

**Para-sight: A study of erroneous decision
making in the presence of copycat packaging**
V1.2 25th July 2017

Dr Tim Holmes
Director of Research & Development, Acuity Intelligence Ltd
Honorary Research Associate, Royal Holloway, University of
London



Overview:

The existence of copycat brands, which for the purposes of this paper are defined as own label products whose packaging mimics colour, shape and design features of leading branded products, is not new, but the possible impact of them on consumer decision making was brought into sharp focus by a report in the consumer magazine Which? in 2013. They reported more than 150 examples of copycats in the UK market at that time in stores like Boots, Tesco, Morrison's and Sainsbury's as well as Aldi and Lidl. Perhaps more surprisingly, of the 2244 people surveyed, 20% reported having bought a copycat by mistake, thinking it was actually the branded product.

There are many reasons why own label products might be chosen by shoppers including price, availability and even quality, but accidental purchases suggest that the visual signal from some copycat brands is sufficient to mislead a shopper at the point of purchase and therefore raise questions around IP infringement for the brands.

This paper describes a study conducted by Acuity Intelligence in 2015/2016 to investigate the likelihood that shoppers will reliably make such errors, the factors which contribute to those errors when they occur and the degree to which shoppers are consciously aware of copycats when they have erroneously selected them.

The information contained within this review was collated, and is correct to the best interpretation of the requirements, as of 25th July 2017.

About Acuity Intelligence

Acuity Intelligence was founded in 2011 with a simple mission: to apply rigorous scientific methodologies from the world of neuroscience to answer commercial questions around human behaviour and cognition. It operates as a full service research agency providing detailed and actionable shopper insight. It delivers fully interactive education and hands-on training on a range of topics from visual perception and attention, to neuroscience of design and neuromarketing methods such as eye-tracking.

Through links with universities, it researches and develops unique in-house analytics and data visualisations to provide robust insights that are reflected in ROI. Its customers are many and varied ranging from the global FMCGs (Unilever, P&G, and GSK) and leading brands (Coca-Cola, Ralph Lauren, and Premier Foods) to smaller research agencies and also include advertising, design and content creators such as Coley Porter Bell, Tangible Worldwide, BskyB and The Guardian.

Dr Tim Holmes is a neuroscientist specialising in visual attention and decision making. In addition to being Director of Research and Development at Acuity Intelligence, he is an Honorary Research Associate in the Department of Psychology at Royal Holloway, University of London.

Further information at <http://www.acuity-intelligence.com>

Funding Statement

This research was co-funded by GlaxoSmithKline (GSK) and the British Brands Group.

The research was independently designed, executed and analysed by Acuity Intelligence Ltd without input or influence from either funder.

No employees of GSK or British Brands Group were involved in data collection and had no contact with any of the participants.

Neither Acuity Intelligence Ltd, nor any of its directors or employees, are involved in the production or sale of any consumer goods or packaging.

Introduction

Definition of Copycat

There is some debate in the literature as to what exactly constitutes a copycat brand, with definitions ranging from virtually identical to similar in some specific ways. Some examples of definitions in the literature are:

"Parasitic copying takes many – but not necessarily all – of the marketing properties of a brand and becomes a variation on a theme. Thus the colour and shape of the packaging, the layout and the design of the label, the concept and style of the advertising and promotion and the design of the product itself are closely imitated." (AIM Position Paper: (AIM Trade Mark Committee, January 2010),

"The subtle goal of 'lookalike' packaging is to hijack the reputation and symbolism of the famous brand. To give two products a virtually identical visual appearance is to imply a similarity of quality, taste or efficiency." ('Brand of Logic', The Times, 20 April 1994.)

Copycat brands imitate a leading brand to make use of the latter's brand equity (Van Horen & Pieters, 2013).

A brand imitation is a product that borrows or copies some special attributes of a famous or leading brand, such as name, shape or colour (Lai & Zaichkowsky, 1999).

Copycats imitate the name, logo, and/or package design of a leading national brand to take advantage of the latter's positive associations and marketing efforts (Van Horen & Pieters, 2012).

A copycat brand imitates the visual appearance of a leading brand with the aim of exploiting positive associations related to the leading brand (Warlop & Alba, 2004).

Copycats may imitate low-level, concrete perceptual attributes (such as colors, shape, sizes, lettering), as well as high-level, abstract themes (such as benefits, goals, or usage context) communicated by the trade dress of a leading brand (Miceli & Pieters, 2010).

A lookalike product is a product sold by a third party which looks similar to a manufacturer brand owner's product and by reason of that similarity consumers perceive the lookalike to share a greater number of features with the manufacturer brand owner than would be expected by reason of the products being in the same product category alone (Johnson, et al., 2013).

In legal terms, when one item incorporates a registered trade mark of another it is considered counterfeit rather than merely copycat. For the purposes of this paper, the term copycat will be used to describe an ***own-label product whose packaging is visually similar, but not identical, to a recognised branded product***. Visual similarity could apply to one or more of the following: product name, logo, colour palette for the package, shape, imagery and product description.

Copycat Brands

In 2013, the consumer magazine Which? published the results of a survey highlighting the prevalence of copycat products in the UK fast moving consumer goods (FMCG) and grocery markets. They identified more than 150 examples and reported that whilst the main reason for consumers purchasing own label brands was price, 18% of the 2244 people surveyed cited package similarity as a reason for choosing copycats. Perhaps more surprisingly the survey reported that 20% of participants reported had purchased a copycat unintentionally due to its resemblance to a leading brand. These respondents reported feelings of annoyance (38%) and having been misled (30%). Clearly these erroneous purchases have negative consequences for the shopper, but they also represent lost business for the branded product. Moreover there is evidence to suggest that there may be an unintended consequence for the retailer associated with the own label products since the negative emotions experienced as a result of such purchases may actually be attributed to the retailer either as a result of the own-label association or simply by from role as the delivery mechanism for the product (Van Horen & Pieters, 2012). There is relatively little empirical research into the effects that copycat products have on behaviour and in most cases the research has tended to focus on simple product identification tasks rather than contextual search and decision making.

Visual Search

Correctly locating a target in a crowded and diverse visual scene is a challenge, and this difficulty has been well researched and modelled (Treisman & Gelade, 1980; Duncan & Humphreys, 1989; Wolfe, 1994; Wolfe, 1998; Yantis & Egeth, 1999; Connor, Egeth & Yantis, 2004; Maunsell & Treue, 2006). The difficulty is increased as a result of the number of items to be searched, the similarity of non-target items to the target of the search, the similarity of non-target items to other non-target items and the proximity of non-target items to the search target. In the context of the supermarket fixture this suggests that a branded product will be harder to find when a copycat product is present than when it is not, moreover package similarity within the category will further increase this difficulty (Pieters & Wedel, 2004; Pieters et al., 2005; Whitney & Levi, 2011). In stores like Tesco and Boots where own label copycats are presented alongside branded products the visual search literature suggests that it will take longer to find a branded product if that is what the shopper is looking for. This might account for some of the errors reported by Which? (2013) but it does not explain behavioural effects in

stores like Aldi and Lidl, where some of the strongest copycat designs are employed. In these stores the branded product is almost certainly not available and there is little research into the effects on visual search behaviour when the target is not present, but a visually similar item is, and the shopper is reliant on memory based search.

Decision making

Erroneous purchases of similar looking products are only surprising if the shopper is fully engaged in a conscious decision at the point of sale, but research from neuroscience and the rapidly developing field of behavioural economics suggests that this is rarely the case (Kahneman, et al., 1982; Kahneman & Tversky, 2000; Kahneman, 2011). Kahneman describes decision making in the brain in terms of two systems: System 1 is always on, fast and uses heuristics, or rules and models based on prior experience, to automate decision making in an irrational way; System 2 is slower and only engaged when the brain encounters new information or dissonance, a conflict between new information and the existing heuristics, requiring a rational evaluation of evidence to make a reasoned decision. The evidence from neuroscience suggests that System 1 is responsible for the majority of everyday decisions and that this is an evolved strategy to free up resources in the brain for new learning (Kahneman, 2011).

One of the many heuristics that influence decision making is the availability heuristic (Chapman, 1967; Tversky & Kahneman, 1973) which proposes that decisions are often made based on the most readily available information at the time the decision needs to be made. Given that most shoppers do not possess perfect recall, this suggests that it is the most easily recalled information from long-term memory that will influence decision making at the point of sale since this requires a match between the package features observed on the shelf with those retrieved from memory. A process of deselection (Rangelov, et al., 2013) occurs in visual search, but in the case of the copycats the similarity of the design will usually evade deselection and so become part of the evaluation set at the fixture and thus is likely to be selected depending on whether the leading brand or copycat is seen first.

Visual Disorders and Ageing populations

Most research into shopper behaviour is conducted on participants with normal, or at least corrected to normal, vision, and this is equally true of much of the visual search literature. World Health Organisation statistics suggest that around 68% of the UK population requires some form of correction to achieve 20:20 vision (Optical Confederation, 2015) and this percentage increases in aging populations where a range of visual disorders including cataracts, glaucoma and macular degeneration are all more prevalent. There is a correlation between economic status and vision correction (World Health Organisation, 2014) which means that those who are least able to afford corrective lenses are least likely to invest in them. Given that own label products are typically cheaper and therefore more likely to be purchased by those less well-off there is an, as yet, unanswered question around susceptibility: are there certain subsets of the population who are more likely to make these erroneous decisions simply as a result of their visual acuity?

Objectives for this study

This study was designed to answer the following questions:

- Search:
 - Is the ability to locate a branded product affected by the presence of a copycat?
 - Are copycats visual proxies for leading brand when the branded product is unavailable?
 - How do colour and visual acuity affect these results?
- Decision:
 - Is the ability to correctly identify a branded product affected by the presence of a copycat?
 - Are copycats recognised when the branded product is unavailable?
 - How do colour and visual acuity affect these results?
- Recall:
 - Are copycats consciously processed as part of the decision making process

Methods

Location and dates of data collection

Data collected at the GlaxoSmithKline Shopper Science Lab, 980 Great West Road, Brentford, Middlesex, TW8 9GS, UK on 17-18th October 2014 and 12-13th October 2015.

Design

4 categories of product were tested, using 2 products from each category:

Shampoo:	Target Brands:	Head & Shoulders	Herbal Essences
	Copycats	Boots Anti Dandruff	Tesco My Senses
Biscuits:	Target Brands:	McVites Rich Tea	McVites Digestives
	Copycats	Belmont Rich Tea	Belmont Digestives
Cereals:	Target Brands:	Kellogg's CoCo Pops	Kellogg's Special K
	Copycats	Harvest Morn Choco Rice	Harvest Morn Benefit
Butters:	Target Brands:	Stork	Lurpak
	Copycats	Greenvale perfect for cakes	Norpak

The packs are shown in Fig 1.



