

Ehrenberg-Bass Institute Working Paper:

*Childhood Exposure to Brands: Comparing Age of Acquisition Effects
With Ongoing Brand Exposure and Experience*

This working paper, dated 20 July 2023, is forthcoming in the Journal of Advertising Research.

Authors:

Dr Peilin Phua - Ehrenberg-Bass Institute

Dr Bill Page - Ehrenberg-Bass Institute

Assoc. Professor Giang Trinh - Ehrenberg-Bass Institute

Dr Nicole Hartnett - Ehrenberg-Bass Institute

Professor Rachel Kennedy - Ehrenberg-Bass Institute



Childhood Exposure to Brands...

Comparing Age of Acquisition Effects With Ongoing Brand Exposure and Experience

ABSTRACT

The age of acquisition (AoA) effect suggests that things learned early in life, including brand names, are recognized more quickly and accurately. This study confirms this effect but cautions that the managerial impact of AoA is small. Brand exposure frequency and usage recency have a far greater effect on recognition than AoA. The strongest AoA effect is observed among individuals unfamiliar with the brand, suggesting repetition, such as advertising, is necessary. Respondents were slower to identify brands released before age ≈ 15 , indicating memory-based processes occur for early-learned brands, while later-learned brands relied more on non-memory-based processes like guessing.

MANAGERIAL SLANT

- Early-learned (established) brands are recognized faster and more accurately than later-learned (newer) brands. However, the effect sizes are tiny, with very limited practical value.
- Other factors like brand usage and exposure become crucial as consumers age, highlighting the need for continued exposure to help sustain any early-learned advantage.
- Newer brands can reach recognition fluency comparable to established brands among their brand users and individuals exposed to their advertising, suggesting that new brands can become a part of individuals' mental "brand lexicon" at any age.
- However, older consumers' usage and exposure status for newer brands are especially influential, indicating that this cohort requires greater repetition and maintenance to sustain recognition fluency.

- A faster response time does not necessarily indicate better memory structures or the ability to identify branding correctly. Thus, using time-to-respond measures in a branding context may be problematic.

INTRODUCTION

Brand names in and of themselves can elicit consumers' associations that can lead to brand choice (Aaker & Keller, 1990), and known brands are more likely to be included in buyers' consideration sets (Macdonald & Sharp, 2000). Considering the limited time consumers allocate to buying everyday goods, spending as little as five seconds in stores (Sorensen et al., 2017) and 10 seconds in online shopping (Anesbury et al., 2016), it becomes essential for marketers to understand the techniques and tactics that facilitate such rapid brand recognition. By understanding and leveraging these tactics and strategies, brands can enhance their likelihood of being noticed, recognized, and selected at the critical point of purchase.

One relevant concept studied extensively in psychological research is the age of acquisition (AoA) effect, which suggests that items learned early in life are recognized with greater speed and accuracy than those learnt later in life (Carroll & White, 1973; Pérez, 2007).

In marketing, foundational research explored the influence of AoA on brand names and proposed intriguing results regarding the AoA effect on brand name recognition (Ellis et al., 2010). It reported that for adults, brands learned early in life are recognized quicker and more accurately than brands learned later in life. However, while becoming the precedent in this space, the conclusions drawn were based on a single research that remains untested.

Therefore, the present study aims to fill this gap, replicating the initial study with a larger sample and incorporating additional variables. This research explores the practical and theoretical implications of the AoA effect on brand name recognition and seeks to provide actionable insights for marketing practitioners.

RESEARCH BACKGROUND

Bias towards early learned items – including brands

Words, objects, and faces learned early in life are identified more quickly and with fewer errors than those learned later in life (Carroll & White, 1973; Pérez, 2007). This phenomenon, called the age of acquisition effect (AoA), has been studied widely in the psychological research (Cortese & Khanna, 2007; Ellis & Morrison, 1998; Johnston & Barry, 2006; Pérez, 2007). Early studies in this area focus on how AoA assists in the process of retrieving words from the mental lexicon, such as *'book'* or *'shoe'* for early-acquired items and *'syringe'* or *'tuning fork'* for late-acquired items (e.g., Carroll & White, 1973). Further studies have reported AoA effects in other tasks, such as determining whether images illustrate real or imaginary objects (Holmes & Ellis, 2006) or whether faces depict famous or unknown people (Richards & Ellis, 2009). A similar effect may be seen in developing music preferences (Davies et al., 2022).

According to AoA studies, the accessibility of a concept is determined by the age it is learned and remains largely unchanged (Morrison et al., 2002). Thus, the advantage enjoyed by early-learned brands can be permanent, and the disadvantage for later-learned or newly launched brands may be irreversible. However, memories consolidated and stored in long-term memory fade over time without reinforcement (e.g., synaptic connections retract with time, Chang et al., 2011). There is also the possibility of memories being displaced, in this instance by competitor advertising: retroactive interference makes it difficult to remember previously learned items after learning a new concept (Tulving & Craik, 2000).

Ellis, Holmes, and Wright (2010) studied AoA effects in the consumer context and showed that brands learned early in life (under five years of age) are recognized more fluently than brands learned later in life. If two brands have similar exposure levels, early learned brand names were recognized slightly faster (reaction times 632ms v 659ms, $t(19) = 2.93$, $p < .01$) and more accurately (mean error rates of 6 vs. 11 percent, $z = 2.71$, $p < .01$) than later-learned brand names. From these results, it appears that brand exposure during childhood helps recognition later in life. Other experiments explored and confirmed that AoA effects were present for related semantic information (category belonging) and long-established brands that had either survived or exited the marketplace.

Conversely, these findings imply that new brands (later-learned) are disadvantaged and may require an entire generation to reach the recognition fluency of established brands. This presents an opportunity for investigation if other controllable factors, such as advertising, could neutralize the predisposed AoA advantage for early-learned, established brands. Greater insights into the role of marketing efforts in maintaining early memories and establishing new ones across generations of consumers will benefit brands of any age.

Nevertheless, the generalizability of the conclusions needs to be tested, as in Ellis et al. (2010), a small student sample was used (for further discussion, see Ashraf & Merunka, 2016). The present research replicates Ellis et al. (2010) using a representative sample and extends it by including the two new variables of brand usage and brand exposure.

Ongoing exposure and reinforcement may improve recognition performance

According to associative network theory (widely adopted in marketing, e.g., Teichert & Schontag, 2010) everything associated with a brand (e.g., feelings, images, and usage situations) is organized in memory as individual nodes that link to each other in a network of associations (Anderson, 1983). The richness of a brand's representation in the network can impact memory fluency, including encoding and retrieving relevant information (Simmonds et al., 2020; Stocchi et al., 2016).

