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# **Memory enhances the Mere Exposure Effect**

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## **Abstract**

The fact of having already encountered something inclines us to prefer it in the future, a phenomenon known as the Mere Exposure Effect (MEE). There is a widely accepted view that recognition inhibits the MEE. We contest this view, questioning the generality of the findings upon which it is based. We present new evidence from a systematic investigation of the moderating influence of recognition memory on the MEE, using brand logo stimuli and methods that make our results directly applicable to marketing practice. We show that recognition, whether correct or mistaken, enhances, rather than inhibits, the likelihood of preference.

**Keywords:** Mere exposure effect, memory, brand recognition, choice, preference

## **Introduction**

The mere exposure effect (MEE; Zajonc, 1968) is that exposure to a stimulus, without any reinforcement, tends to enhance liking of that stimulus. It is typically found after brief, repeated exposures to an audience with low levels of attention and involvement; conditions that often characterize our increasingly cluttered media and consumption environments (Ha & Litman, 1997; Skinner & Stephens, 2003). Given that consumers are often engaged in tasks that occupy attention and severely limit their engagement with advertising (MacInnis, Moorman & Jaworski, 1991; Shapiro *et al.*, 1997), it is potentially of great relevance to understanding, explaining and influencing the effects of contemporary marketing communication (Bornstein & Craver-Lemley, 2004; Grimes, 2008). Its efficacy in this domain, however, is dependent on a detailed understanding of the factors that enhance and constrain the size of the effect.

Significant reviews of the MEE have identified recognition memory as the most important limiting factor, considerably reducing the size of the experimental effect (see Bornstein, 1989; Bornstein & Craver-Lemley, 2004). Historically, this claim has been influential in the interpretation of the MEE in the marketing literature. The natural implication is that the effect is strongest when consumers are not able to recognise items they have been exposed to. This is contrary to traditional assumptions regarding the importance of attention, engagement and memory in marketing communication, and raises the spectre of 'hidden persuasion' (Packard, 1957). An early, impressive demonstration of the MEE without conscious perception, and thus without memory, for the exposed stimuli has reinforced the impression that exposure of which consumers are unaware is at the core of this phenomenon (Kunst-Wilson & Zajonc, 1980). It is because

of these factors, we believe, that there has been an underestimation of the importance and ubiquity of the mere exposure effect in the marketing literature.

In this paper we wish to call into question the validity of the claim that recognition memory diminishes the size of the MEE. Our review of the literature suggests that the foundations for this claim are weak and that, rather than there being a consensus, the influence of recognition memory remains an open empirical question and a central point of contention between competing theories of mere exposure. Indeed, we contend that the issue of how both veridical recognition and the subjective experience of memory influence the MEE is crucial to deciding between theories of this phenomenon. Furthermore, it is of practical importance to the effective and appropriate application of the MEE in a marketing context. From a practitioner perspective, the question is simple: *will attention, engagement and subsequent stimulus recognition exert a positive or negative influence on the size of the MEE in marketing communication?*

Here we endeavour to provide an answer to this question by robustly examining the moderating influence of recognition memory in conditions that more closely approximate those of real-world environments. To be clear, it is not our intention to disentangle the relative influence of explicit versus implicit memory in the creation of the MEE, but rather to demonstrate that the effect is larger or smaller in the presence of recognition memory. From an applied perspective, we believe this to be the central issue for marketing practitioners and researchers. Whether the outcome we observe is due to the relative strength of explicit versus implicit processing or, perhaps, their cumulative effect (over that of implicit processing alone) is not a question that we seek to resolve. In

essence, therefore, the purpose of this paper is to compare the extent of exposure-induced preference (i.e. the MEE) in the presence and absence of recognition memory, with specific regard to the incidental but supraliminal exposure of typical marketing stimuli, in a social setting.

## **Literature Review and Theoretical Framework**

### ***Recognition, recollection and theories of the Mere Exposure Effect***

There are a number of competing psychological theories of how the MEE arises (Berlyne, 1970; Sawyer, 1981; Zajonc, 1980; Winkielman & Cacioppo, 2001; Stang, 1975; Sawyer, 1981; Mandler et al., 1987; Bornstein & D'Agostino, 1994). These have been characterised as 'affective' (Berlyne, 1970; Zajonc, 1980; Winkielman & Cacioppo, 2001) and 'cognitive' explanations (Stang, 1975; Sawyer, 1981; Mandler et al., 1987; Bornstein & D'Agostino, 1994), according to the dominant kind of processing that is assumed to underpin the MEE (Bornstein & Craver-Lemley, 2004). However, we note that it is also possible to categorise all of these theories according to whether they posit recognition as a facilitator (Berlyne, 1970; Stang, 1975; Sawyer, 1981; Winkielman & Cacioppo, 2001) or inhibitor of the MEE (Zajonc, 1980; Mandler et al., 1987; Bornstein & D'Agostino, 1992 1994).

