

Visual Attention Analysis on Mutated Brand Name using Eye-Tracking: A Case Study

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Abstract—Brand name plays a vital role for in-shop buying behavior of consumers and mutated brand name may affect the selling of leading branded products. In Indian market, there are many products with mutated brand names which are either orthographically or phonologically similar. Due to presence of such products, Indian consumers very often fall under confusion when buying some regularly used stuff. Authors of the present paper have attempted to demonstrate relationship between less attention and false recognition of mutated brand names during a product selection process. To achieve this goal, visual attention study was conducted on 15 male college students using eye-tracker against a mutated brand name and errors in recognition were noted using questionnaire. Statistical analysis of the acquired data revealed that there was more false recognition of mutated brand name when less attention was paid during selection of favorite product. Moreover, it was perceived that eye tracking is an effective tool for analyzing false recognition of brand name mutation.

Keywords—Brand Name Mutation, Consumer Behavior, Visual Attention, Orthography

I. INTRODUCTION

SELECTION of proper brand name for a product is a most important marketing strategy for marketers. As there are lots of advantages of developing effective brand names [2], [3], [14], [15], [23], [24]; proper brand naming is necessary. Perception of meanings of brand are generally different for different people but the term "personality" or "relationship" are frequently used to explain the meaning of brand [4].

Now-a-days, brand name needs distinctiveness in the highly competitive commercialized world. For fulfilling this purpose, great number of irregularly spelled words in trademarks is used [7]. In addition to that, brand name has great impact on brand perception and brand memory as stated by several researchers [5], [13], [17], [19].

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Further, brand name potentially influences perception of quality, value and willingness of consumer to buy a product positively [8]. Due to these facts most recent marketing strategy is seeding of brand recognition evoking factors into the mind of young consumers for better marketing [1]. So, brand name perception and recognition are very prospective for brand awareness. In addition to that orthographically or phonologically similar brand names affect brand name recognition process and create confusions in consumer's mind [10], [18]. There are many regularly used products with orthographically similar brand name available in the Indian market. On the other hand, visual attention plays a vital role for recognition of visual world. Attention selects and engages objects during recognition process [26]. When multiple objects are presented simultaneously, they compete for neural representation and thus may alter attention [9], [11]. So, identification and/ or recognition process of an object chiefly depends on visual attention. In this context eye-tracking study provides direct insight of visual behavior against a real or realistic stimulus based settings. Eye tracking generates data of different eye movement patterns such as saccades and fixations which are chiefly related to visual word recognition process [21]. Furthermore, fixation duration and fixation count are more relevant eye-tracking variables to find out visual attention [22], [12]. Although, some studies were done using eye-tracker on visual attention and its impact on brands displayed on a self in a supermarket [16], [20] but no one reported about role of attention in false recognition of mutated brand name (which is orthographically similar) using eye-tracking. Thus, all the information converges into a research question whether consumer with less attention may cause false recognition of mutated brand name (orthographically similar) during purchasing process or not. The idea of mutated brand name arises from the concept of biological mutation. In biological mutation it may cause serious illness; similarly mutated brand name which is orthographically mutated may cause false recognition of brand name. As a consequence, it may alter the selling of leading brand. In this paper authors try to unfold the fact that less attention contributes false recognition of mutated brand name, given all people with previous brand name memory.

II. METHODS

A. Study Design

This experiment was designed to evaluate the role of attention on false recognition of mutated brand name which is orthographically similar, while keeping a variety of other potentially confounding variables constant. After experimental modification of brand name, each participant viewed 21 packets of chips on which brand name presented as 'Lyas' which is mutated and orthographically similar to original brand name 'Lays'(This modification done strictly and only for experimental purpose).

We expected that recognition errors or false recognition to be more likely with less attention paid on mutated brand name which is orthographically similar. Error responses were recorded by questionnaire immediately after presentation of visual stimulus. All of the experiments described below were done by asking participants to give their consent before participation. To achieve the main goal of this study i.e. role of attention on false recognition of mutated brand name eye-tracking was performed.

B. Participants

Randomly chosen fifteen male students (age, 25.27 ± 2.37 years) of Indian Institute of Technology Guwahati, India from various disciplines volunteered in this experiment. All the students had normal or corrected vision.