Figure 1: Target brands and Copycats tested in this study.

Each category was tested in the following product conditions: (see Fig 2):

- Brand Only: Fixture populated with multiple facings of category specific products including the target brand, but not including the copycat.
- Copycat Only: Fixture populated with multiple facings of category specific products including the copycat, but not including the target brand.
- Brand & Copycat: Fixture populated with multiple facings of category specific products including the target brand and the copycat.
- Neither Target nor Brand (Null): Fixture populated with multiple facings of category specific products excluding both the target brand and the copycat.

Each category was also tested in the following image conditions (see Fig 2):

- Full colour, non-blurred: Colour and sharp focus
- Full colour, blurred: Gaussian blur applied over entire image
- Desaturated, non-blurred: B&W but retaining luminance differences and sharp focus
- Desaturated, blurred: B&W but retaining luminance differences and Gaussian blur applied over entire image

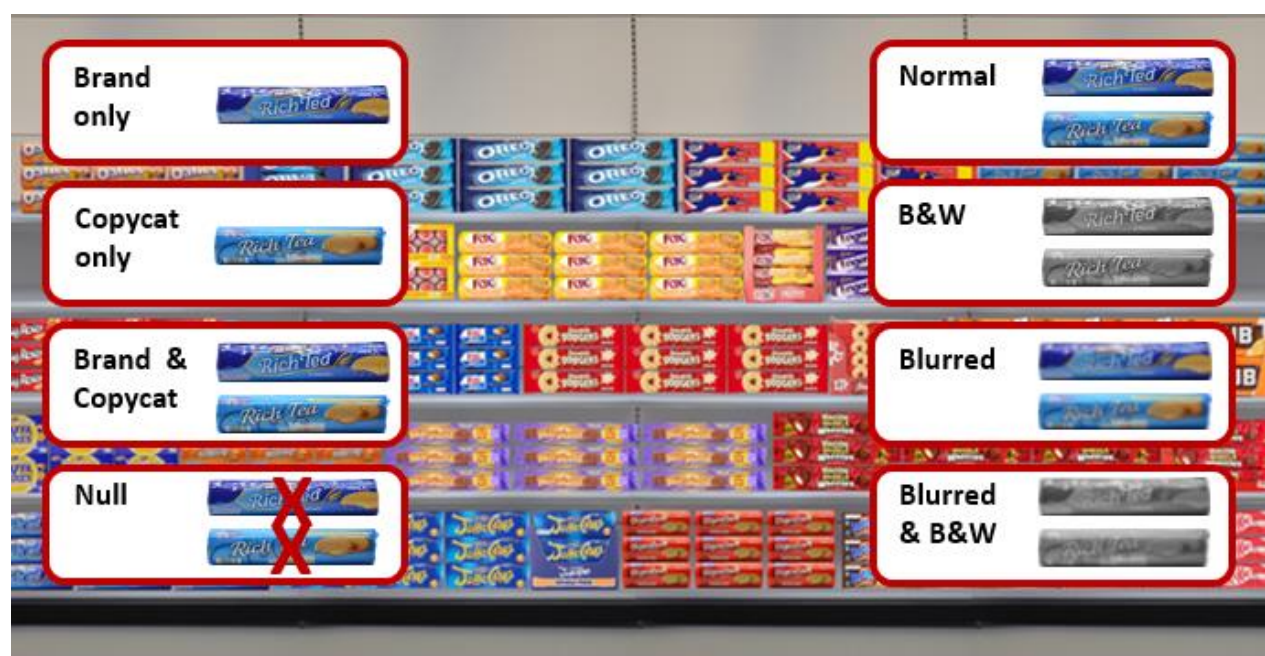


Figure 2: Product and Image conditions tested. Background is example of a biscuit fixture from the study.

Para-sight: A study of erroneous shopper decision making in the presence of copycat packaging

Each participant completed 4 test trials (1 from each of the image conditions) from a 5th product category (toothpaste) before beginning the study, this was to familiarise them with the task and also to familiarise them with the different image types without introducing any of the brands from the main experiment.

The task was stated as follows:

"You will be asked to complete a series of search tasks. At the start of each one you will be given the name of the product to search for. Then you will be shown a supermarket shelf filled with products and will be asked to find the product. When you've found the product you will push a button to end the task. After the task the screen will go blank and the researcher will ask you whether you found it or not."

Each trial was structured as in Figure 3.

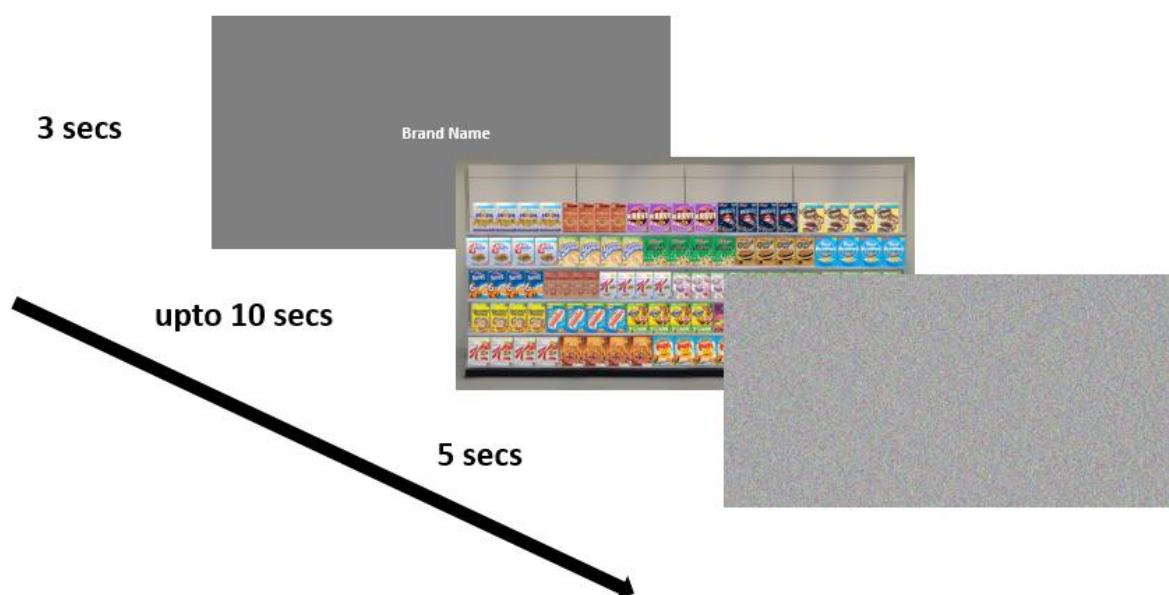


Figure 3: Trial structure. 3 second presentation of target brand, followed by fixture for up to 10 seconds with 5 second noise mask in between each trial. Participants pressed a button to indicate when they had found the target brand which triggered presentation of the noise mask if pressed before the 10 seconds elapsed.

Participants were presented with the name of the target brand to search for - this was always the branded product and **never** the copycat. The name of the target brand appeared centrally on screen for 3 seconds, and was followed by a shelf image from the relevant category representing one of the 4 product conditions in one of the 4 image conditions. Participants had up to 10 seconds to find the product and push the button, which immediately terminated the trial. In the event that the participant was unable to find the target product or failed to push the button, the trial automatically terminated after 10 seconds. A colour retinal noise mask was presented on screen for 5 seconds to remove any after images (van Dam & van Ee, 2006) caused by the large screen.

Stimuli

Each stimulus comprised a supermarket fixture that was populated with multiple facings of a range of products from a single category: toothpaste (test trials only), shampoo, biscuits, cereal and butter. Within each category product locations were shuffled so that no two stimuli had the target brand, copycat or other brands in the same configuration to ensure that memory of location, or surrounding distractor products, from a prior stimulus could not be used to facilitate performance in any subsequent trial.

Target brands and copycats were never located in the central region of the shelf since attention would always be in this location at the start of each trial from the brand cue shown immediately before each shelf stimulus. 16 stimuli were created for each category i.e. 8 for each brand, meaning that each brand appeared twice in each of the four product conditions. The image conditions were balanced to ensure each brand was presented twice in all 4 conditions and that all 16 combinations of image and production condition were represented in each category.

Stimuli were presented in 4 randomised counterbalanced blocks of 16 trials, each of which contained the same number of trials for each brand, each product condition and each image condition. The four blocks were presented in a randomised sequence for each participant. This was done to normalise any learning or fatigue effects across the 64 trials.

Product pack shots were obtained from Brandbank (Brand Image Database, <https://www.brandbank.com/>), and where they were not available were created from photographed real packs.

All stimuli were presented life size in full HD (1920x1280) resolution. This was achieved by calibrating the 236" display screen to the match the physical packs that had been scanned for inclusion in the stimuli.

The full set of 64 stimuli are available on request.

Participants

49 participants were pre-recruited (Criteria Fieldwork Ltd, 1-2 Hampstead Gate, 1a Frognal, London, NW3 6AL, UK) to be primary household shoppers in the four product categories being tested (shampoo, biscuits, cereal & butter) and be regular shoppers at the following UK supermarkets: Tesco, ASDA, Sainsbury's, Waitrose, Morrisons, Aldi and Lidl. All participants were recruited for full colour vision and tested with normal, or corrected to normal, vision.

A mix of males and females aged 18-65 were recruited as shown in Figure 4.