By being exposed to brands through advertising and incidental environmental exposure, a consumer's memory associations for a brand are refreshed. Newer brands may need to work harder to form memories in consumers' minds because they compete with brands with more established memory networks. Unfamiliar (or late acquired) brands are more prone to competitive advertising interference (Kumar & Krishnan, 2004). Thus, established brands have advantages in advertising: brand users generally have higher levels of ad recall (Vaughan et al., 2016), consumers' memories are less affected by interference by competitors' ads (Kent & Allen, 1994), and people tend to favor brands with established memories when confused (Braun-LaTour & LaTour, 2004).

Brands require ongoing exposure to maintain these networks (Vaughan et al., 2021). Memories may fade if a brand is learned earlier in life but not reinforced. Conversely, if a brand is learned later in life, but an individual is more frequently exposed to it, it may counteract the

advantage of an early-learned brand name. Similar recognition performance is seen for expert vocabulary (late acquired, high-frequency) and early acquired, low-frequency words (Stadthagen-Gonzalez et al., 2004). This differentiation in exposure/usage needs to be explored in the context of consumer research. This research tests the application of AoA effects by inspecting known conditions influencing brand recognition.

Rather than just sensory exposure, brand experience is subjective, internalized, and related to one's actual use of brands and products (Brakus et al., 2009). Direct brand usage builds memory links, which increases peoples' ability to retrieve brand-related information from the memory (Hoch, 2002). People who have *ever* used a brand tend to score higher on brand awareness and brand image associations than people who have *never* used a brand (Vaughan et al., 2021). This is because users interact with and build more diverse mental associations with the brand (Stocchi et al., 2017), though sometimes the effects of these wider networks can be unexpected (Stocchi et al., 2016).

Brand users are therefore more likely to experience (and remember) greater exposure frequency. The ease of retrieving information from memory is, however, not only influenced by exposure. It also is affected by the recency of exposure (Jones, 2007). Current brand users are more likely to have recent, direct experience with the brand. Consequently, brand usage is important to contextualize AoA effects concerning brand name recognition performance. Hence, our hypotheses are as follows:

Hypothesis 1: Consumers will recognize early-learned brands faster than late-learned brands.

Hypothesis 2: Consumers will more accurately recognize early-learned brands than late-learned brands.

Hypothesis 3: Brand usage recency will positively influence brand recognition performance.

Hypothesis 4: Brand exposure frequency will positively influence brand recognition performance.

METHOD

Product categories and brand selection

The research focuses on five CPG categories: beer, breakfast cereal, chocolate, hair care, and

pet food in Australia, with data obtained via a survey. These categories were selected as respondents are likely to interact with them in childhood (e.g., cereal) or adulthood (e.g., beer). Each category included brands launched across the 20th century to accommodate younger and older consumers. Launch years were obtained from company websites.

The authors selected brands with varying market shares to increase the likely variation for a comparison of recognition performance. Brands were selected to ensure enough responses for brand exposure (seen/never seen) and usage (user/non-user). Brands included were available in major retailers. There were 52 real brands in the survey and an equal number of fictitious brands included, as the task required respondents to determine if brands were real or false. Fictitious brand names were generated to appear realistic. Consistent with the original study, real and fictional sets were matched for the number of words (mean=1.54 words).

Experimental procedure

Respondents completed the experiment using a keyboard. They were instructed to identify real brand names quickly and accurately in an uninterrupted environment. The sample of n=1000 was sourced through a reputable commercial provider of panels for research purposes and was representative of the population by age (18-74), gender, and geography.

Each brand name (real or fictitious) was randomly presented one at a time in the center of the screen using a large clear font. Participants responded by pressing 'F' if the brand was real or 'J' if it was fictitious so that respondents could focus on the screen rather than their fingers (Ingmarsson et al., 2004). Each brand name was displayed one at a time and stayed on the screen until a response was made. The screen would blank for 500ms before the next name was shown. Response latency was recorded in milliseconds from when a stimulus was presented until a response was made. Only the response times (RT) for correct answers (i.e., accurately identified real brands as "Yes, this is a brand") are included in this section. Recognition accuracy is the proportion of responses that accurately identify a real brand stimulus as a real brand.

The experiment started with three real and fictitious brand names (not included in the analysis), followed by the 104 stimuli presented randomly for each respondent. The

investigation concluded with questions about respondents' prior brand exposure, usage experience, and relevant demographics.

Respondents indicated if they had seen each brand in shops, TV, newspaper or magazine advertisements, etc., in the past 12 months (brand exposure) and if they had used it in the past 12 months (brand usage). Consistent with Ellis et al., (2010), we defined early learned brands as those that existed when respondents were less than five years old.

Data cleaning

Outliers (IQR of $\pm 1.5x$ the upper or lower quartile) were removed via the following three phases:

- (1) individuals with extremely incorrect total responses ($> 36/52$ incorrect);
- (2) total response times unreasonably short (cut-off = 7 minutes);
- (3) individual response times to each real brand (shorter than 372ms).

After this process, 59,100 individual responses were used for the analyses.

RESULTS AND DISCUSSION

Brands learned during childhood are recognized faster and more accurately

We found that early-learned brand names ($M=746\text{ms}$, $SD=127$) were recognized significantly faster than later-learned brands ($M=760\text{ms}$, $SD=125$); $t(21704) = -7.53$, $p < .01$. This finding is consistent with prior studies looking at words/concepts (e.g., Pérez, 2007) and brand name recognition (Ellis et al., 2010). Hypothesis 1 is supported, but with a small effect size.

Brands learned early in life were recognized more accurately (76%) than brands learned later in life (74%). There is a significant association between AoA and recognition accuracy: $\chi^2(1, n = 29550) = 10.86$, $p < .01$, but with a small effect size ($V = .02$). The current findings are directionally consistent with Ellis et al. (2010), but with a smaller magnitude of effects (Table 1).

Additional analysis that included all responses revealed consistent findings. Early-learned brands were recognized quicker and more accurately than later-learned ones (see Appendices, Table 2). Hypothesis 2 is supported.

Fictitious brands were rejected with 80% accuracy and a mean RT for correct responses of 768ms.

