale, Pieters, and Zeelenberg 2008; Wansink and Park 2000). But in Study 4, I found that aged consumers do not exhibit less preference for big-sized products, which contradicts the alternative account of decreased self-control. Moreover, prior research has illustrated that older adults have fewer self-control problems than younger individuals (e.g., Ameriks et al. 2007; Righetti and Finkenauer 2011). Taken together, both research findings and past literature do not support the claim that lower self-control mediates the negative effect of aging on consumers' reactions to volume-based promotions.

Another possible explanation for the observed effect is whether the smaller volume is perceived as fresher and therefore better suited to meet the requirements of the elderly. However, again, Study 4 suggests that this is unlikely to occur. If this is true, including a big-size condition in Study 4 would not allow me to confirm this boundary condition. Instead, I would expect to find the opposite - elderly consumers do not enjoy big-sized products as much.

Another alternative explanation of the proposed effect is that with age, a person may feel the need to act more responsibly and only receive what she wants, not too much more. Indeed, a recently published paper (Park et al. 2021) showed that psychological aging would increase perceived responsibility for others' welfare, which encourages them to do good for others, such as donating more. Using this logic, as an individual age, she/he may feel more responsible for others, which may activate her/his altruistic motive. As a result, they prefer volume-based promotion as their altruistic motives will make them see the benefits of excess product volumes that can be shared with others or benefit others, which is similar to my findings in Study 7: When psychologically older consumers observe that the products can be shared with

family, the effect will be diminished. In other words, I predict that the feeling of responsibility may predict the opposite effect of the effect proposed in the current study. Accordingly, this possibility may not be sufficient to explain the negative impact of aging in my study.

In Study 5, I showed a boundary condition for the observed effect; that is, the effect of aging on consumers' reactions to volume-based promotions is attenuated when the promoted extra product volume can be separated from the focal product (e.g., buy-one-get-one-free). Previous research did not distinguish between these two forms of quantity-based promotions, such as whether the promoted extra product volume can be separated from the focal product, or cannot be (e.g., Chen et al. 2012, Mishra and Mishra 2011; Ong, Ho, and Tripp 1997). The current study provides preliminary evidence by showing that consumers' reactions differ depending on whether or not the add-on volume can be isolated from the focal product. Future research is encouraged to systematically test the differences attached to these two forms of quantity-based promotions.

My study demonstrated that the negative effect of aging on consumers' reactions to volume-based promotions diminishes when the product is positioned as a family-sized product (Study 7). Future research could consider alternative message framings that could make volume-based promotions more appealing to older consumers. For example, using "we" rather than "I" in ads, which easily primes one's interdependent self-construal (e.g., Cross, Hardin, and Gercek-Swing 2011; Gardner, Gabriel, and Lee 1999), can induce an individual to focus more on essential relationships with others, thereby activating one's sharing motive. Additional research could be conducted to evaluate this possibility.

5.4. MANAGERIAL IMPLICATIONS

Practically, this research offers rich managerial implications for marketers to understand volume-based sales promotion and present viable techniques for marketers to apply to improve the success of sales promotions. I find in this research that the perception of aging could lower consumers' favorability toward products with a volume-based sales promotion. These findings suggest that marketers should optimize their sales promotion formats to match different customer segments. For example, there are many industries with the elderly as their main targeted customer segment (e.g., healthcare, leisure and tourism, and insurance industries). In addition, in many situations, adult consumers may feel that they are getting older. For example, consumers may feel that they are getting old when they are recommended an anti-age cream by a salesperson, or when young social cues are present in the retailing environment (e.g., Park et al. 2021). In times like these, consumers may not have positive attitudes toward volume-based sales promotions; thus, marketers might need to use other types of promotional activities (e.g., price discount or promotional games) to boost sales.