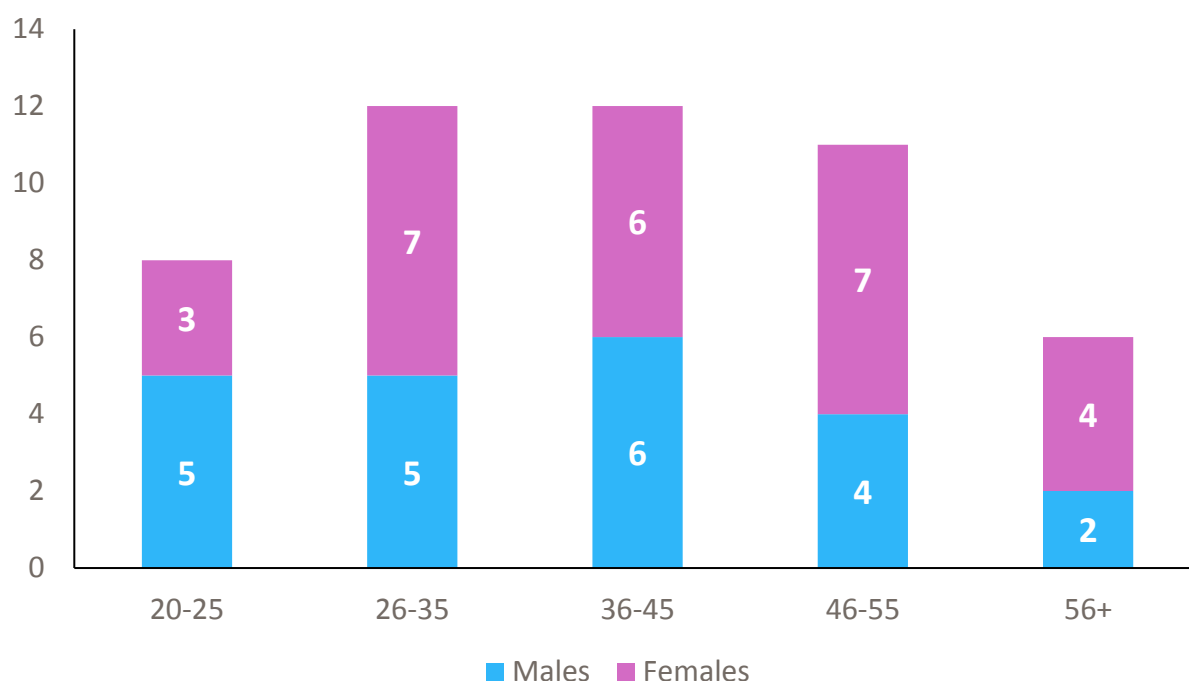


Figure 4: Participant age and gender split.

The study design used does not just look at variance between participants, but also the variance within the participants over the 64 stimuli shown to each subject, making this a substantial, and in fact, quite large sample for an eye-tracking study like this. The analysis is conducted across a total of N=3136 trials.

Eye-tracking

All participants were eye-tracked using a Tobii X120 (120Hz) remote binocular eye-tracker, which was placed at 60 cm from the participant. This type of eye-tracker was selected due to its tolerance of head-movement and capability at tracking gaze across a large screen (236" rear projection touch screen). Participants stood 1.5m from the screen. Ambient light was used throughout the eye-tracking study. Participants were required to stand throughout, and the eye-tracker was height adjusted, using an electronic stand, for each participant.

All stimuli were presented using Tobii Studio software.

Questionnaire

On completion of the eye-tracking part of the study, all participants were provided with a short self-paced questionnaire on an iPad which probed their recall for the products presented as well the participant's attitudes towards branded and own-label brands. Other questions relating to shopping behaviour were also included.

The full questionnaire is provided in Appendix 1.

Results

The results of this study have been combined from two separate data collection sessions as detailed in the Methods section. The two sessions were run approximately a year apart, using different research teams, but apart from that they were identical. Before data was combined, the data from two sessions were analysed separately and the results compared to confirm that there was no statistical difference between the two sets of results. Here we present just the combined data. Results from the individual sessions are available on request.

The results are divided into the three stages relating to search, decision and recall. Throughout this analysis, where eye-tracking data is analysed, the I-VT fixation filter (Olsen & Matos, 2012) was used to separate fixations from eye-movements (saccades) during which time most visual processing is suspended. The settings for the filter used in this analysis are:

- Velocity threshold: 30°/sec
- Window length: 20ms
- Max time between fixations 75ms
- Max angle between fixations 0.5°
- Minimum fixation duration: 100ms

The following statistics are based on areas of interest (AOI) drawn around the blocks of products so that all facings were treated a single contiguous AOI – this ensured that all AOIs were approximately equal in size within each fixture image. An example of AOIs is shown in Figure 5.



Figure 5: Example of areas of interest (AOIs) used for analysis. *T* is the Target Brand AOI, *D* is the Copycat AOI, *S1-5* are Shelf AOIs.

Bonferroni correction for multiple measures were applied throughout. Significance levels of $p > 0.05$ are not reported. Cohen's Effect Size is reported for significant ($p < 0.05$) results which is a measure of the likelihood that results will replicate – value of 0.8 or above are generally considered large and therefore represent a high level of confidence in both the effect and it's robustness.

Search Time

The time to first fixation was calculated for each stimulus and each participant. The times were then averaged across participants for sub groupings of the stimuli representing the product and image type conditions.

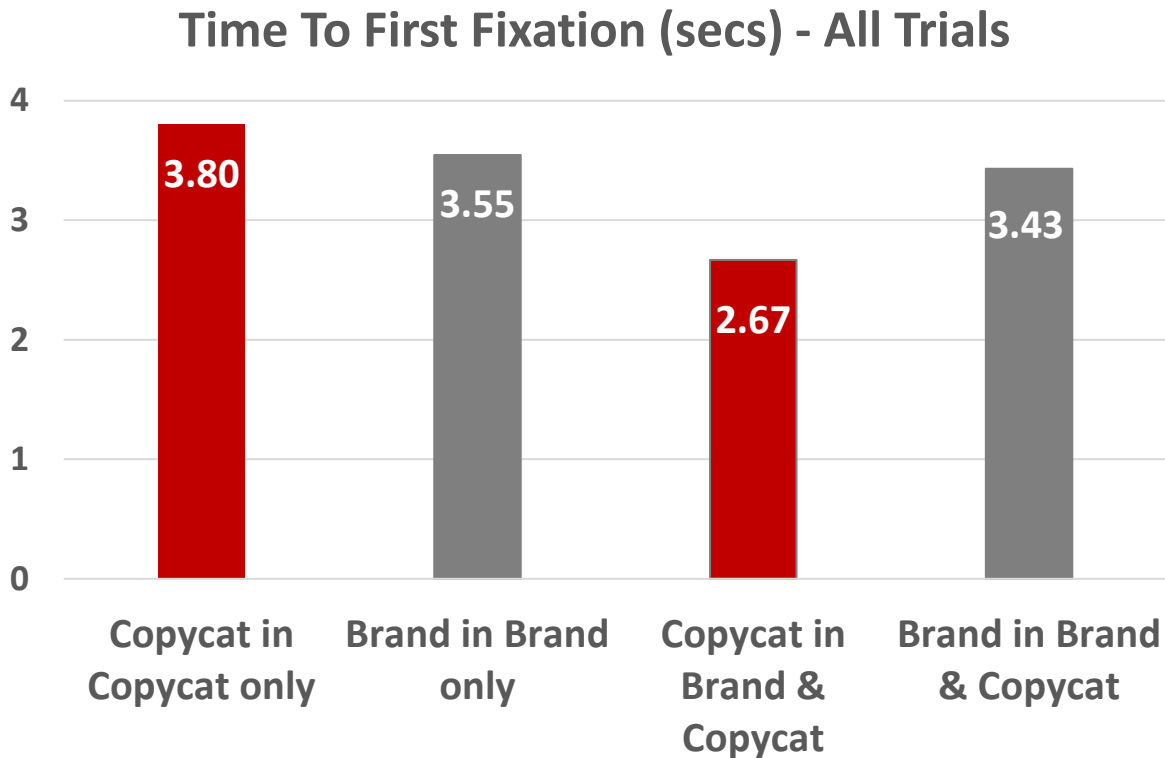


Figure 6: Time to first fixation for the copycat and target brands averaged over all participants and all trials.

Figure 6 shows the time to locate the target brand or copycat in all 3 conditions where at least one of them was present. Time to first fixation is the standard measure for such tasks. In all conditions the participant was only ever asked to find the copycat. Time to first fixation for the brand is 3.55 seconds when the copycat is not present and 3.43 seconds when the copycat is present. This difference is non-significant suggesting that the time taken to find the brand is unaffected by the presence of a lookalike package. Time to first fixation for the copycat when the brand is not present is 3.80 seconds and not significantly different from the time to fixate on the target brand in either condition, suggesting that when presented in isolation it acts as a proxy for the target. The time to first fixation for the copycat when the target brand is present is 2.67 seconds which represents a highly significant reduction $t(48) = 7.039$, $p < 0.001$ with a large effect size $d = 1.14$, suggesting a significant gain in standout when both target brand and copycat are present. The time to first fixation for the copycat relative to the target brand is also

significantly reduced $t(48) = 4.691$, $p < 0.001$ with a medium effect size $d = 0.67$, suggesting a facilitation in standout relative to the target brand.

