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Unsold is unseen ... or is it? Examining the role of peripheral vision in the consumer choice process using eye-tracking methodology

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abstract

In visual marketing, the truism that “unseen is unsold” means that products that are not noticed will not be sold. This truism rests on the idea that the consumer choice process is heavily influenced by visual search. However, given that the majority of available products are not seen by consumers, this article examines the role of peripheral vision in guiding attention during the consumer choice process. In two eye-tracking studies, one conducted in a lab facility and the other conducted in a supermarket, the authors investigate the role and limitations of peripheral vision. The results show that peripheral vision is used to direct visual attention when discriminating between target and non-target objects in an eye-tracking laboratory. Target and non-target similarity, as well as visual saliency of non-targets, constitute the boundary conditions for this effect, which generalizes from instruction-based laboratory tasks to preference-based choice tasks in a real supermarket setting. Thus, peripheral vision helps customers to devote a larger share of attention to relevant products during the consumer choice process. Taken together, the results show how the creation of consideration set (sets of possible choice options) relies on both goal-directed attention and peripheral vision. These results could explain how visually similar packaging positively influences market leaders, while making novel brands almost invisible on supermarket shelves. The findings show that even though unsold products might be unseen, in the sense that they have not been directly observed, they might still have been evaluated and excluded by means of peripheral vision. This article is based on controlled lab experiments as well as a field study conducted in a complex retail environment. Thus, the findings are valid both under controlled and ecologically valid conditions.

1. Introduction

A truism in visual marketing is that “unseen is unsold,” which means that a product that customers do not notice will not be sold. This concept rests on the idea that the consumer choice process is strongly influenced by visual search of information. Extensive research (e.g., Clement, 2007; Orquin & Loose, 2013; Pieters & Warlop, 1999) shows that this is indeed the case. Thus, since the consumer choice process relies heavily on visual input, it can be investigated by examining customers’ visual attention, defined as the processes involved when visual information is filtered and

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behavior literature have admittedly investigated several important aspects pertaining to the role of peripheral vision in visual search (e.g., Duncan & Humphreys, 1989; Findlay, 1997; Wolfe, 1994); however, as far as can be ascertained, no studies have examined the extent to which customers can exclude products without having to look directly at them (i.e., how their use of peripheral vision can guide which products in a supermarket shelf they will instantly filter out and which they will process more carefully). Therefore, the aim of the present research is to explore how peripheral vision guides attention during the consumer choice process. To summarize, the research questions addressed in this article are:

1. Do customers use peripheral vision in goal-directed search during the consumer choice process to discriminate between task-relevant and task-irrelevant stimuli (hereinafter referred to as targets and non-targets)?
2. Does such presumed use of peripheral vision enable customers to exclude non-targets without directly looking at them?
3. Do the saliency of non-targets and the similarity between targets and non-targets interfere with such potential reliance on peripheral vision?
4. Does the presumed use of peripheral vision generalize from instruction-based laboratory tasks to preference-based choice tasks under ecologically valid conditions in a real supermarket setting?

2. Theoretical framework

According to Broadbent’s (1958) selective filter theory, people only have a limited capacity to process the huge amount of information that enters their sensory channels, which means that they select the stimuli that are to be further processed quite quickly. Therefore, in order to cope with the myriad of sensory input, all stimuli are initially processed in a preattentive manner for basic, information that enters their sensory channels, which means that they only have a limited capacity to process the huge amount of information based on goals, needs, or desires (i.e., top-down factors; Orquin, Bagger, & Loose, 2013) also acts as a strong driver of attention (Driver, 2001), but may be influenced by, and sometimes compete with, salient bottom-up factors. Later research (e.g., Lachter, Forster, & Ruthruff, 2004; Parkhurst et al., 2002) has confirmed the central tenets of the selective filter theory, including its stage model view of attention comprising initial processing of all stimuli, filtering of irrelevant stimuli, and the selection of potentially relevant stimuli for further processing. Such a stage model conceptualization is also a fundamental part of the consumer choice process.

