RESEARCH NOTE

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Older and more personal: Stronger links between brand-name recall and brand-related autobiographical memories in older consumers

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Abstract

Successful recall of brand names often determines consumer decisions. Yet, unaided recall fails increasingly as adult consumers get older, which is a threat to brand awareness in aging societies. Still, consumer research has not explored if personally relevant episodic memories consumers associate with a brand can support brand-name memory when consumers age. This study, therefore, explores how cognitive aging affects the links between the recall of brand names from semantic memory and the subjective quality of brand-related autobiographical memories (AMs). Experimental data from 20- to 33-year-old and 60- to 90-year-old participants suggest that consumers associate successfully recalled brand names with more significant, phenomenologically richer AMs, and that this connection between semantic and episodic memory is stronger in older adults. We discuss how research and brand communication could utilize AMs to further understand and reduce negative impacts of aging on brand awareness.

KEYWORDS
aging, autobiographical memory, brand names, episodic memory, recall, semantic memory

1 | INTRODUCTION

Marketing research has long acknowledged that memory drives consumer decision-making (Lynch & Srull, 1982). Yet, memory is multilayered and its performance is subject to age-related changes. You may remember situations, where you wanted to recall the name of a brand you knew that you knew, for example, in a pharmacy, but it just would not come to your mind. If a selection of brands is visible, we can often resolve such situations by resorting to our more reliable recognition memory. Otherwise, recall failures or *tip-of-the-tongue* states are frustrating and, unfortunately, occur more frequently the older we get (Burke et al., 1991). Therefore, put drastically, brand-related memory

decline will increasingly undermine companies' efforts to foster brand awareness in aging societies such as Europe and North America, where one in four persons could be 65 or over by 2050 (United Nations, 2019).

Recall of meaningful words primarily depends on the performance of our semantic memory (SM) but it also benefits from episodic memory (EM) (Takashima et al., 2017; Westmacott & Moscovitch, 2003). In short, SM includes factual knowledge, while EM represents our life experience (Tulving, 1972). Many EMs include a subjective perspective and personal history, and these are called autobiographical memories (AMs) (Fivush, 2011). When consumers make brand-related decisions, SM and EM may inform decisions differentially (Herz & Brunk, 2017; Ratnayake et al., 2010), and EM is

especially susceptible to aging, while SM is relatively robust (Koen & Yonelinas, 2014; Siegel et al., 2020). In this respect, prior consumer research demonstrated that supporting SM—for example, by presenting brand names with more meaningful or semantically related pictorial logos (Mohanty et al., 2016) or by presenting grocery product-price associations with realistic (meaningful) compared to unrealistic prices (Amer et al., 2018)— can, in turn, help older adults to overcome deficits in remembering episodic details. However, to our knowledge, research has not explored how the quality of brand-related EM reciprocally contributes to SM when consumers age. Further, psycholinguistic evidence on word memory and aging cannot be directly transferred to brand names because they have a special status in the mental lexicon. For example, their accessibility is lower compared to common nouns, yet higher than for proper names (Gontijo et al., 2002). The present study therefore investigates if brand-name recall from SM is positively associated with the phenomenological significance of brand-related AMs, and if these links are stronger in older adults.

2 | BACKGROUND

2.1 | Semantic, episodic, and autobiographical memory

Tulving (1972) introduced the influential subcategorization of declarative long-term memory into SM ("knowing"), which stores context-independent factual knowledge including language, and EM ("remembering"), which represents the contextual details of experiences including temporal-spatial and emotional dimensions. Today, semantic and episodic memory are key components of memory models (Baddeley et al., 2020). Research often operationalizes these two memories with Tulving's (1985) *remember-know* (RK) paradigm. Participants study a list of stimuli and, after a delay, they are represented with those target stimuli mixed with lure-items that were not on the original list. Then, they first judge subjectively if a stimulus appears "old" or "new" to them. Next, they rate stimuli they classified as "old" as "remember" in case of conscious and detailed recollection, or "know" in case they only feel familiar with them. In this form, the RK paradigm tests recognition because an encountered stimulus needs to be matched with memory information. Adaptations testing recall require unaided reproduction of information from memory without any direct stimulus cue.

In (neuro-)psychology, the interplay between SM and EM and age-related changes therein are debated (Devitt et al., 2017; Fang et al., 2018). They could be independent memory systems, interacting systems or just dimensions of the same system, universally or differentially affected by cognitive aging. In this context, AMs are interesting because they are predominantly retrieved from EM, yet enriched with information from SM (Devitt et al., 2017; Tulving, 1972). For Fivush (2011, p. 562), taking a subjective perspective and including personal history distinguish EMs of "what happened" from AMs of "what happened to *me*" (but see Gilboa, 2004). Consumer

research considers AMs that involve narratives about personal experiences with a brand as the cornerstones of personalized consumer-brand relationships (Fournier, 1998).