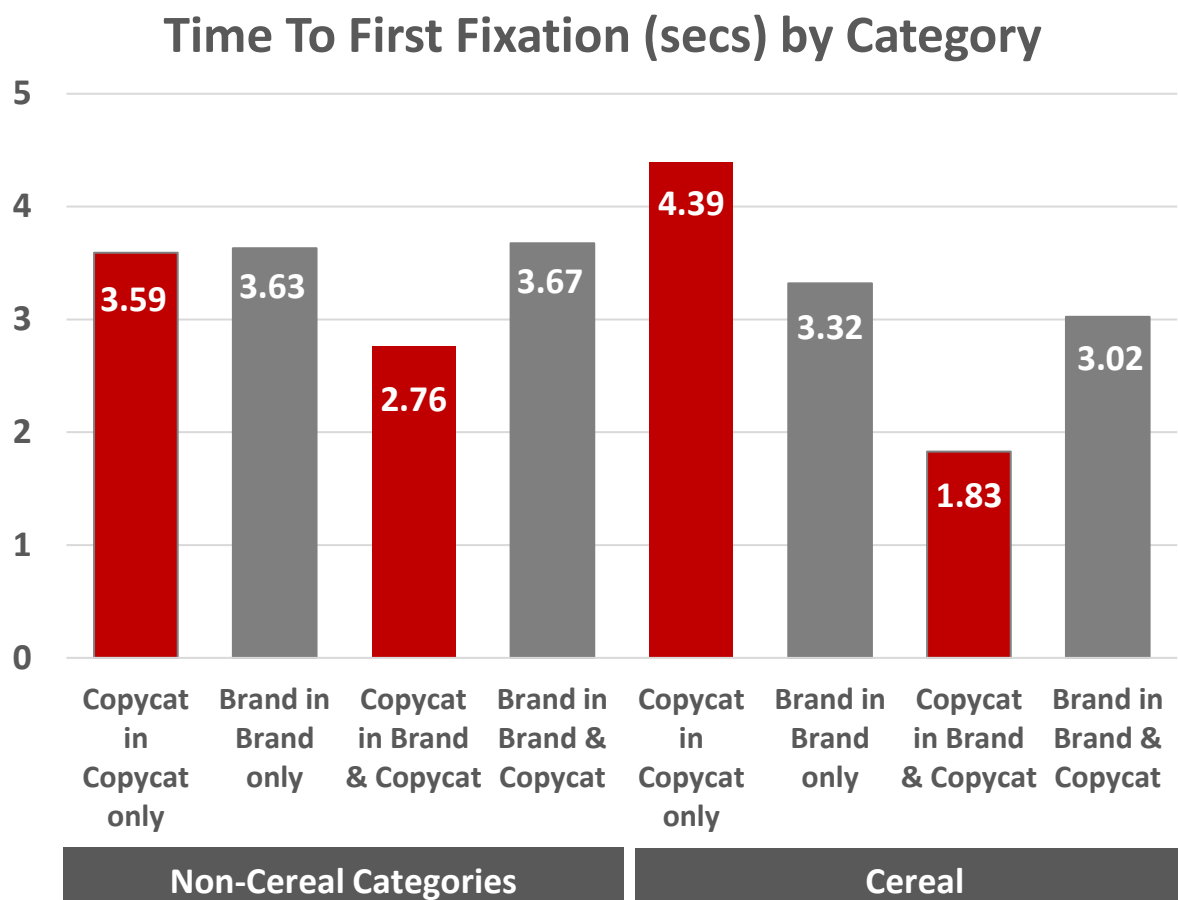


Figure 7: Time to first fixation for the copycat and target brands averaged over all participants with cereal category data shown separately.

Figure 7 shows the time to first fixation on the target brand or copycat in all 3 conditions where at least one of them was present with the cereal category results isolated. The same pattern of behaviour can be seen in the cereal packs but the copycat times are quite different. Time to first fixation for the copycat when the brand is not present is now 4.39 seconds suggesting that when presented in isolation the cereal copycats take longer to act as a proxy for the target. The facilitation effect of standout for the copycat cereals when presented alongside the target brand is magnified, suggesting that this effect stems from the need to deselect the copycats as part of the decision making process and this is easier with the larger cereal packs. Differences were all highly significant ($p < 0.001$) as before.

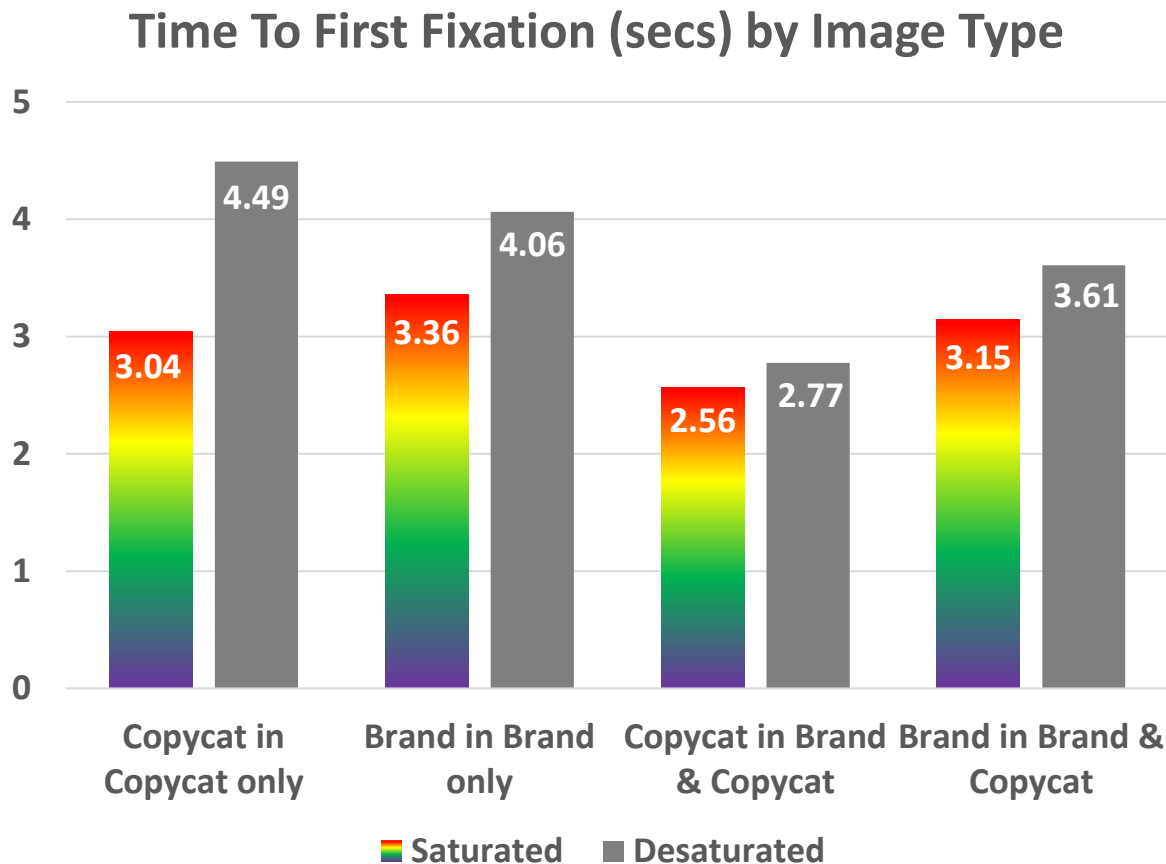


Figure 8: Time to first fixation for the copycat and target brands averaged over all participants grouped by colour saturation condition.

There was a highly significant effect from colour in the search results (see Figure 8) with desaturation consistently increasing the search time for both target brands and copycats in all conditions, $t(48) = 6.204$, $p < 0.001$ with a large effect size $d = 0.89$, suggesting that colour is an essential feature for optimal search performance. Similar effects were seen in both cereal and non-cereal categories. The facilitation is reduced when both the copycat and target brand are available on the same fixture and is in fact non-significant, suggesting that colour is relied on less for deselection when other comparison features are available e.g. imagery, product name and pack shape/size.

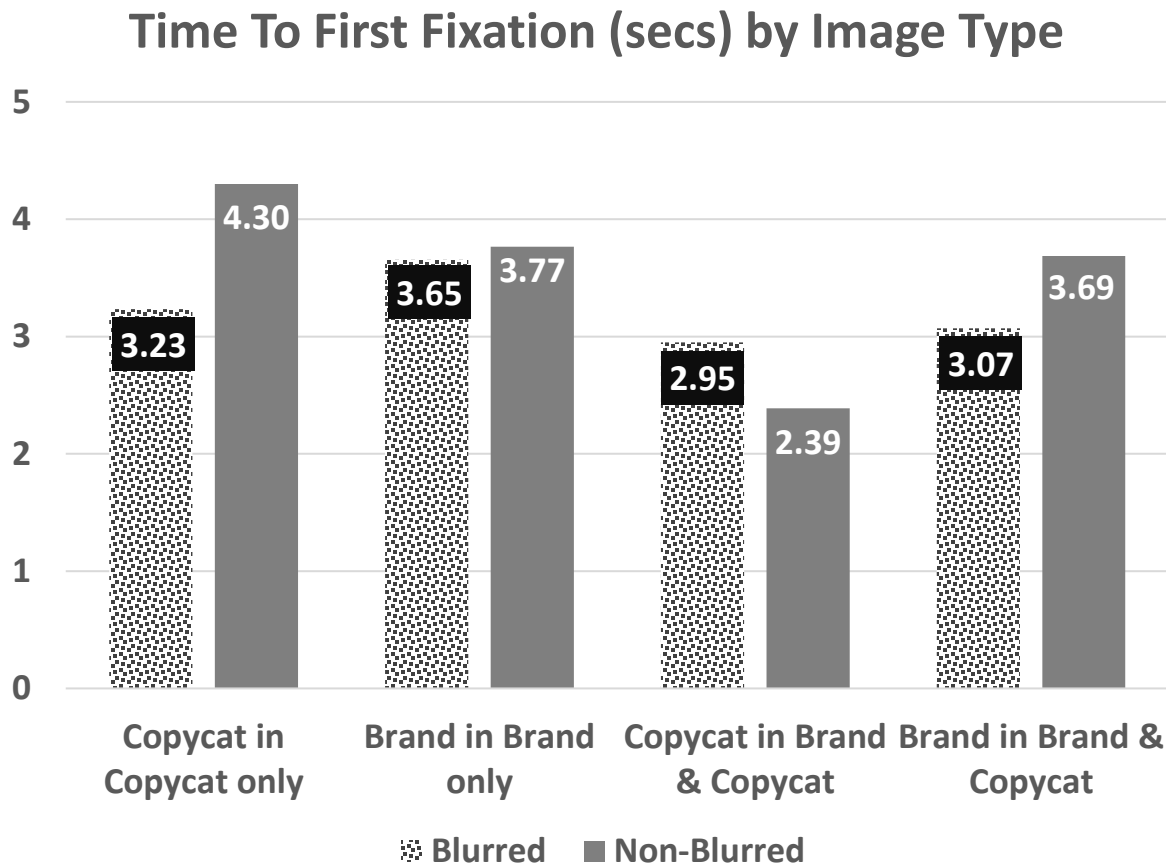


Figure 9: Time to first fixation for the copycat and target brands averaged over all participants grouped by blurring condition.

There was also a highly significant effect from image clarity in the search results (see Figure 9) with blurring usually, but not consistently, decreasing the search time, $t(48) = 3.525$, $p < 0.005$ with a medium effect size $d = 0.50$. This effect is consistent for the brand and copycats in isolation, but blurring increases the search time when the copycat is presented alongside the target brand. The general improvement in search times when the image is blurred suggests that high contrast pack design elements serve to slow the search process down as the visual search literature would suggest because they effectively increase the dimensionality of the number of features requiring deselection (Rangelov, et al. 2013).

Decision Making

Two measures are of interest from a decision making perspective, namely the error rate which speaks to the disruption caused by the presence of copycats to the conscious decision about having located the target brand. In the product conditions where the target brand was not present, and error constitutes a button press, whereas in the conditions where the target brand was present an error is represented by an inability to find and correctly identify the target brand i.e. the absence of button press. The second measure of interest is the product being looked at immediately before a conscious decision was made that the target brand was present since this gives an indication of the product which was triggering that decision.