A critical distinction here, it may be argued, is the extent to which the MEE is considered to be the product of implicit processing alone. Where this is proposed to be the case,

explicit recognition is deemed to be a hindrance to the MEE (Bornstein & D'Agostino, 1992, 1994). For example, the influential theory of *perceptual fluency/attribution* (Bornstein & D'Agostino, 1992, 1994) holds that the MEE occurs because previous exposure to a stimulus increases the ease with which it can be processed ('perceptual fluency') and that, in the absence of successful recognition, this fluency is misattributed to affect. On this basis, it is proposed that both accurate recognition and subjective recollection (even if not correct) hinder the extent to which misattribution occurs, and thus the size of the affect-bias. However, the assumption that the MEE is by necessity a product of implicit processes is not universally shared by the various competing explanations. For example, in providing support for the theory of *uncertainty reduction* (Sawyer, 1981) – which has enjoyed resurgent interest and support over the past decade (e.g. Lee, 2001b; Robinson & Elias, 2005) – Lee (1994: 271) succinctly explains it as follows:

“If subjects have been repeatedly exposed to the stimulus, then the learning following exposure, *in either conscious or nonconscious form*, should result in some uncertainty reduction toward the stimulus. Furthermore, if subjects are informed as to whether or not they have seen the stimulus before, this should also reduce some of the uncertainty that may accompany the task of evaluating the stimulus” (italics added)

From this perspective, therefore, recognition may be expected to *enhance* the size of the MEE. Similarly, this facilitating effect is also apparent in the *hedonic fluency model* (HFM; Winkielman & Cacioppo, 2001); a theory that has recently received empirical support over that of *perceptual fluency/attribution* in one of the most recent marketing-based studies of the MEE (Fang, Singh & Ahluwalia, 2007). The basis for the HFM is

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that the processing fluency created by mere exposure always gives rise to a genuine, positive affective reaction as it may, for example, relate to a feeling of confidence in having appropriate knowledge to deal with the stimulus (Bless and Fiedler, 1995; Schwarz, 1990), or a sense of achievement at having explicitly recognized and interpreted it (Carver and Scheier, 1990; Vallacher and Nowak, 1999). Whether as hindrance or help, therefore, the moderating influence of recognition memory is a crucial and contested element of the various competing theories of mere exposure.

### ***Contrasting evidence for the moderating influence of recognition memory***

Against this background, marketing-based mere exposure research has supported a number of different theories; including, for example, *uncertainty reduction* (Lee, 1994), *hedonic fluency* (Fang et al., 2007) and *perceptual fluency/attribution* (Shapiro, 1999, Lee 2002). But it is the latter of these that appears to underpin most treatments of the MEE in the wider marketing literature (e.g. Auty & Lewis, 2004; Matthes et al., 2007; Chatterjee, 2008; Pandelaere, Millet & den Bergh, 2010). This, we believe, stems from the traditional dominance of this explanation in psychological research (see Butler & Berry, 2004).

The credibility of the *perceptual fluency/attribution* theory is largely based on the fact that it purports to account for the findings of a small body of work in which stimuli are repeatedly presented below the threshold of conscious perception. In a meta-analysis of these results (and those of nearly 200 other studies) the MEE was observed to be considerably larger under conditions of subliminal exposure (Bornstein, 1989); it is this

finding that has since been interpreted as evidence that the conscious processes of recognition memory hinder the MEE (see Bornstein & D'Agostino, 1992, 1994; Bornstein & Craver-Lemley, 2004).

However, the validity of this interpretation, and indeed the findings themselves, may be challenged on three grounds. Firstly, it is founded primarily on the results of Bornstein's (1989) meta-analysis in which the size of the MEE was found to be significantly larger across 9 studies that had employed subliminal exposure techniques than in over 200 that had not. Indeed, Newell & Shanks (2007:104) observe that, beyond that provided by Bornstein & D'Agostino (1992), "there is little direct empirical evidence to substantiate the claim that 'subliminal' mere exposure effects are larger than supraliminal ones." Furthermore, it should be acknowledged that 'mere exposure' is, by its very nature, different to subliminal exposure; the former being specifically defined by Zajonc (1968: 1) as that which is "just perceptible." Secondly, whilst scarcely acknowledged in the literature, it is important to note that Bornstein's (1989) original interpretation of this particular aspect of his meta-analysis centred upon the possibility that participants were less likely to experience boredom and fatigue during experiments that employed a subliminal exposure phase; factors that have since been found to limit the size of the MEE (Bornstein et al., 1990).