C. Stimulus Material

There were total twenty one images of three different flavoured chips packets in each row respectively. All the coloured packets were bearing mutated (orthographically similar) brand name- 'Lyas' instead of 'Lays', the correct one. This stimulus display frame was projected on large screen (approximately 1.5x1.0 meter square) for 15 seconds in such a way that it looks like shelving environment as in stores (virtual shelving environment) (Fig. 1).



Fig. 1 Stimulus frame which creating virtual shelf environment

D. Apparatus

Eye movements were recorded against the stimulus using SMI-iView-X- HED eye-tracking system. The eye tracker is monocular (Right eye) with sampling rate of 50 Hz. SMI-eye-tracking system has two hardware – a head part bearing cameras and IR-sensor, and, a laptop workstation for storing and analyzing the video data. After recording and saving the video data of each participant, area of interest (AOI) study was carried out using Be-gaze 0.3 software. Analysis of AOI commonly used in eye-tracking research to delineate sections of stimulus within which filtered eye movements such as fixations are counted.

E. Calibration

To calibrate the eye-tracking glasses, five markers were used in calibration mode as it requires a five point calibration. The experimenter first asked to the participant to stand at a distance of 1 meter from a flat vertical surface (e.g. a wall) and the five point calibration process was started accordingly. During the calibration process the participant is instructed to hold their head steady and see on a particular marker with their eyes.

F. Procedure

Before starting the experiment, participants were asked to stand 1m (39 inches) from the wall on which stimulus was projected to create virtual shelf environment in a constant indoor lighting condition. Then participants were asked to view and select their favorite 'Lays' flavor and eye movement recording was done using eye-tracker. After completion of eye-tracking experiment participants were asked to fill up a basic demographic, brand memory and error related questionnaire. Then eye tracking video data was analyzed and a relation was established between eye tracking data and recognition error responses.

G. Data Analysis

Percentage of error in terms of false recognitions of mutated brand name was calculated from the responses of the participants immediately after presenting the visual stimulus. Eye-tracking variables for attention such as fixation durations and fixation counts on AOI (i.e. mutated brand name 'Lyas') are measured through AOI analysis with Be-Gaze 0.3 software. Simultaneously scan path analysis was also done for detecting overall trend of eye-fixations. To test the hypothesis, t- test was carried out (n=15) for finding the differences of fixation counts and fixation durations between false recognition group and true recognition group.

III. RESULTS

A. Error Response

All the participants had previous brand name (Lays) memory which was confirmed through questionnaire study. Recognition error response of each participant was noted by asking the participant whether he found any change in the spelling of 'Lays' or not, immediately after presenting the stimulus. Results showed that about 60% participants made mistakes in recognition of mutated brand name (in other words spelling error) and rest of them were not (Fig. 2). Based on error responses, participants were categorised into two groups viz. false recognition group (n=9) and proper recognition group (n=6) for further analysis.

B. Eye Fixations

It is clearly showed from scan path analysis of both proper recognition group and false recognition group that there were less fixation counts and fixation durations on mutated brand name – 'Lyas' in case of false recognition group than the proper recognition group (Fig. 3).

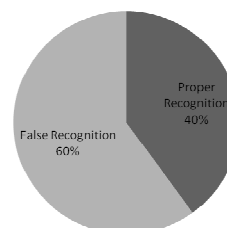


Fig. 2 Recognition senario of mutated brand name



(a)



(b)

Fig. 3 Scan path (Trailer time: 10 seconds) picture furnishing fixations of participants: from false recognition group (a) and proper recognition group (b)

Student's t-tests were performed between eye fixation data of false recognition group and proper recognition group. Mean fixation count and mean fixation duration in false recognition group were found less in comparison to proper recognition group (Fig. 4). However, there were significant differences ($P < 0.05$) in fixation duration between two groups but no significant differences ($P > 0.05$) were observed in fixation counts between two groups.

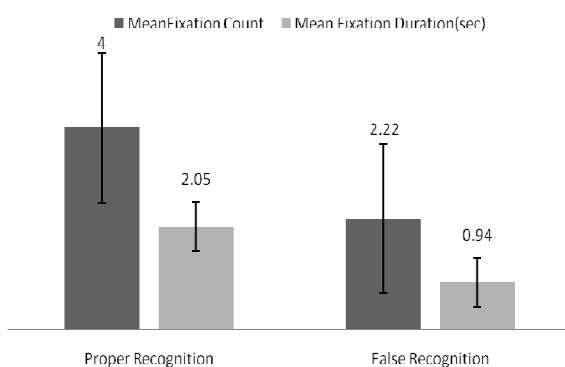


Fig. 4 Visual attention vs. recognition pattern of mutated brand name

IV. DISCUSSIONS

From the above results it is confirmed that false recognition (60%) of the mutated brand name i.e. 'Lyas' (which is orthographically similar to original brand name 'Lays') occurred, although all participants had previous brand name memory.