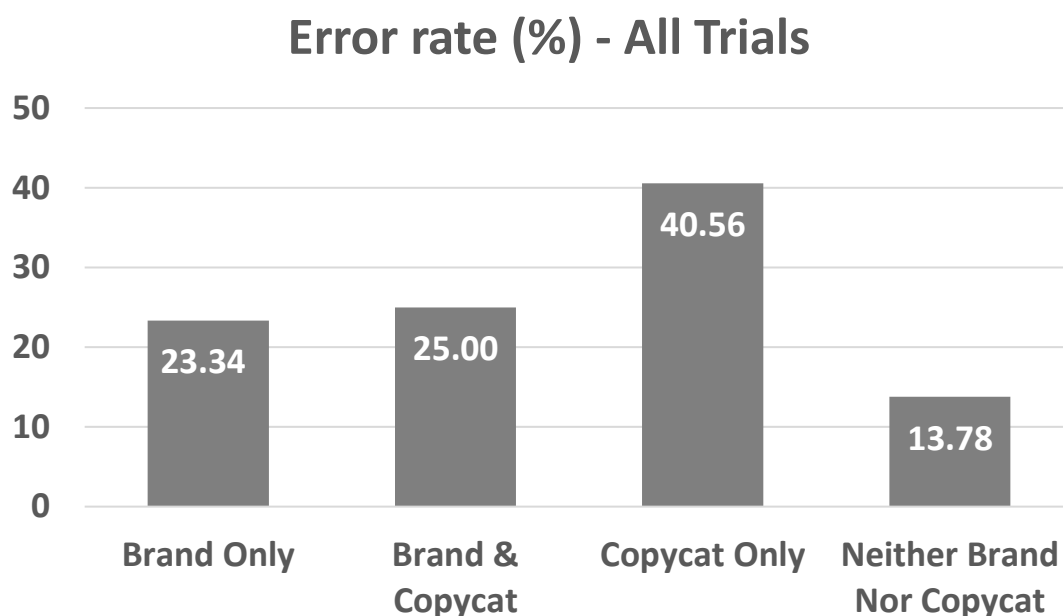


Figure 9: Error rate by condition. An error in the Brand conditions was signified by the absence of a button press, whereas an error in the Copycat and Null conditions was signified by a button press.

Figure 9 shows error rates for the four product conditions. The null condition (Neither Brand Nor Copycat) shows a baseline error rate while performing this task of 13.78%. In the Brand conditions we see a further increase in the error rate almost certainly resulting from the different way the error rate is measured i.e. absence of a button press. More interestingly there is no significant difference between the Brand and Brand & Copycat conditions, suggesting little effect from the copycats, but it cannot be determined from this data which pack was being used to make that decision. In the Copycat Only condition we see a significant increase in the error rate relative to all other conditions but in particular the null condition since, for the task, these two conditions should be equivalent i.e. the Target Brand is not present so there should be no button press clearly indicating increased erroneous decisions making as a result of the presence of copycat packs.

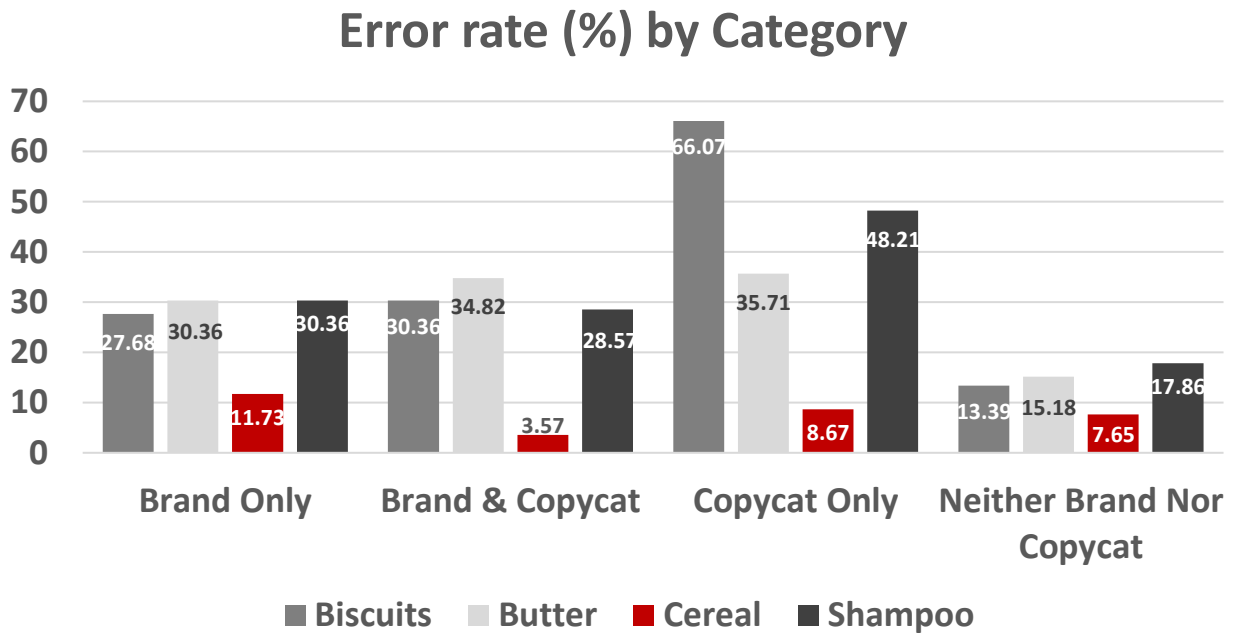


Figure 10: Error rate by condition and product category. An error in the Brand conditions was signified by the absence of a button press, whereas an error in the Copycat and Null conditions was signified by a button press.

Figure 10 shows the error rates by product category. Essentially there are limited differences between the non-cereal categories, although the variance in the Copycat Only condition suggests that either our participants were more familiar with some copycats than others, something which the survey data below does not support, or that there were different degrees of similarity between copycats in the categories. This certainly corresponds with a subjective evaluation where the biscuits and shampoo copycats seem to be much closer to their target brands than the butter or cereal copycats. Most notably the error rates are significantly lower for the cereal category which is almost certainly a result of the package size which allows for greater clarity of design features even in the blurred conditions. Figure 11 shows the error rates by image type. Blurring contributes to higher error rates for all conditions suggesting that the ability to recognise detail design elements on the pack is essential to the final decision.

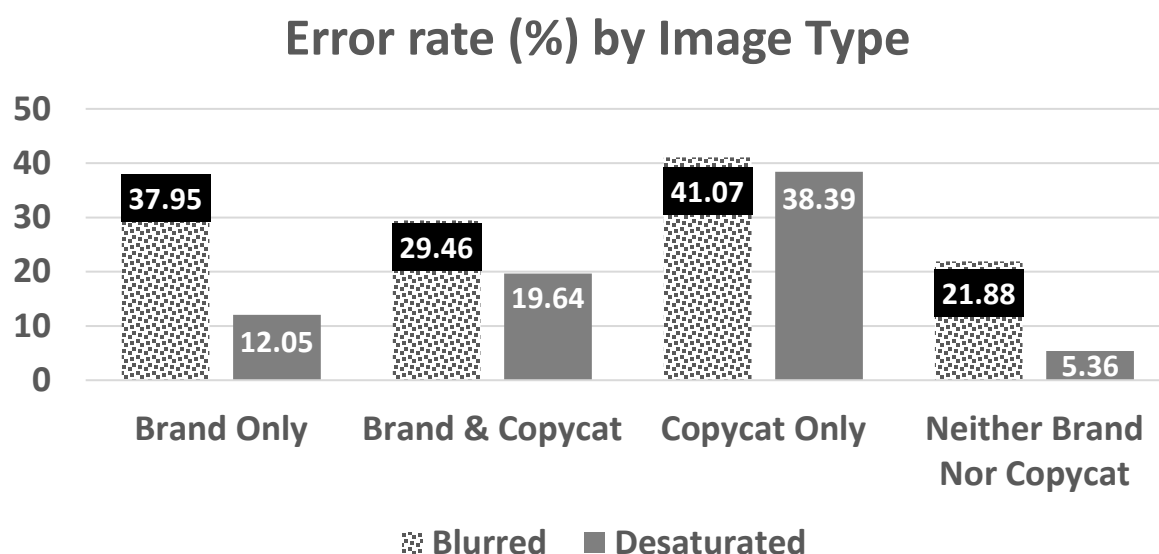


Figure 11: Error rate by condition and image type. An error in the Brand conditions was signified by the absence of a button press, whereas an error in the Copycat and Null conditions was signified by a button press.

Decision driver

As noted above, the error rate, while indicative of a degree of confusion caused by the presence of copycat brands, does not confirm their direct influence in the decision making of the participants, particularly when comparing between the brand conditions where there may not be copycats present. The best indicator of what drives that decision is where the visual attention is focussed at the time the decision is made. Figure 12 shows where the participants were looking at the time they initiated the button press. In the Brand Only condition, the attention at decision time is split between the target brand (57.99%) and other brands (18.66%). In the Brand & Copycat condition, there is no significant change in the error rate or the attention to other brands, but the attention to the target brand reduces to 44.33% because 15.24% of participants were now looking at the copycats when making their decision. This means that 20.32% of the correct decisions were being made for the wrong reason. In the Copycat Only condition, the attention to other brands remains stable (14.89%), whilst the attention to copycats at decision time is now 25.67%, meaning 63.29% of the erroneous decisions were triggered by looking at the copycats. In the Neither Brand Nor Copycat condition, the attention to other brands remains stable (13.78%), whilst the attention to copycats at decision time is now 25.67%, meaning 63.29% of the erroneous decisions were triggered by looking at the copycats.