Table 1: Brand name recognition performances across studies

AoA effects observed by childhood brand exposure		Present study	Ellis et al. (2010)
Recognition RT (milliseconds)	Early	746	632
	Late	760	659
	Diff.	14	27
Recognition accuracy (%)	Early	76	94
	Late	74	89
	Diff.	2	5

Usage recency does not meaningfully influence response time

Users of a brand were quicker to correctly identify it as real ($M=743\text{ms}$, $SD=123$) than brand non-users (762ms , $SD=129$); $t(21704) = 10.98$, $p < .05$. One-way ANOVA showed brand usage recency has a significant effect on RT, $F(5,21706) = 34.73$, $p < .01$. However, the effect size was small for the actual difference in mean scores between the groups ($\eta^2 = .001$), indicating that usage recency does not meaningfully impact RT. Detailed results for RT by usage recency are in the Appendices (Table 5).

An additional ANOVA was performed to examine if different levels of brand usage influence brand recognition by excluding brand non-users from the analysis. A significant effect was found for the level of exposure frequency on RT, $F(4,12175) = 13.81$, $p < .01$, with a small effect size ($\eta^2 = .005$). A similar pattern was found across the categories tested. While there is some variation in the mean RT for different recency levels, the small effect sizes suggest that usage recency levels have a very small influence on recognition RT ($\eta^2 = .02$ or lesser in all categories).

A series of ANOVA analyses show no significant interaction effects ($p > .05$) between AoA and brand exposure and usage. Detailed results are in the Appendices: Figure 5 through Figure 7 (Table 6 through Table 8) illustrate the interactions across these variables on RT (report the statistical results).

Brand usage recency influences recognition accuracy to a certain extent

Brand users were 1.6 times more likely to identify a brand name accurately than non-users

(94% vs. 58%). A chi-square test for independence indicated a large effect size and significant association between usage recency and recognition accuracy, $\chi^2 (5, n=29045) = 5663.36$, $p < .01$, $V = .44$. Hypothesis 3 is supported. The more recently a brand was last used, the higher the recognition accuracy. Note that those respondents who reported never using the brand may still have seen it (e.g., on shelves or in advertising but never directly used the product). The Appendices detail the brand usage recency and recognition accuracy (Table 9).

An additional test that excluded non-users showed a significant but small effect between usage levels and recognition accuracy, $\chi^2 (4, n=12598) = 43.73$, $p < .01$, $V = .06$. Consistent results were found in each category, suggesting that brand usage recency (e.g., in the past month to over a year) has a real but limited practical influence on recognition accuracy among brand users ($V \leq .11$ in all categories). Consumers who last used a brand over a year ago can recognize a brand with similar accuracy as recent users.

Brand exposure does not meaningfully influence response time

Claimed brand exposure was associated with faster recognition reaction time ($M=751$ ms, $SD=125$) than no claimed exposure (765 ms, $SD=146$); $t (21704) = 3.14$, $p < .05$.

Brands with a claimed higher exposure frequency were recognized faster. A one-way ANOVA showed a significant but small effect of claimed exposure frequency on RT, $F(5,22123) = 8.94$, $p < .01$, $\eta^2 = .002$). Detailed results on brand exposure levels on RT are in the Appendices (Table 3).

An additional test investigating brand exposure (ever vs. never) on RT yielded a significant but small effect, $F(4,21311) = 8.901$, $p < .01$, $\eta^2 = .002$. All categories showed consistent results, reinforcing that brand exposure frequency and exposure (never vs. ever exposed) have a real but very small effect on RT ($\eta^2 < .01$ in all categories).

Higher recognition accuracy for frequently encountered brands

As expected, brand exposure frequency positively affects accuracy. Notably, brands reported to have been seen at least once a year were recognized with high accuracy (>90 percent). A chi-square test for independence indicated a statistically significant association between exposure frequency and recognition accuracy, $\chi^2 (5, n=29550) = 14896.25$, $p < .01$. Hypothesis 4 is

supported. Recognition accuracy results of brand exposure levels are detailed in the Appendices (Table 4).

An additional test performed by excluding those that had never seen the brand resulted in a statistically significant association between exposure levels and recognition accuracy, $\chi^2(4, n=23703) = 559.51, p < .01$, with moderate effect size at $V = .15$. Similar findings were found in each category, meaning that brand exposure frequency (from daily to over a year) systematically increases recognition accuracy (effect sizes range from $V = .11$ to $.19$).

Using a binary logistic regression to examine the relationship between brand name acquisition (early/late), brand exposure (never or hardly seen/seen recently), brand usage (non-user/user), and brand name recognition accuracy (incorrect/correct), we found that brand exposure and usage were significant predictors ($p < 0.01$). Brand exposure has a slightly larger influence on recognition than usage (odds of accurate recognition increased by 2.7 times versus 1.5 times).

The above analyses applied the same cut-off as Ellis et al. (2010): the age of four as a threshold for considering a brand to be learned early in life – which is a limitation. The following section addresses this shortcoming.

ADDITIONAL ANALYSIS

Identification accuracy declined with respondent age when the brand was launched

The first stage was to investigate the accuracy of identifying brands by AoA. If a brand existed before a respondent was born, they had a roughly 80% likelihood of correctly identifying a brand as real. There is a downward trend for correct identifications. When respondents were 50 years of age at the brand launch, this likelihood declined to 50% (Figure 1). An AoA effect is visible.

Incorrect responses are systematically quicker

The next stage was to investigate the speed of response. To account for the variability in the responses of individuals, each individual had their response times for each response

standardized by subtracting their mean response time and dividing by their standard deviation. This was then compared with the relative age when a brand was launched. Correctly identified real brands had a higher (slower) standardized response time. In contrast, incorrect responses were faster (Figure 2). One explanation is that recognition or recall of a brand requires memory access, a slower process than finding no trace in memory or guessing (for more discussion of the differences in recognition, recall, and guessing, see Gardiner et al., 1998; Wixted & Mickes, 2010). Correct responses also sped up when respondents considered brands launched once they were 15-20 years old, although respondents were more accurate at recognizing brands the younger they were. When the brand is older than the respondent (Figure 1), the slope is effectively flat, but when the respondent considers brands a) they don't use and b) launched after their birth, the slope changes. This slope change appears to happen during the first few years of the respondents' life. The speed and accuracy of response appeared to be moderately correlated ($r=.47$), but this requires further investigation.