Behaviorally, the nature of AMs has been studied with content-analyses of participants' personal narratives (Devitt et al., 2017; Fivush, 2011) and with questionnaires. There, respondents evaluate the phenomenological quality of an AM on a number of dimensions such as vividness, coherence and emotionality (Luchetti & Sutin, 2016; Rubin et al., 2003). Devitt et al. (2017) reanalyzed the content of AMs elicited in eight studies. They observed that individuals compensatorily fill gaps in episodic detail with objective semantic information. Older adults do this more often and consistently. In a content analytical study on brand-related memories by Herz and Brunk (2017), regression analyses showed that perceived brand quality depended on SM, while only the extent to which EMs were reported in pictorial collages and interviews predicted if a brand would trigger positive emotional responses. This aligns with neurological evidence suggesting that brand-related AM is associated with self-relevant, personal and lifetime experiences, whereas brand-related SM is not connected with self-identity (Ratnayake et al., 2010).

Westmacott and Moscovitch (2003) studied the relationship between subjectively evaluated AM significance and SM performance. They found that adults can recall more names of famous people from a previously heard 14-item list if these names are associated with autobiographically more significant EMs. Parallel findings emerged in delayed recognition, fame judgment and speeded reading tasks. Autobiographical significance was inferred from RK judgments and validated with ratings of familiarity, vividness and emotionality, both according to the norms by age-matched peers (Exp. 2) and target participants' own postrecall evaluations (Exp. 3). Descriptively, SM differences related to autobiographical significance were larger in 65–80-year-old than 45–55-year-old adults, but the authors did not test for age-effects. List-based recall tasks may also not be ideal to study age-related long-term memory changes because their outcome varies as a function of working memory capacity (Unsworth, 2007). This, in turn, can bias comparisons between groups that differ notably in their working memory capacity—such as younger and older adults.

2.2 | Aging and memory

Memory decline is the most self-noticeable symptom of cognitive aging. Older adults notice, for instance, that doing calculations in one's head gets harder (working memory), word-finding difficulties occur more frequently (SM) and remembering the details of past events becomes more challenging (EM). Yet, aging does not deteriorate all levels of memory equally (see Park & Festini, 2017; Siegel et al., 2020 for reviews). For example, a meta-analysis of 25 long-term memory studies in the context of cognitively healthy aging (Koen & Yonelinas, 2014) found large age-related declines in *remembering* episodic details, while the losses in familiarity-based

knowing were small or negligible. Some aspects of SM remain particularly robust (e.g., language in general) or even expand (e.g., vocabulary) for a long time in healthy older adults (Cohen-Shikora & Balota, 2016). Similar to the *remember-know* disparity, free recall is cognitively more challenging than cued recognition and, thus, shows larger age-related declines (Rhodes et al., 2019).

Aging research has developed a number of theories explaining these (selective) declines in memory performance (see Park & Festini, 2017; Siegel et al., 2020 for reviews). These include (a) a general slowdown in cognitive processing speed, (b) fewer and less accessible cognitive resources, (c) deficits in inhibiting irrelevant information—all as a consequence of continued degeneration of neural networks— and (d) a local deterioration of prefrontal brain regions. The empirical evidence suggests that these factors contribute jointly to cognitive aging.

Consumer research on brand-related memories in older adults is rare but generally confirms that older consumers find it more difficult to recall and recognize brand names. In this respect, Lambert-Pandraud et al. (2017) asked radio listeners aged 18–92 to name (recall) all of about twenty local radio stations they knew and verified these responses in later recognition tests. After taking into account that younger adults could recall more recent and older adults more long-established brands, recall performance did not vary much with age until respondents reached their early sixties. Thereafter, older adults showed a steep decline in brand-name recall.

3 | THE PRESENT STUDY

3.1 | Hypotheses and design

This study explores how cognitive aging affects the relationship between the recall of brand names from SM and the quality of brand-related autobiographical memory. In summary, extant memory research suggests that word recall is driven by semantic and supported by EM, which includes AM. Brand-related EM benefits from stronger SM across age-spans (Amer et al., 2018; Mohanty et al., 2016), and people recall more proper names previously seen on lists if they associate them with significant AMs (Westmacott & Moscovitch, 2003). Taken together, these findings suggest a bidirectional, positive relationship between SM and EM, so that for the unaided recall of brand names and after correcting for working memory capacity, we assume:

H1. Successful brand-name recall is associated with phenomenologically richer brand-related autobiographical memories.