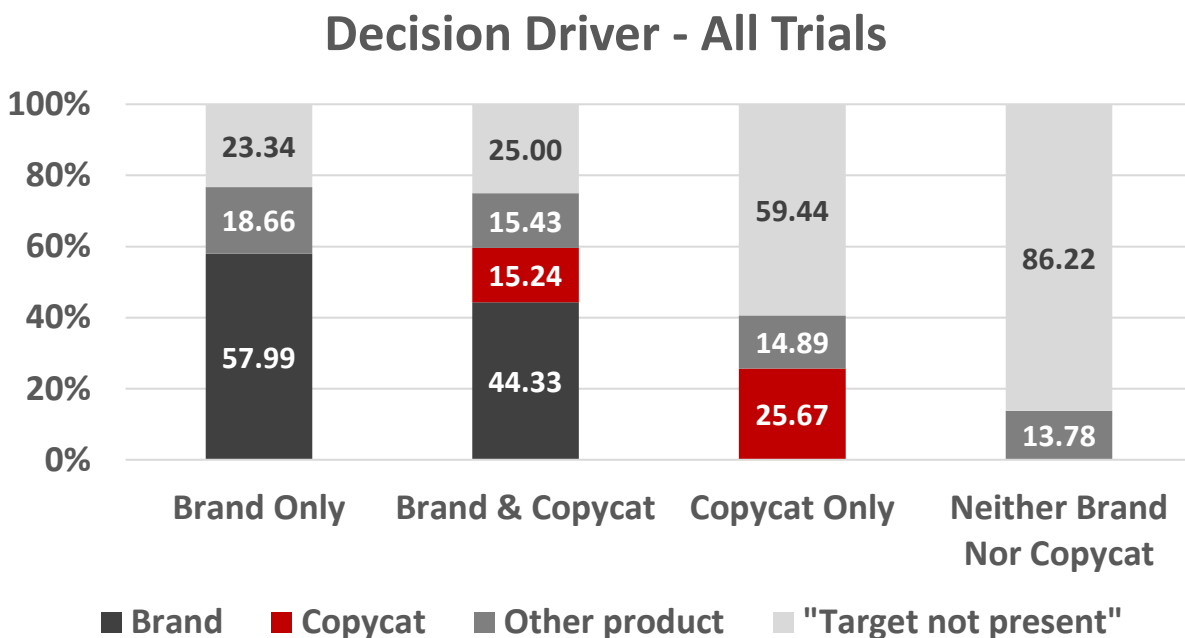


Figure 12: Location of fixation immediately prior to "Target found" decision. "Target not present" data represents the percentage of participants who did not make a conscious "Target found" decision.

Figures 13a and 13b show the attention at decision time for the non-cereal and cereal categories separately. The three categories with smaller packs show a similar pattern to the overall results: again there is no significant difference in the error rate or attention to other brands between the Brand Only and Brand & Copycat conditions, but now 26.11% of the correct decisions in the Brand & Copycat condition are the result of attention to the copycats. The proportion of erroneous decisions in the Copycat Only condition is now 63.56%. These figures are markedly different for the cereal category where the bigger packs seem to contribute to a lower error rate, and the influence of the copycats is correspondingly reduced.

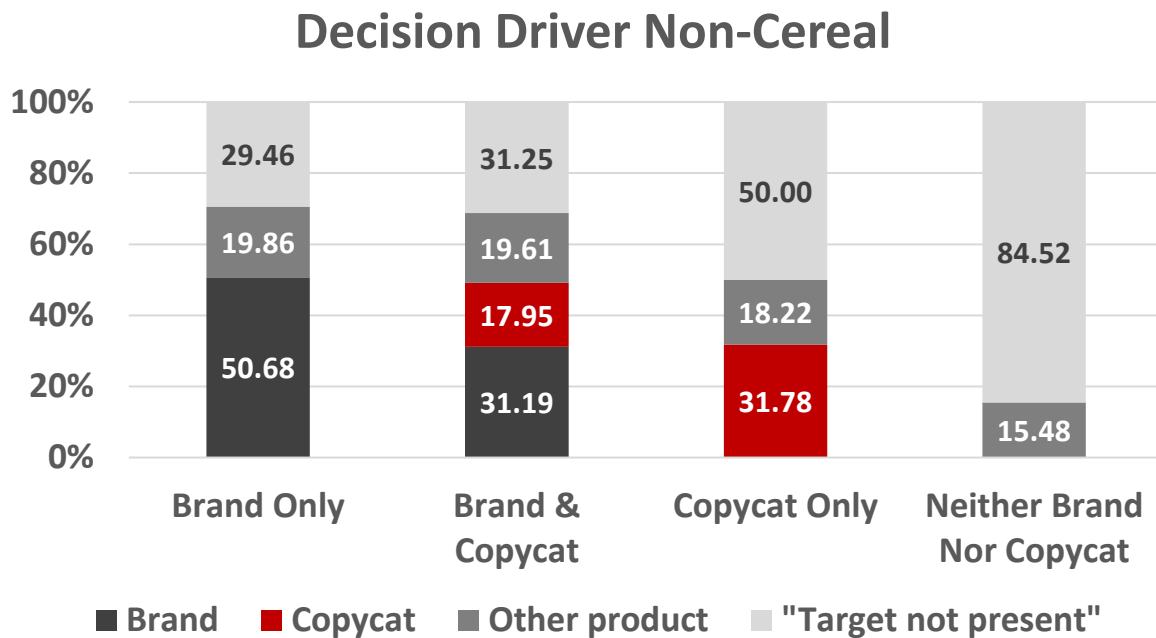


Figure 13a: Location of fixation immediately prior to "Target found" decision. "Target not present" data represents the percentage of participants who did not make a conscious "Target found" decision – non-cereal category products.

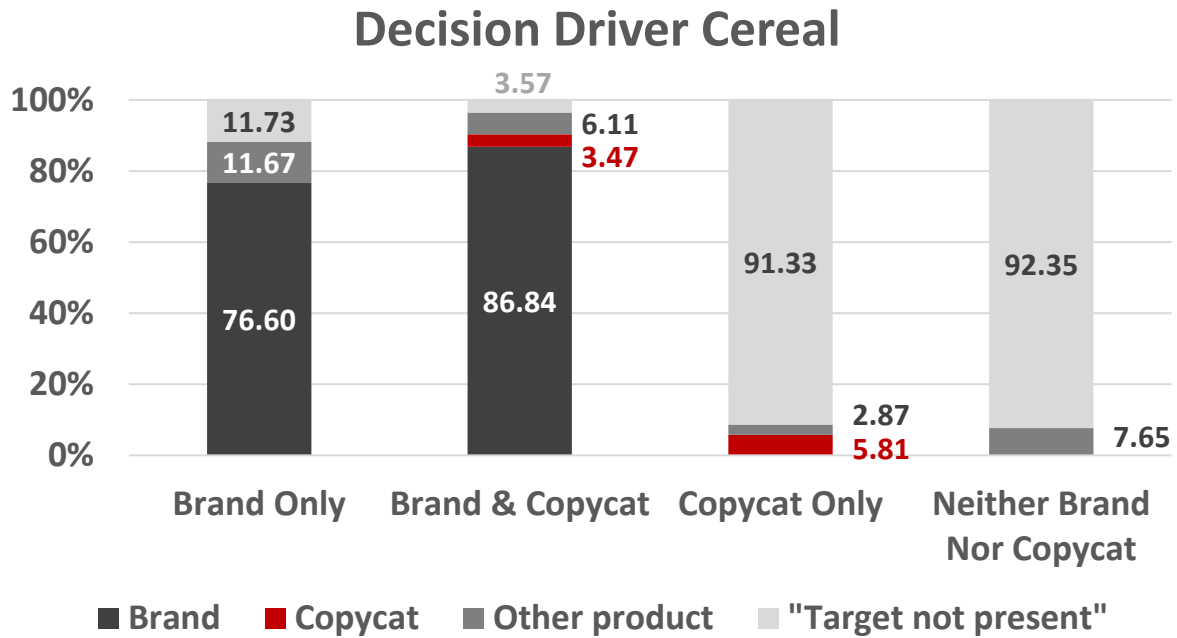


Figure 13b: Location of fixation immediately prior to "Target found" decision. "Target not present" data represents the percentage of participants who did not make a conscious "Target found" decision –cereal category products.

Recall

After the eye-tracking task, participants completed a survey (Appendix 2) and the full results of that are provided in Appendix 3. Here we present the results for the recall question, in which participants were presented with a list of products and the following task: "Please select any products you saw on the big screen." The list contained an equal number of target brands, copycats as well as other seen brands and products in each category which had never been included in any of the stimuli.

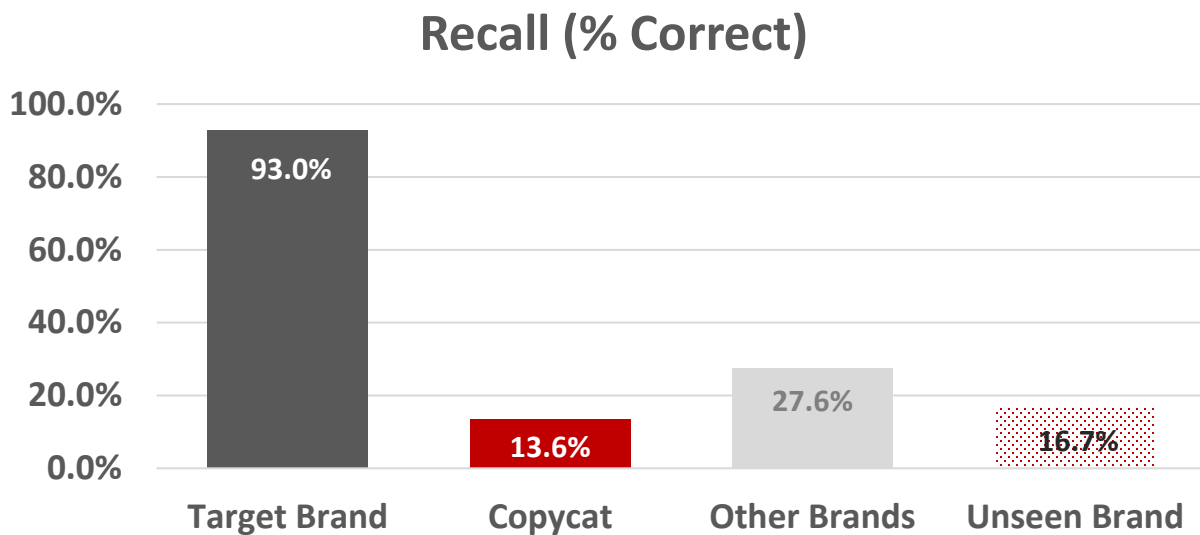


Figure 14: Percentage of participants who successfully recalled products based on a list provided in the post study questionnaire (see Appendix 1). Other brands are products which appeared in the study but were neither targets nor copycats. Unseen brands were not included in any stimuli.

