

Ehrenberg-Bass Institute Working Paper:

Out of Reach or Out of Mind?

Differences in Advertising's Effectiveness Across Age Groups

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Abstract

Our research explores differences in cognitive evaluative measures of consumer buying behaviour and advertising's effectiveness across age groups. We seek to ascertain if older segments show dissimilar memory structures and cognitive processes than younger targets, or if modern advertising approaches are simply lacking reach among older consumers. Our main measure of interest is *mental availability* – i.e., the ease at which a brand comes to mind in buying situations. We compare the scores of three underlying mental availability metrics across age groups and find differences primarily for associative penetration, a proxy for advertising reach. We then examine differences in other important cognitive evaluative measures of advertising effectiveness, such as the purchase funnel (narrowing down of alternatives for purchase) and product category knowledge. We detect additional differences that further illustrate why there are likely limits to advertising's reach amongst older consumers. Hence, we stress the importance of using these cognitive evaluative measures to appraise the effectiveness of inclusive, cross-age advertising strategies in theory and practice.

Keywords: cognitive evaluations, advertising effectiveness, reach, older consumers, mental availability.

1. Introduction

Advertising campaigns striving to match the needs and wants of specific consumer groups often rely on segmentation based on chronological and cognitive ages (Chaneya, Touzanib and Slimane 2017; Stephens 1991; Van Auken, Barry and Anderson 1993). Based on this premise, existing research recurrently presents comparisons of age and generations, reporting on the likely dissimilarities between the groups such as communication habits, learning styles and interests (van der Goot et al. 2018; Chaney, Touzani and Slimane 2017; Strutton, Taylor and Thompson 2017), and media usage (Taylor 2018). Generational Cohort Theory research also compares consumers based on the generation they belong to, based on the assumption they will share similar social, cultural, political, and economic events forming common values and behaviors, including advertising responses (Huan 2010). Although some studies have compared how people of different ages respond to advertising (Phillips and Stanton 2004; McKay-Nesbitt et al. 2011; Chang 2008; Keshari and Jain 2016), there is scant empirical research comparing advertising's effectiveness across age groups.

Recently, a clear need emerged for advertising research to focus on more generalizable parameters to compare age groups with greater clarity, aiming for scholarly agreement on the topic (Taylor 2018; Eisend 2022). Our research answers this call and compares various age groups by focusing on *cognitive evaluative measures of advertising's effectiveness*, as follows.

Through adaptation of theoretical and analytical principles from psychology to advertising research, cognitive evaluative measures of advertising's effectiveness ascertain the effects of marketing communications on consumer memory, especially changes in underlying chances to process and use information about brands to inform behavior (Bergvist and Taylor 2022). The first cognitive evaluative measure of advertising effectiveness that we consider and contrast across different age groups is *mental availability*. Advertising aimed at

sustaining and improving the performance of any brand hinges on its ability to maintain or build the chance that it will come to mind in purchase situations. Based on psychological principles of how memory works and how people process information (e.g., Anderson and Bower 1979; Collins and Loftus 1975) mental availability (Romaniuk 2013; 2023) captures this underlying propensity. In the marketing literature, there is strong empirical evidence that mental availability is essential for brands to maintain and improve market performance (Sharp 2010; Romaniuk and Sharp 2018; Sharp et al. 2024). More closely related to the aims of the present study, mental availability is largely built through advertising; thus, it reveals differences in crucial cognitive aspects that shape buying behaviour across individuals (Romaniuk 2013; 2023; Sharp et al. 2024). Due to the strong relationship between mental availability and buying behaviour, Vaughan et al. (2021) proposed using mental availability as a cognitive evaluative measure of advertising's effectiveness. Their results show that mental availability robustly captures the extent to which an advertising campaign fulfills its primary goal - i.e., the ease of facilitating and processing brand and product information across a variety of consumption contexts. Accordingly, the first objective of the present study is to explore how mental availability differs across younger vs. older consumers (**RO₁**).

To further enhance the robustness of our conclusions, as a second research objective, we also explore other cognitive evaluative measures of advertising's effectiveness intrinsically linked to how consumers retain, access, and use information in purchase decisions (**RO₂**). First, we explore differences across age groups for the *purchase funnel* – i.e., the steps leading to the establishment of a purchase repertoire, via narrowing down alternatives for buying (Mecredy et al. 2022a). Second, we look for likely differences across age groups in memory structures that supersede mental availability and the purchase funnel – i.e., *product category knowledge*, or the overall perception of consumer knowledge and expertise for a given product class (Stocchi, Wright and Fuller 2021). In the literature, each of

these measures corresponds to evaluations of advertising's effectiveness (Mehta and Purvis 2006; Gruca 1989; Banelis et al. 2013; Sharp et al. 2002); yet they are not routinely used in research discussing advertising implications across different age groups or generations.

Our results contribute to advertising theory and practice by introducing a new scholarly take on advertising and media consumption across different age groups, turning the attention to cognitive evaluative measures of advertising's effectiveness. Doing so addresses the need for generalizable parameters to compare age groups (Taylor 2018; Eisend 2022). This shift in focus also addresses previous concerns about the fact that no matter which age-related parameter is used for grouping consumers, no group will be uniformly homogeneous, and heterogeneity within groups will inevitably create analytical problems (Taylor 2018). In contrast, cognitive evaluative measures of advertising's effectiveness uniformly capture the essential and most desirable outcome of advertising, revealing the likely impact on consumer buying behaviour and, therefore, on market performance. Moreover, by concentrating on cognitive aspects that underlie advertising response, it is possible to make inferences on the *lasting* effects of marketing communications (e.g., pre- and post-campaigns, and over time), over and above more volatile measures such as consumer attitudes or purchase intentions.

From a practical viewpoint, we provide simple, insightful empirical benchmarks for comparisons of different age groups across multiple product categories and markets. The US and New Zealand data was sourced through online surveys administered by a commercial panel provider. The value of this approach is that most firms could independently and regularly identify gaps in media plans, which may be failing to reach older consumers (e.g., due to over-digitalization of the media choices made). When used as a complement to the comparison of differences between age groups in terms of their personal characteristics, media habits and media access, it is anticipated that firms would be well poised to outline effective and age-inclusive advertising practices.

2. Background

2.1 *Cognitive Evaluation of Advertising Effectiveness*

Theoretical and practical efforts to determine how to best appraise the effects of advertising constitute one of the most vivid scholarly debates, matched by unparalleled discussions amongst practitioners too. Within the vast array of options that can be explored, there is robust consensus on the value of *cognitive evaluative measures of advertising's effectiveness*.

Conceptually adapted from psychology and mass communication theory to marketing scenarios, cognitive evaluative measures of advertising's effectiveness focus on assessing the impact of marketing communications on memory associations (links between brands and their advertised features); chances and ease of retrieving information from memory; and predisposition to rely upon memory and information activated during decision making (Bergvist and Taylor 2022). In more detail: "Cognitive techniques attempt to measure an advertisement's ability to attract attention, be remembered and communicate the desired message, and also to analyze the levels of knowledge and understanding which an individual possesses about the advertisements and are thus useful when the aim is to make the individual aware of the existence of a product or brand and of the benefits which it provides." (Beerli and Santana 1999, p.14).

Accordingly, our study concentrates on cognitive evaluative measures of advertising's effectiveness for the comparison of age groups, due to the following benefits. First, these measures address two fundamental challenges: i) capturing the cognitive effects of any communication process, irrespective of its commercial connotations; and ii) capturing the extent of influence on the consumer decision-making (or choice) process, especially in terms of biases toward a specific alternative over the others, ultimately increasing consumption (Steth 1974). Second, as we show, cognitive evaluative measures of advertising's

effectiveness approximate ‘make or break factors’, i.e. mechanisms that if absent imply advertising will not attain other outcomes, such as attention and emotional appeal (Keller 1991a; b). As such, the cognitive evaluative measures are a pre-requisite for many other measures to display any meaningful change (Duke and Carlson 1993; Bergvist and Taylor 2022). Third, these measures control the delay between exposure to marketing communications and purchase decisions, describing “the likelihood that any communication effects stored in memory from ad exposure (i.e., what consumers saw, heard, learned, thought, felt, etc., while exposed to an ad) influence consumers’ brand decisions” (Keller 1991a, p.42). Therefore, they register the *net impact* of advertising, in terms of wavering underlying propensities. They also focus on *latent* factors that enhance or limit the effects of advertising, while considering advertising effectiveness as the joint outcome of *continuums* in information reception (e.g., recognition and cued recall), evaluative responses (e.g., thoughts and emotions) and behaviour (e.g., purchase probabilities) (Mazzocco et al. 2006). Finally, cognitive evaluative measures capture incremental improvements such as information reinforcement and saliency increases resulting from advertising, over and above the intensification of buying motives (Steth 1974), or attitude change (Bergvist and Taylor 2022).