Aging research has shown that SM declines less than EM (Koen & Yonelinas, 2014; Siegel et al., 2020) and that SM increasingly supports EM (Amer et al., 2018; Devitt et al., 2017; Mohanty et al., 2016). Reciprocally, this suggests two predictions for age-related changes in the interrelation between brand-related semantic and episodic memory. First, in terms of the availability of cognitive resources, EM will become scarcer and, therefore, more important. Second, there will be more incidences where personal episodes can

prime the recall of brand names because—after all—SM declines as well. Therefore, we hypothesize:

H2. Successful brand-name recall will benefit more from rich autobiographical memories in older adults.

We tested these hypotheses in an experiment with younger and older adults building on the methodology used by Westmacott and Moscovitch (2003) and Lambert-Pandraud et al. (2017) in two steps. First, we used a recall and recognition task to establish the difference between brand names each participant could freely recall from a product category (*successful recall*) and those they could only recognize as known (*failed recall*). Second, we elicited brand-related AMs for each individuals' most accessible sets of successful/failed recall brand names, and participants evaluated AM phenomenology. The main statistical analyses compared how recall (H1) and its interaction with age group (H2) predicted AM phenomenology.

3.2 | Participants

Participants were 52 younger and 52 older adults who could win gift vouchers as a thank you. The younger adults had a mean age of 24.42 years (*SD* = 3.03; range = 20–33) with 33 females. The older adults were on average 69.67 years old (*SD* = 8.41; range = 60–90) with 39 females. All of them had spent most of their lives in Germany and reported to be in good mental health.

3.3 | Method

Participants were recruited via social networks, a student initiative that arranges community events for senior citizens and a senior citizen sports club. We recruited a first cohort of 60 participants (30 younger and 30 older) and a second cohort of 44 participants (22 younger and 22 older). Three researchers interviewed participants individually via video call for 40–50 min. If necessary, household members assisted with the video setup.

After a general introduction and informed consent, participants took a backward digit-span task to assess working memory independently of semantic and episodic memory. (Jones & Macken, 2015). Participants heard a sequence of digit numbers and repeated them verbally after the experimenter in reverse order, with increasingly longer sequences in each trial. This procedure was repeated until failure to repeat correctly. The observed digit span corresponded to the longest sequence of accurately reported numbers.

Next, participants completed three trials of a SM task consisting of a brand name recall and a recognition part. We assessed semantic recall memory with a category fluency task (also called "unaided awareness" (Laurent et al., 1995). Participants were encouraged to freely recall as many brand names from a product category as possible. In the first cohort, we requested brand names in three product categories—*cars*, *chocolate bars* and *liquor*—for which younger and older consumers of both sexes could spontaneously tell AMs in a

pretest focus group discussion. Since some first cohort older participants found AMs associated with the brand categories *chocolate bar* and *liquor* challenging to remember, we replaced those categories with *beers* and *sportswear* in the second cohort based on participants' open feedback and sample characteristics. Product categories were presented in random order. Any accurate category member brand name was counted a *successful recall*. The subsequent recognition task (aided awareness (Laurent et al., 1995) served to differentiate between successful recall observed in the category fluency task and failed recall of recognizable (*known*) brand names. We sampled the twenty most popular brands in Germany in 2019 from the market-research database statista.com for our five product categories (see Appendix A). The recognition task required participants to decide whether they knew each of these brands, if only by its name, or not. The experimenter read out each name skipping those the participant had successfully recalled before. Confirmatory responses were classified as *failed recall*, denials as *unknown*.

Finally, participants were requested to tell and subsequently evaluate one AM associated with the first successfully recalled brand and, then, one AM associated with the most popular brand they recognized but failed to recall in each of the three product categories (six AMs altogether). This should allow them to narrate their individually "best" AMs, potentially also about off-list brands. They should remember an experience from their personal life and describe it precisely and specifically, so that a person who was not present at the event could imagine what happened. They were asked to tell details such as where and when the event occurred, what they were doing, who was present and what they felt and thought. For each memory, they had 1 min to think about it and 1 min to tell it. The experimenter gave a short example for a brand from a different category at the first instruction. Participants were instructed to keep in mind their memory while answering the AM questionnaire.

As each participant evaluated six AMs, existing phenomenology questionnaires were too long. Therefore, we compared three recent questionnaires and selected nine items they share (Fitzgerald & Broadbridge, 2013; Luchetti & Sutin, 2016; Rubin et al., 2003). Each item assesses one phenomenological dimension, that is, *sensory detail*, *vividness*, *emotional intensity*, *time perspective*, *visual perspective*, *coherence*, *distancing*, *valence* and *sharing*, using different 7-point rating scales (see Appendix B for the English version of the German

questionnaire). The valence rating was recoded, such that a higher composite mean score corresponded to a richer, personally more significant AM. The experimenter transcribed the word and questionnaire responses and a summary of the autobiographical narratives.