Given that volume-based promotion is preferred by marketers because the extra product volume encourages greater stockpiling and consumption, which can accelerate inventory sales more than price-based promotions (Chen et al. 2012; Li, Sun, and Wang 2007; Mishra and Mishra 2011), the findings of this research also offer potential tactics to increase the acceptance of volume-based sales promotions among older consumers. For example, making the promoted extra product volumes in a separated (vs. non-separated) form, such as an additional bonus pack, significantly increases the appeal of volume-based promotions to older consumers (Study 5). As

found in Study 6, consumers' negativity toward volume-based promotion was weakened when product judgments were detached from the consideration of consumption time, such as in the case of purchasing for others. Inspired by this finding, when companies use volume-based sales promotions to entice older consumers, they might consider creating a context to encourage consumers to make a purchase for others. Furthermore, volume-based promotions can excite older consumers by portraying the product as a family-sized offering, which encourages their desire to share and enjoy the products with other family members, and so diverts their attention away from their time limits (Study 7).

The global population is aging, and the older age group has gradually become an important market segment. In addition, the elderly have higher purchasing power compared to younger adults (World Data Lab 2020), as they are burdened with few financial burdens, have already paid their mortgages, and have brought up their children (Global Demographics Research 2015). These considerations make the understanding of the senior consumer segment's needs and wants one of the important tasks for marketing researchers. There is still much to discover regarding the consequences of consumer aging, and the current work, ideally, will serve as a foundation for fruitful future research in this direction.

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APPENDICES

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APPENDIX A

THE LIST OF PARTICIPANTS' AGE RANGES IN ALL STUDIES

Study	Study Type	Age Range
Study 1A	Correlation Study	Open Age (18 to 77)
Study 1B	Correlation Study with Incentive-Compatible Behavioral Study	Open Age (18 to 74)
Study 2A	Main Effect Study	30 to 39
Study 2B	Main Effect Study with Incentive-Compatible Behavioral Study	17 to 23
Study 3	Mediation Study	20 to 29
Study 4	Boundary Condition Study	30 to 39
Study 5	Boundary Condition Study	30 to 39
Study 6	Moderation Study	20 to 29
Study 7	Moderation Study	30 to 39

APPENDIX B

ADVERTISEMENTS USED IN STUDY 1A

Price-based Promotion Condition

Volume-based Promotion Condition


APPENDIX C

ADDITIONAL DATA ANALYSES WITHOUT CONTROL VARIABLES IN STUDY 1A

Study 1A (N = 195; M_{age} = 36.05, SD = 11.40; 47.2% female)

Regression analyses with chronological age and promotion type (volume-based promotion = 0, price-based promotion = 1) as the independent variables, product attitude as the dependent variable, yielded a significant mani effect of chronological age (b = -.05, SE = .02, t(191) = -2.99, *p* = .003), and a marginally significant main effect of promotion type (b = -.1.59, SE = .88, t(191) = -1.81, *p* = .071) on product attitude. More importantly, there was a significant interaction between chronological age and promotion type (b = .05, SE = .02, t(191) = 2.24, *p* = .026; see below table). Consistent with my expectation, participants' chronological age negatively predicted their attitudes toward the product in the volume-based promotion condition (b = -.05, SE = .02, t(92) = -2.71, *p* = .008). This effect, however, was not significant in the price-based promotion condition (b = .00, SE = .02, t(99) = .21, *p* = .837).

Variables	B	SE	t						
Interaction: Age	.05	.02	2.24*	Volume-based			Price-based		
× Promotion type				Promotion Condition			Promotion Condition		
Promotion type	-1.59	.88	-1.81	B	SE	t	B	SE	t
Age	-.05	.02	-2.99**	-.05	.02	-2.71**	.00	.02	.21
Intercept	8.90	.64	14.00***	8.90	.70	12.70***	7.31	.54	13.50***

* p ≤ .05
** p ≤ .01
*** p ≤ .001

APPENDIX D

PRODUCTS USED IN STUDY 1B

	A Product without Volume-based Promotion (Dried Apples)	**A Product with Volume-based Promotion (Dried Pineapples)**
Choice Set		
	A Product without Volume-based Promotion (Dried Pineapples)	**A Product withVolume-based Promotion (Dried Apples)**
Counter-balanced Choice Set		