More broadly, cognitive evaluative measures are embedded in *behavioral advertising paradigm*, which studies advertising as social phenomenon (Pozharliev et al. 2017) and concentrates on conceptualizing how consumers are persuaded and respond to advertising (Tellis 2003). A further distinctive feature of these measures is that they hinge on the following fundamental assumptions: “consumers use heuristic decision processes, such as reliance on corporate image, for evaluative purposes. In many situations, consumer information processing is limited, and decisions and judgments are based on simplified product cues and symbolic association, such as corporate image” (Koo et al. 2006, p. 83).

Notwithstanding rampant growth in the popularity of alternative approaches and scholarly lines (e.g., neuroscience and neuro-physiological evaluations in advertising research), cognitive evaluative measures of advertising's effectiveness continue to prominently feature in both academic research and industry practice. In a meta-analysis of empirical research documenting advertising effects, Eisend and Tarrahi (2016) highlight that cognitive evaluative measures fall among the most frequently used to report the *size* of advertising impact, especially measures linked to cognition (thoughts and cognitive response to advertising), memory (ability to recover information presented in advertising), behaviour (choice, brand behaviour) and information processing (stages of cognitive involvement with advertising, including awareness and understanding).

Cognitive evaluative measures of advertising's effectiveness are widely used to appraise different forms of advertising, including television advertising (Shen 2001; Jeong, Kim and Zhao 2011; van Kuilenburg, de Jong and van Rompay 2011; Zarantonello et al. 2014; Bang and King 2021; Phua et al. 2023); print advertising (Beerli and Santana 1999); out-of-home advertising (Wilson, Baack and Till 2015; Huo and Jiang 2022); and online advertising (Yoo and Kim 2005; Crespo-Almendros et al. 2014; Kong et al. 2019; Santoso et al. 2020; Santoso et al. 2022), including social media communication and influencers (Araujo et al. 2017; Bandari and Rodgers 2020; Lou et al. 2023). We also find cognitive evaluative measures of advertising's effectiveness in research assessing multi-screen advertising (Segijn et al. 2017); product and brand placement (Babin and Carder 1996; Avramova et al. 2017); Naderer, Matthes and Binting 2021); sponsorship (Bloxham 1998; Tripodi et al. 2003; Herrmann, Walliser and Kacha 2011; Walraven et al. 2014); and celebrity endorsement (Tian et al. 2022). Finally, these measures are used in the evaluation of the effectiveness of specific advertising styles or appeals (e.g., Chattopadhyay and Basu 1990; Putrevo and Lord 1994; Arias-Bolzmann et al. 2000; Chang 2007; Buijzen 2007; Borborjafari et al. 2016; Chang et al.

2018; Reavey et al. 2018; Riemer and Noel 2021). Yet, thus far, they have not been focal to age and generational classifications for advertising research.

As Duke and Carlson (1993) contend, it is best to infer advertising's effectiveness from a combination of cognitive evaluative measures, and by focusing on patterns in these measures – e.g., across different brands, or for different groups of consumers, as in the present study. Embracing this approach, only differences consistently emerging across multiple cognitive measures and conditions would signal non-arbitrary disparities across age cohorts that supersede advertising effects. In contrast, differences emerging only for specific measures would capture dissimilarities in the underlying propensities to respond to advertising that each measure approximates. Some examples of cognitive evaluative measures of advertising's effectiveness include awareness and memory tests turned into proportions vs. a given population, and variations in underlying conative propensities (e.g., purchase probabilities) or predispositions such as attitudes (e.g., Putrevo and Lord 1994; Beerli and Santana 1999; Grewal et al. 1997; Koo et al. 2006). However, to further enhance the contribution of our study, we focus on the following measures: *mental availability*, the *purchase funnel* and *product category knowledge*.

2.2 Mental Availability

The origins of mental availability as a cognitive evaluative measure of advertising's effectiveness rest in the work of Romaniuk (2003), who reported the existence of a positive relationship between the attributes associated to a brand stored in consumer memory and future brand purchases. Adapting principles from cognitive psychology concerning how memory works and how people retrieve information to guide their actions (e.g., Anderson and Bower 1979; Collins and Loftus 1975), Romaniuk labelled these links as '*mental distribution outlets*' originating from personal experiences and/or marketing communications. The link between mental availability and advertising can also be inferred from Romaniuk and

Sharp (2003; 2004), who introduced the measure *share of mind*, i.e. the proportion of people, from a given population (e.g., survey respondents), linking a brand to attributes conveyed in advertising. Later, Romaniuk (2013) proposed a collection of cognitive evaluative measures derivable from consumer surveys, including:

- *Mental market share* – for any given brand, the share of associations between the brand and a list of attributes vs. the associations all other brands in category attained.
- *Associative penetration* – for any given brand, the number of respondents able to provide at least one association between the brand and a list of attributes.
- *Network size* – for any given brand, the average number of associations between the brand and a list of attributes given by the respondents who were able to provide at least one association for that brand.

Sharp (2010) and Romaniuk and Sharp (2016) explicitly referred to the above measures as *mental availability*, stressing the importance of cueing a wide range of situations and needs consumers are likely to encounter during decision-making in marketing communications (e.g., why, where, when they might buy something). More recently, Vaughan et al. (2021) explored the value of mental availability as a measure of advertising effectiveness, stressing that it enables comparisons of different consumer groups (e.g., segments with dissimilar levels of experience and/or loyalty). Links between mental availability measures (especially associative penetration) and advertising effectiveness can also be found in Romaniuk (2023), who illustrates how deficits and deviations in mental availability are associated to poor advertising reach across a population of potential buyers. However, surprisingly, existing research is yet to compare mental availability across different age groups – a knowledge gap that is at odds with advertising studies that have documented dissimilarities across younger and older consumers, including under-representation relative to the population in media targets for the older groups (The American Association of Retired Persons 2019).

As adults age, they experience decline in their overall cognitive performance (Drolet and Yoon 2020). For instance, age-related *cognitive decline* includes reductions in information processing speed, and in working memory and long-term memory performance (Park et al. 2002; Salthouse 2012). While there is substantial heterogeneity in the rate of decline, it is widely accepted that until end of life most adults experience continuous decline (Park et al., 2002), and that older adults process and store information in memory differently to younger adults (Bjälkebring and Peters 2020; Phillips and Sternthal 1977). Evidence of these differences can be seen in psychology studies, where it is shown that cognitive decline has a negative effect on older adults' ability to recall words and text (Dixon et al. 1982; Smith 1977). This negative effect includes the process of removing irrelevant information before it enters working memory (Hasher et al. 1999), as well as forming links between individual bits of information and personally lived episodes (Naveh-Benjamin 2000). More closely linked to mental availability's role as cognitive evaluative measure of advertising's effectiveness, there are studies suggesting age-related decline in cognitive abilities impact how older adults comprehend television advertisements, with younger adults recalling more information than older adults (O'Donoghue et al. 2019). Accordingly, our first research question is:

RQ1: To what extent do mental availability metrics differ across age groups?

2.3 Purchase Funnel and Product Category Knowledge

Mental availability does not exert its force on consumer decisions and behaviors in isolation; nor does it solely capture the effects of advertising. It is nested within other important underlying cognitive processes and corresponding evaluations, which the present study also explores to derive robust conclusions. In more detail, we first ~~explore differences across age groups in the retrieval set size, or the average number of brands a consumer can retrieve from memory, calculated in surveys as the sum of all brands' associative penetration scores~~

expressed as a number (Stocchi et al. 2016). We then consider the consumer decision-making process across a path-to-purchase or *purchase funnel*, given recent research by Fuller et al. (2023) and Mecredy et al. (2022a) that has reposed the use of Shocker et al.'s (1991) model for the evaluation of consumers' ability to narrow down alternatives for purchase (e.g., brands from the same product category). The narrowing down process occurs in memory in near-autonomic fashion, with information salient in memory largely shaping choices pre-purchase. Based on this premise, it is possible to quantify the 'size' of crucial decision-making stages, including (Stocchi et al. 2016; Fuller et al. 2023; Mecredy et al. 2022a): i) the *awareness set* (alternatives the consumer knows of, or, in a survey, the average number of brands recognized when prompted with the product category, often inferred from the sum of all brands' awareness scores expressed as a number); ii) the *consideration set* (alternatives retrieved in memory and evaluated against cues such as consumption needs featuring in advertising, or, in a survey, for any given brand, the number of respondents claiming they would consider it for purchase); and iii) the *repertoire size* (average number of brands purchased from the product category within a given time frame).

Besides being cognitive evaluations per se, each element of the purchase funnel corresponds to metrics previously linked to advertising's effectiveness such as prompted *brand awareness* (Mehta and Purvis 2006; Romaniuk et al. 2017; Bergvist and Taylor 2022), *brand consideration* (Gruca 1989; Howard and Sheth 1969) and the *purchase repertoire* (Banelis et al. 2013; Dawes 2008; Sharp et al. 2002).

