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Recognition of New Nonword Brand Names: Exposure to a Pleasant Scent

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ABSTRACT
The practice of scenting retail environments to increase sales has become common but do pleasant scents actually affect consumer behavior? Nonwords in English were rated as possible brand names during the learning phase of a recognition memory experiment. The test phase was a speeded old-new task. Exposure to a complex, pleasant scent during the test phase facilitated accuracy compared to non-exposure.

KEYWORDS: Brand Name, Scent, Memory, Recognition, Nonword

The effects of exposure to a pleasant scent on the encoding and recognition of new nonword brand names

Companies introducing a new product with a nonword brand name face an extra hurdle compared to introducing a product with a real word(s) brand name. Customers already have experience with real words. In terms of word recognition that means that customers already have a frequency index for real words. That is, they have already encountered real words some number of times. The more someone has encountered a word the easier it is for that person to recognize it on the next encounter.

Nonword brand names are by definition words that no one has encountered before. Thus, one more difficulty is added to the problem of introducing just such a new product. However, previous studies have shown that a single exposure to a nonword can lead to a familiarity effect when the word is deliberately attended to (Holden &Vanhuele, 1999) and an improved affective attitude toward the nonword even when the single exposure is incidental (Janiszewski, 1993). Still, recognition of a new nonword brand name will never be as easy as recognizing a real word until the frequency of exposure is in the same range. One objective of an initial advertising campaign for a new nonword named product, therefore, would be to expose the target market to the name as much as possible. Given the inherent expense and risk of such a campaign it is worth investigating techniques to supplement it that would enhance customer awareness and recognition of the new nonword name.

One approach to improving recognition of a new nonword brand name is to couple exposure with a stimulus from another sense (Lindstrom, 2005). The sense of smell is especially useful as odors can have an impact on affect (Moss et al, 2003, Ludvigson&Rottman, 1989). Also, odors can have an effect on aspects of word recognition (Baron and Bronfen, 1994; Baron and Thomley, 1994). However, the relationship between scent and performance or affect is not all rosy. Knasko, 1992;1993 failed to find a relationship between odor and mood or creativity. The scent of lavender can inhibit arithmetical reasoning performance (Ludvigson and Rottman, 1989) but facilitate some memory tasks. In some conditions the administration of a scent can inhibit low frequency word recognition (Gaygen & Hedge, 2009).

There has been much research on the cognitive aspects of odor detection (Rotton, 1983;Knasko and Gilbert, 1990; Knasko, 1992, 1993, 1995; Chebat and Michon, 2003, Danuser, etal., 2003) , and on the factors affecting odor detection (Distel and Hudson, 2001; Herz and von Clef, 2001; Sakai et al., 2005; Zellner and Kautz, 1990), but there has been little work investigating how odor affects higher cognitive processes especially word recognition. Yet there have been calls to couple other sensory stimuli with brands (Lindstrom, 2005).

The practice of scenting the business environment has grown quickly (Bainbridge, 1998; Helmsley 1997; Chase 1998) and perhaps beyond the scope of scientific support for the practice. Morrin & Ratneshwar (2003) found that scent can facilitate brand recall. Spangenberg, Crowley, & Henderson (1996) demonstrated that pleasant ambient scent can lead to better evaluation of products. Mitchell, Kahn, &Knasko (1995) found that scents congruent with the product lead customers to spend more time making a buying decision than an incongruent scent. Still, more science needs to be done in the laboratory and in the field to determine if all the effort to use scents in the marketplace is worthwhile.

Instructions can affect participants' classification of, perception of, intensity of, and apparent adaptation to odors (Dalton, 1996). Participants gave higher intensity ratings when they were told the odor name and participants who correctly identified an odor when not given its name rated its intensity higher than participants who did not identify it (Distel and Hudson, 2001). Invariant odors are rated differently by the same participants in different sessions when the context of the label (positive or negative) that accompanies the odor differs from session to

session (Hertz and von Clef, 2001). Thus, the present study will use a complex fragrance not easily identified and participants will not be given any instructions at all regarding scent. Indeed, a minority of participants in a study by Gaygen & Hedge (2009) reported even noticing the presence of odor in a post- experiment questionnaire.

The present study will investigate the relationships between odor and new nonword brand name recognition. An explicit memory test called an old-new test will be used to measure recognition of nonword brand names exposed and tested in scented and unscented environmental conditions. An encoding phase in which participants see nonwords will be either scented or unscented. The participants will subsequently be tested for recognition of the nonwords in the old-new test under either scented or unscented environmental conditions. Data from the resulting 4 conditions of encoding and test, unscented-unscented; unscented-scented; scented-unscented; scented-scented, will yield evidence of the relationship between odor and encoding of new nonword stimuli, and odor and decoding of new nonword stimuli.