Thirdly, and most strikingly perhaps, the dearth of direct empirical support for the attenuating influence of recognition memory on the MEE may be contrasted with emerging evidence to the contrary. Whilst there are a small number of marketing-based replications of the MEE in what appears to be the absence of recognition (Janiszewski,



1993; Shapiro & Krishnan, 2001; Fang et al., 2007), such findings are not universal. For example, Anand, Holbrook & Stephens (1988) found that the MEE occurs only in the *presence* of recognition; prompting the authors to claim that the MEE “increases with the accuracy of recognition” (Anand et al., 1988: 390). However, whilst these studies provide evidence for the MEE in either the presence or absence of memory, they do not constitute a direct test of the influence that memory exerts on the *size* of the effect. For this, it is necessary to look to the psychology literature. In this respect, there are a number of comparative studies that purport to show that the MEE is strongest when accompanied by recognition memory (Newell & Shanks, 2007; Wang & Chang, 2004; Yagi, Ikoma & Kikuchi, 2009). Furthermore, Lee (2001b) demonstrates that not only does objective recognition enhance affective response to previously exposed stimuli, but so too does the subjective experience of recognition (regardless of whether this impression is correct or not).

Finally, whilst Hansen & Wanke (2009) do not directly address the issue of whether or not recognition memory has a multiplicative influence on effect size, their detailed study of the degree to which the MEE is ‘driven’ by conscious and unconscious processes appears to suggest that it should neither enhance nor diminish the magnitude of what is essentially a non-conscious affect-bias. To some extent, therefore, this work might be considered to give rise to a third proposition regarding the moderating influence of recognition memory on the size of the MEE; i.e. that it is negligible. At the very least, however, it further contributes to the emerging case against the notion that recognition memory *diminishes* the MEE (Bornstein & D’Agostino, 1992; Lee, 2001a; Bornstein & Craver-Lemley, 2004).

In summary, therefore, we contend that the direction in which explicit memory moderates the MEE remains an open question that is of both theoretical and practical importance to psychologists and marketers. On the assumption that any study of moderating factors must first begin with replication of the phenomenon itself, however, we first propose that:

***H1.** Mere exposure to a novel brand logo will significantly enhance the rate at which it is preferred over an equivalent, non-exposed brand logo.*

Following this, and on the basis of theoretical (e.g. Sawyer, 1981) and empirical (e.g. Lee, 1994; Lee, 2001b; Wang & Chang, 2004; Newwell & Shanks, 2007) challenges to the notion that accurate recognition inhibits the MEE (e.g. Bornstein, 1989; Bornstein & D'Agostino, 1992, 1994) we propose that:

***H2.** The size of the MEE for novel brand logos will be **enhanced** by accurate recognition memory*

Finally, in response to emerging indications that that the MEE may also be magnified by the subjective experience of memory (Lee, 2001b; Wang & Chang, 2004), we predict that:

***H3.** The size of the MEE for novel brand logos will be **enhanced** by subjective confidence in recognition memory, regardless of accuracy.*

## **Methodology**

Our methodology is aligned to that of the original nonconscious mere exposure experiments of Kunst-Wilson & Zajonc (1980); although with the major changes that a) stimuli were exposed supraliminally, b) the exposure phase occurred over several weeks in the lectures of an introductory psychology course at a major university, and, c) the testing was done collectively in a lecture on the same course. At this stage, therefore, it is perhaps useful to discuss the nature of our experimental setting and how it supports the contribution that this study makes to the extant marketing literature.

### *Experimental setting*

The design of the experiment allows us to take advantage of the rigor of controlled experimental designs whilst combining them with some advantages of a naturalistic setting. It is not that a design which is in between a fully controlled lab-based experiment and a fully naturalistic observation study is without weaknesses, but rather that the quasi-naturalistic design affords certain advantages of both control and generalisability that cannot otherwise be obtained. Additionally, a great advantage of this design is that it allows us to test a relatively large number of people and so access greater statistical power in analysing our results.