Figure 14 shows that there was good recall for the Target Brands, and this was true for all categories. This is unsurprising because these products benefitted from the search cue visual instruction presented immediately before the fixture image as well as the pack design on the fixture image itself. The copycats and other brands were both recalled significantly less, with recall for the copycats being half that of the other brands and, at 13.6% is only slightly above chance (12.5%). This is interesting because the eye-tracking data confirmed that the attention to the copycat brands was much higher in terms of fixation time and number of fixations than the other brands. It is worth noting that the recall rate for the copycats is highly influenced by a 64.6% recall for Choco Rice which is the largest and most salient copycat in the study, and without this the recall rate for the copycats would be 6.3%, well below chance. The “recall” rate for unseen brands confirms that the conscious self-report nature of this task is being influenced by expectation of what would have been on the shelves rather than an uncontaminated response to what was actually seen and this probably also contributes to the recall rate of the other brands.

Discussion

The results of this study can be summarised as follows:

- Time to first fixation on a target brands is unaffected by the presence of a copycat
- Time to first fixation on a copycat brand in the absence of the target brand is slightly, but not significantly, longer than for the matched target brand
- Time to first fixation on a copycat brand in the presence of the target brand is significantly lower suggesting that in most cases the copycat will be seen before the target
- Both colour and visual acuity are important for successful visual search, with colour being the primary search feature
- Presence of copycats on the fixture disrupt the decision making process, most significantly in the situation where the target brand is not available for comparison
- Visual acuity is important for correct decision making
- When a decision is made, the copycat brands are mistakenly identified as the target brands 20% of the time in the Brand & Copycat condition, and 64% of the time in the Copycat Only condition
- Recall for the copycats after multiple exposures, and direct looking at them, is not significantly better than chance

Visual Search

The results from the visual search task suggest that in stores like Aldi and Lidl, where copycats are presented to the shopper instead of the branded products, they behave exactly like the brands themselves. It is worth remembering that the participants in this study had no prior awareness of the presence of copycats in any of the stimuli and were only ever tasked with finding the target brands, and so this result almost certainly stems from the visual similarity. Most brands rely on visual salience (Alba & Chattopadhyay, 1986; Itti & Koch, 2000; Van der Lans, et al., 2008) to achieve standout at the point of sale, and two very similar pack designs will inevitably produce similar visual salience maps. One of the key features of most salience models is colour (luminance and intensity) and so it is not surprising that desaturating the packs increases search time, but this is a strong indicator that copycatting of pack colour will result in the behaviour seen in this study.

Perhaps more interesting is the advantage that seems to be achieved by the copycats when they appear alongside the branded products. The earlier fixation time on the copycats could be the result of the deselection process, but given the visual similarity of the copycats in this study it is surprising that such a strong effect is visible. An alternative explanation might be that the copycats are somehow more category typical than the brands we tested. Brands invest significantly in their brand equity (Keller, 2002) for the very reason that they want to differentiate themselves from competitors and this frequently requires deviation from the category norms. When a visual target is not provided for direct matching, the brain will search based on the most easily recalled information from memory – the availability heuristic (Chapman, 1967; Tversky & Kahneman, 1973), and this will typically be those features most strongly associated with the product (e.g. pack size, shape, general design aesthetic such as a picture of a cookie on most biscuit packs) and not necessarily lower frequency features associated with any one specific brand (e.g. the brand logo or precise spelling of the product name). In fact many cases it is the category lead brand that defined many of these norms in the first place. This adherence to category specific designs can be seen in the baseline error rate in this study, which shows a degree of confusion even in the null (Neither Brand or Copycat) condition, since here we still see errors being made and this is almost certainly the result of lower levels of similarity exhibited by the other brands.

One of the reasons that is often cited for selecting own label over branded products is the price, with own label typically being cheaper. Although not directly tested in this study, these results suggest an unconscious driver of this behaviour, since the early fixation on the copycat will almost certainly provide early exposure to price information at the point of sale. Whilst it's possible that the early attention might be sufficient to trigger the purchase of a non-brand loyalist, a shopper who is looking for the brand will almost certainly continue the search until they find it, but will then be exposed to the higher price of the branded product. Loss aversion theory (Kahneman & Tversky, 2000) suggests that this will trigger a more price-led decision and potentially lead cost conscious shoppers to select the copycat.

Decision Making & Recall

The decision making results in this study are particularly interesting in that they highlight a separation between the conscious and unconscious decision making that is much discussed in marketing and branding today. Behavioural economics theory and the research of Kahneman and Tversky suggest that much decision making is on auto-pilot, what Kahneman calls System 1 (Kahneman, 2011). This is a direct consequence of the brain being optimised to direct attention to new and conflicting information rather than familiar stimuli it encounters every day. The brain uses heuristics, or mental rules and models, to predict outcomes and make decisions without fully engaging attention since this would be too costly for the brain. The result of this is that a package which closely resembles a search target will in fact be recognised as the search target and that decision will never be questioned unless it is directly challenged. We see this in the decision making here as participants routinely made erroneous decisions about having found the leading target brand when they were directly looking at the copycat. The visual similarity of the packs is sufficient to fulfil the minimum requirement for recognition that triggers the behavioural response which in this study was a button press, but at the point of sale would be a purchase.

The degree of conscious awareness involved in making the erroneous decisions is difficult to prove since neuroscience is still battling with how to define, let alone measure, consciousness. The results from the recall test do provide some insight however. The participants were unable to reliably recall any of the copycat products better than chance, with the possible exception of Choco Rice, and in fact were more likely to recall having seen products they were never exposed to than the copycats. This suggests that the copycats were never encoded in long-term memory during the search process even though the eye-tracking data shows that they received as much attention as the target brands. Encoding in memory is one of the hallmarks of conscious behaviour (Tulving, 1985) and so this data certainly suggests that unconscious decisions were being made as a result of the package similarity. In this study the participants had a single task to perform without any additional distraction. In the real-world shoppers are bombarded with store based multi-sensory distractions as well as additional stressors such as time, supervising children and the ever present mobile phone. All research suggests that as stress and distraction increase so too does the reliance on unconscious automated behavioural strategies like those seen in this study (Pieters & Warlop, 1999; Dijksterhuis, et al. 2005; Kahneman, 2011) further increasing the likelihood of the effects reported here.

Design & Testing Considerations

The resilience of the leading brand cereal packs to the copycats is almost certainly the result of the pack size. Large packs allow for larger text and bigger images which would have been less affected by the blurring applied in this study. This means that these packs would be more recognisable in para-foveal and peripheral regions of vision (Anstis, 1974) resulting in more accurate eye-movements which reduce the likelihood of even looking at the copycats in the first place. This, together with the result highlighting the strong role that colour plays in the visual search process, suggests some design principles which can be employed to strengthen the performance of the branded products:

- Colour is the primary visual search feature so this should be carried through all visual and brand equity to provide large colour blocks on the fixture.
- Larger design features such as logo, product name and product variant need to be clearly visible to facilitate correct decision making
- Intricate or elaborate design features are not resilient to blurring and lower the contrast of other features meaning that they will reduce standout and weaken performance in visual search
- Branded products often obscure key design features and colour through the addition of promotional messages. Not only do these obscure visibility of the primary search features, but they decrease the resemblance of the pack design to the category norm, which in turn increases the likelihood of a copycat being recognised as the branded product
- Large pack sizes are more resilient because they create larger images on the retina. This has a consequence for e-commerce and mobile where screen sizes are small and direct comparison between products can be difficult. Images which accentuate the brand, product and variant rather than full pack shots are likely to perform better.

This study also provides important learnings for the testing procedures around pack design. Most contextual pack design tests occur quite late in the design process and are frequently too late for significant learnings to be applied. Early stage testing using focus groups is typically far removed from the point-of-sale context and heavily dependent on conscious self-report methods. Clearly such testing cannot identify which products will be susceptible to erroneous unconscious decisions in store and so brands should give greater consideration to incorporating methods like those used here into their design testing procedures. Furthermore consideration should be given to methods which better simulate the level of stress and distraction encountered in the real-world.

At Risk Groups

One of the aims of this study was to establish whether visual acuity played a role in erroneous decision making with respect to copycat packaging. It is clear from this research that both colour and clarity of the pack design play a role, with errors increasing as a result of both. This has important consequence for an aging population since many of the most common visual disorders are highly correlated with age. The range of colour vision is increasingly restricted with age (Haegerstrom-Portnoy, 2014) and blurred vision is not only the consequence of uncorrected hyperopia, but also the presence of cataracts and scotomas associated with macular degeneration, all of which have increased prevalence in aging populations (Klein & Klein, 2013). The results from this study suggest that such populations are at increased risk of erroneous decision making from the presence of highly similar copycat packages at the point of sale, and that this effect could even be exploited in products specifically targeted at this demographic. Blurred vision is also a symptom of type II diabetes, which is dramatically increasing here in the UK and elsewhere (Chen, et al. 2012). The cost of detection and correction of all these conditions means that the poorest members of society are the least likely to correct their vision (World Health Organisation, 2014) and therefore are most susceptible to the effects reported in this study.

Conclusion

This study set out to establish whether the reported incidence of erroneous purchasing of copycat packages (Which?, 2013) was the result of a bias in conscious self-report data or the inevitable consequence of package similarity on unconscious shopper decision in store. The results clearly indicate that these errors are unavoidable by the shoppers and that it is package similarity which drives this effect. Whilst outside the scope of this project, subsequent research performed by Acuity Intelligence with shoppers in a real-world store setting suggests these effects are not just the consequence of the lab based methodology used for this study, but do in fact occur at the point of purchase. The design and testing methodology improvements suggested in this study will improve resilience of brands, but inevitably these methods could be adopted by the copycats too, suggesting that brands should seek all possible routes to protect not just their brand equity but the visual equity too.

References

- Alba, J.W., & Chattopadhyay, A. (1986). Salience Effects in Brand Recall. *Journal of Marketing Research*, 23(4), 363-369.
- Anstis, S.M. (1974). A chart demonstrating variations in acuity with retinal position. *Vision Research*, 14, 589-592.
- Chapman, L.J. (1967). Illusory correlation in observational report. *Journal of Verbal Learning*, 6, 151-155.
- Chen, L., Magliano, D.J. & Zimmet, P.Z. (2012). The worldwide epidemiology of type 2 diabetes mellitus—present and future perspectives. *Nature Reviews Endocrinology*, 8, 228-236.
- Connor, C.E., Egeth, H.E., & Yantis, S. (2004). Visual Attention Bottom-Up Versus Top-Down. *Current Biology*, 14(19), 850-852.
- Dijksterhuis, A., Smith, P. K., Van Baaren, R. B., & Wigboldus, D. H. (2005). The unconscious consumer: Effects of environment on consumer behavior. *Journal of Consumer Psychology*, 15(3), 193-202.
- Duncan, J., & Humphreys, G. W. (1989). Visual search and stimulus similarity. *Psychological Review*, 96, 433-458.
- Haegerstrom-Portnoy, G., Schneck, M.E., Lott, L.A., Hewlett, S.E. & Brabyn, J.A. (2014). Longitudinal Increase in Anisometropia in Older Adults. *Optometry and Vision Science*, 91(1), 60-67.
- Itti, L., & Koch, C. (2000). A saliency-based search mechanism for overt and covert shifts of visual attention. *Vision Research*, 40, 1489-1506.
- Johnson, P., Gibson, J. & Freeman, J. (2013). The Impact of Lookalikes: Similar packaging and fast-moving consumer goods. Intellectual Property Office. Newport, UK.
- Kahneman, D. & Tversky, A. (Eds.) (2000) "Choices, values and frames," New York, Cambridge University Press.
- Kahneman, D. (2011), "Thinking, Fast and Slow," Farrar, Straus and Giroux.
- Kahneman, D., Slovic, P. & Tversky, A. (1982) "Judgment Under Uncertainty: Heuristics and Biases," New York: Cambridge University Press.

