

Memory Enhances the Mere Exposure Effect

Tom Stafford

University of Sheffield

Anthony Grimes

University of Manchester

ABSTRACT

The fact of having already encountered something encourages future preference, a phenomenon known as the mere exposure effect (MEE). There is a widely accepted view that recognition inhibits the MEE. Here this view is contested and the generality of the findings upon which it is based questioned. New evidence is presented from a systematic investigation of the moderating influence of recognition memory on the MEE, using brand logo stimuli and methods that make the results directly applicable to marketing practice. It is shown that recognition, whether correct or mistaken, enhances, rather than inhibits, the likelihood of preference. © 2012 Wiley Periodicals, Inc.

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 and Litman, 1997; Skinner and Stephens, 2003). Given that consumers are often engaged in tasks that occupy attention and severely limit their engagement with advertising (MacInnis, Moorman, and Jaworski, 1991; Shapiro et al., 1997), it is potentially of great relevance to understanding, explaining, and influencing the effects of contemporary marketing communication (Bornstein and 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 and 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 recognize 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 and Zajonc, 1980). Because of these factors there has been an underestimation of the importance and ubiquity of the MEE in the marketing literature.

This paper calls into question the validity of the claim that recognition memory diminishes the size of the MEE. A 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, it is contended here 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 it is endeavored 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, the intention is not 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, this is the central issue for marketing practitioners and researchers. Whether the outcome observed is due to the relative strength of explicit versus implicit processing or, perhaps, their cumulative effect (over that of implicit processing alone) is not necessarily a question that this study is intended 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 MEE

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

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 and D'Agostino, 1992, 1994). For example, the influential theory of *perceptual fluency/attribution* (Bornstein and 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, 2001; Robinson and

Elias, 2005)—Lee (1994, p. 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 and Cacioppo, 2001); a theory that has received empirical support over that of *perceptual fluency/attribution* in one of the most recent marketing-based studies of the MEE (Fang, Singh, and Ahluwalia, 2007). The basis for the HFM is 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, Singh, and Ahluwalia, 2007), and *perceptual fluency/attribution* (Lee, 2002; Shapiro, 1999). But it is the latter of these that appears to underpin most treatments of the MEE in the wider marketing literature (e.g., Auty and Lewis, 2004; Chatterjee, 2008; Matthes, Schemer, and Wirth, 2007; Pandelaere, Millet, and den Bergh, 2010). This, it seems plausible, stems from the traditional dominance of this explanation in psychological research (see Butler and 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 and Craver-Lemley, 2004; Bornstein and D'Agostino, 1992, 1994).

However, the validity of this interpretation may be challenged on three grounds. First, 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 nine studies that had employed subliminal exposure techniques than in over 200 that had not. Indeed, Newell and Shanks (2007, p. 104) observe that, beyond that provided by Bornstein and 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, p. 1) as that which is "just perceptible." Second, while scarcely acknowledged in the literature, it is important to note that Bornstein's (1989) original interpretation of this particular aspect of his meta-analysis centered 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, Kale, and Cornell, 1990).

Third, 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. While there are a small number of marketing-based replications of the MEE in what appears to be the absence of recognition (Fang, Singh, and Ahluwalia, 2007; Janiszewski, 1993; Shapiro and Krishnan, 2001), such findings are not universal. For example, Anand, Holbrook, and 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, Holbrook, and Stephens, 1988, p. 390). However, while 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 and Shanks, 2007; Wang and Chang, 2004; Yagi, Ikoma, and Kikuchi, 2009). Furthermore, Lee (2001) 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, while Hansen and 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; 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 and Craver-Lemley, 2004; Bornstein and D'Agostino, 1992; Lee, 2001).