The setting for the experiment was a routine course of weekly lectures, attended by participants as part of the undergraduate degree programme they had chosen to pursue. Lab-based studies of the MEE are often characterised by lone individuals processing abstract stimuli with high levels of expectation, concentration and wariness – in other

words, very different psychological conditions from those of the everyday media environments under which we suppose the MEE operates. In the context of this study, the main purpose is not necessarily to replicate a single, specific type of media space but rather to more broadly approximate some of the conditions under which mere exposure to brand logos might be expected to occur in a range of non-traditional media environments.

In this respect, the target stimuli are placed at the periphery of focally attended information that is not consumption related, but has been selected for processing by participants during a normal and routine aspect of their life. Furthermore, this processing takes place in a normal social setting in which each participant is accompanied by friends/peers and is located within an 'audience'. Under such conditions, and depending on the specific location of each participant and their interaction with the focal material, variation in the duration, frequency, angle and distance of exposure might be expected across the audience. Indeed, such variation is common in a wide range of real-world media environments; such as cinema, public TV venues and other outdoor/ambient advertising in crowded locations (e.g. train stations). As such, and by way of the greatly enhanced statistical power that is afforded by a relatively large sample, this study seeks to embrace natural variation in the nature of exposure as a context in which to test the robustness of the MEE. Finally, and given the long-standing rejection of subliminal advertising techniques (on the grounds of both ethics and effectiveness; see Broyles, 2006), it may be argued that mere exposure is most likely to occur as a result of brief switches in attention and/or peripheral processing in cluttered real-world environments (Ha & Litman, 1997; Skinner & Stephens, 2003). For this reason, the study seeks to

replicate some of the key conditions under which mere exposure might naturally occur, rather than to closely control for them in a contrived laboratory environment

However, whilst locating the study in the weekly lecture programme of student participants necessarily requires the relaxation of control over some elements, we retain control over many of the elements that are important for experimental tests of the MEE. The “two alternative forced choice” design mimics that of the canonical experiments of Kunst-Wilson and Zajonc (1980), allowing us to collect measures of recognition and preference that are inclusive of both explicit and implicit memory. We retain control of the exposure stimuli, which have not been seen before or after by the participants. Factors such as exposure frequency, duration and delay between exposure and test are also controlled or contained within a known range.

### *Participants*

These were those PSY101 students, from two consecutive years, who attended the lecture during which testing occurred. Our analysis includes only those who responded to 9 or 10 of both the memory and preference judgments, and who attended the previous lectures. Given this there were valid responses from 230 participants. 83% of the participants were female. The mean age was 18.81 years ( $SD = 2.44$ ).

### *Stimuli*

Stimuli were twenty brand logos adapted from samples provided by 3 logo design companies. These were selected to be typical of brand-logos that might be used for known products and services, but which would be unknown to participants. Sixty logos were pretested for recognition in terms of perceived association with an existing brand ('yes' or 'no') and how much participants liked them (on a 5-point scale from strongly dislike, through a neutral point to strongly like, henceforth 'intrinsic likeability'). Following this, twenty logos which had zero or very low brand recognition and similarly neutral intrinsic likeability were selected for use in the experiment (average likeabilities for the selected logos were in the range 2.62 – 3.31, with the average likeability being 2.98 and the distribution not being significantly different from 3 - i.e. neutral). Ten were used during the exposure phase, and then paired against the unexposed remaining ten in the test phase. We henceforth refer to previously exposed logos as 'targets', and their foils as 'distractors'.

### *Procedure*

The exposure phase occurred during the first three lectures of PSY101 ('Introduction to Psychology) on two consecutive years. In each of these lectures the logos were discretely placed in the upper right corner of the slides (see figure 1). Each logo was seen 9 times for an average of 117 seconds in total (standard deviation 28 seconds). No reference to the logos was made by the tutors, who gave their lectures as normal. No students queried the presence of the logos.

[figure 1 about here]

The test phase occurred in the middle of a subsequent lecture, three days after the last exposure. Responses were gathered from all attending students on that day using the ComTec Audience Response system. This involves each participant pressing buttons on a handset that wirelessly transmits their response to a centralised receiver. After some introduction the participants were familiarised with the system and some demographic data were collected (including questions about attendance at previous lectures). Because all participants were viewing the same display (the lecture theatre projection screen) it was not possible to individually randomise the order of stimulus presentation or to randomise pairing during testing, nor was it possible to individually vary the order of the memory and preference tests (as in Kunst-Wilson & Zajonc, 1980). Instead the memory and preference questions were asked in two blocks, with the order counterbalanced across the two years. In each block, participants were shown 10 pairs of logos (each containing a target and distractor) and were required to indicate which of the two they preferred/remembered (mirroring the 2AFC tests of Kunst-Wilson & Zajonc, 1980). In each case, participants were asked to respond as quickly as possible on the basis of their ‘snap reaction’. Following each recognition judgment, they were also required to report their level of confidence in its accuracy. Our dependent variable is thus mean preference proportion (with chance being 0.50). Our independent variables are stimulus exposure

(exposed vs novel), stimulus recognition (recognised vs not-recognised) and recognition confidence (sure vs half-sure vs guessing).