Figure 1: Brand recognition accuracy & respondent's age at brand launch (all correct responses)

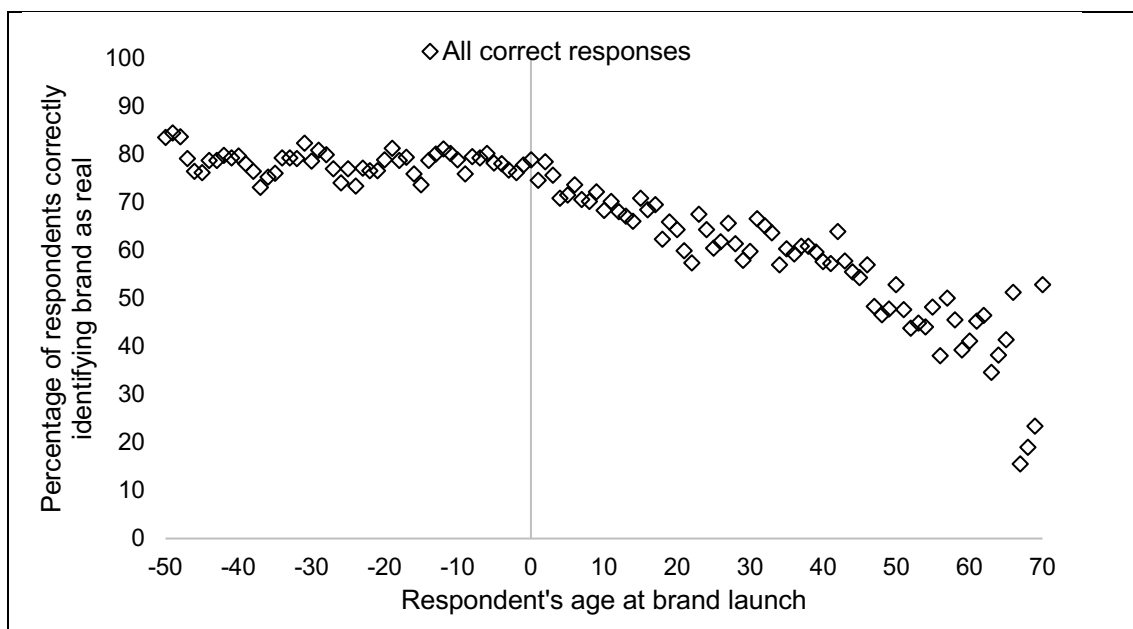
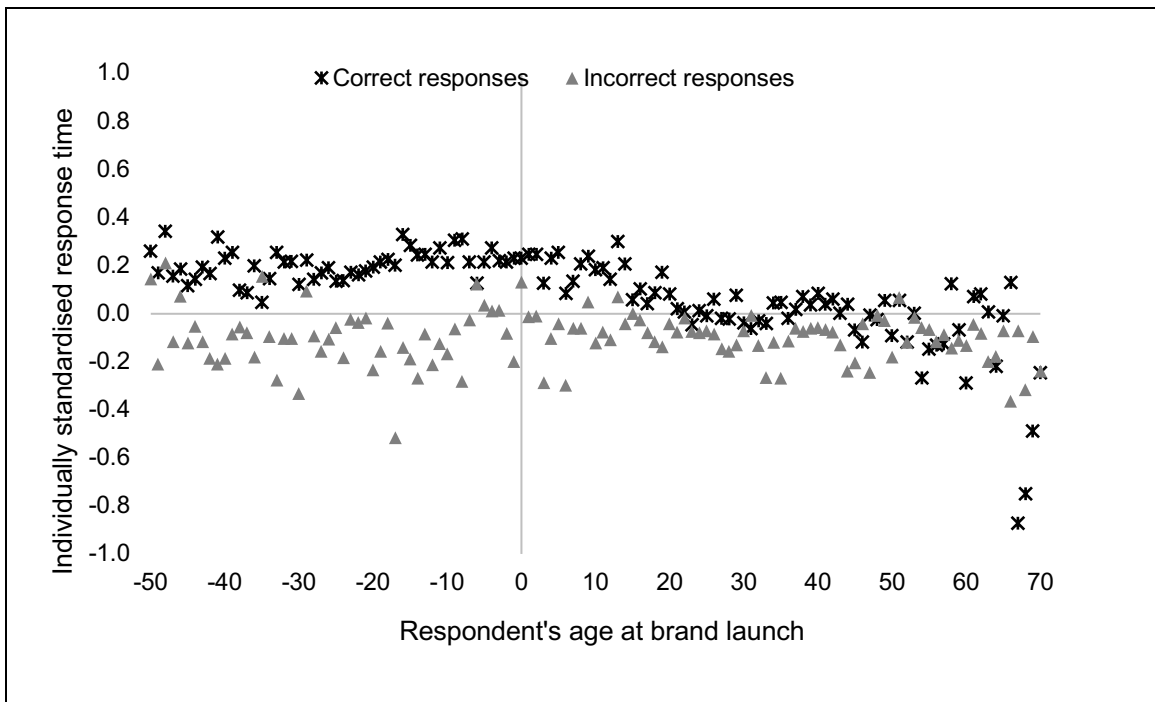


Figure 2: Mean standardized response time by respondent's age at brand launch (correct vs. incorrect responses)



Brand usage has the greatest influence on recognition, especially for older consumers/newer brands

Applying the same approach, we found a clear pattern in brand usage (user vs. non-user) and exposure (last seen 12 months vs. never/longer) on brand name recognition. The results were consistent with the previous analysis, but the presentation below provides greater insights into the relationship between recognition performance and the age of respondents at brand launch. Regardless of the respondent's age when the brand was launched, accuracy was consistently higher for brands that respondents had used (Figure 3) and had some exposure to within a year (Figure 8 in the Appendices).

However, respondents' age at brand launch played an important role in recognition accuracy for brands that were *not* used/*not* seen recently. Where the brand is older than the respondent, the slope is effectively flat, but the slope changes for non-users or the unexposed when the brand was launched after the respondent's birth. This is particularly obvious among older consumers with newer brands, suggesting that it is especially vital for newer brands to reach this cohort (e.g., via advertising) to stay competitive. However, this would be moderated by the relative importance of this age group to category sales.