Previous research suggests that consumer choice is a multi-stage process involving screening and choice (Andreas & Currim, 2009; Neelamegham & Jain, 1999; Shocker, Ben-Akiva, Boccara, & Nedungadi, 1991). During the screening phase, inappropriate alternatives are eliminated from further consideration (Andrews & Srinivasan, 1995; Glaholt & Reingold, 2009) resulting in a subset of all available products. By only evaluating this subset, the decision making process is vastly simplified (Bettman, 1979; Johnson & Payne, 1985). Indeed, given estimations that an ordinary supermarket contains between 30,000 and 50,000 products (Sorensen, 2009), a successful elimination of products that are irrelevant for the customer’s current task or goal is vital to reduce complexity and allocate attentional resources properly.

In their seminal eye-tracking study, Russo and Leclerc (1994) identified three stages in the consumer choice process – orientation, evaluation, and verification – with visual attention varying over these stages. In short, the orientation phase results in a set of possible choice options; that is, a consideration set (Nedungadi, 1990). During the evaluation phase, the products that best fits the goal of the customer will be identified in this set (van der Laan et al., 2015). The validity of this evaluation will then be confirmed during the verification phase. The inclusion and exclusion of products into the consideration set is especially interesting as these processes rely on visual search to discriminate between target and non-target products (cf. Findlay, 1997), with the target products being relevant for the customer’s current task or goal.

Previous research has shown that product inclusion into consideration sets is driven by both out-of-store factors, like shopping goals and brand experiences (Chandon, Hutchinson, Bradlow, & Young, 2009), and in-store factors, such as priming of in-store marketing material (Otterbring, Wastlund, Gustafsson, & Shams, 2014), placement of verbal and pictorial packaging elements (Otterbring, Shams, Wastlund, & Gustafsson, 2013), and visual design features such as shape and contrast (Clement, Kristensen, & Grienhaug, 2013). To the best of the authors’ knowledge, however, no studies in the food science literature have examined the extent to which products can be excluded from consideration sets without reliance on the customer’s focal vision (i.e., vision within the central two degrees of vision that provides a detailed representation of an object; Slagbuis & Thompson, 2003).

To address this gap in the literature, the authors proceed as follows. First, a lab-based eye-tracking experiment is presented (Studies 1A and 1B), in which the role and limitations of peripheral vision is investigated in discriminating between targets and non-targets. Specifically, it is examined whether peripheral vision is used in goal-directed search during the consumer choice process, thus enabling individuals to exclude non-targets without directly looking at them through their focal vision. Moreover, it is investigated whether the saliency of non-targets and the similarity between targets and non-targets can interfere with such presumed reliance on peripheral vision. Second, the results of a field experiment in an actual supermarket are reported, where the authors test the validity and real-world implications of the lab-based findings, again by means of eye-tracking methodology (Study 2). Before closing, the theoretical and managerial implications of the results are highlighted, after which the key content is summarized in a conclusion. Finally, the authors acknowledge some limitations of their work and offer fruitful directions for future research. As far as can be ascertained, this is one of the first eye-tracking studies to examine the role of peripheral vision in actual field settings. Thus, the article contributes to the growing stream of eye-tracking research examining how customers’ use of visual attention can guide their subsequent choice behavior, purchase decisions, and product preferences (for some other notable examples from the food science literature, see Blakova et al., 2014; Nijs, Muris, Euser, & Franken, 2010; Van Herpen & Van Trijp, 2011).

3. Study 1A – the role of peripheral vision in goal-directed visual attention and the effect of saliency

The main objective of Study 1A was to investigate the role of peripheral vision in goal-directed visual attention (that is, the voluntary allocation of attention towards the objects that are most informative for the individual’s current goal or task; van der Laan
et al., 2015). More precisely, the study aimed to examine whether individuals can exclude task-irrelevant stimuli (non-targets) without directly looking at them, and therefore devote a larger share of their visual attention on task-relevant stimuli (targets) by means of peripheral vision. If peripheral vision has no influence in the exclusion process of non-targets, individuals should have to look directly at every single stimulus (using their focal vision) before being able to exclude those that are irrelevant for the current task. The result should be an equal number of viewings on targets and non-targets. On the other hand, if peripheral vision guides exclusion of non-targets, individuals should not have to look directly at such stimuli in order to exclude them. This should result in a larger number of viewings on targets. The main hypothesis was that individuals should indeed be able to efficiently exclude non-targets through the use of peripheral vision without directly looking at them. However, given that recent eye-tracking research shows that salient non-targets “steal” visual attention from task-relevant stimuli, thereby resulting in decreased visual attention towards the actual targets (e.g., Zhang & Seo, 2015), it was predicted that the presence (versus absence) of a salient non-target would make this process more difficult (cf. Parkhurst et al., 2002).