The unscented-unscented condition will be the control condition. The scented-unscented condition represents odor during encoding of new nonword brand names. The unscented-scented condition represents odor during a test of recognition of previously encoded nonword brand names, and the scented-scented condition represents odor during both encoding and decoding of nonword brand names. The use of nonwords as stimuli is especially useful for this test. The internal frequency counter for each stimulus in the minds of the participants will be zero. Thus no confound can occur between presence or absence of scent and the experience/familiarity of participants with the stimuli.

The critical comparisons are between the control condition (unscented-unscented) and each of the other 3 conditions. The first hypothesis to be tested will be that exposure to a pleasant scent during encoding of nonwords (scented-unscented) will facilitate recognition performance compared to the control condition. The second hypothesis tested will be that exposure to a pleasant scent during recognition testing (unscented-scented) will facilitate performance compared to the control condition. The third hypotheses tested will be that exposure to a pleasant scent during encoding and recognition testing will facilitate performance compared to all other conditions.

Material and methods

Participants

The participants were members of the community (students, faculty, and staff). Participants were paid $5.00. All participants were over 18 years of age. Only participants who report learning and understanding English as their first language were included in the analysis. Only participants who reported no history of serious vision, hearing, smell or speech problems or special sensitivity to air pollutants, odors, or chemicals typically found in office environments were allowed to participate. Age data was not collected but the average age of participants is estimated to be 25 years. The focus of this study was on the performance effects of exposure to a complex fragrance rather than any sensory threshold effects. Thus participants were not screened

for specific odor sensitivity. A total of 25 people participated. Five were not included in the analysis: one because of computer problems and four that did not meet the language requirements. Equal numbers of participants were randomly assigned to each of the four conditions.

Materials

Two hundred nonwords in English were constructed by adding, subtracting, or substituting one or more letters from a real word in English. Each nonword in the resulting set was phonotactically legal and easily pronounceable using the rules of English.

For scented sessions a commercially available air freshener made of a mixture of pleasantly scented essential oils was used to introduce a pleasant scent to the test area. The scented oil was applied to cotton balls and placed in a small container under the table where participants sat. The scented container was out of sight of participants but inside their breathing zone. The scent was generated continuously from 10 minutes before the start of the session until the participant left after the conclusion of the session. During non-exposure sessions the scented container was removed.

Procedure

Stimulus presentation and response collection were controlled by a Dell Optiplex 960 desktop computer using an experimental control program created with E-prime software (Schneider et al., 2002). The display was a 48cm LCD monitor (Dell AS501, 1280 x 1024 pixels). The display was viewed from an average of 53 cm. No instructions about scent were given to participants at any time during the experiment. All trial display material was presented in black, 18 point, courier new type presented against a uniform white background.

Two sessions, an encoding session and a test session, were required of each participant and were conducted on the same day. The average time between the encoding and test sessions was 5 minutes. Equal numbers of participants were randomly assigned to four groups: Exposure to scent during encoding and test; exposure to scent during encoding but not during test; no exposure to scent during encoding but exposure during test; no exposure during encoding or test.

Equal numbers of the nonwords were randomly assigned to two lists. One list was used during the encoding sessions and the other list will served as foils during the test sessions. At the beginning of the encoding session a series of 5 crosses (e.g., +++++) appeared on the display centered vertically and horizontally. The crosses served as a fixation point whose duration was1000ms. The crosses disappeared and were immediately replaced by a string of letters (a nonword). Participants' task on each trial during encoding sessions was to rate the nonword on a 5 point scale for how good a brand name the nonword would make for a new product. The scale was: 1=terrible name, 2=bad name, 3=neither bad nor good name, 4= good name, 5=terrific name. Participants indicated their choice by pressing the appropriately labeled button on a button box placed in front of them on the table at which they sat and viewed the computer display. Once the rating was made the display changed to a screen asking participants to rate their confidence

in the brand name rating they just gave. The confidence rating was on a 5 point scale: 1=no confidence, 2=little confidence, 3=some confidence, 4=much confidence, 5=total confidence. Participants indicated their confidence rating by pressing the appropriately labeled button on the button box. Once participants gave their confidence rating the next trial began. Participants experienced the encoding sessions individually (i.e. one at a time).

Test sessions were run individually. Half of the participants exposed to scent during the encoding sessions were exposed to scent during the test sessions and half were not exposed. Half of the participants not exposed to scent during encoding were exposed to scent during the test sessions and half were not exposed.