Figure 3: Brand recognition accuracy & respondent's age at brand launch

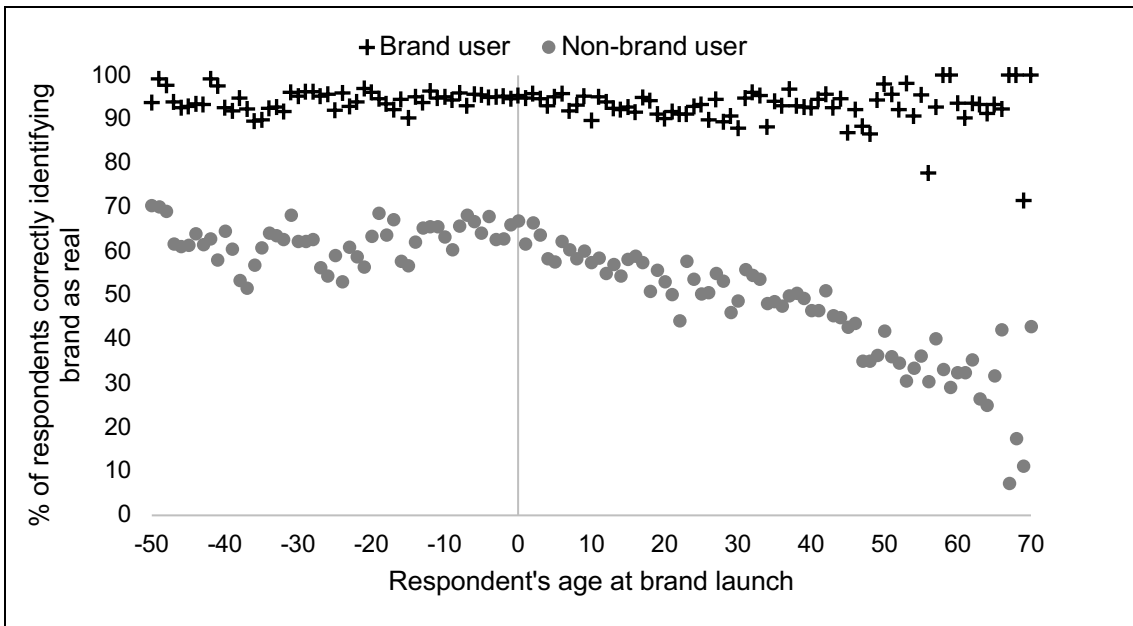
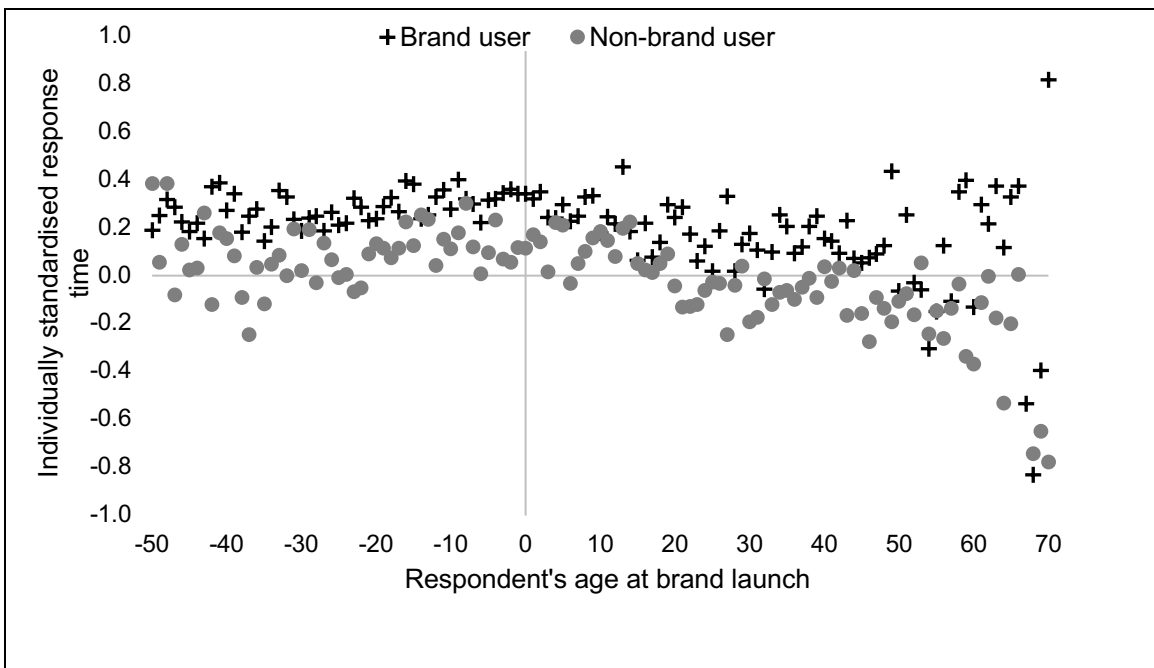


Figure 4: Mean standardized response time by respondent's age at brand launch

(brand user vs. non-brand user)



Brand users' standardized response times were slightly slower ($M=.24$, $SD=.91$) than for non-users (mean $=.04$, $SD=1.0$); see Figure 4. Similarly, respondents responded slightly slower to recently seen brands ($M=.19$, $SD=.94$) than to brands never/hardly seen ($M=.03$, $SD=.1.0$); see Figure 9 in the Appendices.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

Despite statistically significant differences and the differences in accuracy found in recognition performance between early and late-acquired brands, the current study repeatedly found small effect sizes. This suggests that childhood brand exposure has limited practical influence on recognition performance and only partially contributes to the fluency of brand name recognition in adulthood. Other factors, such as brand exposure and usage experience, have far greater implications for consumer memory and marketing practice. Childhood exposure can positively influence consumer memory, but other factors become increasingly crucial as consumers enter adulthood, especially in a competitive environment. This is good news for practitioners who cannot change their brand's history (e.g., launch date) nor influence consumers' personal history with their brand. Industry professionals know the significance of consistent brand communication, advertising campaigns, and positive customer experiences (via usage) in fostering brand recognition and repeat patronage. Our findings remind brand owners to allocate resources strategically and invest in initiatives that generate maximum brand exposure (e.g., high reach continuous advertising) and reinforce positive experiences (e.g., stay relevant and deliver value to consumers throughout their lifetime).

Among the conditions tested, brand exposure (seen vs. never seen) has the largest effect on recognition accuracy (i.e., knowing the brand) compared to usage (used vs. never used) or childhood brand exposure. The levels of claimed exposure frequency have real effects, but the magnitude of its impact on recognition is limited. The current study found that any exposure to the brand can have a lasting effect (i.e., brands seen less than once a year still positively impact memory), but this is a short-term effect.

