

Assessing the Impact of Color in the Store Environment. An Environmental Psychology Approach.

M. Brengman*, M. Geuens**

**Faculty of Applied Economics, Limburgs Universitair Centrum
Universitaire campus – gebouw D, B-3590 Diepenbeek, BELGIUM*

***Faculty of Applied Economics, Ghent University, Vlerick Leuven-Gent Management School,
Hoveniersberg 24, B-9050 Gent, BELGIUM*

*Corresponding author: M. Brengman (malaika.brengman@luc.ac.be)

ABSTRACT

The current study aims to fill a gap in an extensive stream of research concerning the impact of store atmospherics on the consumer. The impact of one store design element, namely color, is investigated more thoroughly. The purpose is, more specifically, to examine the different effects of store-color hue, brightness and saturation on the emotions elicited by the store and on consumers' subsequent approach-avoidance behavioral intentions towards the store. Since research on the impact of color in the store environment is scarce and methodologically flawed, the employed methodology is elaborately presented. By means of an $8_{(\text{hue})}$ by $2_{(\text{brightness})}$ by $2_{(\text{saturation})}$ between-subjects factorial experimental design, store interior color was demonstrated to affect feelings of pleasure and excitement, but also tension. Moreover, such store-color-evoked emotions were found to be significantly related to approach and avoidance intentions towards the store. Specific effects of store color hue, brightness and saturation could be discerned.

1. THE IMPACT OF STORE COLOR ON RETAIL SHOPPERS

The recent finding that almost two thirds of all purchase decisions are made in the store¹, has turned the attention to the point-of-purchase and to store atmospherics. In fact, there has been a growing recognition among practitioners and marketing researchers that store interiors and exteriors can be designed to create specific feelings in shoppers, that can have an important cueing or reinforcing effect on purchase. In the last two decades, there have been many studies concerning store atmospherics^{2,3,4}, predominantly based upon environmental psychology and specifically on the Mehrabian and Russell Stimulus-Organism-Response model⁵, which has first been applied to the study of store atmosphere by Donovan and Rossiter⁶. In this context it has been proposed that approach/avoidance behaviors of customers are largely determined by individual internal (cognitive, emotional and physiological) responses to the store environment⁷. As such, atmospheric variables have been found to influence a wide variety of consumer evaluations and behaviors⁸. Although many atmospheric variables (such as crowding, music and scent) have already extensively been examined, Turley and Milliman⁸ suggest that store interior color has not received the attention it probably deserves. In fact, research on the impact of color in the store environment appears to be scarce and methodologically flawed⁹. Nevertheless, it demonstrates that color appears to influence pleasant feelings, arousal, store and merchandise image, simulated purchases, purchasing rates, time spent in the store and retail display attraction^{10,11,12}. In spite of the fact that these studies found that color influences the behavior of retail shoppers, it is still unclear, however, how exactly color affects shoppers' emotions and behavior. These past studies are flawed because they have failed to provide adequate specifications or controls of color stimuli (e.g., absence of controls for saturation and brightness while investigating effects of hue), a caveat noted to be common among color research¹³. Indeed, color stimuli have not been specified according to a standard color system, but only vague verbal descriptions have been reported with regard to the color stimuli used. Nevertheless, color stimuli can be characterized completely in terms of hue, saturation and brightness¹⁴, where hue refers to the pigment contained in the color; saturation (or chroma) identifies the richness or purity of the color (with lower saturation colors containing more grey) and brightness (or value) signifies the depth of tone in the color or its black-to-white quality. In previous studies, notwithstanding, hue effects have

been tested, without controlling for saturation or brightness, this way confounding the effects of the three color-attributes. Moreover, only effects of color-hue have been investigated in a retailing context^{10,11,12}, whereas effects of saturation and brightness have been ignored completely. Yet, these neglected color dimensions may very well be the major determining factors in color effects on human feelings and behavior^{15,16}.

2. RESEARCH OBJECTIVE

The proposed study aims to assess (1) the direct effect of color in the store environment on the emotions experienced in the store (notably pleasure, excitement, tension and dominance)¹⁷ and (2) the direct and indirect effect of color on consumers' approach/avoidance behavior through the store-color-evoked emotions. In particular, the specific effects of color hue, saturation and brightness in the store interior design are investigated.