In summary, therefore, the contention here is 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, the first proposal of this paper is that:

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

Following this, and on the basis of theoretical (e.g. Sawyer, 1981) and empirical (e.g. Lee, 1994; Lee, 2001; Newell and Shanks, 2007; Wang and Chang, 2004) challenges to the notion that accurate recognition inhibits the MEE (e.g. Bornstein, 1989; Bornstein and D'Agostino, 1992, 1994) it is also proposed 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, 2001; Wang and Chang, 2004), it is predicted that:

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

Methodology

The methodology used here is aligned to that of the original nonconscious mere exposure experiments of Kunst-Wilson and 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 the 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 some advantages of the rigor of controlled experimental designs while 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 generalizability that cannot otherwise be obtained. Additionally, a great advantage of this design is that it allows the testing of a relatively large number of people and so access to greater statistical power in analyzing the results.

The setting for the experiment was a routine course of weekly lectures, attended by participants as part of the undergraduate degree program they had chosen to pursue. Lab-based studies of the MEE are often characterized 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 it is supposed 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 nontraditional 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 longstanding 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 and Litman, 1997; Skinner and 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, while locating the study in the weekly lecture program of student participants necessarily requires the relaxation of control over some elements, it retains 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 the collection of measures of recognition and preference that are inclusive of both explicit and implicit memory. Control is retained 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. The analysis includes only those who responded to nine 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 three 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 that 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. Henceforth, previously exposed logos are referred to 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

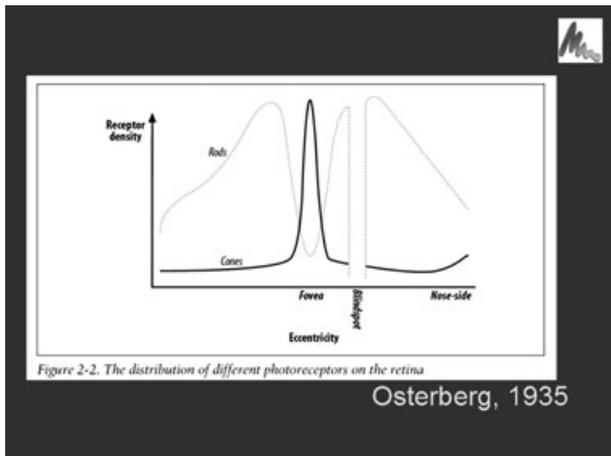


Figure 1. Example slide from one of the exposure lectures. Typical experimental stimulus is shown placed in the top right (n.b. this is a black and white reproduction of a color slide and stimulus).

slides (see Figure 1). Each logo was seen nine times for an average of 117 seconds in total (standard deviation 28 seconds). No reference to the logos was made by the lecturers, who gave their lectures as normal. No students queried the presence of the logos.

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 centralized receiver. After some introduction the participants were familiarized 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 randomize the order of stimulus presentation or to randomize pairing during testing, nor was it possible to individually vary the order of the memory and preference tests (as in Kunst-Wilson and 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 and 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. The dependent variable is thus mean preference proportion (with chance being 0.50). The independent variables are stimulus exposure (exposed vs. novel), stimulus recognition (recognized vs. not recognized) and recognition confidence (sure vs. half sure vs. guessing).

In each judgment block the 10 targets were shown in a pseudorandom order and randomly paired with one

distractor. The distractor logos were pseudorandomly 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 10 seconds in all cases) and then a confidence rating was requested. After the first block of judgments 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 pseudorandom order but using different pairings with the distractors.

RESULTS

A first essential step is to check for the presence of the MEE in the data. Does exposure to the experimental stimuli make them more preferred than nonexposed 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 nonexposed 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 the data are grouped. Overall, the recognition rate was also above chance (mean proportion 0.57, $t(229) = 6.165$, $p < 0.0001$).

The main analysis presented here differs from a standard ANOVA, so the rationale behind it will be briefly explained. While 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 Baayen, 2008 and Jaeger, 2008). This technique allows the combination of 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 judgment 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 judgments. As well as being a valid technique for use on proportions, this technique allows the convenient and concurrent testing of the influence of multiple factors, in addition to the ones of primary theoretical interest.

In this case, the primary interest is in how recognition and recognition confidence influence preference judgments. Also included are measures of the intrinsic

Table 1. Effects of Recognition, Recognition Confidence, Target and Distractor Likeability on Preference Judgments.