APPENDIX E

PRODUCTS PRETEST ANALYSES IN STUDY 1B

Study 1B (N = 80; M_{age} = 33.05, SD = 12.73; 60.0% female)

Eighty participants recruited from the same subject pool via the Prolific platform took part in this pretest study. Participants answered three questions for both dried apples and dried pineapples: how much do you like dried apples/ dried pineapples; how often do you eat dried apples/ dried pineapples; if you enter a lucky draw and can get a free bag of dried fruit, how much are you willing to get dried apples/ dried pineapples, all on 9-point scales (1 = not at all, 9 = very much).

Results showed that participants equally like the dried apples (M = 4.61, SD = 2.23) and dried pineapples (M = 4.51, SD = 2.57; t(79) = .32, p = .747). They also reported similar frequency to eat dried apples (M = 2.68, SD = 1.72) and dried pineapples (M = 2.48, SD = 1.73; t(79) = 1.05, p = .296). I found that there was no difference between their willingness to get the dried apples or dried pineapples as their prize of the lucky draw ($M_{dried\text{-}apples}$ = 4.40, SD = 2.24 vs. $M_{dried\text{-}pineapples}$ = 4.44, SD = 2.39, respectively; t(79) = -.12, p = .907).

APPENDIX F

ADDITIONAL DATA ANALYSES WITHOUT CONTROL VARIABLES IN STUDY 1B

Study 1B (N = 200; M_{age} = 36.28, SD = 12.94; 63.5% female)

A logistic regression conducted with the dried fruit choice (0 = regular size, 1 = extra volume size) as the dependent variable, age as the independent variable, revealed a significant effect of chronological age on consumers' choice of product with volume-based promotion (b = -.05, SE = .01, Wald = 16.58, $p < .001$, Exp (B) = .95; see below table), showing that participants getting older were less likely to choose the product with a volume-based sales promotion.

Variables	B	SE	Wald	*p*-value	Exp(B)
Age	-.05	.01	16.58	*.000*	.95
Intercept	2.06	.47	19.49	*.000*	7.84

APPENDIX G

PSYCHOLOGICAL AGE MANIPULATIONS USED IN STUDIES 2-7

Psychological Older Condition:

Please recall a recent circumstance that makes yourself feel older than your actual age.

In the following, please write down the circumstance that makes yourself feel older in detail (e.g., What's the circumstance? Where did it happen? What did you do? How did you feel?)

Psychological Younger Condition:

Please recall a recent circumstance that makes yourself feel younger than your actual age.

In the following, please write down the circumstance that makes yourself feel younger in detail (e.g., What's the circumstance? Where did it happen? What did you do? How did you feel?)

APPENDIX H

ADVERTISEMENTS USED IN STUDY 2A

Price-based Promotion Condition

Volume-based Promotion Condition

APPENDIX I

ADDITIONAL DATA ANALYSES WITH DATA EXCLUSION IN STUDY 2A

Study 2A (After Data Exclusion: N = 203; M_{age} = 33.71, SD = 2.87; 44.8% female)