These findings have implications for brands at all stages. While established brands learned at a younger age may have some mental advantage (e.g., Bronnenberg et al., 2012; Lambert-Pandraud & Laurent, 2020), this is limited to individuals that do not use/have not seen the brand for a long time¹. It is important to note that this advantage is not an impenetrable

¹ While not tested in the current study, these respondents may be category non-users, hence, less susceptible to competitive interference.

barrier for new or competing brands. Continuous brand reinforcement (e.g., from advertising or usage) is needed throughout an individual's lifetime to sustain this early-learned mental advantage. Apart from the obvious of keeping the same brand name, one way to extend this early-learned mental advantage is having consistent branding (over decades). Consumers' brand memories extend beyond the brand name (Vieceli & Shaw, 2010; Ward et al., 2020), and so, disciplined use of a brand's attributes, such as distinctive assets (e.g., logo, color, shapes, characters, etc.) across all touchpoints can leverage consumers' brand-related memories to capture attention. In practice, this means mandating the likes of a brand's messaging and image while limiting changes to the logo, pack, or name.

For new brands, there is potential to achieve recognition fluency similar to established brands. Our findings emphasize the importance of marketing efforts to help newer brands become a part of individuals' mental "brand lexicon" across all ages. That said, older consumers' usage and exposure status are especially influential for newer brands, indicating that this cohort requires greater repetition and maintenance to sustain recognition fluency. Older consumers (e.g., > 55 years) can recognize and recall as many brands as those <40 years (Mecredy et al., 2023) and exhibit brand choices similar to their younger counterparts (e.g., purchasing newer brands (Phua et al., 2020)). Brand managers can influence whom they reach, how often, when, and in what ways, such as by providing free trials or samples to encourage usage.

The additional analyses imply that a faster response time does not necessarily indicate more memory structures or the ability to identify branding correctly. This finding raises questions about the validity and usefulness of using time-of-response measures to evaluate branding success. The number of influences on speed of response measures (e.g., respondent age, time of day; see Zhou et al. (2011)) mean that these are unsuitable when investigating branding clarity or quality – there is more value in correctly identifying a brand or brand assets than in a marginally faster but incorrect brand identification. The ultimate goal of branding is to establish a strong and accurate association between the brand and its desired attributes in consumers' minds. Thus, measuring the accuracy and clarity of brand identification should take precedence over the speed of response.

Measures of consumers' memories should also consider the context of brand usage and exposure, as the AoA effect seems only apparent for non-brand users or those who have not seen the brand recently. The findings suggest that the effect of the mere exposure or availability of a brand may be more prominent for non-brand users or individuals who have not recently encountered the brand. This supports that targeting efforts should be tailored to reach broadly (including non and light buyers). This implication is consistent with the growing evidence on the importance of light buyers in sustaining long-term brand growth (e.g., Dawes et al., 2022; Graham & Kennedy, 2022; Trinh et al., 2023).

THEORETICAL IMPLICATIONS AND FUTURE RESEARCH

The finding that recent brand exposure and usage have a far greater influence on consumers' memories than the age of acquisition (AoA) highlights some important insights about the AoA theory and its practical value in the context of consumer memory. While these results technically replicated the initial study by Ellis et al. with statistically significant results, the differences are minimal: in the order of 10 to 15 milliseconds. Our research cautions against overemphasizing small effect sizes that could lead to an incomplete understanding. In today's world, where sample sizes are increasingly large (Kennedy et al., 2014) and devices are increasingly accurate in measuring timed differences, attention needs to be given to the practical importance of such findings.

Our findings suggest that AoA theory has limited utility in brand recognition in adulthood as the impact of childhood brand exposure diminishes as individuals enter adulthood. Factors such as recent exposure and usage experience become more crucial in memory processes in adulthood. The emphasis on recent brand exposure and usage experiences highlights the dynamic nature of memory and its susceptibility to change over time. The research emphasizes the cumulative impact of brand exposure and usage on recognition fluency, reinforcing that repeated exposure and positive experiences are crucial in strengthening brand memory. This insight aligns with the broader theoretical understanding of memory consolidation and retention, highlighting the importance of reinforcement and ongoing interactions with a brand (e.g., Romaniuk & Gaillard, 2007).

Moreover, this study expands our understanding of memory and recognition by exploring the interplay between memory-based processes (associated with early-learned brands) and non-memory-based processes (guessing) for later-learned brands. This finding highlights the complexity of memory and recognition as measures and suggests that different cognitive processes may be involved depending on the timing of brand exposure.

More specifically, in future research into consumer learning, these findings call into question the use of the age of five as a threshold for considering a brand early- or late-learned, with these results giving some initial evidence to support late adolescence as a potential tipping point in the formation of branded networks of memory. Future research in brand recognition and memory theories can benefit from further exploration of the role of recent brand use.

This research is an important reminder for practitioners and academics in today's data rich world. With such abundant data and user-friendly access, it is crucial to avoid getting overly focused on small and potentially insignificant findings. This paper emphasizes the need for a balanced and thoughtful approach to data analysis and interpretation, encouraging a broader perspective to avoid losing sight of the big picture.

ACKNOWLEDGMENT

We would like to thank the editor, associate editor, and anonymous reviewers for their invaluable input and constructive feedback, which significantly improved this manuscript. Their expertise and thoughtful comments enhanced the quality and clarity of our work.

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APPENDICES

Table 2: Brand name recognition performance (all responses)

AoA effects observed by childhood brand exposure		All responses (n=52,000)
Recognition RT (milliseconds)	Early	550
	Late	565
	Diff.	15
Recognition accuracy (%)	Early	70
	Late	62
	Diff.	8

Table 3: Description of RT according to brand exposure frequency (in milliseconds).

Exposure frequency	n	Mean	SD	95% CI	
				Lower bound	Upper bound
Daily	620	751	120	741	760
Weekly	3530	743	126	739	747
Monthly	6101	749	126	746	752
Yearly	4972	752	126	749	756
Less than once a year	6093	758	123	755	761
Never	807	765	145	755	775
All	22122 ^a	752	126	750	753

^a Smaller than n of all accurate recognition for real brands due to missing data (i.e., responses of 'don't know' for exposure frequency of brand).

Table 4: Description of recognition accuracy for brand exposure frequency

Exposure frequency	n	Mean of accurate recognition (%)
Daily	719	93
Weekly	7324	95
Monthly	6465	94
Yearly	5536	90
Less than once a year	7259	84
Never	5847	14
Average		75

Table 5: Description of RT per usage recency (in milliseconds).