	β	(Std error)	Z	p
(Intercept)	1.95	(0.56)	3.50	<0.001
Recognition	0.46	(0.08)	5.29	<0.001
Recognition confidence	0.37	(0.05)	7.18	<0.001
Target likeability	2.64	(0.56)	3.50	<0.001
Preference distractor like	-2.17	(0.21)	-10.29	<0.001
Recognition distractor like	-1.06	(0.20)	5.32	<0.001

likability of logos involved in the preference judgments. 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 judgments. Therefore, the regression model also included the intrinsic likeability of exposed (target) logos and the intrinsic likeability of the nonexposed (distractor) logos in both the preference and recognition judgments.

The results of the mixed-models logistic regression are shown in Table 1. The analysis reveals highly significant effects of recognition on preference ($\beta(se) = 0.46(0.08)$, $Z = 5.29$, $p < 0.001$). Targets that were recognized were more likely to be preferred than those

that were not recognized (confirming H2). This is a crucial test of the proposed inhibitory effect of recognition on the size of the MEE (see Bornstein, 1989; Bornstein and 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, it is found that recognition memory predicts enhanced—rather than inhibited—preference.

It is insightful to show these results graphically, separating those logos that had been previously exposed and were judged as remembered (correctly recognized) from those that had not been previously exposed but were judged as remembered (falsely recognized). The mean preference proportions for both correctly recognized and falsely recognized logos are shown in Figure 2. Splitting the data this way allows it to be clearly seen 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 recognized items is whether they have been exposed, and hence are eligible to be *correctly* recognized).

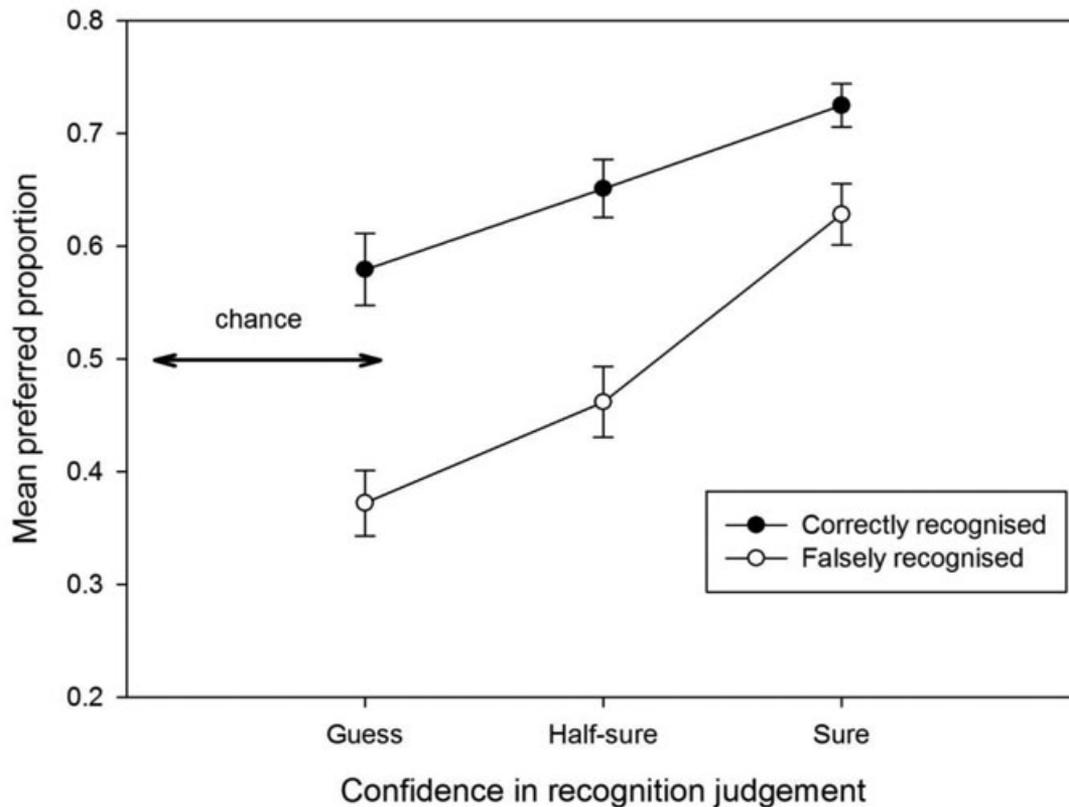


Figure 2. Mean preferred proportion for correctly and falsely recognized stimuli, according to confidence in recognition judgment (standard errors shown).