In each judgement block the ten targets were shown in a pseudo-random order and randomly paired with one distractor. The distractor logos were pseudo-randomly positioned on left and right so that the target was on each side in exactly half the cases. The choice pair was shown until responses had been collected from the majority of participants (less than ten seconds in all cases) and then a confidence rating was requested. After the first block of judgements a short pause was allowed and a reminder of the instructions was given before the remaining block. The targets were again presented in the same pseudo-random order but using different pairings with the distractors.

## **Results**

A first essential step is to check for the presence of the mere exposure effect in our data. Does exposure to the experimental stimuli make them more preferred than non-exposed stimuli? Bonferroni-corrected T-tests show that the mean preferred proportion of previously exposed logos was significantly above chance, for both the remember first (mean proportion 0.58,  $t(122)=5.946$ ,  $p<0.0001$ ) and the preference first (mean proportion 0.61,  $t(106)=9.691$ ,  $p<0.0001$ ) groups. This confirms the presence of the MEE (and thus H1): mere exposure to novel brand logos significantly enhances affective response, as measured by the rate at which they are preferred over non-exposed

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alternatives (Zajonc, 1968). At this point, it should also be noted that there were no significant differences between participants who answered the remember questions first, and those who answered preference questions first, and so for the remainder of the analysis we group the data. Overall, the recognition rate was also above chance (mean proportion 0.57,  $t(229)=6.165$ ,  $p<0.0001$ ).

The main analysis we present here differs from a standard ANOVA, so we will briefly explain the rationale behind it. Whilst an ANOVA test might be a conventional choice of statistical test for data like this, it is known that statistics on proportions rather than scalars are subject to some peculiarities that diminish the power of the technique (Jaeger, 2008). A superior analysis technique for proportions is that of mixed models logistic regression (for discussion see Jaeger, 2008 and Baayen, 2008). This technique allows us to combine dichotomous variables (such as whether a logo was recognized or not) with continuous variables (such as the intrinsic likeability of the logos) in predicting, for each preference judgement made by all participants, whether the target or the distractor logo would be chosen as preferred. If the predictor factors are significant in the model it shows that they have a separate influence, statistically, on preference judgements. As well as being a valid technique for use on proportions, this technique allows us to conveniently and concurrently test the influence of multiple factors, as well as the ones of primary theoretical interest.

In this case we are primarily interested in how recognition and recognition confidence influence preference judgements. We also include measures of the intrinsic likability of logos involved in the preference judgements. Although all logos in the experiment had approximately equivalent intrinsic likeability scores, it was apparent that even those small

differences in intrinsic likeability that remained had an effect on preference judgements. We therefore included in our regression model the intrinsic likeability of exposed (target) logos and the intrinsic likeability of the non-exposed (distractor) logos in both the preference and recognition judgements.

[Table 1 about here]

The results of the mixed-models logistic regression are shown in Table 1. The analysis reveals highly significant effects of recognition on preference ( $\beta(\text{se}) = 0.46 (0.08)$ ,  $Z=5.29$ ,  $p<0.001$ ). Targets which were recognised were more likely to be preferred than those which were not recognised (confirming H2). This is a crucial test of the proposed inhibitory effect of recognition on the size of the MEE (see Bornstein, 1989; Bornstein & Craver-Lemley, 2004). Greater recognition confidence was also highly significantly associated with increased likelihood of preferring an item (confirming H3). Contrary to previous proposals, then, we find that recognition memory predicts enhanced – rather than inhibited – preference.

[Figure 2 about here]

It is insightful to show these results graphically, separating those logos that had been previously exposed and were judged as remembered ('correctly recognised') from those that had not been previously exposed but were judged as remembered ('falsely recognised'). The mean preference proportions for both correctly recognised and falsely

recognised logos are shown in Figure 2. Splitting the data this way allows us to clearly see that higher recognition confidence was associated with greater likelihood of preference. It also shows that an effect of recognition confidence occurs regardless of whether items have been previously seen or not. Conversely, there is an effect of exposure on preference which is independent of recognition (since the only difference between correctly and falsely recognised items is whether they have been exposed, and hence are eligible to be *correctly* recognised).