Crucial to the aims of the present research, a few studies have investigated differences across dissimilar consumer groups across the stages of the purchase funnel, with results differing depending on the levels of customer loyalty (Fuller et al. 2023) and, more importantly, age (Lambert-Pandraud, Laurent, and Lapersonne 2005; Lambert-Pandraud and Laurent 2020; Mecredy et al. 2022a; b). For example, recent research found a *linear* decline

in the number of brands purchased or repertoire set size for older consumers (Mecredy et al. 2022b); and that brand awareness (the earliest stage of the funnel) shows an inverse-U shape, with the number of brands consumers are aware of *increasing* across age cohorts, until a turning point is reached and cognitive decline onsets (Mecredy et al. 2022a).

Finally, this study considers cognitive evaluations of advertising's effectiveness such as mental availability and the purchase funnel exist within the scope of information schemas like *product category knowledge* – i.e., the collection of autobiographical and situational memories linked to direct experience, advertising and interactions with other consumers (Stocchi, Wright and Fuller 2021). As a cognitive evaluation, product category knowledge delineates between different levels of consumer expertise, confidence, and predisposition to respond to marketing, documented to differ across dissimilar consumer segments (Malaviya and Sivakumar 1998). Product category knowledge is also known to drive emotional responses to generic product information in advertisements (Sujan, Bettman and Baumgartner 1993), including for new products (Dens and De Pelsmacker 2010). Accordingly, it can be used to measure advertising's effectiveness. Surprisingly, previous research has not explored likely differences in product category knowledge across age cohorts – an omission that is at odds with evidence that older consumers typically show evidence of *crystallized intelligence*, or heightened reliance on accumulated knowledge to combat cognitive decline (Salthouse 2012). Therefore, our second research question is:

RQ₂: *To what extent do purchase funnel and product category knowledge differ across age groups?*

3. Methods

We examined two sets of cross-sectional survey data from the US and New Zealand to facilitate *inter-replication* (repeating the same analyses across a range of conditions to enhance robustness of findings, (Uncles and Kwok 2013) – see Appendix A for an overview of the characteristics of both samples. These two markets were chosen for inter-replication as they provide the opportunity to compare results across large and small Western economies with culturally diverse multi-generational populations. Moreover, we tested three product categories in each country to draw generalizable conclusions. Namely, we evaluated yogurt (a well-established packaged goods category) and video-on-demand (VOD) (a growing subscription service category) in both markets; we then varied the third durables’ product category in each market for comparability of results. We examined health and fitness tracking devices in the US, a smaller but growing category, and mobile phones in New Zealand, a well-established technology product. This combination of product categories across the two markets also captured instances of categories more intensively advertised among younger than among older consumers (e.g., health and fitness tracking devices) vs. mass-marketed (e.g., yogurts). At the same time, it captured varying levels of consumer experience, and of exposure to brands and their advertising (e.g., greater experience for health and fitness tracking devices among younger consumers).

Aside from a difference in the durables’ product categories tested across the US and New Zealand, the surveys were identical. In each survey, we first asked respondents about their buying behaviour for the product category and perceived category knowledge. We then presented classic prompted brand awareness and brand consideration questions based on a selection of 8 to 10 popular brands from each category. We also presented respondents with a list of ‘pick-any’ questions (Driesener and Romaniuk 2006), where they were tasked to indicate which brands from the category they associated with a short list of likely attributes.

Both the brands and the attributes were prompted in the same question, using the same brands from the prompted brand awareness and consideration questions, and attributes derived from the literature (see Appendix B). Finally, we asked respondents to indicate which brands they were currently using (listing again the same brands), how often they had purchased and/or used them in the past, and a few additional demographic questions to profile respondents. Based on this information, as Table 1 summarizes, we compared the observed values of the three mental availability measures by Romaniuk (2013; 2023), five purchase funnel measures (adapted from Stocchi et al. 2016; Mecredy et al. 2022a; and Fuller et al. 2023) and three product category knowledge measures (Stocchi et al. 2021) for four chronological age groups (i.e., 18-39yr, 40-59yr, 60-74yr and 75+) vs. the whole sample. In more detail, in line with past studies, the three mental availability metrics included mental market share, associative penetration and associative rate, all capturing different aspects of brand retrieval propensity. The purchase funnel measures focused on consumer decision-making, starting with the awareness set, followed by the consideration set and the purchase repertoire (i.e., average number of brands consumers recognize upon prompted; average number of brands consumers claim they would consider for purchase; and the average number of brands recently purchased). Our evaluation of the purchase funnel also included measures of the extent of ‘narrowing down’ between alternatives, by comparing the awareness and consideration set sizes, as well as the consideration set and repertoire size.

We used chronological age as a grouping criterion, based on its value over cognitive age in advertising research (Stephens 1991). Cognitive age is also highly correlated with chronological age; thus, it is unlikely to capture variations in cognitive constructs not already captured by chronological age (Mecredy et al. 2022b). We identified four age groups for comparison, in line with previous research (Lambert-Pandruad et al. 2005; Mecredy et al. 2022a; b). For more robust conclusions, within each age group, we also compared the key

metrics of interest for current buyers/users of the category against the non-users. While these additional comparisons resulted in relatively small sub-sample sizes (limiting the power of statistical tests) they allowed the ruling out of any impact on results caused by different category usage across age groups (Romaniuk 2013; 2023).

*** Table 1 about here

4. Results

Starting with the comparisons of the mental availability measures (RQ_1), our evaluations of the US and New Zealand markets returned very similar results. Hence, we concentrate on the results for the US (see Table 2 and 3) and append New Zealand's results (see Appendix C).

Overall, differences in mental availability measures across age segments are primarily confined to the associative penetration measure (Table 2). This is consistent across all brands and all three categories considered where the average associative penetration consistently gets smaller across the four chronological age groups. The older age groups have a lower associative penetration than the younger groups, indicating that a smaller proportion of older consumers can provide at least one association for each brand. For example, the older age group (75+ year old) has significantly lower associative penetration scores for most individual brands in the three categories tested aside from a few leading yogurt brands. The deficit in the associative penetration scores amongst older consumers are greater for the smallest brands in each category and can be more than 20% for some of the smallest brands in the yogurt, VOD, and health and fitness tracking devices categories. For the second oldest age group (60-74 years old), there are differences in associative penetration scores vs. the whole sample, but these are smaller (15-19% maximum, and not for all brands in each market). The 40-59 age segment is the most akin to the whole sample, whereas the 18-39 age

segment has associative penetration scores larger than the total sample with some differences as large as 27-29% for some of the smallest brands in both yogurt, and health and fitness devices.

Turning to associative network size, the differences across age groups are much smaller with no systematic patterns across the three categories tested. This indicates that amongst those that can provide at least one association for a brand, there are no age differences in terms of the number of associations they have with each brand. In other words, once older people retrieve a brand from memory, they typically provide a similar number of associations as younger people. Hence, as highlighted above, the deficit is in the proportion of older people who can retrieve the brand from memory, or the associative penetration; not in how many associations those who can do so hold in their brains, on average.

Finally, differences in the mental market share measure are minimal. The greatest difference is for health and fitness tracking devices, where the older age groups have a slightly higher share of brand-to-attribute associations for brands with high mental market share compared to brands with low mental market share.

*** Table 2 and 3 about here

Table 3 reports the same comparison of mental availability measures within each age group split by users and non-users of the category. Like the total sample, associative penetration amongst users and non-users gets subsequently smaller, on average, across age groups. Differences in mental market share and associated network amongst the user and non-user groups also remain relatively consistent across age groups with no clear systematic pattern. The uniformity of these patterns amongst users, non-users and the total sample demonstrate

that the consistent decline in associative penetration at a total level are not caused by differences in category usage across age groups.

Next, we delve into differences across age groups for the purchase funnel and product category knowledge (RQ₂). Given substantial similarity in the results for the US and New Zealand market, we once again discuss our findings focusing on the US (see Table 4 and 5) and append details for New Zealand (see Appendix D and E).

Starting with differences in the purchase funnel (Table 4), in all three categories, we observe a decline in the retrieval set size across the age groups with older consumers retrieving fewer brands from memory than younger consumers. In contrast, we observe an increase in size of the awareness set in the yogurt and VOD categories across age groups, before reaching a turning point and declining slightly. However, the awareness set for health and fitness tracking devices, a relatively new category, declines consistently across groups.

We also observe a sharper narrowing down of alternatives throughout the purchase funnel for older consumers compared to younger consumers. For yogurt and health tracking devices, the narrowing down occurs at both stages from awareness to consideration and consideration to purchase. For example, in the health and fitness tracking category, only one-third of brands in the awareness set are included in the consideration set for the older age groups compared to about half for the younger age groups. The narrowing down between the consideration set and repertoire then ranges from 24% for the 75+ age group to 70% for the 18-to-39 age group. The narrowing down of alternatives for VOD occurs from the awareness to consideration set only.