Usage recency	n	Mean	SD	95% CI	
				Lower bound	Upper bound
Within a month	2822	732	123	727	736
1-3 months	1962	740	123	734	745
3-6 months	1676	739	124	733	745
6-12 months	1564	753	125	747	759
Over a year ago	4151	751	121	747	755
Non-user	9531	762	129	760	765
All	21706 ^a	752	126	750	753

^a Smaller than n of all accurate recognition for real brands due to missing data (i.e., responses of ‘don’t know’ for usage recency brand).

Figure 5: No significant interaction effect between Brand Name Acquisition (Early/Late) and Brand Exposure (Never/Seen)

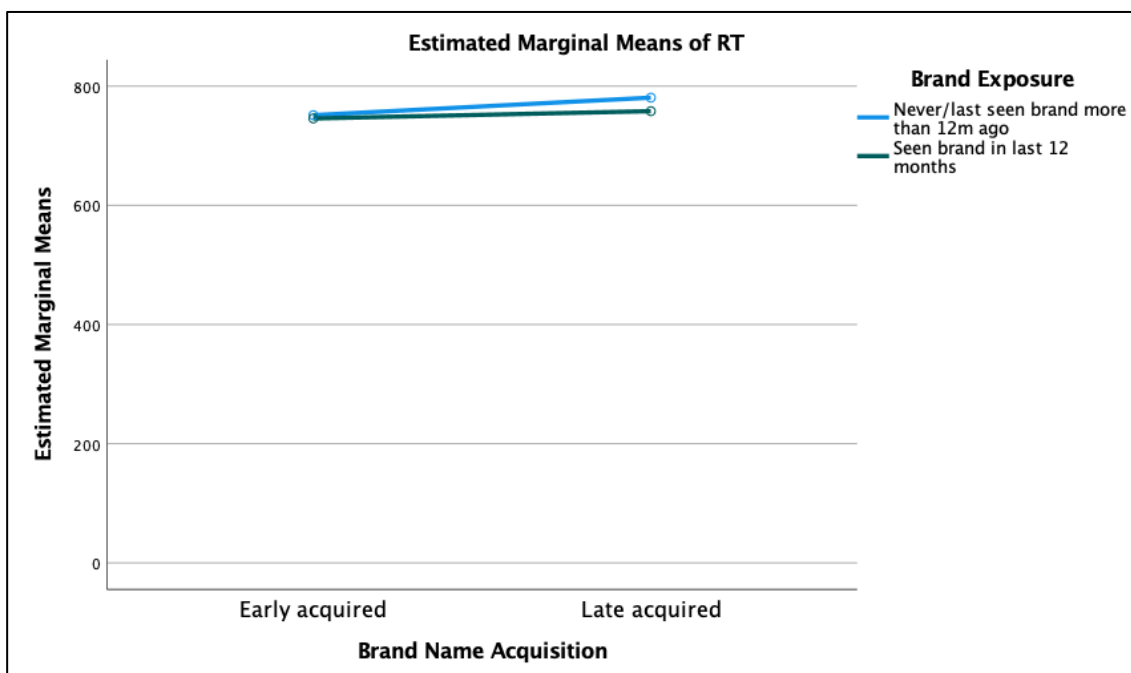


Table 6: Results of two-way ANOVA: Brand Name Acquisition (Early/Late) and Brand Exposure (Never/Seen)

Dependent Variable: Brand Name Recognition Reaction Time (RT)					
Source	Type III SS	df	Mean Square	F	Sig.
Brand Name Acquisition (Early=0; Late=1)	333668	1	333668	21.05	.00
Brand Exposure (Not seen=0; Seen=1)	153672	1	153672	9.69	.00
Acquisition*Exposure	56544	1	56544	3.57	.06
Total	12611674066	21706			

Figure 6: No significant interaction effect between Brand Name Acquisition (Early/Late) and Brand Usage (Non-user/User)

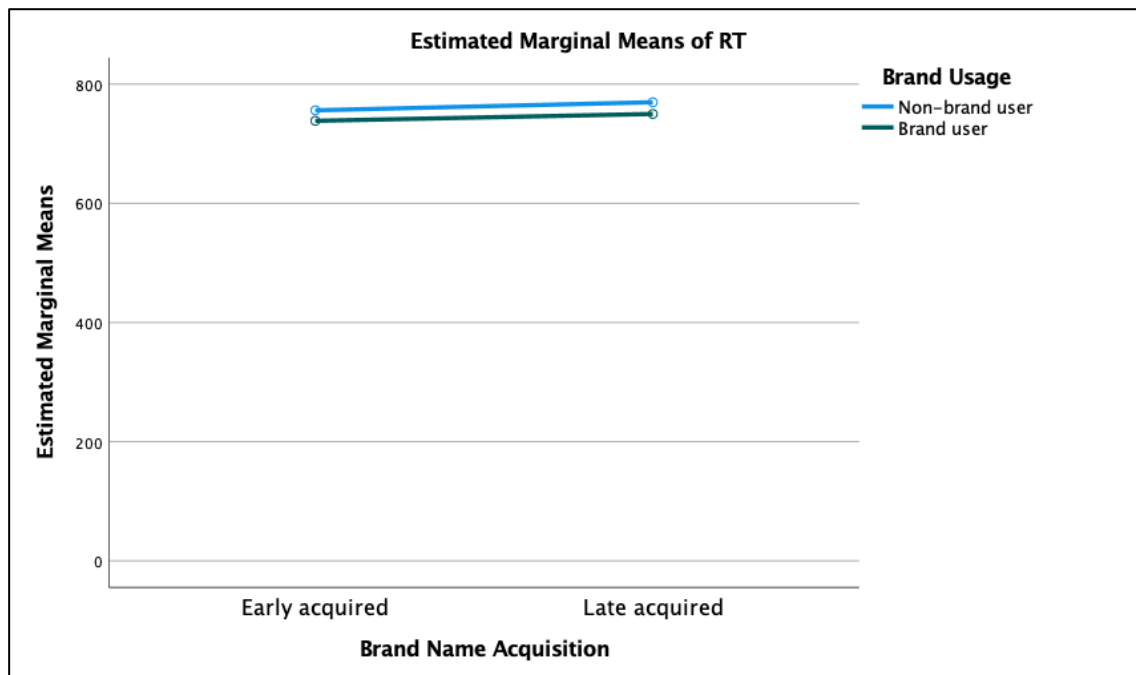


Table 7: Results of two-way ANOVA: Brand Name Acquisition (Early/Late) and Brand Usage (Non-user/User)