Data Exclusion

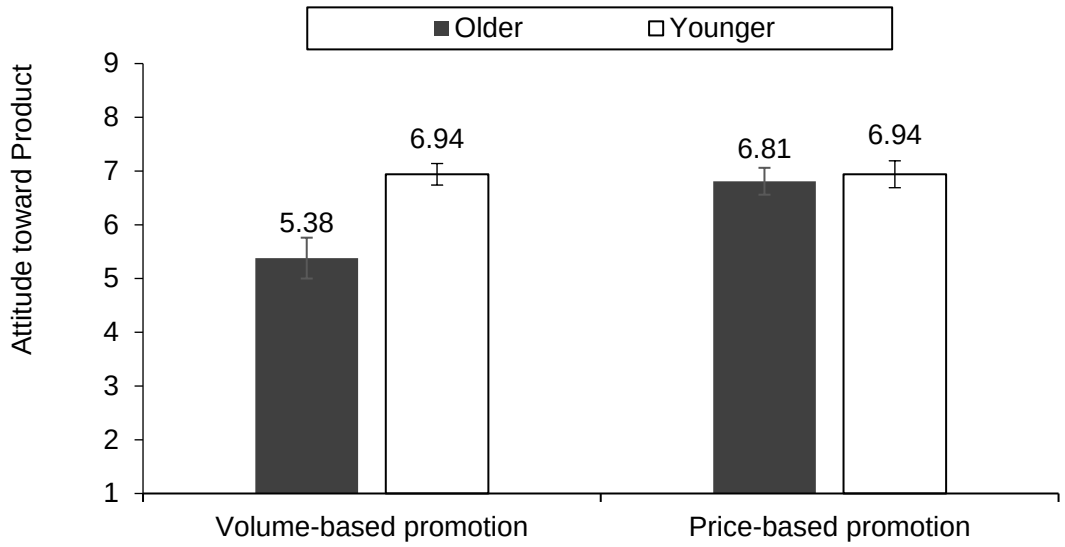
A total of 232 adult US consumers (i.e., aged 30–39) were recruited from MTurk in this study. Twenty-nine participants incorrectly answered the attention-check question (in which they indicated which psychological-age manipulation task they had done), thus data from these participants was excluded from data analyses, which left me with a final data sample of 203 participants (M_{age} = 33.71, SD = 2.87; 44.8% female).

Manipulation Check

As expected, participants indicated that they felt older than their actual age in the older condition (M = 2.82, SD = 8.67), compared to those in the younger condition (M = -6.68, SD = 7.78; t(201) = 8.22, $p < .001$).

As expected, a 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 199) = 9.61, $p = .002$) and promotion type (F(1, 199) = 6.91, $p = .009$) on product attitude, qualified by a significant psychological age × promotion type interaction (F(1, 199) = 6.99, $p = .009$, $\eta_p^2 = .03$; see below Figure). Replicating findings from Study 1A, when the product was under a volume-based sales promotion, participants in the older condition reported less favorable product attitudes (M = 5.38, SD = 2.57) than those in the younger condition (M = 6.94, SD = 1.51; (F(1, 199) = 16.87, $p < .001$, $\eta_p^2 = .08$). However, when there was a price-based sales promotion, no difference was found between participants in the older and younger conditions (M_{older} = 6.81, SD = 1.71 vs. $M_{younger}$ = 6.94, SD = 1.84, respectively; F(1, 199) = .10, $p = .751$).

STUDY 2A (AFTER DATA EXCLUSION): MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND PROMOTION TYPE



APPENDIX J

PRODUCTS USED IN STUDY 2B

	A Product without Volume-based Promotion (Strawberry Flavored)	**A Product with Volume-based Promotion (Peach Flavored)**
Choice Set		
	A Product without Volume-based Promotion (Peach Flavored)	**A Product withVolume-based Promotion (Strawberry Flabored)**
Counter-balanced Choice Set		

APPENDIX K

PRODUCTS PRETEST ANALYSES IN STUDY 2B

Study 2B (N = 21; M_{age} = 21.38, SD = 1.32; 52.4% female)

Twenty-one students recruited from the same subject pool took part in this pretest study. Participants answered a question by indicate their liking of candy in strawberry and peach flavors respectively, on a 5-point scale (1 = very much, 5 = not at all).

Results showed that participants equally like strawberry flavored candy (M = 2.57, SD = .87) and peach flavored candy (M = 2.57, SD = .81; t(20) = .00, p = 1.000, NS).

APPENDIX L

ADDITIONAL DATA ANALYSES WITH DATA EXCLUSION IN STUDY 3

Study 3 (After Data Exclusion: N = 162; M_{age} = 26.14, SD = 2.32; 45.7% female)

Data Exclusion

A total of 175 adult US consumers (i.e., aged 20–29) were recruited from MTurk in this study. Thirteen participants incorrectly answered the attention-check question (in which they indicated which psychological-age manipulation task they had done), thus data from these participants were excluded from data analyses, which left me with a final data sample of 162 participants (M_{age} = 26.14, SD = 2.32; 45.7% female).