4 | RESULTS AND DISCUSSION

4.1 | Semantic and working memory

The digit-span task confirmed a significant age-related decline in working memory capacity (see Table 1). We analyzed if our data replicated that older adults experience a stronger SM decline in unaided brand-name recall than in recognition. As Table 1 shows, older adults recalled fewer of the top-20 brands and fewer off-list brands, so that their overall successful recall rate was also significantly lower than younger adults'. In contrast, older adults did not differ significantly from younger ones in their brand name recognition (failed on-list recall). A repeated measures analysis of variance confirmed a significant interaction between SM type and age group, $F(1, 101) = 21.76$, $p < 0.001$, since younger adults' successful and failed recall performance was similar, $t(51) = 1.02$, $p = 0.312$, yet older adults' recall was much weaker than their recognition, $t(51) = -7.46$, $p < 0.001$. Older adults knew only about one on-list brand name less than younger adults, so that the procedure can be considered relatively age-fair.

4.2 | Semantic, episodic memory, and aging

To test the hypotheses that successful recall of brand names is associated with personally more significant AMs (H1) and that these associations grow stronger when consumers age (H2), we fitted a linear mixed-effects regression model (LMM) using the *lmer* function from the *lme4* package version 1.1–21 (Bates et al., 2019) in R Studio (R Development Core Team, 2020) with sum-coded categorical fixed factors. The AM phenomenology score was the dependent variable with 624 observations (6 AMs by 104 participants). The model included by-participant and by-product category random intercepts

TABLE 1 Means, *SD*s and independent-samples *t* test results for working memory and semantic memory measures

Measure	Age group				Difference	
	Younger		Older			
	M	SD	M	SD	t(102)	p
Working memory (backward digit)	4.32	1.20	3.60	1.27	3.00	0.003
Top-20 brands recalled	6.93	2.22	5.09	1.64	4.80	<0.001
Other correct recall (off list)	5.11	3.20	2.60	1.87	4.88	<0.001
Successful recall (total)	12.04	4.90	7.70	3.00	5.45	<0.001
Failed recall (top-20 only recognized)	11.13	2.08	11.76	2.07	−1.53	0.130
Unknown top-20 brands	1.94	1.33	3.21	2.21	−3.56	0.001

TABLE 2 Linear mixed-effects regression model predicting autobiographical memory phenomenology

Dependent variable	Autobiographical memory phenomenology		
Fixed effects	b	SE	t
(Intercept)	3.87	0.13	29.18
Recall	0.87	0.15	**5.89**
Age group	−0.10	0.15	−0.65
Working memory	−0.15	0.07	**−2.04**
Recall × age group	0.67	0.19	**3.52**

Note: Absolute *t* values more than 1.96 are significant (in bold). Cohort did not improve model fit, $\chi^2(1) = 1.73$, $p = 0.19$, and was dropped. Separate LMMs for Cohorts 1 and 2 yielded the same findings (see Appendix C).

and slopes for the fixed factors age group and recall. The standardized digit-span score served as covariate. Estimates with $|t| \geq 1.96$ fall within the 95% confidence interval and are considered significant.

All participants remembered AMs about a brand in each product category consistent with the "what-happened-to-me" criterion (Fivush, 2011). Reliability analyses showed that the AM score was internally consistent, with Cronbach's $\alpha = 0.89$ (total), 0.87 (younger) and 0.90 (older). The LMM in Table 2 confirmed a significant main effect of recall (H1), in that both age groups rated their AMs linked to successfully recalled brand names phenomenologically richer. Figure 1 depicts the higher mean AM score for successful recall, yet also that the gap to failed recall was wider for older adults. A significant recall-by-age interaction provided positive evidence for H2, such that the link between successful brand name recall and
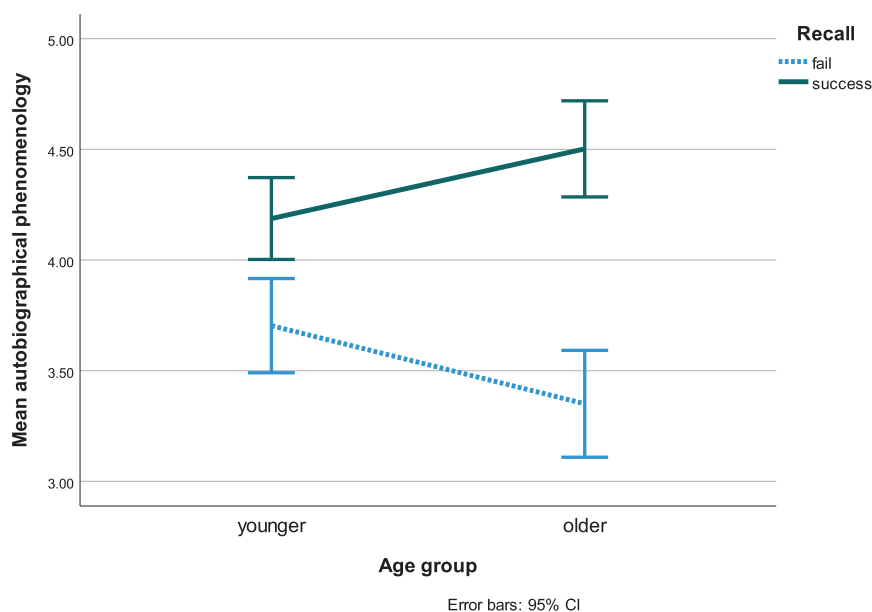
brand-related AMs was weaker for younger adults, *ß* = 0.48, *SE* = 0.16, *t* = 2.90, compared to older ones, *ß* = 1.21, *SE* = .17, *t* = 7.04. Further, age group did not have a direct effect on AM phenomenology because younger (*M* = 3.94, *SD* = 1.28) and older (*M* = 3.93, *SD* = 1.56) adults evaluated their personal brand-related memories very similarly overall, while individuals with stronger working memory rated their AMs significantly more conservatively.