In addition to these effects there were also significant effects of the three likeability measures. Even though we selected our experimental logos for similar intrinsic likeabilities, remaining differences in likeability still had significant influence over preference judgements. Perhaps this is not surprising. For our purposes, the inclusion of these factors in the analysis assures us that the effects of recognition and recognition confidence are independent and not due to some non-random distribution of likeabilities across conditions.

## **Limitations**

As discussed above, the use of a quasi-naturalistic setting in this experiment means that we sacrifice a degree of control over some factors; i.e. precise exposure duration, ordering of exposure items, random selection of exposed and non-exposed items, random ordering of questions and responding conditions. Our feeling, however, is that these losses of control are compensated for by the high statistical power of the study and generalisability of the findings that comes from a quasi-naturalistic setting. Nonetheless,

it is important that we give due consideration to the possibility of increased variance (with the accompanying loss of statistical power) or systematic bias in the results.

In this respect it is first important to stress that, although higher non-systematic variance in our results might mean that we miss a true effect that is present, it does not lead to an increase in the probability that any of the effects we do find are not true effects. Furthermore, potential weaknesses in this respect are largely compensated for by the gain in statistical power that comes from testing a large number of people. More importantly, therefore, we might ask if the factors that our design caused us to relinquish direct control over (in comparison to lab studies) could plausibly cause systematic errors that could be truly responsible for the effects we found. In this respect, the most serious possibility is that preference-bias for exposed over non-exposed items is the result of intrinsic differences in the stimuli, rather than exposure itself. However, our pretesting of stimuli goes some way to accounting for a potential effect of intrinsic likability, as does our statistical analysis; which suggests that while there *is* an effect of intrinsic likability there are also additional independent effects (e.g. of recognition). More fundamentally, our investigation is concerned with the effect of recognition on preference, so systematic differences between items would have to specifically and solely affect this relationship to distort our results. This is hard to imagine. Similarly, it is hard to imagine how other factors, such as the order of questions (which we could not randomize across individuals), would systematically distort our findings on the effect of recognition on preference (recall that we did counterbalance order of tasks and found no differences between participants who made their preference judgments before or after those of recognition).

## **Discussion**

In this study we demonstrate the MEE in conditions that approximate key characteristics of the contemporary marketing environment: peripheral display of brand logos in a public place to an audience primarily engaged in another task. Replicating the measurement approach of Kunst-Wilson & Zajonc (1980), it is striking that previously exposed brand logos are preferred to unexposed brand logos. Exposure enhances preference in the presence and absence of recognition; though with greater strength in the former condition. However, it is important to acknowledge that unexposed brand logos that are mistakenly ‘recognised’ are preferred to unexposed brand logos that are not recognised. This suggests that although there is an affect of exposure that is independent of recognition, there is also an effect of recognition that is independent of exposure – in other words, logos that were recognised, even if incorrectly, tended to be preferred. For the purposes of this paper, however, the most important thing about this result is that recognition enhances preference when it is associated with mere exposure, and when it is not. Contrary to previous assumptions in the literature, therefore, recognition is not inhibitory of the MEE, nor is it neutral.

More insight into the interaction of recognition with enhanced preference comes from the analysis of different confidence levels of recognition. Here we can see that whether participants were 'sure', 'half-sure', or ‘guessing’ about their memory for the logos, recognition was associated with preference (again, whether or not such memory was correct or not). Of note is the fact that those incorrectly recognised stimuli which are

most confidently recognised are preferred at well above chance levels (62.8%), indicating that for these items the fact of confident recognition outweighs the influence on preference judgements of the fact of exposure (in this case the lack of it).

We propose that our reconceptualisation of existing theories - according to their position on recognition as an inhibitor or facilitator of the effect - paves the way for an understanding that is of more direct relevance to marketing than the theory-driven division of 'affective' versus 'cognitive' accounts. In this respect, the current findings provide direct empirical support for those explanatory theories that assume recognition to be a facilitator of the MEE (e.g. *uncertainty reduction*, Sawyer, 1981) over those that do not. In particular, and alongside those of Lee (2001b) and Wang & Chang (2004), they add to an emerging body of evidence against the *perceptual fluency/attribution* account (Bornstein & D'Agostino, 1992, 1994); and in particular the notion of a 'correction mechanism' by which recognition memory serves to reduce misattribution and thus the 'cognitive illusion' of affect (Bornstein & Craver-Lemley, 2004). Further to this, and in light of the fact that boredom and fatigue have also been found to constrain the MEE (Bornstein & D'Agostino, 1990), it may be argued that the current findings lend indirect support to Bornstein's (1989) original interpretation that it is the reduction in these factors, rather than the absence of recognition memory, that is responsible for magnifying the size of the effect in subliminal mere exposure studies (see Bornstein, 1989; Willems et al., 2010).