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

LIMITATIONS

As discussed above, the use of a quasi-naturalistic setting in this experiment means that a degree of control over some factors is sacrificed; that is, precise exposure duration, ordering of exposure items, random selection of exposed and nonexposed items, random ordering of questions, and responding conditions. These losses of control are compensated for by the high statistical power of the study and generalizability of the findings that comes from a quasi-naturalistic setting. Nonetheless, it is important that due consideration is given 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 nonsystematic variance in these results might mean that a true effect that is present is missed, it does not lead to an increase in the probability that any of the effects that are found 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, it can be asked if the factors that the design relinquishes direct control over (in comparison to lab studies) could plausibly cause systematic errors that could be truly responsible for the effects found. In this respect, the most serious possibility is that preference bias for exposed over nonexposed items is the result of intrinsic differences in the stimuli, rather than exposure itself. However, the pretesting of stimuli goes some way to accounting for a potential effect of intrinsic likability, as does the 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, this 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 the results. This is hard to imagine. Similarly, it is hard to imagine how other factors, such as the order of questions (which could not be randomized across individuals), would systematically distort the findings on the effect of recognition on preference (recall the order of tasks was counterbalanced and no differences were found between participants who made their preference judgments before or after those of recognition).

DISCUSSION

This study demonstrates 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 and 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 “recognized” are preferred to unexposed brand logos that are not recognized. 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 recognized, 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 it can be seen 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 recognized stimuli, which are most confidently recognized are preferred at well above chance levels (62.8%), indicating that for these items the fact of confident recognition outweighs the influence on preference judgments of the fact of exposure (in this case the lack of it).

We propose that the reconceptualization 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 (2001) and Wang and Chang (2004), they add to an emerging body of evidence against the *perceptual fluency/attribution* account (Bornstein and 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 and 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 and D’Agostino, 1990), it may be argued that the current findings lend indirect support

to Bornstein's (1994) 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, Dedonder, and Van der Linden, 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 maximized 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 maximizing stimulus consistency (Hill, Radtke, and King, 1997; Tulving and Thomson, 1973), familiarity and saliency (see Kurilla and Westerman, 2008; Moray, 1959; Nielson and Sarason, 1981), while minimizing 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 and 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.