Finally, we conducted a further LMM analysis on the older subsample to see if the recall-age interaction was a continuous effect within the older age group in addition to the categorical difference when compared to younger adults. This continuous interaction was also significant, *ß* = 0.06, *SE* = 0.02, *t* = 3.51.

4.3 | General discussion and conclusion

4.3.1 | Theoretical implications

In summary, the results provide initial experimental evidence that successful brand-name recall is positively associated with phenomenologically richer brand-related AMs and that these associations are stronger in adults older than 60 years, relative to younger adults. Further, these links between SM and EM seem to grow gradually stronger after the age of 60 years. Consistent with prior research, we found an age-related decline in working memory capacity, a steep decline in free recall for brand names from SM, yet no significant differences between younger and older adults' brand-name recognition. At the level of perceived AM phenomenology, younger and older adults did also not differ indicating that the subjective quality of EM can persist with age.

FIGURE 1 Interaction of age group and recall status on autobiographical memory phenomenology (*N* = 104)

This research provides additional behavioral evidence for neuropsychological theories of multisystemic human memory models with semantic and episodic subsystems within long-term memory that deteriorate differentially as a consequence of cognitive aging. In particular, it extends research on positive effects of subjective autobiographical significance on the retrieval of proper names from SM (Westmacott & Moscovitch, 2003) and evidence for enhanced interdependencies between SM and EM in older adults (Amer et al., 2018; Devitt et al., 2017; Mohanty et al., 2016) to the specific context of brand-related memories and unaided recall (brand awareness). The finding that the degree of interaction of SM and EM is age-sensitive may help to clarify how these memories are interconnected developmentally.

4.3.2 | Practical implications

A practical albeit challenging implication for branding and advertising—pending additional causal evidence—could be to generate brand-related AMs to enhance brand awareness, in particular, in older consumers. AMs benefit the consumer-brand relationship beyond easier access in unaided brand-name recall situations (Fournier, 1998), but they are harder to *create* by marketers than SMs that gain from mere repetition (Schmidt & Eisend, 2015). One possibility to form brand-related AMs can be the co-creation of brand experiences by consumers in social media discourse (Herz & Brunk, 2017; Rossolatos, 2019), with a growing senior community posting episodes from their lives online (Pera et al., 2020). Further, autobiographical referencing in advertising can alter AMs (Braun et al., 2002) which could be a strategy, for example, in nostalgic advertisements targeting older consumers. Relatedly, since emotional intensity is an integral part of AM phenomenology (Luchetti & Sutin, 2016), and since older consumers develop a stronger emotion focus with preferences for emotional advertising, a shift from fact-based to more affective content in brand communication (see Drolet et al., 2018 for review) may be effective to maintain brand awareness despite aging.

4.3.3 | Limitations and future research

There are three methodological limitations of the present study that open interesting avenues for future research. First, similar to comparable memory research (Westmacott & Moscovitch, 2003), we tested SM before AM. As the causality of their interrelationship is most likely bidirectional, it would be interesting to see if brand-related AM induction can facilitate brand-name recall from SM across age groups. A promising method could be a brand name learning paradigm with conditions that induce or focus attention on semantic or episodic details (simlar to, e.g., Madore & Schacter, 2014) to manipulate delayed brand name recall.

Second, older adults may have been design-disadvantaged as the current top-20 brands may not have been the ones that had been cumulatively most important in their lives (Lambert-Pandraud et al., 2017), even though they could mention any brand

in the free recall task and did not differ in recognizing on-list brands. Future research could generate age-fairer lists based on peer ratings, for example.