3.1. Participants, design, and procedure

A total of 101 undergraduates (59 percent female; \( M_{\text{age}} = 24.6, SD = 5.7 \)) participated in a lab-based eye-tracking study at a European university. Participants were recruited in an on-campus cafeteria, and were asked if they would be willing to take part in a study on vision that required performing a series of visual attention tasks without wearing glasses. All participants included in the study had normal or corrected-to-normal vision (none wore glasses, but some wore contact lenses). Each participant spent approximately 15 min performing a number of short tasks. The first of the two tasks relevant to this study was presented early on in the experiment (Study 1A) and the second task was presented later (Study 1B), with several filler tasks in between.

The study used a three-group between-subjects design, with participants randomly assigned to one of three treatment groups. Given that an individual’s current task has been found to influence goal-directed visual attention (van der Laan et al., 2015), goal-directed attention was manipulated by means of task instructions. The study aimed to examine the extent to which it is possible to discriminate between targets (circles for group 1 and triangles for groups 2 and 3) and non-targets through peripheral vision, and also investigate the effect of a salient non-target (red circle for group 3) on visual attention. To this end, participants were asked to count the number of targets that they could find on the image projected; see Fig. 1.

There were 14 circles and 14 triangles in the image and the diameter of the circle was the same size as the length of each side of the triangle. The projected sizes of the geometric figures were 9 cm (3.54 inches). The order and distance between the geometric figures were spread across the image and fixed in position between participant and group. The only variation in the image was for participants in group 3, who had one circle swapped from black to red. To increase the accuracy of the recordings, the 28 geometrical figures were positioned away from the extremities of the screen towards the center.

3.2. Eye-tracking apparatus and measurements in the lab

Visual attention was measured by means of eye tracking, which is a method less influenced by response bias than various self-report measures (Otterbring, Wåstlund, & Gustafsson, 2016; Shams, 2013) that has recently started to be used in retail research and food science (Behe, Bae, Huddleston, & Sage, 2015; Clement, Aastrup, & Forsberg, 2015; Greenacre, Martin, Patrick, & Jaeger, 2016; Guyader, Ottosson, & Witell, 2017). Eye movements were recorded with a binocular eye-tracker (Tobii X120) with 0.5° accuracy and 120 Hz sampling frequency. The stimuli were projected on a high-resolution (1280 × 800) display (100 × 63 inches) located 280 cm (110 inches) from the participant; see Fig. 2. The eye-tracker was calibrated for each participant using a nine-point calibration procedure. The accuracy of the recordings was assessed in the calibration process through ocular inspection of each participant’s calibration quality. To increase the accuracy, participants with less accurate calibrations were recalibrated until perfect calibration was achieved. When participants had missing or inaccurate calibration points after 5 consecutive calibrations, they were excluded from the study based on low accuracy.

To reduce the variance caused by small inaccuracies, the area of interest around each figure was extended to 20 percent larger than...
the figure, hence including any inaccurate fixations within that range. The areas of interest were not overlapping with neighboring areas, thus only including the fixations within the specific area of interest.

Eye movements can be expressed as ‘fixations’ and ‘saccades’ (Duchowski, 2007; Holmqvist, et al., 2011). Fixations occur when the eyes rest for a short moment and visual information is gathered, and saccades are fast eye movements between fixations (Duchowski, 2007; Holmqvist, et al., 2011). The measurement used in the current investigation is observation count, which is the aggregated number of times an area has been observed. Hence, if a participant looks back and forth between options, this generates observation count. However, as long as the participant is continuously fixation within an area, there are no additional observations until the participant looks outside the area and then moves back into it again. Therefore, the re-fixation of an area counts as an observation.