Manipulation Check

As expected, participants indicated that they felt older than their actual age in the older condition (M = 3.79, SD = 8.57), compared to those in the younger condition (M = -2.98, SD = 6.69; t(160) = 5.64, $p < .001$).

Results

As expected, participants in the older condition indicated less favorable attitudes toward the product with a volume-based sales promotion (M = 6.25, SD = 2.48) compared to those in the younger condition (M = 7.01, SD = 1.48; t(160) = -2.39, $p = .018$, d = .37). I also found a significant effect of aging on the perception of future time limitation. Participants in the older condition perceived their future time as more limited (M = 6.08, SD = 2.27) than those in the younger condition did (M = 5.28, SD = 2.16; t(160) = 2.28, $p = .024$, d = .36). Importantly, boothstraping methods (PROCESS Model 4, with 5,000 samples; Hayes 2013) confirmed that the perception of future time limitation mediated the negative effect of aging on consumers' reaction toward the product with a volume-based sales promotion (b = .16, SE = .10; 95% CI = .0203 to .4489).

APPENDIX M

ADVERTISEMENTS USED IN STUDY 4

Volume-based Promotion Condition

Big-size Condition

APPENDIX N

ADDITIONAL DATA ANALYSES WITH DATA EXCLUSION IN STUDY 4

Study 4 (After Data Exclusion: N = 274; M_{age} = 33.88, SD = 3.07; 33.6% female)

Data Exclusion

A total of 341 adult US consumers (i.e., aged 30–39) were recruited from MTurk in this study. Sixty-seven participants incorrectly answered the attention-check question (in which they indicated which psychological-age manipulation task they had done), thus, data from these people were omitted from my data analyses, leaving a final data sample size of 274 participants (M_{age} = 33.88, SD = 3.07; 33.6% female).

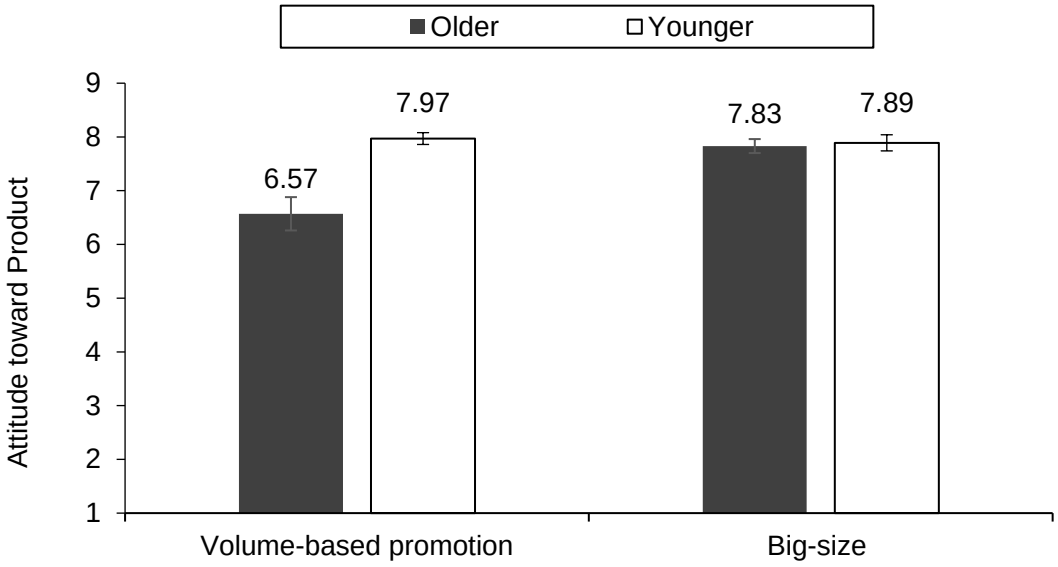
Manipulation Check

As expected, participants indicated that they felt older than their actual age in the older condition (M = .65, SD = 12.78), compared to those in the younger condition (M = -5.41, SD = 7.11; t(272) = 4.79, $p < .001$).