From a practitioner perspective, therefore, this study indicates that the positive effects of mere exposure on affective response are not inhibited by recognition memory; and, in

fact, are more likely to be *enhanced* by this factor. On this basis, the marketing-based MEE should be considered to be quite distinct from techniques of subliminal advertising (in which the elimination of conscious perception and memory is paramount). By contrast, the effects of mere exposure may be maximised by encouraging attention, perceptual processing, encoding and retrieval during each fleeting encounter with the stimulus. The means by which this might be achieved are well-documented in the psychology and marketing literature, and include maximising stimulus consistency (Tulving and Thomson, 1973; Hill et al. 1997), familiarity and saliency (see Moray, 1959; Nielson and Sarason, 1981; Kurilla and Westerman, 2008), whilst minimising contextual interference (Kumar, 2000) and memory decay (Spear, 1978). For marketing practitioners, therefore, this study highlights the relevance of repeated presentations of distinctive, familiar and salient stimuli, via multiple channels and media, right up to the point at which brand choice decisions are made. As such, it aligns the effective application of mere exposure principles with the concepts of integrated marketing communication (see Schultz & Kitchen, 2004), media-neutral planning (see Tapp, 2005) and media recency (see Ephron, 1997), and provides a very different perspective of the MEE to that which is currently evident in much of the extant marketing literature.

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**Table 1**

Effects of recognition, recognition confidence, target and distractor likeability on preference judgments.

	$\beta$ (std error)	Z	p
(Intercept)	1.95 (0.56)	3.50	p<0.001
Recognition	0.46 (0.08)	5.29	p<0.001
Recognition Confidence	0.37 (0.05)	7.18	p<0.001
Target likeability	2.64 (0.56)	3.50	p<0.001
Preference distractor like.	-2.17 (0.21)	-10.29	p<0.001
Recognition distractor like.	-1.06 (0.20)	05.32	p<0.001