The test session was an explicit test of memory called an old-new test. All trial display material was presented in black, 18 point, courier new type presented against a uniform white background. At the beginning of each trial a series of 5 crosses (e.g., +++++) appeared on the display centered vertically and horizontally. The crosses served as a fixation point whose duration was 1000ms. The crosses disappeared and were immediately replaced by a string of letters. The string of letters remained on the display until a keyboard response was made. Participants were instructed to place their right index finger on the button box button marked "old" on the far right of the box and to place their left index finger on the button marked "new" on the far left of the box. They were further instructed to press the appropriate key as quickly and accurately as possible to signify that the string of letters is an "old" word (i.e. appeared in the encoding session) and the other key to signify that the string of letters is a "new" word (i.e. did not appear in the encoding session). The dependent variables were reaction time to correctly identify an "old" word and percentage correct (accuracy) for identification of "old" words. The probability of a string of letters constituting an "old" word on any trial was .5 and the lists were randomized individually for each participant.

Results

Only correct responses to "old" trials were analyzed. Reaction times under or over 2.5 standard deviations from the mean were deemed outliers and removed from the analysis. Fewer than 1% of trials were removed for this reason. Separate between-subjects univariate 2 X 2 [exposure during learning (yes, no) X exposure during test (yes, no)] analyses of variance (ANOVA) were performed on reaction time and percentage correct data collected during recognition testing. A t-test was performed on brand ratings collected during learning comparing ratings by participants exposed to scent with ratings by participants not exposed. A main effect of exposure during test (M exposed = 74.3%, M unexposed = 62.9%;$F(1,3) = 4.82$, $p = 0.043$) was obtained. Participants exposed to pleasant scent during recognition testing were significantly more accurate at correctly identifying "old" nonwords than participants not exposed. No other significant effects were obtained.

Discussion

This study demonstrated that exposure to a pleasant scent facilitated recognition of new nonword brand names in a speeded old/new test. Participants exposed to a complex pleasant scent during an explicit test of recognition memory recognized nonword brand names they had previously rated for quality significantly more accurately than participants not exposed.

While exposure to a pleasant scent activates both hemispheres of the human brain the left hemisphere is activated more in normal patients (Henkin& Levy, 2001). According to those authors most of the additional left hemisphere activation takes place in the anterior frontal and the temporal lobes. Those regions in the left hemisphere are the site of important memory and language processing areas of the human brain. Eichenbaum (2001) reports that the olfactory nerve is in very close proximity to the hippocampus, housed in the temporal lobe, which is important in the selection of items bound for working memory and in long-term memory transmission. I propose that the general activation by exposure to pleasant scent of brain areas known to be important to memory and language processing gave exposed participants an advantage over participants not exposed during testing in the present study. Moreover Warm, Dember, and Parasuraman (1991) demonstrated that exposure to a pleasant scent increased vigilance during a tedious task. The present study was not especially tedious as the number of trials was not excessive but it was such that increased vigilance would have led to improved performance. Future research is needed to determine the relative contribution to the results of the present study of facilitated word and memory processing and increased vigilance.

Why, one may ask, did participants exposed to a pleasant scent during the learning phase (i.e. brand name judging task) not show similar increased performance during testing compared to participants never exposed? Participants were not told that their memory for the judged brand names would later be tested. Thus participants were engaged in a judgment task during the rating session. The anterior portions of the frontal lobe are important centers for judgment tasks (Volz, Schubotz, & von Cramon, 2006) and Henkin and Levy (2001) found that area was activated by exposure to a pleasant scent. Yet any added activation during the judgment (learning) phase did not lead to increased performance during the test phase. Further research is needed to determine if an advantage at test would obtain when participants are told before the first session that their memory for judged nonword brand names would be tested.

The results of this study contribute a small amount of empirical support for the practice of scenting retail stores for the purpose of increasing sales. However, the practice should not be adopted uncritically as many questions about its efficacy remain and so it is difficult to make specific managerial recommendations based on this study. For example, will the effect found in this study still be obtained if the learning and test phases are separated in time by a day, a week, etc.? Also, frequency was completely controlled in this study because the frequency of new nonword brand names is constant at 0 before the learning phase and at 1 before recognition testing. Would differential frequency of exposure to nonword brand names affect the results? Planned future work involves similar testing of recall memory for new nonword brand names and the use of auditory stimuli for testing of recognition and recall of new nonword brand names.

Additional future work should seek converging evidence for facilitation due to exposure to pleasant scent from implicit memory tests (e.g. lexical decision) and from tests of recall memory. Cross-modal tests of recognition and recall would also be useful.