3.3. Results and discussion

The results showed that the average proportion of observations on the target stimuli was 77 percent for group 1, 76 percent for group 2, and 65 percent for group 3 (the group with one salient non-target); see Fig. 3. A one-sample Wilcoxon signed-rank test showed that the proportions of observations on the targets in groups 1 and 2 (M = 0.76, SD = 0.13) were significantly higher (W(67) = 2338.50, p < 0.001) than what could be assumed by chance. Thus, participants could indeed exclude non-targets through reliance of peripheral vision without directly looking at those stimuli. Furthermore, an independent samples Kruskal–Wallis test revealed that salient non-target had a significant (W(2) = 10.77, p = 0.001) effect on the proportion of observations on the target. Follow-up Bonferroni-adjusted pairwise comparisons showed that the inclusion of the salient non-target in group 3 significantly lowered observations on targets compared to groups 1 and 2 (p’s < 0.05), whereas the latter two groups did not differ significantly (p > 0.05). Thus, in line with recent research in food stimuli, with one target product (breakfast cereals) and one of three non-target products (baking flour, coffee, or fruit punch; see Fig. 4). As in Study 1A, the participants’ task was to count the target products. Thus, Study 1B aimed to test whether the exclusion of non-targets by means of peripheral vision generalizes from geometric figures to food products, and to examine whether the effectiveness of this process decreases as the non-targets become more similar to the targets.

4. Study 1B – the role of peripheral vision in goal-directed visual attention for food products and the effect of similarity

In an ordinary grocery store, the visual designs of products and brands are certainly not as differentiated as the circles and triangles used in Study 1A. Therefore, instead of using simple geometric figures, the images shown to participants in Study 1B contained food stimuli, with one target product (breakfast cereals) and one of three non-target products (baking flour, coffee, or fruit punch; see Fig. 4). In an ordinary grocery store, the visual designs of products and brands are certainly not as differentiated as the circles and triangles used in Study 1A. Therefore, instead of using simple geometric figures, the images shown to participants in Study 1B contained food stimuli, with one target product (breakfast cereals) and one of three non-target products (baking flour, coffee, or fruit punch; see Fig. 4). As in Study 1A, the participants’ task was to count the target products. Thus, Study 1B aimed to test whether the exclusion of non-targets by means of peripheral vision generalizes from geometric figures to food products, and to examine whether the effectiveness of this process decreases as the non-targets become more similar to the targets.

4.1. Participants, design, and procedure

The participants, experimental design, and procedures were all identical in Studies 1A and 1B. As in Study 1A, Study 1B used a three-group between-subjects design, with experimental condition as the between-subjects factor. The three groups differed in regards to visual and conceptual similarity between the target (breakfast cereal) and non-target products. The most dissimilar non-target product was fruit punch (both visually and conceptually divergent), followed by coffee (visually similar but conceptually divergent), and baking flour (visually and conceptually similar). Thus, the selection of these particular non-targets was deliberate, as their degree of visual and conceptual similarity with the targets implies that they would be differentially easy to exclude by means of peripheral vision.

The position and size of the breakfast cereal targets were kept constant over the three groups. The size of the alternative non-targets was kept proportional in relation to each other within the specific product category. To reduce visual bias due to size variation between target and non-targets, the fruit punch, coffee, and baking flour packages were enlarged to have approximately the same surface size as the target products. In relation to the geometrical figures in Study 1A, the targets were positioned on the triangles and the non-targets on the circles. The size of the targets and non-targets were somewhat larger than the size of the triangles and circles. In order to erase any possible exposure effects from Study 1A, participants completed five filler tasks (with a total duration of 3–5 min) before the exposure to the food stimuli of Study 1B.

4.2. Results and discussion

The average proportion of observations on the target stimuli was 84 percent in the least similar condition (fruit punch); however, this proportion was markedly lowered in the more similar conditions, with 55 and 51 percent of observations on the targets in the coffee and baking flour conditions, respectively; see Fig. 5. One-sample Wilcoxon signed-rank tests showed that the proportions of observations on the targets compared to the actual 50 percent proportion that would be assumed by chance where significantly higher (W(32) = 228.00, p < 0.001) for fruit punch (M = 0.84, SD = 0.09) and coffee (W(32) = 335.00, p = 0.001) (M = 0.55, SD = 0.08), but not for baking flour (W(35) = 268.50, p = 0.270) (M = 0.51, SD = 0.05).