Third, due to the Covid-19 pandemic, we conducted video interviews. Surprisingly, participants were more willing to tell their AMs within this setup than in comparable lab settings presumably because they were in their familiar environments. For data-security reasons, however, we did not audio-record the narratives and, thus, could not conduct content analyses beyond manipulation checks based on the interviewers' protocols. Eye-movements during AM narration (e.g., El Haj et al., 2017) could provide multimeasure validation and inspire future work that aims to modulate brand-related AMs.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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REFERENCES

Amer, T., Giovanello, K. S., Grady, C. L., & Hasher, L. (2018). Age differences in memory for meaningful and arbitrary associations: A memory retrieval account. *Psychology and Aging, 33*(1), 74–81. https://doi.org/10.1037/pag0000220

Baddeley, A. D., Eysenck, M. W., & Anderson, M. C. (2020). *Memory* (Third edition). Routledge. https://doi.org/10.4324/9780429449642

Bates, D., Maechler, M., Bolker, B., Walker, S., Bojesen Christensen, R. H., Singmann, H., Dai, B., Scheipl, F., Grothendieck, G., Green, P., & Fox, J. (2019). Package Lme4: Linear Mixed-Effects Models Using Eigen and S4 (Version 1.1-21) [Computer software]. https://cran.r-project.org/package=lme4

Braun, K. A., Ellis, R., & Loftus, E. F. (2002). Make my memory: How advertising can change our memories of the past. *Psychology & Marketing, 19*(1), 1–23. https://doi.org/10.1002/mar.1000

Burke, D. M., MacKay, D. G., Worthley, J. S., & Wade, E. (1991). On the tip of the tongue: What causes word finding failures in young and older adults? *Journal of Memory and Language, 30*(5), 542–579. https://doi.org/10.1016/0749-596X(91)90026-G`

Cohen-Shikora, E. R., & Balota, D. A. (2016). Visual word recognition across the adult lifespan. *Psychology and Aging, 31*(5), 488–502. https://doi.org/10.1037/pag0000100

Devitt, A. L., Addis, D. R., & Schacter, D. L. (2017). Episodic and semantic content of memory and imagination: A multilevel analysis. *Memory & Cognition, 45*(7), 1078–1094. https://doi.org/10.3758/s13421-017-0716-1

Drolet, A., Jiang, L., Pour Mohammad, A., & Davis, C. (2018). The influence of aging on consumer decision-making. *Consumer Psychology Review, 33*(1), 74. https://doi.org/10.1002/arcp.1046

El Haj, M., Nandrino, J. -. L., Antoine, P., Boucart, M., & Lenoble, Q. (2017). Eye movement during retrieval of emotional autobiographical

memories. *Acta Psychologica*, 174, 54–58. https://doi.org/10.1016/j. actpsy.2017.02.002

Fang, J., Rüther, N., Bellebaum, C., Wiskott, L., & Cheng, S. (2018). The interaction between semantic representation and episodic memory. *Neural Computation*, 30(2), 293–332. https://doi.org/ 10.1162/neco_a_01044

Fitzgerald, J. M., & Broadbridge, C. L. (2013). Latent constructs of the autobiographical memory questionnaire: A recollection-belief model of autobiographical experience. *Memory*, 21(2), 230–248. https://doi.org/ 10.1080/09658211.2012.725736

Fivush, R. (2011). The development of autobiographical memory. *Annual Review of Psychology*, 62, 559–582. https://doi.org/10.1146/ annurev.psych.121208.131702

Fournier, S. (1998). Consumers and their brands: Developing relationship theory in consumer research. *Journal of Consumer Research*, 24(4), 343–353. https://doi.org/10.1086/209515

Gilboa, A. (2004). Autobiographical and episodic memory—One and the same? Evidence from prefrontal activation in neuroimaging studies. *Neuropsychologia*, 42(10), 1336–1349. https://doi.org/10.1016/j. neuropsychologia.2004.02.014

Gontijo, P. F., Rayman, J., Zhang, S., & Zaidel, E. (2002). How brand names are special: Brands, words, and hemispheres. *Brain and Language*, 82(3), 327–343. https://doi.org/10.1016/S0093-934X(02)00036-6

Herz, M., & Brunk, K. H. (2017). Conceptual advances in consumers' semantic and episodic brand memories: A mixed methods exploration. *Psychology & Marketing*, 34(1), 70–91. https://doi.org/ 10.1002/mar.20974

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

Koen, J. D., & Yonelinas, A. P. (2014). The effects of healthy aging, amnestic mild cognitive impairment, and Alzheimer's disease on recollection and familiarity: A meta-analytic review. *Neuropsychology Review*, 24(3), 332–354. https://doi.org/10.1007/s11065-014-9266-5