REFERENCES

- Anand, P., Holbrook, M. B., & Stephens, D. (1988). The formation of affective judgments: The cognitive-affective model versus the independence hypothesis. *Journal of Consumer Research*, 15, 386–391.
- Auty, S., & Lewis, C. (2004). Exploring children's choice: The reminder effect of product placement. *Psychology & Marketing*, 21, 697–713.
- Baayen, R. H. (2008). *Analyzing linguistic data: A practical introduction to statistics using R*. Cambridge, UK: Cambridge University Press.
- Berlyne, D. E. (1970). Novelty, complexity and hedonic value. *Perception and Psychophysics*, 8, 279–286.
- Bless, H., & Fiedler, K. (1995). Affective states and the influence of activated general knowledge. *Personality and Social Psychology Bulletin*, 21(7), 766–778.
- Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin*, 106, 265–288.
- Bornstein, R. F., & Craver-lemley, C. (2004). Mere exposure effect. In R. F. Pohl (Ed.), *Cognitive illusions: A handbook on fallacies and biases in thinking, judgment and memory* (pp. 215–233). Hove, UK: Psychology Press.
- Bornstein, R. F., & D'Agostino, P. R. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology*, 63, 545–552.
- Bornstein, R. F., & D'Agostino, P. R. (1994). The attribution and discounting of perceptual fluency: Preliminary tests of a perceptual fluency/attributional model of the mere exposure effect. *Social Cognition*, 12, 103–128.
- Bornstein, R. F., Kale, A. R., & Cornell, K. R. (1990). Boredom as a limiting condition on the mere exposure effect. *Journal of Personality and Social Psychology*, 58, 791–800.
- Broyles, S. J. (2006). Subliminal advertising and the perpetual popularity of playing to people's paranoia. *Journal of Consumer Affairs*, 40, 392–406.
- Butler, L. T., & Berry, D. C. (2004). Understanding the relationship between repetition priming and mere exposure. *British Journal of Psychology*, 95, 467–487.
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, 97(1), 19–35.
- Chatterjee, P. (2008). Are unclicked ads wasted? Enduring effects of banner and pop-up ad exposures on brand memory and attitudes. *Journal of Electronic Commerce Research*, 9, 51–61.
- Ephron, E. (1997). Recency planning. *Journal of Advertising Research*, 37, 61–65.
- Fang, X., Singh, S., & Ahluwalia, R. (2007). An examination of different explanations for the mere exposure effect. *Journal of Consumer Research*, 34, 97–103.
- Grimes, A. (2008). Towards an integrated model of low attention advertising effects: A perceptual-conceptual framework. *European Journal of Marketing*, 42, 69–86.
- Ha, L., & Litman, B. R. (1997). Does advertising clutter have diminishing and negative returns? *Journal of Advertising*, 26, 31–42.
- Hansen, J., & Wänke, M. (2009). Liking what's familiar: The importance of unconscious familiarity in the mere-exposure effect. *Social Cognition*, 27, 161–182.
- Hill M. E., Radtke, R., & King, M. (1997). A transfer appropriate processing view of consumer memory. *Journal of Current Issues and Research in Advertising*, 19, 1–21.
- Jaeger, T. F. (2008). Categorical data analysis: Away from ANOVAs (transformation or not) and towards logit mixed models. *Journal of Memory and Language*, 59, 434–446.
- Janiszewski, C. (1993). Preattentive mere exposure effects. *Journal of Consumer Research*, 20, 376–392.
- Kumar, A. (2000). Interference effects of contextual cues in advertisements on memory for ad content. *Journal of Consumer Psychology*, 9, 155–166.
- Kunst-Wilson, W. R., & Zajonc, R. B. (1980). Affective discrimination of stimuli that cannot be recognized. *Science*, 207, 557–558.
- Kurilla, B. P., & Westerman, D. L. (2008). Processing fluency affects subjective claims of recollection. *Memory & Cognition*, 36(1), 82–92.
- Lee, A. Y. (1994). The mere exposure effect: Is it a mere case of misattribution? *Advances in Consumer Research*, 21, 270–275.
- Lee, A. Y. (2001). The mere exposure effect: An uncertainty reduction explanation revisited. *Personality and Social Psychology Bulletin*, 27, 1255–1266.