Furthermore, an independent samples Kruskal–Wallis test (W(2) = 63.12, p < 0.001) and follow-up Bonferroni-adjusted pairwise comparisons showed that the proportion of observations on the targets was significantly higher (p’s < 0.001) in the less-similar non-target group (fruit punch) than in the other non-
target groups (coffee and baking flour). There was also a directionally, albeit not significantly \((p = 0.078)\), larger proportion of observations on the targets in the coffee group (visually similar but conceptually divergent to the targets) compared to the baking flour group (visually and conceptually similar to the targets), consistent with previous research on more basic stimuli (e.g., Duncan & Humphreys, 1989).

Taken together, the results of Study 1A and 1B show that attention is directed by peripheral vision and that it is indeed possible to exclude non-targets without looking directly at them. However, this effect diminishes by visual saliency (Study 1A) and similarity (Study 1B) between targets and non-targets. In fact, the results from Study 1B showed that participants could no longer discriminate between both conceptually and perceptually similar targets and non-targets, thus clearly showing a boundary condition for this effect. However, given that counting the number of targets in lab-based settings is not equivalent to making a preference-based choice at the supermarket, Study 2 investigated the ecological validity of these findings in an actual field setting.

**5. Study 2 — investigating the role of peripheral vision in the supermarket**

In addition to the differences in conducting a search task in a lab vis-à-vis a preference-based choice in a supermarket, the limitations of using photos as stimuli in food research have also been noted (Shen, Wan, Mu, & Spence, 2015). Thus, in order to ensure ecological validity, and hence investigate the role of peripheral vision in goal-directed visual attention in a real grocery store, Study 2 was conducted as an eye-tracking field experiment in a local supermarket. Rather than recruiting undergraduates to perform a search task in a lab facility, Study 2 involved ordinary customers and was conducted in a real supermarket. It should be noted that the study was advertised at the university and that participants were given a 5 percent discount voucher for participating in the study. Even though this led to a deflated mean age in the study, all participants where actual customers, who were asked to select a product from a shelf as they would have done if it had been on their shopping list.

**5.1. Participants, design, and procedure**

A total of 56 customers (39 percent female; \(M_{\text{age}} = 22.5, SD = 2.4\)) participated in the study, which was conducted as a field experiment at a European grocery store. The customers were given a short shopping list containing five products, which were later to be used for making sandwiches. They were instructed to choose products as if they were to participate in the fictive making of sandwiches. This procedure was used in order to focus the customers’ attention on a few selected products instead of allowing them to search for whatever product they were in the store to purchase. One of the items on the shopping list was sandwich meat, which was available on two different shelves. Customers were free to make a choice from either shelf according to their own preferences. The main difference between the two shelves containing sandwich meat was the degree to which the target and non-target products differed visually and conceptually. One of the shelves contained sandwich meat on the shelf’s left-hand side and an assortment of pickled products on the right-hand side (both visually and conceptually divergent), whereas the other shelf contained two differently designed packages of sandwich meat (slightly visually divergent but conceptually similar) on either side; see Fig. 6. In the shelf containing sandwich meats and pickles all the former were considered as targets and all the latter were considered as non-targets. Thus, in this shelf target and non-target products were defined by the task. In the shelf containing two types of sandwich meat, target and non-target products were categorized based on the choice of each individual customer. In this case, the target was thus not defined by the task itself, but rather by the preference of the customer. In line with previous research on the multi-stage consumer choice process (Andrews & Currim, 2009; Shocker et al., 1991) and the findings of Russo and Leclerc (1994), the analyses were focused on the first (orientation) and first (choice) parts of each customer’s scan path.\(^1\)

**5.2. Eye-tracking apparatus and measurements in the field**

Eye movements were recorded using Tobii Glasses head-mounted eye-tracking system (2° accuracy, 30 Hz sampling

\(^1\) A simplified version of the coding scheme proposed by Russo and Leclerc was used and the analysis is based on the six first and six last observations rather than on re-observations. The six first observations (the orientation phase) were counted from the first clear observation when the customer was facing the shelf and the six (the choice phase) last were counted backwards from the point at which the customer selected an alternative.
frequency). The calibration procedure followed the requirements of the manufacturer using the IR-beacons and performing a nine-point calibration. Similar to the lab study, customers with bad calibrations were excluded after several consecutive recalibration attempts.