Comparisons of the purchase funnels (Table 5) for users and non-users return similar results. Amongst both users and non-users, there is a sharper narrowing down of alternatives from the awareness set to repertoire set for older consumers compared to younger consumers.

*** Table 4 and 5 about here

In terms product category knowledge (Table 6), we find one consistent pattern across all categories: younger consumers rate themselves as more knowledgeable than older consumers. However, differences are greater for the VOD and health and fitness tracking device categories than for yogurt, a well-established category where older consumers are likely to benefit from accumulated experience and crystallized intelligence.

When controlling for category use (Table 7), younger consumers still rate themselves as more knowledgeable than older consumers. For yoghurt, self-perceived familiarity and experience is similar across age groups amongst current users. This further suggests that, in some categories, older consumers may be able to compensate for cognitive decline through accumulated experience and crystallized intelligence.

*** Table 6 and 7 about here

5. Discussion

The importance of better understanding consumers based on age or generational cohorts is well-established within advertising research. However, it is often based on non-diagnostic differences across age cohorts based on profiles, needs, habits, and values. This research addressed the need for greater clarity and generalizability around age comparisons (Taylor 2018; Eisend 2022). It updated the scholarly discourse on the topic by shifting the focus to cognitive evaluative measures of advertising's effectiveness such as mental availability, the purchase funnel and product category knowledge. Accordingly, this study also realigned advertising research that focuses on underlying cognitive processes superseding consumer

buying behaviour to infer the effects of marketing communications (e.g., White 1999; Ambler 2000), using it to research comparing different age groups that inform advertising theory and practice. The resulting implications are as follows.

5.1 Theoretical Implications

The conceptual framework that informed this study contends that differences across age groups *confined to* individual cognitive evaluative measures of advertising's effectiveness plausibly reflect dissimilarities in the impact of marketing communications, instead of disparities across ages superseding advertising effects. In such instances, there is great diagnostic information to be extracted from findings, as measures such as the ones explored in this study capture distinct yet interrelated aspects of how advertising works. In response to our first research question, we found that mental availability measures vary across age groups only in terms of associative penetration, and mental market share and network size are relatively consistent across age groups. In more detail, considering that associative penetration captures the proportion of a sample who can provide at least one association between a given brand and a set of attributes prompted within a survey approximating effective advertising reach, it appears that there are proportionally more younger consumers hit by marketing communications than older consumers – as a result, younger individuals are able to retrieve more easily brands from memory than their older counterparts. This outcome is consistent across very dissimilar categories (yogurt, VOD, health and fitness tracking devices and mobile phones) and in both markets (United States and New Zealand). That is, there is consistency in the associative penetration patterns between well-established categories such as yogurt with relatively high usage and accumulated experience amongst older consumers, and newly established categories such as health and fitness trackers with much lower usage and accumulated experience amongst older consumers. Furthermore, the gradual decline in associative penetration across age groups also emerged when comparing

category buyers/users and non-users, suggesting that accumulated experience do not explain differences across age group.

As a response to our second research question, it emerged that, overall, there are differences primarily in product category knowledge, which *mirror* differences in associative penetration and trickle down the purchase funnel. That is, older consumers seem able to recognize a wide range of brands but are less prone to retrieve brands from memory compared to younger consumers, mostly due to a perception of lower product category knowledge, which might be creating activation confusion (see Stocchi, Wright and Driesener 2016). This tendency is opposite for younger buyers, who have greater self-perceived category knowledge and can retrieve brands from memory more easily. The reduced ability to retrieve brands from memory among older consumers also explains why the narrowing down of alternatives across the purchase funnel is often greater for older consumers. Again, these results consistently emerged even when delineating between current buyers/users and non-users of the various product categories considered.

Considering these results, as primary contribution to theory, advertising research aimed at the comparison of age groups now includes additional, more generalizable insights representing the effects of advertising at a cognitive level. At the same time, we have expanded the empirical scope of research on cognitive evaluative measures of advertising's effectiveness for cross-age comparisons. For example, the associative penetration measure approximates the proportion of a given group of consumers with *greater than zero chances* to retrieve a brand from memory, in response to cueing buying situations or consumption contingencies. Logically, the greatest shift in underlying propensities in response to advertising occurs via effective reach of marketing communications, which shifts consumers from zero to non-zero chances to retrieve the brand from memory, and brand purchase

probabilities – see also Bergvist and Taylor (2022). Besides yielding significant conceptual depth, these insights can also be turned into several managerial implications, as follows.

5.2 Practical and Managerial Implications

Recent advertising research recommended that marketers and advertisers rely on mental availability and other cognitive evaluations strongly linked to purchase decisions to better understand advertising's effectiveness, especially for specific consumer groups (Vaughan et al. 2021; Romaniuk 2023). Considering the outcomes of the present research, we recommend implementing the use of these measures of advertising effectiveness within the scope of comparisons across age groups, including benchmarking different markets or product categories. Above all, we anticipate value in pre- and post-campaign tracking to ascertain if marketing strategies in use are reaching the intended targets and adequately 'nudging' existing cognitive structures and processes vital to influencing consumer buying behaviour. When triangulated against other comparisons of the profile of age groups based on other parameters (e.g., based on personal characteristics, media use and habits, etc.), this information has the potential to become a powerful analytical tool to guide effective age inclusive advertising practices. In particular, the declining associative penetration across age groups consistently identified in this research suggests that advertising may not be effectively reaching older consumers to the same extent as younger consumers. While the deficits are largest for those aged 75+ year olds, the average associative penetration score becomes progressively smaller across age groups in comparison to those aged 18-39 years, and we do not see the same pattern in the other metrics considered in this research, which rules out a 'blanket' cognitive decline effect. Therefore, while this may be a result of more-or-less intentional targeting decisions (e.g., due to budget constraints or specific media mixes), the consistent and very confined differences suggest advertisers should look to improve reach amongst older consumer, as wide reach and the acquisition of new customers is important for

business and brand growth (Sharp 2010). Ultimately, considering that most brand tracking or brand health surveys typically include at least some cognitive evaluative measures of advertising's effectiveness as part of broader brand performance assessments (Romaniuk 2023), marketers and advertisers interested in comparing age groups should be able to access these valuable insights with minimal additional investments of cost or time.

5.3 Limitations and Future Research

The present study used a novel approach to determining how advertising's effectiveness may differ across age or generational cohorts by exploring cognitive evaluative measures known to be linked to advertising's effectiveness. While the results provide interesting implications on advertising's effectiveness across age groups, future research could employ the same methodology to explore other demographic or psychographic variables. Future research could also examine how age-based differences in mental availability, the purchase funnel and product category knowledge vary among users and non-users of individual brands, and for brands with different market sizes and advertising budgets. In this study, these additional comparisons yielded limited scope due to reduced and uneven sample sizes for brands.

This study also does not consider how age-related differences in mental availability, the purchase funnel and product category knowledge vary across new-to-the-market vs. established brands. For newer brands, older consumers might be less able to rely on crystalized intelligence from accumulated experience compared to established brands. Hence, different, and more detailed implications for advertising research and practice might emerge from additional brand-level evaluations and, most crucially, longitudinal analyses.

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Tables

Table 1: Measures

Research questions	Measures and sources	Individual items
<i>RQ₁</i>	<i>Mental availability measures</i> (Romaniuk 2013; 2023)	<ul style="list-style-type: none"> • Mental market share • Associative penetration • Network size
<i>RQ₂</i>	<i>Purchase funnel</i> (Stocchi, Banelis and Wright 2016; Fuller et al. 2023; Mecedry et al. 2022a)	<ul style="list-style-type: none"> • Awareness set size • Consideration set size • Repertoire size • Narrowing down ratios (or conversion rates) between: <ul style="list-style-type: none"> ○ Awareness set and consideration set ○ Consideration set and repertoire size
	<i>Product category knowledge</i> (Stocchi, Wright and Fuller 2021)	<ul style="list-style-type: none"> • The percentage of the sample (or sub-sample) claiming they feel highly familiar with the product category • The percentage of the sample (or sub-sample) claiming they feel highly knowledgeable with the product category • The percentage of the sample (or sub-sample) claiming they feel highly experienced with the product category

Table 2: Differences in mental availability measures for the US (RQ1)