- Lee, A. Y. (2002). Effects of implicit memory on memory-based versus stimulus-based brand choice. *Journal of Marketing Research*, 39, 440–454.
- Lee, M. P. Y. (2001). Low involvement processing: Effects of stimulus exposure and repetition on implicit memory, explicit memory and affect. Doctoral thesis, University of Toronto, Toronto, Canada.
- MacInnis, D. J., Moorman, C., & Jaworski, B. J. (1991). Enhancing and measuring consumers' motivation, opportunity, and ability to process brand information from ads. *The Journal of Marketing*, 55, 32–53.
- Mandler, G., Nakamura, Y., & Van Zandt, B. S. (1987). Non-specific effects of exposure on stimuli that cannot be recognized. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 13, 646–648.
- Matthes J., Schemer, C., & Wirth, W. (2007). More than meets the eye: Investigating the hidden impact of brand placements in television magazines. *International Journal of Advertising*, 26, 477–503.
- Moray, N. (1959). Attention in dichotic listening: Affective cues and the influence of instructions. *Quarterly Journal of Experimental Psychology*, 11(1), 56–60.
- Newell, B. R., & Shanks, D. R. (2007). Recognizing what you like: Examining the relation between the mere-exposure effect and recognition. *European Journal of Cognitive Psychology*, 19, 103–118.
- Nielsen, S. L., & Sarason, I. G. (1981). Emotion, Personality, and Selective Attention. *Journal of Personality and Social Psychology*, 41(5), 945.
- Packard, V. (1957). *The hidden persuaders*. New York: David McKay.
- Pandelaere, M., Millet, K., & den Bergh, B. V. (2010). Madonna or Don McLean? The effect of order of exposure on relative liking. *Journal of Consumer Psychology*, 20, 442–451.
- Robinson, Brent M., & Elias, Lorin J. (2005). Novel stimuli are negative stimuli: Evidence that negative affect is reduced in the mere exposure effect. *Perceptual and Motor Skills*, 100, 365–372.
- Sawyer, A. G. (1981). Repetition, cognitive responses and persuasion. In Richard E. Petty, Tom M. Ostrom, & Timothy C. Brock (Eds.), *Cognitive responses in persuasion* (pp. 237–261). Hillsdale, NJ: Erlbaum.
- Schultz, D. E., & Kitchen, P. J. (2004). Managing the changes in corporate branding and communication: Closing and reopening the corporate umbrella. *Corporate Reputation Review*, 6, 347–366.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. New York: Guilford Press.
- Shapiro, S. (1999). When an ad's influence is beyond our conscious control: Perceptual and conceptual fluency effects caused by incidental exposure. *Journal of Consumer Research*, 26, 16–36.
- Shapiro, S., & Krishnan, S. H. (2001). Memory-based measures for assessing advertising effects: A comparison of explicit and implicit memory effects. *Journal of Advertising*, 30, 1–12.
- Shapiro, S., MacInnis, D. J., & Heckler, S. E. (1997). The effects of incidental ad exposure on the formation of consideration sets. *Journal of Consumer Research*, 24(1), 94–104.
- Skinner, H., & Stephens, P. (2003). Speaking the same language: The relevance of neuro-linguistic programming to effective marketing communications. *Journal of Marketing Communications*, 9, 177–192.
- Spear, N. E. (1978). *The processing of memories: Forgetting and retention*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Stang, D. J. (1975). Effects of 'mere exposure' on learning and affect. *Journal of Personality and Social Psychology*, 31, 7–12.
- Tapp, A. (2005). Media neutral planning—A strategic perspective. *Journal of Database Marketing & Customer Strategy Management*, 12, 133–141.
- Tulving, E., & Thompson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review*, 80, 352–373.
- Vallacher, R. R. & Nowak, A. (1999). The dynamics of self-regulation. In R. S. Wyer, Jr. (Ed.), *Advances in Social Cognition* (Vol. 12, pp. 241–259). Mahwah, NJ: Lawrence Erlbaum.
- Wang, M.-Y., & Chang, H.-C. (2004). The mere exposure effect and recognition memory. *Cognition & Emotion*, 18, 1055–1078.
- Willems, S., Dedonder, J., & Van der Linden, M. (2010). The mere exposure effect and recognition depend on the way you look!. *Experimental Psychology*, 57, 185–192.
- Winkielman, P., & Cacioppo, J. T. (2001). Mind at ease puts a smile on the face: Psychophysiological evidence that processing facilitation increases positive affect. *Journal of Personality and Social Psychology*, 81, 989–1000.
- Yagi, Y., Ikoma, S., & Kikuchi, T. (2009). Attentional modulation of the mere exposure effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35, 1403–1410.
- Zajonc, R. B., (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology Monographs*, 9, 1–27.
- Zajonc, R. B., (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35, 151–175.

The authors would like to thank Danielle Matthews for advice on the statistics of mixed-effect logistic regression models, Paschal Sheeran for comments on several drafts of this manuscript, Myles Jones for allowing the authors to insert study stimuli in his lecture slides, Craig Perkins for help with data collection, and the anonymous reviewers of this manuscript.

Correspondence regarding this article should be sent to: Tom Stafford, Lecturer, Psychology and Cognitive Science, Department of Psychology, University of Sheffield, Western Bank, Sheffield S10 2TP, UK (t.stafford@shef.ac.uk)