The coding scheme was based on a grid that was positioned on a static image of the shelves and all observations were coded individually on the images. Each part of the grid was defined as an individual area of interest and the observations were coded on those areas. Thus, eye-movements from one area to another generated an observation. All coding of the field experiment was based on the raw data and aggregated in terms of observations. By using observations as units of analysis, the coding was thoroughly simplified. The coding process was done by a research assistant, unbeknownst to the purpose of the study, with supervision from an expert in eye-tracking methodology.

5.3. Results and discussion

In order to investigate visual attention on targets (sandwich meat) in the shelf containing assorted pickles, a one-sample Wilcoxon signed-rank test was conducted comparing the proportion of observations on targets with the actual proportion of targets in the shelf. If customers’ visual attention was randomly distributed, there would be a proportional amount of observations on targets (sandwich meat) and non-targets (pickles). However, if attention was guided by peripheral vision, the result would be more observations on possible target products. Supporting this latter assertion, customers did indeed observe significantly ($W(11) = 75.00, p = 0.003$) more possible targets ($M = 0.78, SD = 0.04$) than non-targets ($M = 0.56, SD = 0.28$); see Fig. 7.

On the shelf containing two types of sandwich meats, the meats were categorized as targets or non-targets based on the customers’ final choice. Thus, all products that were visually similar to the chosen product were coded as possible target products. The results of a one-sample Wilcoxon signed-rank test showed that customers observed directionally, but not significantly ($p = 0.106$), more target products ($M = 0.57, SD = 0.30$) than the actual distribution (0.5) during the observation phase. For the choice phase, however, a similar analysis revealed that customers observed significantly more ($W(44) = 548.00, p = 0.003$) possible targets ($M = 0.78, SD = 0.04$) than non-targets ($M = 0.56, SD = 0.28$); see Fig. 8.

Comparing this result from the two shelves containing sandwich meats corroborates the finding of Study 1B that visual similarity of target and non-target products diminishes the possibility to exclude non-target products based on visual information acquired through peripheral vision.

6. General discussion

The results of this study have led to three main findings. First, peripheral vision is used to direct visual attention when discriminating between target and non-target objects in an eye-tracking laboratory. Second, target and non-target similarity, as well as visual saliency of non-targets, constitute the boundary conditions for this effect. Third, this effect generalizes from instruction-based laboratory tasks to preference-based choice tasks in a real supermarket setting ensuring ecological validity.

6.1. Theoretical implications

At a general level, the aim of the present article was to investigate the visual process by which customers select a product from a supermarket shelf while only looking at a subset of the available products (Hoyer, 1984; Nedungadi, 1990). The experiments were designed to test if goal-directed visual attention is guided by
peripheral vision during target selection and, if so, identify boundary conditions for this effect. In all three studies, participants looked directly at more targets than non-targets. The only feasible explanation for this result is that peripheral vision is used to discriminate between targets and non-targets and that this information is then used to determine the direction of the subsequent saccadic eye movement. This result seems to be a plausible explanation of how customers can select a product from a supermarket shelf by directly observing only at smaller portion of all available options (Hoyer, 1984). Thus, non-targets can be excluded from the consideration set (Nedungadi, 1990) without being looked at directly by means of focal vision.

Furthermore, the results show that both saliency and similarity serve as boundary conditions for the possibility of directing visual attention based on peripheral vision. The inclusion of a visually salient non-target inhibited the possibility for participants to let their peripheral vision exclude non-targets, which corroborates previous research on attention to food products (Zhang & Seo, 2015). Additionally, the findings reveal that visual and conceptual similarity also reduce the possibility to exclude non-targets based on peripheral vision. However, contrary to saliency, which relies on the pop-out effect attracting involuntary attention (Treisman & Gelade, 1980), similarity requires higher levels of attention to discriminate between targets and non-targets. In fact, the results from Study 1B suggests that while a certain degree of similarity (perceptual or conceptual) might enable customers to discriminate between target and non-target products without looking directly at them, this is not true when non-target products are both perceptually and conceptually similar. Lastly, the results from the lab-based studies were replicated in a supermarket in order to ensure ecological validity. The results of the field study confirm the finding that peripheral vision guides visual attention during the consumer choice process. This may help to explain previous research (van der Laan et al., 2015) showing that participants tend to direct a larger share of their visual attention on chosen (versus non-chosen) food items.