Similar results were also observed in case of orthographically similar drug brand names [10], [18]. Researchers have already established that there will be less fixation durations and fixation counts with less attention [12], [21]. Similarly, our results (Fig. 4) furnished that there was observable mean difference in fixation duration and fixation counts between proper recognition group and false recognition group but, after statistical analysis, it was revealed that only mean fixation duration of proper recognition group was found significantly higher ($P < 0.05$) when compare with the false recognition group. But, no significant difference ($P > 0.05$) was observed between two groups in case of fixation counts although mean fixation count of proper recognition group is higher than the false recognition group. All these results follow the trend of relationship between attention and false recognition of mutated brand name (which are orthographically mutated) as stated in hypothesis but fixation count data did not follow the normal distribution because no significant differences were observed between groups. This may be due to small sample size or due to more time spending by the participants on a particular fixation point. Although event of false recognition occurs due to orthographical similarity between mutated and leading brand name as reported by others [10], [18] but one positive outcome is that participants (40%) who paid greater attention (in terms of greater fixation duration and fixation count) were able to recognise the error in the spelling of brand name. This observation means that persons who had previous brand name memory may not recognize the mutated brand name due to less attention.

V. CONCLUSIONS

It is possible to compare one brand name recognition error with other by conducting a questionnaire survey but it was unable to say whether ineffective in-store marketing is due to a poor attention or not. In this context, eye-tracking tool will be beneficial for measuring role of attention on false recognition of mutated brand names (which are orthographically similar) e.g. 'Lyas'.

Other than the experimental mutated brand name there are many products with mutated brand names found in Indian market such as 'Abidas' and 'Shuruchi' instead of 'Adidas' and 'Suruchi' etc. (Fig. 5), may need to explore further [6]. Even in a very recent study authors highlight that brand name is one of the influencing factors which enhances the switching of one product brand to other [25]. So, brand switching may result if there is no awareness about existence of such products with mutated brand names, and, obviously due to both less attention and orthographical similarity among brand name. In other words both mutated brand name and attention jointly may reduce the selling of leading brands. Although, role of attention in false recognition of orthographically mutated brand name was highlighted in this paper but there are many other factors other than orthography which may alter the frequency of false recognition of mutated brand name. These factors include phonetics of brand name, typography, colour of the font, font size etc. In support of these factors further and detailed studies in this field are needed.



Fig. 5 Pictures of products with mutated brand names found in Indian market

ACKNOWLEDGMENT

We would like to acknowledge our gratitude to the funding agency- Department of Biotechnology, Ministry of Science and Technology, Govt. of India, for providing grant to purchase eye-tracker and conducting research. We would like to give special thanks to Ms. Srabanti Mohanto for providing us pictures of some products with orthographically similar brand name from Indian Market. Lastly, we also acknowledge the Department of Design, Indian Institute of Technology Guwahati, Guwahati 781039, Assam, India, for providing research facilities.