Figure 1

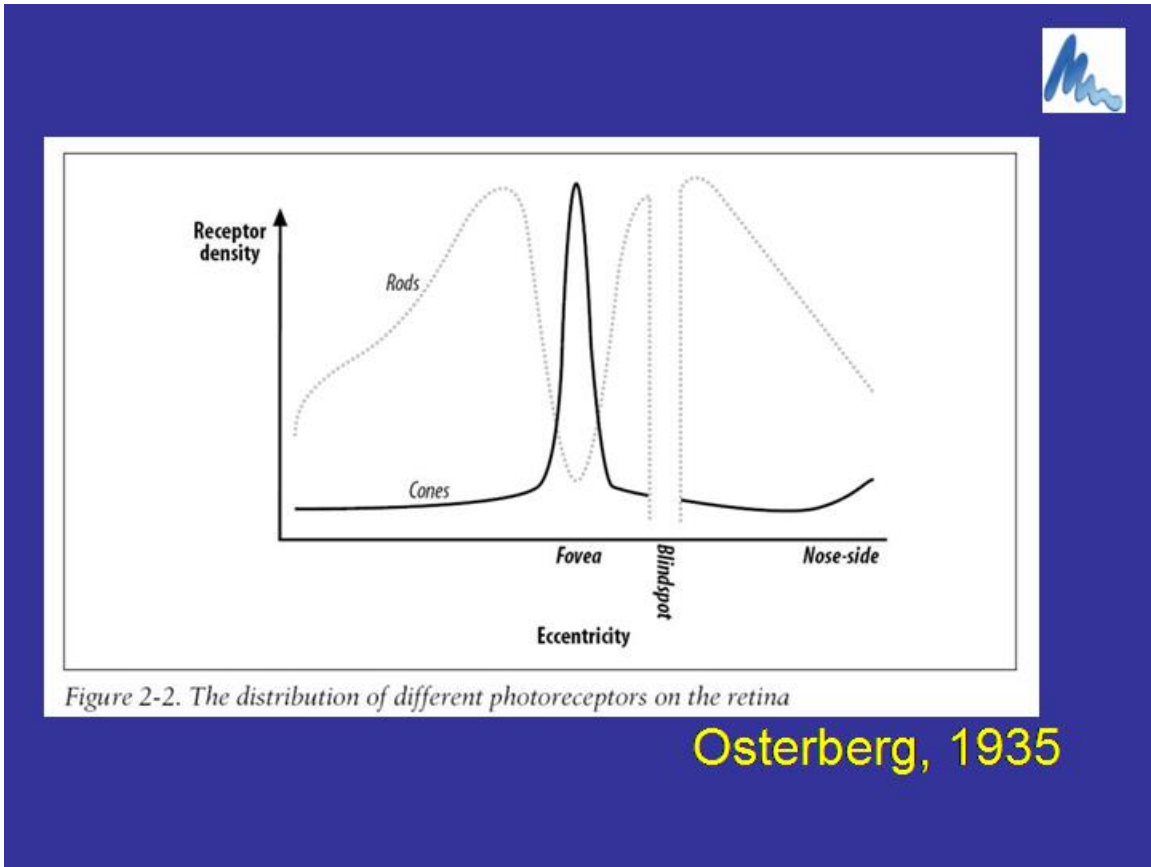
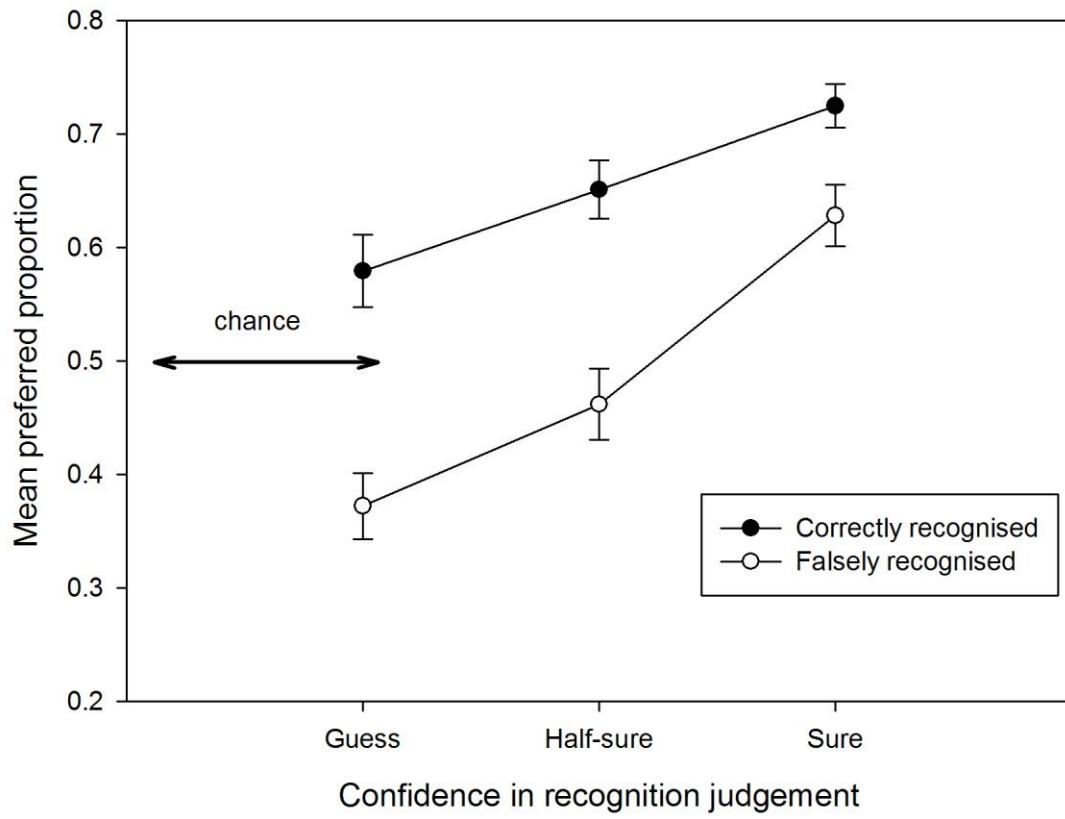


Figure 2-2. The distribution of different photoreceptors on the retina

Osterberg, 1935



Figure 2



## Figure Captions

Figure 1: Example slide from one of the exposure lectures. Typical experimental stimulus is shown placed in the top right (n.b. this is a black and white reproduction of a colour slide and stimulus).

Figure 2: Mean preferred proportion for correctly and falsely recognized stimuli, according to confidence in recognition judgement (standard errors shown)