6.2. Managerial implications

From a practical perspective, it is noteworthy that fewer than 10 percent of the observations fell on the non-targets during the initial orientation phase on the shelf containing non-target products that were both perceptually and conceptually divergent in the field study. This indicates that products that are too dissimilar to products of interest are practically invisible in the supermarket shelf. Conversely, similar products have a chance of being included into the consideration set during the orientation phase. However, once the consideration set is defined, peripheral vision guides attention away from non-considered products. Nearly 80 percent of the observations in the field study fell on considered products during the latter part of the decision-making process. Thus, the results show how the creation of consideration sets relies on both goal-directed attention and peripheral vision. These findings help to explain the underlying process of how sets of visually similar packaging have a positive effect on market leaders, while simultaneously making novel brands almost invisible in the supermarket shelf. From the perspective of the market leader, this highlights the importance of a distinct visual appearance of the brand across product categories. At the other end of the spectrum, the results show the effectiveness of novel brands piggybacking on customers’ mental models of the visual style of already established products with which they want to compete. Taking a step back from the shelf and looking at a product category level, the findings reported herein explicate how merging conceptually similar products and product categories might facilitate customers’ in-store navigation while simultaneously making it more difficult to identify the product of interest. This furthers the case for explicit in-store signage to facilitate customer decision making at the point of purchase.

6.3. Conclusion

This article contributes to the growing body of literature investigating how customers’ visual attention influences their product preferences, purchase decisions, and actual choice behavior in various consumption settings, such as when shopping for groceries in a supermarket or deciding what to order at a restaurant while looking through the food menu. Taken together, the results show that even though unsold products might be unseen in the sense that they have not been directly observed through focal vision, they might still have been evaluated and excluded by means of peripheral vision. This finding is based on controlled lab experiments as well as a field study conducted in a complex retail environment. Thus, the results are valid both under controlled and ecologically valid conditions.

6.4. Limitations and further research

A possible confound in the field study pertains to the reliance on a shopping list instead of customers’ real shopping goals. Thus, even though customers in the field study were instructed to perform a specific task as if it was their own shopping goal, they might have based their choices slightly more loosely on their own preferences compared to if the items on the shopping list would have been based on their personal needs or shopping goals. Notwithstanding this potential limitation, the shopping list procedure utilized in the present research has been successfully used in previous field-based eye-tracking studies (e.g., Wästlund, Otterbring, Gustafsson, & Sham, 2015), and the decision to give customers an identical shopping list was made in an attempt to have them take roughly the same route around the store, thereby increasing the experimental rigor and control.

Albeit beyond the scope of this article, the findings do not explicitly say where, when, and how non-targets are filtered out by means of peripheral vision. Rather, the studies sought to examine if customers are able to exclude non-targets above chance level simply by using their peripheral vision or whether they would need to rely on their focal vision in order to successfully select which products to filter out and which to process further. Thus, a suggestion for future research would be to more specifically investigate the filtering process underlying the results reported in this article. Another factor requiring attention regards the selection of target and non-target stimuli in the present studies. As noted by an anonymous reviewer, it is unlikely that the target (breakfast cereals) and non-target products (fruit punch, coffee, or baking flour) would be located on the same shelf in a store. Thus, although the decision to use these particular targets and non-targets was deliberate due to their visual and conceptual (dis-)similarity, the selection of these stimuli may limit the ecological validity of Study 1B. However, it should be noted that one of the actual shelves in the field experiment contained vastly divergent products (sandwich meats and assorted pickled products). Nevertheless, a fruitful avenue for future research would be to select a variety of brands within a given product category to strengthen the ecological validity further.

Ethical statement

This research was conducted in accordance with guidelines of the local IRB as well as the principles expressed in the Declaration of Helsinki.