Results

A 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 270) = 13.22, $p < .001$) and ad type (F(1, 270) = 8.54, $p = .004$), qualified by a psychological age × ad type interaction (F(1, 270) = 11.24, $p = .001$, $\eta_p^2 = .04$; see below Figure). Consistent with my prediction, participants in the older condition exhibited less favorable product attitudes toward the product with a volume-based promotion (M = 6.57, SD = 2.68) than did those in the younger condition (M = 7.97, SD = .91; F(1, 270) = 25.60, $p < .001$, $\eta_p^2 = .09$). However, the impact of psychological age on consumers' product evaluation was eliminated in the big-size condition (M_{older} = 7.83, SD = 1.09 vs. $M_{younger}$ = 7.89, SD = 1.17, respectively; F(1, 270) = .04, $p = .845$).

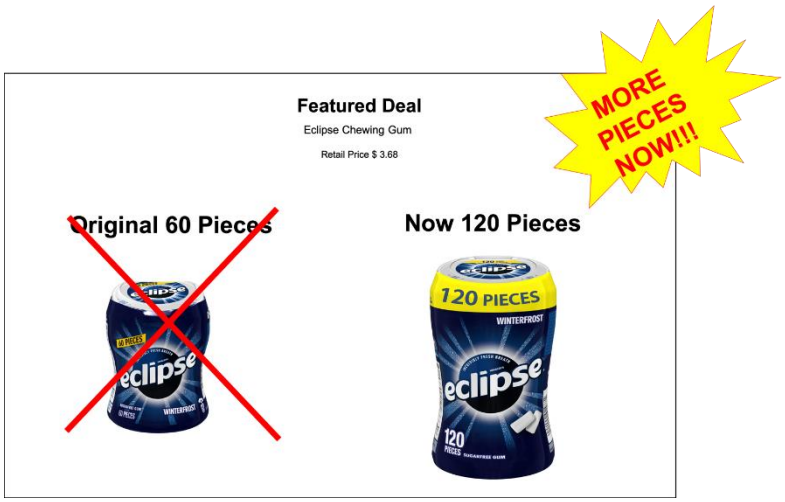
STUDY 4 (AFTER DATA EXCLUSION): MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND AD TYPE



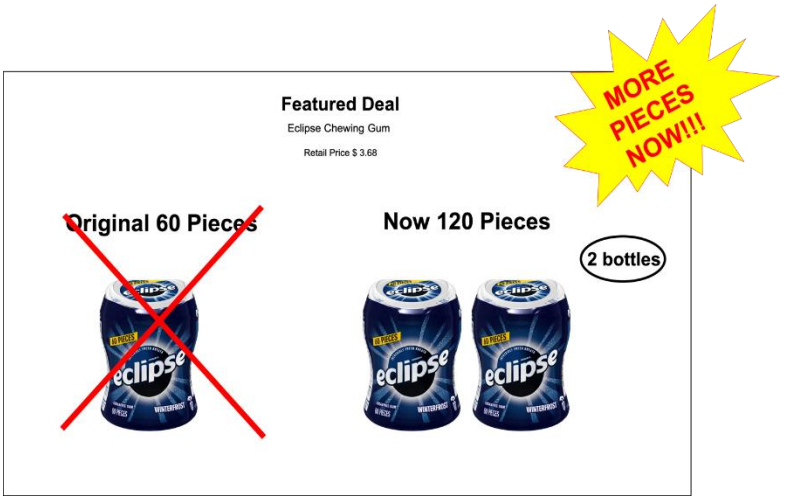
APPENDIX O

ADVERTISEMENTS USED IN STUDY 5

Volume-based Promotion Condition



Buy-One-Get-One-Free Condition



APPENDIX P

ADDITIONAL DATA ANALYSES WITH DATA EXCLUSION IN STUDY 5

Study 5 (After Data Exclusion: N = 271; M_{age} = 34.02, SD = 2.77; 56.5% female)