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

Laurent, G., Kapferer, J. -. N., & Roussel, F. (1995). The underlying structure of brand awareness scores. *Marketing Science*, 14(3_suppl), G170–G179. https://doi.org/10.1287/mksc.14.3.G170

Luchetti, M., & Sutin, A. R. (2016). Measuring the phenomenology of autobiographical memory: A short form of the Memory Experiences Questionnaire. *Memory*, 24(5), 592–602. https://doi.org/10.1080/ 09658211.2015.1031679

Lynch, J. J. G., & Srull, T. K. (1982). Memory and attentional factors in consumer choice: Concepts and research methods. *Journal of Consumer Research*, 9(1), 18. https://doi.org/10.1086/208893

Madore, K. P., & Schacter, D. L. (2014). An episodic specificity induction enhances means-end problem solving in young and older adults. *Psychology and Aging*, 29(4), 913–924. https://doi.org/10.1037/ a0038209

Mohanty, P. P., Naveh-Benjamin, M., & Ratneshwar, S. (2016). Beneficial effects of semantic memory support on older adults' episodic memory: Differential patterns of support of item and associative information. *Psychology and Aging*, 31(1), 25–36. https://doi.org/10. 1037/pag0000059

Park, D. C., & Festini, S. B. (2017). Theories of memory and aging: A look at the past and a glimpse of the future. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 72(1), 82–90. https://doi.org/10.1093/geronb/gbw066

Pera, R., Quinton, S., & Baima, G. (2020). I am who I am: Sharing photos on social media by older consumers and its influence on subjective well-being. *Psychology & Marketing*, 37(6), 782–795. https://doi.org/ 10.1002/mar.21337

R Development Core Team. (2020). R (Version 3.6.3) [Computer software]. R Foundation for Statistical Computing. Vienna, Austria. https://www.r-project.org/

Ratnayake, N., Broderick, A. J., & Mitchell, R. L. C. (2010). A neurocognitive approach to brand memory. *Journal of Marketing Management*, 26(13-14), 1295–1318. https://doi.org/10.1080/ 0267257X.2010.522531

Rhodes, S., Greene, N. R., & Naveh-Benjamin, M. (2019). Age-related differences in recall and recognition: A meta-analysis. *Psychonomic Bulletin & Review*, 26(5), 1529–1547. https://doi.org/10.3758/ s13423-019-01649-y

Rossolatos, G. (2019). Negative brand meaning co-creation in social media brand communities: A laddering approach using NVivo. *Psychology & Marketing*, 36(12), 1249–1266. https://doi.org/10. 1002/mar.21273

Rubin, D. C., Schrauf, R. W., & Greenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, 31(6), 887–901. https://doi.org/10.3758/BF03196443

Schmidt, S., & Eisend, M. (2015). Advertising repetition: A meta-analysis on effective frequency in advertising. *Journal of Advertising*, 44(4), 415–428. https://doi.org/10.1080/00913367.2015.1018460

Siegel, A. L. M., Whatley, M. C., Hargis, M. B., & Castel, A. D. (2020). Changes in memory and metacognition in older adulthood 1. In (Eds.) Drolet, A. & Yoon, C., *The Aging Consumer: Perspectives from Psychology and Marketing* (2nd ed., pp. 26–46). Routledge. https://doi.org/10.4324/ 9780429343780-3

Takashima, A., Bakker, I., van Hell, J. G., Janzen, G., & McQueen, J. M. (2017). Interaction between episodic and semantic memory networks in the acquisition and consolidation of novel spoken words. *Brain and Language*, 167, 44–60. https://doi.org/10.1016/j. bandl.2016.05.009

Tulving, E. (1972). Episodic and semantic memory. In (Eds.) Tulving, E. & Donaldson, W., *Organization of memory: Ed. By Endel Tulving and Wayne Donaldson* (pp. 381–403). Academic Press

Tulving, E. (1985). How many memory systems are there? *American Psychologist*, 40(4), 385–398. https://doi.org/10.1037/0003-066X. 40.4.385

United Nations. (2019). World population prospects 2019: Highlights (ST/ ESA/SER.A/423). https://population.un.org/wpp/Publications/Files/ WPP2019_Highlights.pdf

Unsworth, N. (2007). Individual differences in working memory capacity and episodic retrieval: Examining the dynamics of delayed and continuous distractor free recall. *Journal of Experimental Psychology. Learning, Memory, and Cognition*, 33(6), 1020–1034. https://doi.org/ 10.1037/0278-7393.33.6.1020

Westmacott, R., & Moscovitch, M. (2003). The contribution of autobiographical significance to semantic memory. *Memory & Cognition*, 31(5), 761–774. https://doi.org/10.3758/bf03196114

APPENDIX A

A total of 20 most popular brands (names) per category in Germany in 2019 (statista.com)