Brands ranked by mental market share (%)	Mental market share (%)					Difference vs. 'All'				Associative penetration (%)					Difference vs. 'All'				Associative network					Difference vs. 'All'			
	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Yoplait	17	14	17	20	23	-4	-1	3	6	89	92	85	88	88	4	-3	-1	-1	4.3	3.7	4.4	4.8	4.3	-0.6	0.1	0.5	0.0
Dannon	17	12	16	20	22	-4	-1	4	6	86	86	82	87	87	0	-4	2	2	4.2	3.5	4.4	4.8	4.2	-0.7	0.1	0.5	-0.1
Chobani	16	13	16	18	19	-3	0	2	4	80	86	80	76	74	6	0	-4	-6	4.3	3.7	4.3	4.8	4.3	-0.6	0.1	0.5	0.0
Stonyfield	10	9	9	11	11	-1	-1	1	1	55	66	55	50	40	11	0	-5	-15	3.9	3.5	3.8	4.4	4.4	-0.4	-0.1	0.5	0.5
Fage	10	9	10	10	9	0	0	0	-1	54	68	56	46	36	14	2	-8	-18	3.9	3.4	3.9	4.4	4.0	-0.4	0.0	0.5	0.2
Yocrunch	8	10	9	6	4	2	1	-2	-4	47	71	51	33	21	23	4	-15	-27	3.6	3.4	3.8	3.8	2.9	-0.2	0.2	0.3	-0.7
The Greek gods	7	9	8	5	4	2	1	-2	-3	41	66	45	25	17	25	3	-16	-24	3.7	3.4	3.8	4.5	3.4	-0.3	0.1	0.7	-0.3
La yogurt	6	8	6	5	5	2	0	-2	-1	39	62	39	24	21	23	0	-15	-18	3.5	3.3	3.6	4.0	3.7	-0.3	0.1	0.5	0.1
Lala	5	8	5	2	1	3	0	-2	-4	32	59	35	14	8	27	3	-18	-24	3.4	3.3	3.4	3.8	2.2	-0.1	0.0	0.4	-1.1
Voskos	5	8	5	2	2	3	0	-2	-3	31	58	33	13	8	27	2	-17	-23	3.5	3.4	3.4	3.8	3.2	0.0	-0.1	0.3	-0.3
Average	10	10	10	10	10					55	71	56	46	40					3.8	3.5	3.9	4.3	3.7				
Netflix	16	15	16	17	18	-1	0	1	2	87	93	89	83	75	6	2	-3	-12	4.4	4.2	4.6	4.6	4.0	-0.3	0.2	0.2	-0.4
Amazon Prime	14	13	14	16	17	-2	0	1	2	83	89	85	81	71	6	2	-3	-12	4.2	3.7	4.4	4.5	4.0	-0.4	0.2	0.3	-0.2
Hulu	13	13	13	13	12	0	0	0	0	78	89	81	70	62	11	4	-8	-16	4.0	4.0	4.1	4.1	3.4	0.0	0.1	0.1	-0.6
Disney+	12	13	12	12	12	1	0	-1	0	75	91	75	67	59	15	0	-8	-16	3.9	3.9	4.2	4.0	3.5	-0.1	0.2	0.0	-0.5
HBO	11	11	11	12	12	0	0	0	1	76	83	73	74	65	8	-2	-2	-10	3.6	3.5	3.9	3.6	3.1	-0.1	0.3	0.0	-0.5
Paramount+	10	10	10	11	10	0	0	0	0	67	77	71	63	48	9	3	-5	-19	3.7	3.4	3.7	3.9	3.4	-0.2	0.1	0.2	-0.2
Discovery+	10	10	9	10	9	0	0	0	-1	64	75	65	59	50	10	1	-5	-14	3.6	3.4	3.8	3.9	3.0	-0.2	0.2	0.2	-0.6
Starz	8	8	8	8	8	0	0	0	0	60	69	63	53	49	9	3	-7	-11	3.2	3.2	3.4	3.3	2.8	0.0	0.2	0.0	-0.5
Vudu	6	7	7	4	2	2	1	-2	-3	41	61	52	24	15	20	11	-17	-25	3.3	3.3	3.4	3.5	2.6	-0.1	0.1	0.1	-0.7
Average	11	11	11	11	11					70	81	73	64	55					3.8	3.6	4.0	3.9	3.3				
Apple watch	22	18	21	27	30	-4	-1	5	8	71	85	69	64	58	14	-2	-7	-13	4.0	3.9	4.2	4.1	3.5	-0.1	0.2	0.1	-0.5
FitBit	20	16	20	27	28	-4	-1	6	7	75	84	75	70	63	10	0	-5	-12	3.6	3.5	3.7	3.9	3.0	-0.1	0.0	0.2	-0.7
Samsung watch	16	15	17	17	16	-1	1	1	0	57	76	62	45	33	19	5	-12	-24	3.7	3.7	3.9	3.7	3.3	-0.1	0.2	0.0	-0.4
Garmin	13	12	13	14	14	-1	0	1	1	50	66	53	39	31	16	3	-11	-19	3.4	3.3	3.5	3.5	3.1	-0.1	0.1	0.1	-0.3
AmazFit	9	11	10	7	6	1	1	-2	-3	36	61	40	18	13	25	4	-18	-22	3.5	3.3	3.5	3.9	3.2	-0.1	0.0	0.4	-0.3
Huawei band	7	10	7	4	3	3	0	-4	-4	30	57	34	11	6	27	4	-19	-24	3.2	3.3	2.9	3.3	3.2	0.1	-0.3	0.1	0.0
Oura	7	10	6	3	2	3	0	-4	-5	28	56	29	9	3	29	1	-18	-24	3.2	3.2	3.0	3.3	4.0	0.0	-0.1	0.1	0.8
Whoop	6	9	6	2	1	3	0	-4	-5	26	55	27	7	2	29	1	-19	-24	3.2	3.2	3.2	3.3	3.0	0.0	0.0	0.1	-0.2
Average	13	13	13	13	13					47	68	49	33	26					3.5	3.4	3.5	3.6	3.3				

Bold in Differences vs. 'All' columns = Statistically significant differences of an age group vs. the whole sample ('All'), confidence level 0.95

Table 3: Differences in mental availability measures for the US detailed by buyers/users and non-users of the category (RQ1)

Brands ranked by mental market share (%)	Category Buyers/Users (Difference vs. 'All' category buyers/users)												Non-Users (Difference vs. 'All' non-users)											
	Mental market share (%)				Associative penetration (%)				Associative network				Mental market share (%)				Associative penetration (%)				Associative network			
	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Yoplait	-6	-3	1	2	1	0	0	-3	-0.6	0.1	0.6	-0.1	-4	-1	2	7	6	-9	0	3	-0.7	0.0	0.4	0.2
Dannon	-6	-3	1	3	-2	-1	3	-1	-0.6	0.0	0.6	0.0	-6	0	3	5	1	-9	2	6	-0.9	0.3	0.5	-0.1
Chobani	-5	-3	0	3	1	1	-1	-3	-0.5	0.0	0.6	0.1	-2	0	1	2	12	-5	-4	-6	-0.7	0.2	0.5	0.0
Stonyfield	-3	-3	0	0	8	0	-3	-17	-0.4	-0.2	0.5	0.6	0	0	0	1	12	-2	-4	-9	-0.6	0.0	0.4	0.6
Fage	-2	-2	-1	0	11	0	-8	-13	-0.4	0.0	0.5	0.2	0	1	0	-3	15	2	-6	-19	-0.6	-0.1	0.7	0.0
Yocrunch	0	0	-3	-6	21	7	-18	-32	-0.1	0.2	0.2	-1.0	3	-1	-1	-3	24	-4	-9	-19	-0.3	-0.1	0.5	-0.2
Greek gods	1	-1	-3	-5	24	3	-18	-30	-0.2	0.0	0.6	-0.4	2	1	-2	-3	25	2	-13	-17	-0.5	0.2	0.9	0.0
La yogurt	1	-1	-3	-3	28	5	-24	-31	-0.2	0.1	0.4	0.0	2	-1	-1	-1	24	-1	-12	-15	-0.4	-0.1	0.7	0.4
Lala	2	0	-4	-5	23	2	-19	-21	0.0	-0.1	0.4	-1.2	3	0	-2	-3	22	-5	-9	-13	-0.2	0.2	0.5	-0.9
Voskos	2	-1	-4	-5	27	2	-20	-30	0.1	-0.1	0.0	-1.3	3	0	-2	-2	26	1	-14	-15	-0.3	-0.1	0.8	0.6
Netflix	-1	0	1	4	2	2	-2	-10	-0.4	0.2	0.4	0.2	1	-1	0	0	5	-2	1	-4	0.0	0.1	0.2	-0.5
Amazon Prime	-2	0	2	5	2	-1	-1	-5	-0.6	0.2	0.6	0.3	-2	0	0	0	-2	2	3	-7	-0.3	0.0	0.1	-0.3
Hulu	0	0	0	0	6	1	-6	-16	-0.2	0.1	0.3	-0.3	2	1	-1	0	10	6	-3	-6	0.0	0.1	0.1	-0.4
Disney+	1	0	-1	-1	11	-2	-8	-21	-0.2	0.2	0.1	-0.2	2	0	-1	1	13	1	-3	-3	-0.1	0.1	0.1	-0.3
HBO	0	0	0	0	6	-2	-2	-15	-0.2	0.3	0.1	-0.4	-2	-2	1	2	-5	-8	4	1	-0.3	0.0	0.2	-0.2
Paramount+	0	0	1	-1	5	1	-2	-20	-0.3	0.1	0.3	-0.3	0	0	0	0	8	4	-1	-8	-0.3	-0.2	0.2	0.0
Discovery+	0	0	0	-1	8	0	-6	-19	-0.3	0.2	0.3	-0.3	-1	-1	1	-1	3	-1	0	-3	-0.3	-0.1	0.3	-0.6
Starz	1	0	-1	-1	8	0	-7	-16	-0.1	0.2	0.0	-0.2	-1	0	0	1	-5	6	-1	1	-0.2	-0.1	0.2	-0.3
Vudu	2	1	-3	-4	17	9	-22	-33	-0.1	0.2	0.0	-0.6	1	2	0	-2	10	14	-4	-10	-0.2	-0.3	0.5	-0.7
Apple watch	-3	0	6	13	7	-3	-7	-14	-0.2	0.2	0.2	0.4	-3	-2	2	4	12	-2	-2	-6	-0.2	0.2	0.2	-0.6
FitBit	-3	0	8	13	2	-1	-1	-12	-0.2	0.1	0.4	0.2	-5	-3	4	3	7	0	-2	-4	-0.3	0.0	0.3	-0.7
Samsung watch	-1	1	1	-2	13	3	-20	-39	-0.2	0.1	0.2	0.0	0	1	0	0	14	5	-4	-13	-0.1	0.3	0.0	-0.3
Garmin	-1	0	1	3	10	-2	-13	-25	-0.1	0.2	0.1	0.1	-3	1	1	1	4	7	-3	-7	-0.3	0.0	0.3	-0.4
AmazFit	1	0	-2	-5	19	0	-27	-38	-0.2	0.0	0.5	-0.6	2	1	-1	-1	16	7	-7	-9	-0.4	0.0	0.5	0.0
Huawei band	2	-1	-5	-6	21	-1	-31	-42	0.2	-0.2	-0.2	0.7	3	1	-2	-2	16	7	-7	-9	-0.1	-0.3	0.6	0.0
Oura	2	-1	-4	-8	22	-2	-31	-47	0.1	-0.1	-0.1	-3.2	3	0	-2	-2	18	3	-6	-9	-0.2	-0.1	0.4	0.9
Whoop	2	0	-5	-8	23	-2	-31	-45	0.0	0.0	0.0	-3.3	4	1	-2	-3	20	4	-7	-9	-0.1	0.0	0.4	0.1