Data Exclusion

A total of 295 adult US consumers (i.e., aged 30–39) were recruited from MTurk in this study. Twenty-four participants incorrectly answered the attention-check question (in which they indicated which psychological-age manipulation task they had done), thus data from these participants were excluded from data analyses, leaving a final data sample size of 271 participants (M_{age} = 34.02, SD = 2.77; 56.5% female).

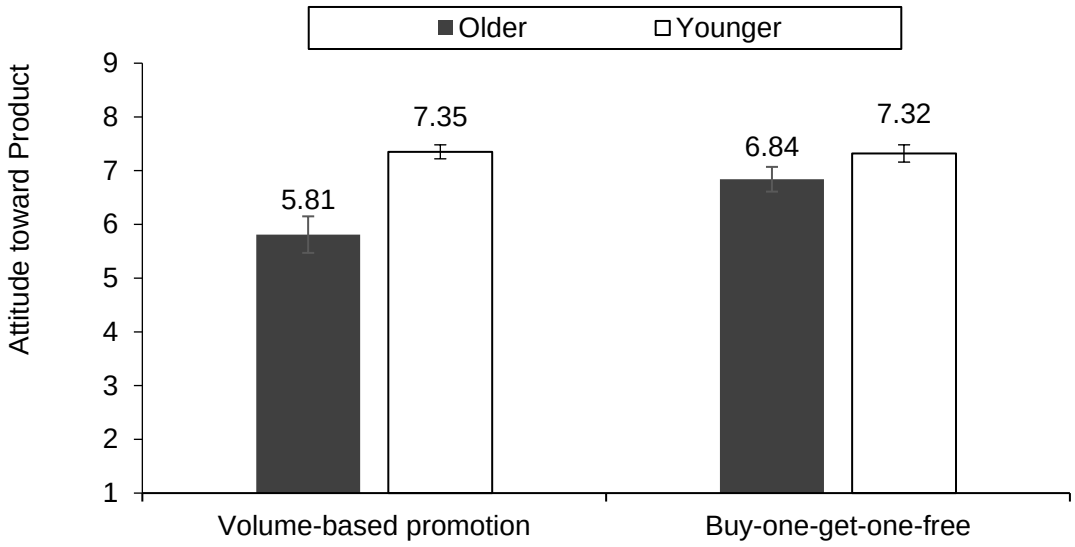
Manipulation Check

As expected, participants indicated that they felt older than their actual age in the older condition (M = 3.96, SD = 12.12), compared to those in the younger condition (M = -5.09, SD = 7.29; t(269) = 7.57, $p < .001$).

Results

A 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 267) = 22.28, $p < .001$) and promotion form (F(1, 267) = 5.44, $p = .020$), qualified by a psychological age × promotion form interaction (F(1, 267) = 6.05, $p = .015$, $\eta_p^2 = .02$; see below Figure). Replicating findings from previous studies, the results demonstrated that participants in the older condition displayed less favorable attitudes toward the product with a volume-based promotion (M = 5.81, SD = 2.61) than did those in the younger condition (M = 7.35, SD = 1.06; F(1, 267) = 24.72, $p < .001$, $\eta_p^2 = .09$). However, the negative impact of psychological age on consumers' product evaluation was diminished in the buy-one-get-one condition (M_{older} = 6.84, SD = 1.83 vs. $M_{younger}$ = 7.32, SD = 1.37, respectively; F(1, 267) = 2.67, $p = .104$).