REFERENCES

- [1] S. Baxter, C. Webster and C. Webster, "Naming brands: Implications for children's brand awareness," in proc. Anzmac Annu. Conf., organized by Department of Marketing, Monash University (Business and Economics), 2009, pp. 1-7.
- [2] T. Blackett, "Researching brand names," *Marketing Intelligence and Planning*, Vol. 6, no. 3, pp. 5-8, 1988.
- [3] Chan, A. K. K. "Localisation in international branding," *Int. J. of Advertising*, vol. 9, no. 1, pp. 81-91, 1990.
- [4] L. D. Chernatony, and F.D. Riley, "Defining a "brand": Beyond the literature with experts' interpretations," *J. of Marketing Management*, vol.14, no. 5, pp. 417-443, 1998.
- [5] M. Cheunga, A. S. Chanb, and S. L. Szeb, "Electrophysiological correlates of brand names," *Neuroscience Letters*, vol. 485, pp. 178-182, 2010.
- [6] A. Chowdhury, S. M. Reddy and S. Karmakar, "Mutated/scrambled brand name and its impact on market," in *Emerging Issues in Management and Behavioral Sciences*. Delhi: Bharti Publications, A. Kumar, Arshdeep and K. Singh, Eds. 2012, pp. 201-209.
- [7] K. Demirci, "An approach to unorthodox spellings in trademarks," *Bilig*, vol. 56, pp. 81-97, 2011.
- [8] W. B. Dodds, K. B. Monroe, and D. Grewal, "Effects of price, brand, and store information on buyers' product evaluations," *J. of Marketing Research*, vol. 28, no.3, pp. 307, 1991.
- [9] J. Duncan, "Cooperating brain systems in selective perception and action," in *Attention and Performance XVI*. Cambridge: MIT Press, T. Inui and J.L. McLeand, Eds. 1996, pp. 549-578.
- [10] B. L. Lambert, K. Y. Chang, and S. J. Lin, "Effect of orthographic and phonological similarity on false recognition of drug names," *Social Science & Medicine*, vol. 52, no.12, pp. 1843-1857, 2001.
- [11] K. Lamberts, "Information-accumulation theory of speeded categorization," *Psychological Review*, vol. 107, pp. 227-260, 2000.
- [12] T. R. Lee, D. L. Tang, and C. M. Tsai, "Exploring color preference through eye tracking," *Culture*, Eurocongres S.A., 2005, pp. 333-336.
- [13] Y. H. Lee, and K. S. Ang, "Brand name suggestiveness: A Chinese language perspective," *Int. J. of Research in Marketing*, vol. 20, pp. 323-335, 2003.
- [14] L. nOpatow, "From experience creating brand names that work," *J. of Product Innovation Management*, Vol. 4, no.2, pp. 254-258, 1985.
- [15] C. W. Park, B. J. Jaworski, and D. J. Macinnis, "Strategic brand concept image management," *J. of Marketing*, Vol. 50, pp. 135-145, 1986.
- [16] R. Pieters, and L. Warlop, "Visual attention during brand choice: The impact of time pressure and task motivation," *Int. J. of Research in Marketing*, vol. 16, pp. 1-17, 1999.

- [17] H. Plassmann, T. Ambler, S. Braeutigam, and P. Kenning, "What can advertisers learn from neuroscience?" *Int. J. of Advertising*, vol. 26, no. 2, pp. 151-175, 2007.
- [18] P. V. Rataboli, and A. Garg, "Confusing brand names: Nightmare of medical profession," *J. of Postgraduate Medicine*, vol. 51, no. 1, pp. 13-16, 2005.
- [19] N. Ratnayake, A. J. Broderick, and R. L. C. Mitchell, "A neurocognitive approach to brand memory," *J. of Marketing Management*, vol. 26, pp. 13-14, 2010.
- [20] S. M. Reddy, A. Chowdhury, D. Chakrabarti and S. Karmakar, "Need of visual behavioral study of Indian consumers," in *Emerging Issues in Management and Behavioral Sciences*. Delhi: Bharti Publications, A. Kumar, Arshdeep and K. Singh, Eds. 2012, pp. 285-293.
- [21] B. R. Riegler, and G. L. R. Riegler, *Cognitive psychology: Applying the science of mind*, Pearson Education: India, 2008.
- [22] J. E. Russo, and F. Leclerc, "An eye-fixation analysis of choice processes for consumer nondurables," *J. of Consumer Research*, vol. 21, pp. 274-290, 1994.
- [23] D. Shipley, G. J. Hooley, and S. Wallace, "The brand name development process," *Int. J. of Advertising*, Vol. 7, no.3, pp. 253-266, 1988.
- [24] B. Vanden-Bergh, K. Adler, and L. Oliver, "Linguistic distinction among top brand names" *J. of Advertising Research*, Vol. 27, no.4, pp. 39-44, 1987.
- [25] G. Vanil, M. G. Babu, and N. Panchanatham, "Toothpaste brands- a study of consumer behavior in Bangalore city," *J. of Economics and Behavioral Studies*, vol.1, no. 1, pp. 27-39, 2010.
- [26] M. Wedel, and R. Pieters, "Eye tracking for visual marketing," *Foundation and Trends in Marketing*, vol. 1, no. 6, pp. 231-320, 2006.

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