Table 4: Differences in the purchase funnel measures for the US (RQ₂)

Categories	Measures compared	All	18-39	40-59	60-74	75+
Yogurt	1) Awareness set	4.03	3.79	4.12	4.22	3.92
	Narrowing down from 1) to 2)	57%	61%	63%	52%	52%
	2) Consideration set	2.31	2.32	2.59	2.19	2.04
	Narrowing down from 2) to 3)	50%	68%	50%	39%	35%
VOD	3) Repertoire	1.16	1.58	1.29	0.85	0.71
	1) Awareness set	6.38	5.25	6.64	7.10	6.70
	Narrowing down from 1) to 2)	49%	72%	58%	35%	25%
	2) Consideration set	3.10	3.78	3.85	2.46	1.65
Health and Fitness tracking devices	Narrowing down from 2) to 3)	76%	76%	75%	77%	78%
	3) Repertoire	2.36	2.88	2.87	1.90	1.29
	1) Awareness set	2.77	3.01	2.86	2.63	2.31
	Narrowing down from 1) to 2)	45%	52%	48%	37%	35%
Health and Fitness tracking devices	2) Consideration set	1.23	1.57	1.37	0.98	0.82
	Narrowing down from 2) to 3)	51%	70%	48%	32%	24%
	3) Repertoire	0.62	1.10	0.66	0.32	0.20

Table 5: Differences in the purchase funnel measures for the US detailed by buyers/users and non-users of the category (RQ₂)

Categories	Measures compared	Category Buyers/Users				Category Non-Users			
		18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Yogurt	1) Awareness set	4.2	4.7	4.9	4.6	3.2	3.3	3.6	3.3
	Narrowing down from 1) to 2)	66%	70%	57%	70%	50%	48%	44%	51%
	2) Consideration set	2.8	3.3	2.8	3.2	1.6	1.6	1.6	1.7
	Narrowing down from 2) to 3)	70%	55%	46%	37%	NA	NA	NA	NA
VOD	3) Repertoire	2.0	1.8	1.3	1.2	NA	NA	NA	NA
	1) Awareness set	5.3	6.9	7.5	7.1	4.8	5.9	6.6	6.4
	Narrowing down from 1) to 2)	59%	49%	39%	35%	35%	24%	11%	6%
	2) Consideration set	3.1	3.4	2.9	2.5	1.7	1.4	0.7	0.4
Health and Fitness tracking devices	Narrowing down from 2) to 3)	29%	29%	21%	16%	NA	NA	NA	NA
	3) Repertoire	0.9	1.0	0.6	0.4	NA	NA	NA	NA
	1) Awareness set	3.3	3.2	3.2	3.0	2.5	2.6	2.4	2.1
	Narrowing down from 1) to 2)	58%	56%	44%	47%	44%	39%	33%	33%
Health and Fitness tracking devices	2) Consideration set	1.9	1.8	1.4	1.4	1.1	1.0	0.8	0.7%
	Narrowing down from 2) to 3)	79%	72%	71%	50%	NA	NA	NA	NA
	3) Repertoire	1.5	1.3	1.0	0.7	NA	NA	NA	NA

Table 6: Differences in product category knowledge measures for the US (RQ₂)

	Category knowledge measure	All	18-39	40-59	60-74	75+
<i>Yogurt</i>	% of sample rating themselves as familiar	58	65	57	53	54
	% of sample rating themselves as experienced	50	54	51	46	47
	% of sample rating themselves as knowledgeable	47	59	47	40	37
<i>VOD</i>	% of sample rating themselves as familiar	58	68	68	48	44
	% of sample rating themselves as experienced	50	62	61	38	31
	% of sample rating themselves as knowledgeable	50	64	60	36	38
<i>Health and Fitness tracking devices</i>	% of sample rating themselves as familiar	58	68	68	48	44
	% of sample rating themselves as experienced	50	62	61	38	31
	% of sample rating themselves as knowledgeable	50	64	60	36	38

Table 7: Differences in product category knowledge measures for the US detailed by buyers/users and non-users of the category (RQ₂)

Categories	Measures compared	Category Buyers/Users				Category Non-Users			
		18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
<i>Yogurt</i>	% of sample rating themselves as familiar	77	72	73	73	48	36	34	37
	% of sample rating themselves as experienced	65	66	65	69	37	30	28	27
	% of sample rating themselves as knowledgeable	71	63	57	53	42	25	23	22
<i>VOD</i>	% of sample rating themselves as familiar	75	80	68	72	25	30	23	22
	% of sample rating themselves as experienced	67	74	57	55	32	21	15	13
	% of sample rating themselves as knowledgeable	71	72	55	61	26	22	14	20
<i>Health and Fitness tracking devices</i>	% of sample rating themselves as familiar	75	74	63	58	24	23	13	11
	% of sample rating themselves as experienced	65	65	51	45	26	15	7	6
	% of sample rating themselves as knowledgeable	73	66	47	45	24	18	8	10

Appendices

Appendix A

Samples description: Demographics and category buying behaviour

Variables	US (N=1,515)	New Zealand (N=1,541)
Age (% of sample)		
<i>18-39yo</i>	31	26
<i>40-59yo</i>	23	27
<i>60-74yo</i>	36	30
<i>75+</i>	10	17
Gender (% of sample)		
<i>Male</i>	37	42
<i>Female</i>	61	57
<i>Undisclosed</i>	1	1
People in household (% of sample)		
<i>1-2</i>	57	60
<i>3-4</i>	31	29
<i>5+</i>	12	11
Income (% of sample)		
<i>Lowest</i>	23	15
<i>Mid-range</i>	66	68
<i>Highest</i>	7	6
<i>Undisclosed</i>	4	11
Doing all or most shopping in the household (% of sample)	66	71
Shopping habits have changed over time (Yes) (% of sample)	66	77
Category buying/usage rates (% of sample)		
<i>Yoghurt (bought last four weeks)</i>	55	52
<i>Video-on-demand (currently paying for)</i>	68	58
<i>Health and fitness trackers (currently own)</i>	44	-
<i>Mobile phones</i>	-	98