Dependent Variable: Brand Name Recognition Reaction Time (RT)					
Source	Type III SS	df	Mean Square	F	Sig.
Brand Name Acquisition (Early=0; Late=1)	827495	1	827495	52.44	.00
Brand Usage (Non-user=0; User=1)	1827906	1	1827906	115.84	.00
Acquisition*Usage	5174	1	5174	.33	.57
Total	12611674066	21706			

Figure 7: No significant interaction effect between Brand Exposure (Never/Seen) and Brand Usage (Non-user/User)

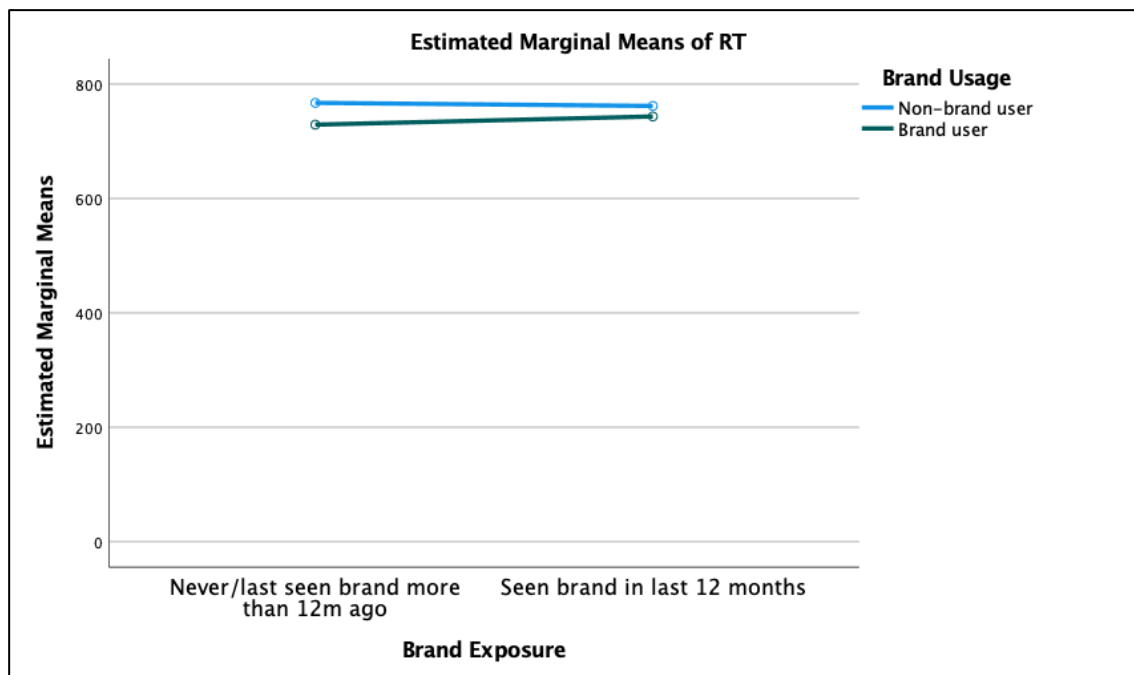


Table 8: Results of two-way ANOVA: Brand Exposure (Never/Seen) and Brand Usage (Non-user/User)

Dependent Variable: Brand Name Recognition Reaction Time (RT)					
Source	Type III SS	df	Mean Square	F	Sig.
Brand Exposure (Not seen=0; Seen=1))	2954	1	2954	.19	.67
Brand Usage (Non-user=0; User=1)	117767	1	117767	7.45	.01
Exposure*Usage	14351	1	14351	.91	.34
Total	345181002	21705			

Table 9: Description of recognition accuracy by usage recency.

Usage recency	n	Mean of accurate recognition (%)
Within a month	2887	98
1-3 months	2034	96
3-6 months	1776	94
6-12 months	1627	96
Over a year ago	4274	97
Never	16447	58
Average		75

Figure 8: Brand recognition accuracy & respondent's age at brand launch (exposed vs. not exposed)

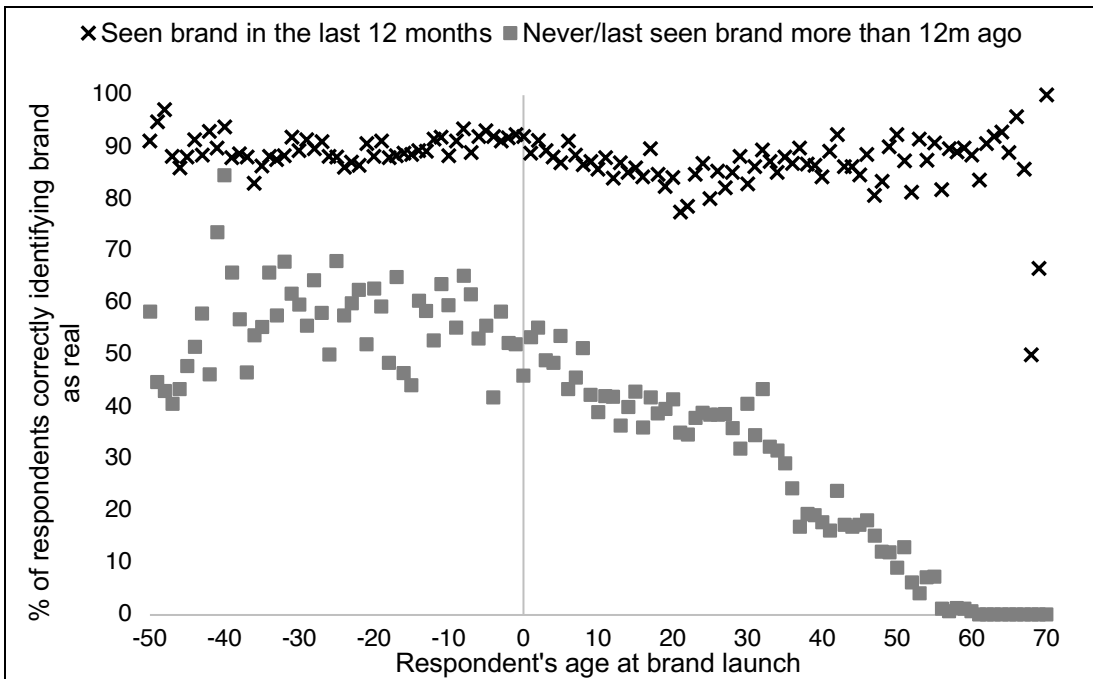


Figure 9: Mean standardized response time by respondent age at brand launch (exposed vs. not exposed)