STUDY 5 (AFTER DATA EXCLUSION): MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND PROMOTION FORM



APPENDIX Q

ADVERTISEMENTS USED IN STUDY 6

Volume-based Promotion AD


APPENDIX R

ADDITIONAL DATA ANALYSES WITH DATA EXCLUSION IN STUDY 6

Study 6 (After Data Exclusion: N = 359; M_{age} = 25.76, SD = 2.64; 56.0% female)

Data Exclusion

A total of 380 adult US consumers (i.e., aged 20–29) were recruited from MTurk in this study. Twenty-one participants incorrectly answered the attention-check question (in which they indicated which psychological-age manipulation task they had done), thus data from these participants were excluded from data analyses, which left me with a final data sample of 359 participants (M_{age} = 25.76, SD = 2.64; 56.0% female).

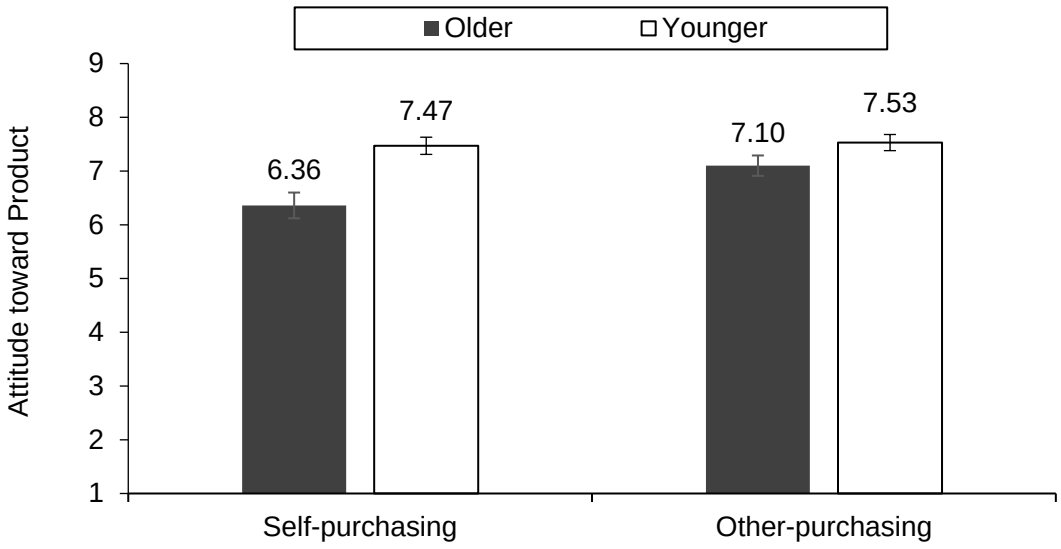
Manipulation Check

As expected, participants indicated that they felt older than their actual age in the older condition (M = 7.18, SD = 11.37), compared to those in the younger condition (M = -1.51, SD = 8.13; t(357) = 8.31, $p < .001$).

Results

A 2 × 2 ANOVA yielded significant main effects of psychological age (F(1, 355) = 15.59, $p < .001$) and consumption context (F(1, 355) = 4.27, $p = .039$), qualified by a marginally significant interaction between psychological age and consumption context (F(1, 355) = 2.98, $p = .085$, $\eta_p^2 = .01$; see below Figure). Replicating findings from previous studies, in the self-purchasing condition, participants in the older condition reported less favorable attitudes toward products with a volume-based sales promotion (M = 6.36, SD = 2.42) than did those in the younger condition (M = 7.47, SD = 1.44; F(1, 355) = 15.83, $p < .001$, $\eta_p^2 = .04$). However, in the other-purchasing condition, consumers' reactions to volume-based sales promotion did not differ significantly across the older (M = 7.10, SD = 1.72) and younger conditions (M = 7.53, SD = 1.47; F(1, 355) = 2.51, $p = .114$).

STUDY 6 (AFTER DATA EXCLUSION): MEAN PRODUCT ATTITUDE AS A FUNCTION OF PSYCHOLOGICAL AGE AND CONSUMPTION CONTEXT



APPENDIX S

ADVERTISEMENTS USED IN STUDY 7

Regular Volume-based Promotion Condition

Family-sized Volume-based Promotion Condition