Samples description: Category buying behaviour

Country	Categories	All	18-39	40-59	60-74	75+
United Stated	Yoghurt (% bought last four weeks)	55	60	59	50	47
	Video-on-demand (% used in the last 6 months)	68	85	75	55	43
	Health & Fitness trackers (% currently owning/had in the last 12 months)	44	66	45	30	20
New Zealand	Yoghurt (% bought last four weeks)	52	49	58	51	51
	Video-on-demand (% used in the last 6 months)	58	75	75	44	29
	Mobile phones (% currently owning/had in the last 12 months)	98	100	100	98	91

Appendix B

Brands and attributes description

Categories	Brands - US	Brands – New Zealand	Attributes	Sources
Yogurt	Chobani Dannon Fage La yogurt Lala Stonyfield The Greek gods Voskos Yocrunch Yoplait	Activate Cyclops De Winkle Fresh 'n' Fruity Meadow Fresh Piako Puhoi Valley Symbio The Collective Yoplait	<i>Suitable for my diet</i> <i>Something that taste good</i> <i>Smooth texture</i> <i>A healthy option</i> <i>Something that is ready-to-eat</i> <i>Suitable for a morning snack</i> <i>For when I need comfort food</i> <i>To have anytime of the day</i> <i>Good for weight management</i>	Stocchi, Kemps and Anesbury (2021)
VOD	Amazon Prime Discovery+ Disney+ HBO Hulu Netflix Paramount+ Starz Vudu	Acorn Amazon AppleTV Curiosity Str. Disney+ DocPlay Mubi Neon Netflix SkyGo YouTube	<i>Easy to use</i> <i>Has an appealing layout</i> <i>Innovative</i> <i>Easily customised to one's needs</i> <i>Fills up spare time</i> <i>For everyday use</i> <i>Respects my privacy</i> <i>Functions well across devices</i> <i>Entertaining</i> <i>Large variety of content</i>	Stocchi et al. (2021)
Health and fitness trackers (US) and mobile phones (New Zealand)	AmazFit Apple watch FitBit Garmin Huawei band Oura Samsung watch Whoop	Alcatel Apple CAT Huawei Nokia Oppo Samsung Xiaomi	<i>Easy to use</i> <i>Has an appealing layout</i> <i>Innovative</i> <i>Easily customised to one's needs</i> <i>Fills up spare time</i> <i>For everyday use</i> <i>Respects my privacy</i> <i>Functions well</i> <i>Entertaining</i>	

Appendix C

Differences in mental availability measures for New Zealand (RQ1)

Brands ranked by mental market share (%)	Mental market share (%)					Difference vs. 'All'				Associative penetration (%)					Difference vs. 'All'				Associative network					Difference vs. 'All'			
	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	All	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Fresh 'n' Fruity	19	18	17	20	23	-1	-2	1	5	90	93	93	90	80	3	4	0	-10	4.1	3.9	4.3	4.1	4.0	-0.1	0.2	0.0	-0.1
Meadow Fresh	18	17	17	18	21	-1	-1	0	3	87	94	91	84	75	7	4	-3	-12	3.9	3.7	4.3	3.9	3.8	-0.2	0.4	-0.1	-0.2
Yoplait	16	13	15	18	21	-3	-1	2	5	82	80	88	83	76	-2	6	1	-6	3.9	3.4	4.1	4.0	3.8	-0.4	0.2	0.2	0.0
Puhoi Valley	11	11	12	11	11	0	0	0	0	59	72	66	50	45	13	7	-9	-15	3.7	3.1	4.1	4.1	3.5	-0.6	0.4	0.4	-0.2
Symbio	8	7	9	7	7	0	1	0	-1	45	56	55	39	24	11	10	-6	-21	3.3	2.7	3.7	3.4	3.8	-0.6	0.4	0.1	0.5
De Winkle	7	6	7	8	6	-1	0	1	-1	41	47	45	39	29	6	4	-2	-12	3.3	2.7	3.7	3.8	2.9	-0.6	0.3	0.4	-0.4
The Collective	7	8	7	6	4	2	0	-1	-3	37	57	44	28	12	20	7	-9	-25	3.5	3.1	3.7	4.0	4.1	-0.5	0.2	0.4	0.6
Piako	6	7	7	5	4	1	1	-1	-2	36	52	46	24	16	16	10	-11	-20	3.4	2.9	3.7	3.8	3.5	-0.5	0.3	0.4	0.1
Cyclops	4	6	5	4	1	1	1	-1	-3	28	42	35	21	7	14	7	-7	-21	3.1	2.8	3.4	3.4	2.7	-0.3	0.3	0.3	-0.4
Activate	4	7	5	3	1	2	1	-2	-3	27	47	36	14	6	20	8	-13	-21	3.0	2.9	3.2	3.3	2.3	-0.2	0.2	0.2	-0.7
Average	10	10	10	10	10					53	64	60	47	37					3.5	3.1	3.8	3.8	3.4				
Netflix	21	19	20	25	31	-3	-1	3	9	86	98	93	80	67	12	7	-6	-19	4.4	4.6	4.8	4.2	3.5	0.2	0.4	-0.2	-0.9
Disney+	15	15	16	15	14	0	1	0	-2	71	91	84	59	41	20	13	-12	-30	3.7	3.9	4.2	3.4	2.5	0.2	0.4	-0.3	-1.2
YouTube	12	12	13	12	11	0	1	0	-1	62	83	76	49	32	20	13	-13	-30	3.4	3.4	3.7	3.2	2.5	0.1	0.3	-0.2	-0.8
Amazon	11	11	11	11	9	0	0	0	-2	56	78	68	42	27	22	12	-14	-29	3.4	3.4	3.7	3.3	2.6	0.0	0.3	-0.1	-0.8
Neon	10	9	11	10	11	-1	1	0	1	55	74	66	44	31	18	11	-12	-24	3.2	3.0	3.6	3.2	2.7	-0.2	0.4	0.0	-0.6
SkyGo	10	8	9	12	13	-1	-1	2	3	52	65	58	44	37	13	6	-9	-15	3.2	3.1	3.3	3.6	2.6	-0.1	0.1	0.4	-0.6
AppleTV	9	9	8	8	8	1	0	0	0	47	71	52	33	24	24	5	-13	-23	3.2	3.1	3.5	3.3	2.6	-0.1	0.3	0.1	-0.6
Acorn	4	4	4	3	3	0	0	0	-1	22	34	27	16	9	12	4	-6	-13	2.9	2.8	3.0	2.9	2.3	0.0	0.1	0.0	-0.5
Curiosity Str.	3	5	3	1	0	1	0	-2	-3	18	38	22	6	2	20	4	-12	-16	3.1	2.9	3.1	4.0	1.5	-0.2	0.1	0.9	-1.6
DocPlay	3	4	3	1	0	2	0	-1	-2	17	36	20	6	2	19	3	-11	-15	2.9	2.9	3.0	3.1	1.5	0.0	0.1	0.2	-1.4
Mubi	3	4	3	1	0	1	0	-2	-2	16	33	30	4	1	18	14	-12	-15	2.8	2.6	1.9	2.9	1.0	-0.1	-0.9	0.1	-1.8
Average	9	9	9	9	9					46	64	54	35	25					3.3	3.3	3.4	3.4	2.3				
Samsung	27	22	26	32	35	-5	-1	5	8	91	96	94	87	86	5	3	-4	-6	4.5	4.5	4.9	4.5	3.8	0.0	0.4	0.0	-0.7
Apple	23	23	22	23	22	0	-1	0	0	75	95	81	65	54	19	6	-11	-21	4.5	4.6	4.7	4.4	3.9	0.1	0.2	-0.1	-0.6
Nokia	13	12	12	14	17	-1	-1	1	3	72	83	75	66	61	11	3	-6	-10	2.7	2.7	2.9	2.7	2.5	0.0	0.2	0.0	-0.2
Huawei	12	12	13	11	11	0	1	-1	0	59	77	68	46	39	18	9	-13	-20	3.0	2.9	3.3	3.1	2.8	-0.1	0.2	0.0	-0.3
Oppo	10	11	10	9	7	1	1	-1	-3	44	68	53	30	17	24	9	-14	-27	3.4	3.1	3.5	3.7	3.7	-0.3	0.1	0.3	0.3
Alcatel	7	8	7	6	5	1	0	-1	-2	39	56	48	28	20	17	8	-11	-20	2.6	2.6	2.7	2.6	2.4	0.0	0.1	0.0	-0.2
Xiaomi	5	7	6	3	2	2	1	-2	-3	27	51	33	11	5	25	7	-16	-22	3.0	2.8	3.1	3.3	3.8	-0.2	0.1	0.3	0.9
CAT	3	5	3	1	0	2	0	-2	-3	17	37	22	4	2	20	5	-13	-15	2.7	2.5	2.8	3.1	2.2	-0.1	0.1	0.4	-0.5
Average	13	13	13	13	13					53	70	59	42	35					3.3	3.2	3.5	3.4	3.1				