All of the techniques and paradigms discussed so far can also be used to investigate the effects of exposure to pleasant odor on recognition and recall of real word brand names. However, care must be taken to control for the differential pre-experiment experience participants have with real words.

Conclusions

Exposure to pleasant scent elicits measurable behavioral effects related to consumer research. The present study demonstrated that memory for new nonword brand names to which participants were exposed only once was facilitated by such an exposure. Areas of the brain activated by pleasant scent include important memory and language centers. Thus, incremental support for the process of scenting retail environments is provided.

References

Baron RA,&Thomley J. (1994). A whiff of reality: Positive affect as a potential mediator of the effects of pleasant fragrances on task performance and helping. Environmental Behavior, 26, 766-784. Chase V. (1998).Making Stereophonic Scents.Appliance Manufacturer , 46, 12.

ChebatJ.C.,&Michon R. (2003). Impact of ambient odors on mall shoppers' emotions, cognition, and spending: A test of competitive causal theories. Journal of Business Research, 56, 529-539.

Dalton P. (1996).Odor perception and beliefs about risk.Chemical Senses, 21, 447-458.

Danuser B, Moser D, Vitale-Sethre T, Hirsig R, & Krueger H. (2003). Performance in a complex task and breathing under odor exposure. Human Factors, 45, 549–562.

Distel H, & Hudson R. (2001). Judgment of odor intensity is influenced by subjects' knowledge of the odor source. Chemical Senses, 26, 247-251.

Eichenbaum, H. (2001). The hippocampus and declarative memory: Cognitive mechanisms and neural codes.

Behavioural Brain Research, 127, 199-207.

Gaygen, D. E.,& Hedge, A.(2009). Effect of acute exposure to a complex fragrance on lexical decision performance.Chemical Senses, 34, 85-91.

Helmsley, S. (1997).Scents and Sensibility.Marketing Week, 20, 45–50.

Henkin, R., &Levy, L. (2001).Lateralization of Brain Activation to Imagination and Smell of Odors Using Functional Magnetic Resonance Imaging (fMRI): Left Hemispheric Localization of

Pleasant and Right Hemispheric Localization of Unpleasant Odors. Journal of Computer Assisted Tomography, 25(4), 493-514.

HerzRS,& von Clef J. (2001). The influence of verbal labeling on the perception of odors: Evidence for olfactory illusions?Perception, 30, 381-391.

Holden J,&Vanhuele M. (1999). Know the Name, Forget theExposure: Brand Familiarity versus Memory of ExposureContext. Psychology & Marketing, 16(6):479–496.

Janiszewski C. (1993). Preattentive Mere Exposure Effects.The Journal of Consumer Research, 20, 376-392. Knasko SC. (1992). Ambient odor's effect on creativity, mood, and perceived health.Chemical Senses, 17, 27- 35. Knasko SC. (1993). Performance, mood, and health during exposure to intermittent odors. Arch Environ Health 48, 305-308.

Knasko SC. (1995). Pleasant odors and congruency: Effects on approach behavior. Chemical Senses, 20, 479- 487.

Knasko SC, Gilbert AN. (1990). Emotional state, physical well-being, and performance in the presence of feigned ambient odor. Journal of Applied Social Psychology, 20, 1345-1357.

Lindstrom M.(2005).BRAND Sense: Build Powerful Brands Through Touch, Taste, Smell, Sight, and Sound. New York. Simon and Schuster.

Ludvigson, H.W., &Rottman, TR. (1989). Effects of ambient odors of lavender and cloves on cognition, memory, affect and mood. Chemical Senses, 14, 525-536.

Mitchell D, Kahn B, &Knasko S. (1995). There's Something in the Air: Effects of Congruent orIncongruent Ambient Odor on Consumer Decision Making. Journal of Consumer Research, 22, 229–38.

MorrinM,&Ratneshwar S. (2003). The Impact of Ambient Scent on Evaluation, Attention, and Memoryfor Familiar and Unfamiliar Brands.Journal of Business Research, 49, 157–165.

Moss M, Cook J, Wesnes K, &Duckett,P. (2003). Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults. International Journal of Neuroscience, 113(1),15 – 38.

Rotton J. (1983). Affective and cognitive consequences of malodorous pollution. Basic ApplSoc Psychol 4, 171-191.

Sakai N, Imada S, Saito S, Kobayakawa T, &Deguchi Y. (2005). The effect of visual images on perception of odors. Chemical Senses, 30, i244-i245.

Schneider W, Eschman A, &Zuccolotto A. (2002).E-Prime user's guide.Pittsburgh, PA: Psychology Software Tools.