Keller, K. L. (2002). Branding and brand equity. *Handbook of marketing*, 151-178. Sage Publications Ltd, London.

Klein, R. & Klein, B.E.K. (2013). The Prevalence of Age-Related Eye Diseases and Visual Impairment in Aging: Current Estimates. *Investigative Ophthalmology and Visual Science*, 54(14), 5-13.

Lai, K. & Zaichkowsky, J. L. (1999). Brand Imitation: Do the Chinese Have Different Views? *Asia Pacific Journal of Management*, 16 (2), 179-192.

Miceli, G.N. & Pieters, R. (2010). Looking more or less alike: Determinants of perceived visual similarity between copycat and leading brands. *Journal of Business Research*, 63(11), 1121-1128.

Maunsell, J.H.R., & Treue, S. (2006). Feature-based attention in visual cortex. *Trends in Neuroscience*, 29, 317-322.

Olsen, A. & Matos, R. (2012). Identifying parameter values for an I-VT fixation filter suitable for handling data sampled with various sampling frequencies. *Proceedings of the Symposium on Eye Tracking Research and Applications*, Santa Barbara, California, March 28-30, 317-320.

Optical Confederation (2015). Optics at a glance 2014. Retrieved from <http://www.opticalconfederation.org.uk/downloads/optics-at-a-glance2014web.pdf> 18th April 2017.

Pieters, R. & Warlop, L. (1999), "Visual Attention During Brand Choice: The Impact of Time Pressure and Task Motivation," *International Journal of Research in Marketing*, 16, 1-16.

Pieters, R. & Wedel, M. (2004), "Attention Capture and Transfer in Advertising: Brand, Pictorial and Text Size Effects," *Journal of Marketing*, 68 (2), 36-50.

Pieters, R., Wedel, M. & Zhang, J. (2005), "Optimal Feature Advertising Design under Competitive Clutter," Internal Report Tilburg University, University of Michigan.

Rangelov, D., Müller, H.J. & Zehetleitner, M. (2013). Visual search for feature singletons: Multiple mechanisms produce sequence effects in visual search. *Journal of Vision*, 13(3), 22, 1-16.

Treisman, A., & Gelade, G. (1980). A feature integration theory of attention. *Cognitive Psychology*, 12, 97-136.

Tulving, E. (1985). Memory and consciousness. *Canadian Psychology* 26:1-12.

van Horen, F., & Pieters, R. (2012). When High-Similarity Copycats Lose and Moderate-Similarity Copycats Gain: The Impact of Comparative Evaluation. *Journal of Marketing Research*, 49(1), 83-91.

van Horen, F., & Pieters, R. (2013). Preference reversal for copycat brands: Uncertainty makes imitation feel good. *Journal of Economic Psychology*, 37, 54–64.

Warlop, L. & Alba, J.W. (2004). Sincere flattery: trade dress imitation and consumer choice. *Journal of Consumer Psychology*, 14(1), 21027.

Which? (2013). "Spot the difference – Big brand or supermarket equivalent?", May 2013, 22-25.

Tversky, A. & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5(2), 207-232.

Van Dam, L. C. J. & Van Ee, R. (2006). Retinal image shifts, but not eye movements per se, cause alternations in awareness during binocular rivalry. *Journal of Vision*, 6(11), 1172-1179.

Van der Lans, R., Pieters, R., & Wedel, M. (2008). Competitive Brand Salience. *Marketing Science, Articles in Advance*, 1–10.

Whitney, D., & Levi, D. M. (2011). Visual crowding: A fundamental limit on conscious perception and object recognition. *Trends in cognitive sciences*, 15(4), 160-168.

Wolfe, J.M. (1994). Guided search 2.0 – a revised model of visual search. *Psychonomic Bulletin and Review*, 1, 202-238.

Wolfe, J.M. (1998). What can one million trials tell us about visual search? *Psychological Science*, 9(1), 33-39

World Health Organisation (2014). Visual impairment and blindness fact sheet number 282. Retrieved from <http://www.who.int/mediacentre/factsheets/fs282/en/> April 18th, 2017.

Yantis, S., & Egeth, H. (1999). On the distinction between visual salience and stimulus-driven attentional capture. *Journal of Experimental Psychology: Human Perception and Performance*, 25 (3), 661-676.

Appendix 1 – Post Study Questionnaire

1. Participant ID

2. Are you in the final sample? (in case of exclusions due to non-completion of eye-tracking task)

3. What is your gender?

4. What is your age?

5. Where did you do your last major shopping trip?

Tesco Morrisons Asda Aldi Waitrose Lidl Sainsbury's Other (please specify)

6-12. When was the last time you shopped at (answer to Q5)?

13. How much did you spend on this shop?

14. In a typical month, how often do you think you would shop in this store?

15. What are the reasons for using this store?

Please rank the 5 reasons in order of their importance using the numbers (1 = Most important, 5 = Least important)

- Brand
- Price
- Quality
- Performance of products
- Location

16. Are there any other reasons for using this store?

17. How strongly do you agree with the following statements?

Strongly disagree Disagree Indifferent Agree Strongly agree

- I buy supermarket own brands whenever they are available
- I like to sample new and different brands
- I always buy the cheapest option
- There is no real difference between cheap and expensive brands
- I never shop according to price

Para-sight: A study of erroneous shopper decision making in the presence of copycat packaging

- I always buy the same brands
- I am not influenced by product packaging
- The brand is a measure of quality
- I never buy supermarket value brands

18-22. When you buy (toothpaste/butter/cereal/biscuits/shampoo), how important are the following to you?

Please rank the 4 reasons in order of their importance using the numbers (1 = Very important, 4 = Least important)

- Brand
- Price
- Quality
- Performance of product

23. Please select any products you saw on the big screen.

- * Special K cereal
- * Lurpak butter
- * Norpak butter
- * Stork
- * Greenvale perfect for cakes spread
- * Harvest Mom Benefit cereal
- * Coco Pops cereal
- * Choco rice cereal
- * Mc Vitie's original digestives
- * Belmont digestives
- * Mc Vitie's Rich Tea biscuits
- * Belmont Rich Tea biscuits Oaties
- * KitKat
- * Mc Vities milk chocolate digestives
- * Mc Vities ginger nuts
- * Weetabix
- * Kellogs cornflakes cereal
- * Pure sunflower spread J
- * Just Right
- * Dorset cereal
- * Anchor light spreadable butter
- * Bertolli with butter
- * Herbal Essences shampoo
- * Head and Shoulders shampoo
- * Tesco My Senses shampoo
- * Boots Anti Dandruff shampoo
- * Dove shampoo

- * Elvive nutri gloss crystal shampoo
- * Aussie Miracle shine shampoo
- * Vo5 Revive me daily shampoo

24. Please select any products you buy once a month or more.

- * Coco Pops
- * Special K
- * Lurpak
- * Stork
- * Head and Shoulders
- * Herbal Essences
- * Mc Vitie's Rich Tea
- * Choco rice cereal
- * Vo5 Revive me daily
- * Belmont digestives
- * Just Right
- * Pure sunflower spread
- * Mc Vitie's milk chocolate digestives
- * Mc Vitie's original digestives
- * Kellogs Cornflakes cereal
- * Harvest Mom Benefit cereal
- * Belmont Rich Tea biscuits
- * Mc Vitie's Ginger Nuts
- * Bertolli with butter
- * Dorset cereal
- * Weetabix
- * Aussie's miracle shine shampoo
- * Oaties
- * Boots Anti Dandruff shampoo
- * KitKat
- * Tesco My Senses shampoo
- * Norpak butter
- * Greenvale perfect for cakes spread
- * Elvive nutri gloss crystal shampoo
- * Dove shampoo
- * Anchor Light spreadable butter
- * None of the above

25. Please state how much you agree or disagree with the following statement:

Strongly disagree Disagree Indifferent Agree Strongly agree

- It would concern me if the packaging of a grocery item suggested that the item is similar to a long established make or brand when actually it is not
- I do not find it difficult to distinguish between items that are similar to a long and established brand and items that are not

26. Across all of the products you buy, have you ever mistakenly or accidentally purchased a 'lookalike', thinking you were buying the branded/own branded version or the product?

Yes, once or twice Yes, a few times Yes, frequently No, never Don't know Other
(please specify)

27. How did you feel about purchasing a 'lookalike' brand?

Satisfied Surprised Confused Frustrated Angry Neutral Other (please specify)

28. Across all of the products you buy, do/have you ever deliberately purchased a 'lookalike'?

Yes, once or twice Yes, a few times Yes, frequently No, never Don't know Other
(please specify)

29. Why did you buy it?

- Brand
- Price
- Quality
- To compare with another brand Performance of product
- I don't know
- Other (please specify)

30. Out of the tasks in the eye tracking session, how difficult did you find them? Please rank them in order (1 = Most difficult, 4 = Least difficult)

- Full colour in focus
- Full colour blurred
- Black and white in focus
- Black and white blurred

31. Is there anything else you would like to add about your participation in this research?

Appendix 2 – Questionnaire Results

The following PDF contains the full set of responses to the post eye-tracking questionnaire



Acrobat Document

Acuity Intelligence Ltd. Is a company registered in England number 7721205
VAT Number: GB 122 1137 73
Davidson House, Forbury Square, Reading, RG1 3EU, United Kingdom
Tel. +44 (0) 118 9000 795 Fax. +44 (0) 118 919 5095 Email. sales@acuity-intelligence.com
For full terms & conditions please see our website at www.acuity-intelligence.com