Bold = Statistically significant differences of an age group vs. the whole sample ('All'), confidence level 0.95

Differences in mental availability measures for New Zealand detailed by buyers/users and non-users of the category (RQ1)

Brands ranked by mental market share (%)	Category Buyers/Users (Difference vs. 'All' category buyers/users)												Non-Users (Difference vs 'All' non-users)											
	Mental market share (%)				Associative penetration (%)				Associative network				Mental market share (%)				Associative penetration (%)				Associative network			
	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Fresh 'n' Fruity	-1	-2	1	5	0	2	-1	-4	-0.2	0.3	-0.2	0.1	-2	-2	2	4	6	5	1	-17	-0.1	0.0	0.2	-0.4
Meadow Fresh	0	-1	0	2	4	3	-1	-10	-0.2	0.5	-0.2	-0.1	-1	-1	0	5	10	5	-4	-15	-0.1	0.2	0.1	-0.2
Yoplait	-2	-1	1	4	-2	3	0	-2	-0.3	0.3	-0.1	0.0	-4	-1	3	7	-1	8	2	-10	-0.5	0.0	0.5	-0.1
Puhoi Valley	0	0	0	1	8	6	-9	-7	-0.6	0.5	0.2	-0.3	0	1	0	0	18	8	37	-22	-0.5	0.2	-1.4	-0.1
Symbio	-1	1	-1	-1	5	11	-6	-17	-0.5	0.5	-0.1	0.0	0	1	0	-1	17	8	-6	-26	-0.5	0.1	0.3	1.6
De Winkle	-1	0	1	-1	-1	2	2	-6	-0.5	0.6	0.2	-0.7	0	0	1	-1	13	6	-5	-19	-0.5	-0.1	0.8	-2.3
The Collective	1	0	0	-2	14	6	-6	-20	-0.4	0.2	0.2	0.3	2	0	-1	-5	26	7	-12	-30	-0.3	0.0	0.8	0.5
Piako	1	1	-1	-1	11	10	-10	-16	-0.5	0.5	-0.1	0.0	1	1	-1	-4	21	10	-13	-25	-0.4	-0.1	1.1	-0.2
Cyclops	1	0	0	-3	9	6	-3	-20	-0.1	0.3	-0.1	-0.7	1	1	-1	-3	19	8	-11	-22	-0.3	0.1	0.8	0.0
Activate	2	1	-1	-3	15	10	-11	-21	-0.2	0.3	0.0	-1.1	3	0	-2	-3	25	6	-16	-21	0.0	-0.1	0.5	-0.3
Netflix	-2	-1	3	9	2	2	-5	-4	-0.2	0.3	0.0	-0.5	-5	-2	3	8	22	5	0	-15	0.8	0.1	-0.1	-0.6
Disney+	0	0	0	-1	11	6	-16	-24	-0.1	0.3	-0.1	-1.1	-2	2	1	-1	26	13	-2	-20	0.7	0.3	-0.2	-0.9
YouTube	0	1	-1	-2	10	6	-14	-25	-0.1	0.4	-0.3	-0.7	0	2	0	-2	36	19	-7	-23	0.4	0.0	0.0	-0.7
Amazon	0	0	0	-1	10	6	-14	-30	-0.2	0.2	0.2	-0.3	1	1	-1	-1	33	8	-5	-15	0.5	0.3	-0.2	-0.9
Neon	-1	0	1	2	9	4	-13	-16	-0.3	0.3	0.3	-0.4	-1	2	0	0	22	8	-2	-13	0.2	0.6	-0.2	-0.5
SkyGo	-1	-1	2	4	6	2	-10	-6	-0.3	0.0	0.6	-0.1	-2	-1	2	2	18	0	-2	-8	0.2	0.2	0.3	-0.8
AppleTV	1	0	-1	-2	16	2	-16	-28	-0.3	0.3	0.3	-0.4	1	-1	0	1	33	1	-6	-11	0.4	0.1	0.0	-0.5
Acorn	0	0	0	0	6	3	-9	-11	-0.2	0.1	0.4	-0.5	2	-1	0	-1	18	-2	-1	-7	0.7	-0.3	-0.4	-0.5
Curiosity Str.	1	0	-1	-3	13	2	-15	-23	-0.2	0.0	1.4	-1.2	2	-1	-1	-2	29	-1	-6	-8	0.0	0.0	0.0	-1.4
DocPlay	1	0	-2	-3	12	4	-16	-21	-0.2	0.3	0.3	-1.9	2	-1	-1	-1	24	0	-5	-6	0.3	-0.7	-0.2	-1.4
Mubi	1	0	-2	-3	14	2	-15	-21	-0.1	0.2	0.0	1.1	3	-1	-1	-2	27	-3	-5	-6	0.2	-0.9	0.6	-1.9

Appendix D

Differences in the purchase funnel measures for New Zealand (RQ₂)

Categories	Measures compared	All	18-39	40-59	60-74	75+
Yogurt	1) Awareness set	4.53	4.00	4.74	4.94	4.40
	Narrowing down from 1) to 2)	53%	57%	61%	48%	45%
	2) Consideration set	2.42	2.28	2.88	2.38	1.99
	Narrowing down from 2) to 3)	48%	59%	51%	40%	37%
VOD	3) Repertoire	1.16	1.35	1.46	0.95	0.74
	1) Awareness set	4.76	4.76	4.92	4.95	4.18
	Narrowing down from 1) to 2)	44%	61%	54%	31%	22%
	2) Consideration set	2.10	2.91	2.68	1.53	0.94
Mobile phones	Narrowing down from 2) to 3)	75%	73%	78%	73%	72%
	3) Repertoire	1.57	2.13	2.09	1.12	0.68
	1) Awareness set	4.65	4.77	4.86	4.60	4.23
	Narrowing down from 1) to 2)	34%	32%	35%	34%	36%
Mobile phones	2) Consideration set	1.59	1.55	1.72	1.55	1.53
	Narrowing down from 2) to 3)	75%	88%	78%	70%	61%
	3) Repertoire	1.20	1.36	1.34	1.08	0.94

Differences in the purchase funnel measures for New Zealand detailed by buyers/users and non-users of the category (RQ₂)

Categories	Measures compared	Category Buyers/Users				Category Non-Users			
		18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
Yogurt	1) Awareness set	4.57	5.23	5.37	5.11	3.45	4.06	4.49	3.65
	Narrowing down from 1) to 2)	61%	61%	48%	47%	51%	60%	49%	42%
	2) Consideration set	2.81	3.21	2.56	2.42	1.77	2.43	2.19	1.54
	Narrowing down from 2) to 3)	60%	58%	52%	50%	NA	NA	NA	NA
VOD	3) Repertoire	1.69	1.85	1.33	1.20	NA	NA	NA	NA
	1) Awareness set	5.01	5.20	5.61	5.35	3.97	4.11	4.43	3.69
	Narrowing down from 1) to 2)	65%	62%	44%	37%	51%	29%	18%	14%
	2) Consideration set	3.24	3.22	2.49	1.99	2.04	1.19	0.79	0.51
VOD	Narrowing down from 2) to 3)	73%	78%	78%	79%	NA	NA	NA	NA
	3) Repertoire	2.38	2.53	1.95	1.57	NA	NA	NA	NA

Appendix E

Differences in the product category knowledge measures for New Zealand (RQ₂)

Categories	Category knowledge measure	All	18-39	40-59	60-74	75+
<i>Yogurt</i>	% of sample rating themselves as familiar	58	65	57	53	54
	% of sample rating themselves as experienced	50	54	51	46	47
	% of sample rating themselves as knowledgeable	47	59	47	40	37
<i>VOD</i>	% of sample rating themselves as familiar	58	68	68	48	44
	% of sample rating themselves as experienced	50	62	61	38	31
	% of sample rating themselves as knowledgeable	50	64	60	36	38
<i>Mobile phones</i>	% of sample rating themselves as familiar	58	68	68	48	44
	% of sample rating themselves as experienced	50	62	61	38	31
	% of sample rating themselves as knowledgeable	50	64	60	36	38

Differences in the product category knowledge measures for New Zealand detailed by buyers/users and non-users of the category (RQ₂)

Categories	Measures compared	Category Buyers/Users				Category Non-Users			
		18-39	40-59	60-74	75+	18-39	40-59	60-74	75+
<i>Yogurt</i>	% of sample rating themselves as familiar	70	73	73	77	59	57	62	36
	% of sample rating themselves as experienced	54	59	59	61	34	36	41	30
	% of sample rating themselves as knowledgeable	54	64	52	58	44	44	35	23
<i>VOD</i>	% of sample rating themselves as familiar	70	68	54	56	36	16	15	11
	% of sample rating themselves as experienced	51	48	48	41	27	13	10	8
	% of sample rating themselves as knowledgeable	58	54	41	39	31	17	9	9