	Cars		Chocolate Bars		Liquor
1.	Mercedes	1.	Duplo	1.	Jägermeister
2.	BMW	2.	Hanuta	2.	Ramazotti
3.	Porsche	3.	Knoppers	3.	Absolut Vodka
4.	Skoda	4.	Snickers	4.	Smirnoff Vodka
5.	Tesla	5.	Twix	5.	Baileys
6.	Volkswagen	6.	Mars	6.	Licor 43
7.	Audi	7.	Bounty	7.	Underberg
8.	Volvo	8.	Kinder Riegel	8.	Jack Daniels
9.	Mini	9.	Kitkat	9.	Jim Beam
10.	Hyundai	10.	Pick up	10.	Aperol
11.	Kia	11.	Milky Way	11.	Verpoorten
12.	Seat	12.	Balisto	12.	Kuemmerling
13.	Mazda	13.	Milch-Schnitte	13.	Berentzen
14.	Land Rover	14.	Kinder Pinguin	14.	Hennessey
15.	Alfa Romeo	15.	Kinder Country	15.	Rémy Martin
16.	Jaguar	16.	Nuts	16.	Sierra Tequila
17.	Dacia	17.	Kinder Bueno	17.	Bombay Sapphire Gin
18.	Ford	18.	Milka Nussini	18.	Hendricks Gin
19.	Toyota	19.	Lion	19.	Havana Club
20.	Peugeot	20.	Kinder Maxi King	20.	Captain Morgan
	Beer		Sportswear		
1.	Beck's	1.	Adidas		
2.	Krombacher	2.	Nike		
3.	Warsteiner	3.	Puma		
4.	Bitburger	4.	Reebok		
5.	König Pilsener	5.	Esprit		
6.	Veltins	6.	Fila		
7.	Erdinger	7.	Asics		
8.	Paulaner	8.	Marc O'Polo		
9.	Oettinger	9.	Converse		
10.	Radeberger	10.	Lacoste		
11.	Jever	11.	New Balance		
12.	Schöfferhofer	12.	Trigema		
13.	Hasseröder	13.	Skechers		
14.	Vitamalz	14.	Benetton		
15.	Franziskaner	15.	Venice Beach		
16.	Köstritzer	16.	Fruit of the Loom		
17.	Clausthaler	17.	Vans		
18.	Augustiner	18.	Kangaroos		
19.	Rothaus/Tannenzäpfle	19.	Under Armour		
20.	Karamalz	20.	Bogner		

APPENDIX B

Autobiographical memory questionnaire (based on Fitzgerald & Broadbridge, 2013; Luchetti & Sutin, 2016; Rubin et al., 2003)

Memory characteristic	Item	Scale
Sensory details	As I remember the event, I can hear it in my mind.	(1 = not at all, 7 = as clearly as if it were happening right now)
Vividness	As I remember the event, I can see it in my mind.	(1 = not at all, 7 = as clearly as if it were happening right now)
Time perspective	As I remember the event, I am aware of the time of the day.	(1 = not at all, 7 = as clearly as if it were happening right now)
Emotional intensity	As I remember the event, I can feel the emotions that I felt then.	(1 = not at all, 7 = as clearly as if it were happening right now)
Visual perspective	As I remember the event, I feel that I travel back to the time when it happened, that I am a participant in it again, rather than an outside observer tied to the present.	(1 = not at all, 7 = as much as any memory)
Valence	As I recall them now, how would I rate the emotions I experienced during the event?	(−3 = as negative as any event I have experienced, 3 = as positive as any event I have experienced)
Coherence	As I remember the event, it comes to me in words or in pictures as a coherent story or episode and not as an isolated fact, observation or scene.	(1 = not at all, 7 = as much as any memory)
Sharing	Since it happened, I have talked or thought about this event.	(1 = not at all, 7 = as often as any event in my life)
Distancing	This memory is significant for my life because it imparts an important message for me or represents an anchor, critical juncture, or a turning point.	(1 = not at all, 7 = as much as any memory)

APPENDIX C

Linear mixed-effects regression models predicting autobiographical memorie phenomenology with separate analyses for Cohorts 1 and 2.

Dependent Variable	Autobiographical memory phenomenology, Cohort 1			Autobiographical memory phenomenology, Cohort 2		
Fixed effects	*b*	*SE*	*t*	*b*	*SE*	*t*
(Intercept)	4.14	0.17	24.66	3.79	0.17	22.95
Recall	0.70	0.14	**4.91**	0.97	0.24	**4.06**
Age group	−0.13	0.21	−0.62	−0.07	0.22	−0.31
Working memory	−0.17	0.09	−1.80	−0.08	0.11	−0.68
Recall x age group	0.52	0.23	**2.24**	0.96	0.29	**3.36**

Note: Absolute *t* values more than 1.96 are significant (in bold).