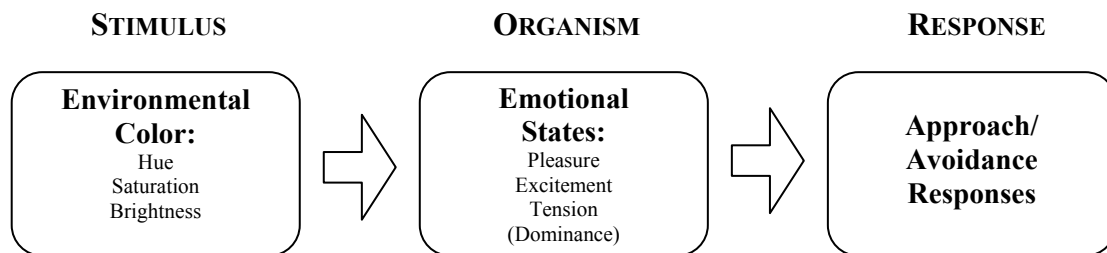


Figure 1: An Environmental Psychology Approach⁵ to the study of Color in the Store Environment

3. METHODOLOGY

A store in design furniture and accessories has been developed in Computer Aided Design (ARKEY), allowing us to realistically manipulate color in the store environment. The experimental design is a three-way (8_{hue} by $2_{\text{saturation}}$ by $2_{\text{brightness}}$) between-subjects factorial design, with about 25 observations per cell. For the experimental manipulation initially only four hues had been selected from the Munsell Color System for their divergent pleasure and arousal eliciting properties¹⁸. However, a manipulation check revealed that the hues did not elicit pleasure and arousal as intended. Therefore, four more hues from the Munsell Color System were added to the study. For each hue, four specific tones have been selected with low versus high saturation (Munsell chroma 6 versus 14) and low versus high levels of brightness (Munsell value 5 versus 8 for most hues except for those for which the former values exceed the existing range). This way 32 color manipulations of the store are obtained (see figure 2).



Figure 2: Manipulations of color hue in the experimental store
e.g. Munsell hue Yellow-Red (left) and Blue (right)

A laboratory experiment, using store interior pictures, was opted for, because it provides a level of control that would be hard to achieve in a field study. The use of photographic simulations of

retail environments has moreover been proven to be a valid method for studying the effects of environments on evaluations, affective responses and behavior^{19,20}. The experiment was monadic in nature, in the sense that each subject was exposed to a picture of only one of the 32 color manipulated stores, a procedure deemed necessary in order not to reveal the specific nature of the study. A total of 874 Belgian respondents, intercepted by means of a random walk sampling procedure, participated to the study. Respondents' general mood was assessed before the picture of the store was shown. Subsequently, they were told that an Italian store in design furniture and accessories was thinking about opening an outlet in Belgium and that the study involved market research to determine whether people would be interested in this store. A lengthy questionnaire was administered to each respondent, containing questions pertaining to experienced pleasure, arousal and dominance and intended approach/avoidance behaviors with regard to the store. To conclude, respondents were screened for color blindness, using a series of pseudo-isochromatic plates from the Ishihara Color Vision Test.

4. RESULTS

The actual hypothesis testing was split up into two main parts. First of all, a set of hypotheses concerning store-color-evoked emotions were tested by means of multivariate analysis of variance (MANCOVA). Here pre-existing mood was introduced as a covariate, to control for its potentially confounding effect, and the different emotions elicited by store-colour hue, brightness and saturation were examined in detail. A three-way full factorial multivariate analysis of variance, with mood as a covariate, revealed significant main effects for store-colour hue and value on the emotions elicited, but not for store-color saturation. Nevertheless, a significant two-way (hue x saturation) as well as three-way (hue x value x saturation) interaction effect also emerged (see table 1). A comprehensive overview of the specific findings can be found in Brengman (2002)⁹.

Table 1: Main and interaction effects of store color hue, brightness and saturation.
MANCOVA analysis, including pre-existing mood as a covariate (Wilk's lambda, $p < .001$)

EMOTIONS	MAIN EFFECTS										INTERACTION EFFECTS			
	Color Hue								Color Brightness		Color Saturation		Hue x Bright.	Hue x Sat.
	P B	B	B G	G	G Y	Y	Y R	R	Low	High	Low	High	p	p
Pleasure	5	1 ^a	6	4	8 ^a	2	3	7	.037	ns	.034	-.033	ns	ns
Tension	5	8 ^b	6	7	1 ^b	4	3	2	.047	ns	-.076	.077	ns	ns
Excitement	7	5	4	6	3	2	1	8	ns	ns	-.010	-.006	ns	ns
Dominance	6	1	4	5	8	3	2	7	ns	ns	.035	-.040	ns	ns
WILK'S LAMBDA	.028								.017		ns		ns	.026
	^a Means scores are significantly different (post-hoc Bonferroni, $p = .028$)													
	^b Means scores are significantly different (post-hoc Bonferroni, $p = .012$)													

A subsequent set of hypotheses concerned the relation between store-color-evoked emotions and approach and avoidance intentions. These were tested by means of Structural Equation Modeling (SEM). The findings support the presumption that emotions evoked by store interior color can induce approach and avoidance responses. Approach intentions towards the store appear to be positively affected by store-color-evoked pleasure (*with a path coefficient of .79*) and excitement (*path coefficient of .47*) and negatively by feelings of tension (*with a path coefficient of -.69*). Store-color-evoked tension, on the other hand, appears to induce avoidance responses, which also seem to increase when less pleasure and less excitement are experienced (*with respective path coefficients of .72, -.68 and -.38*).

Furthermore, we established that it is reasonable to assume that store-color-elicited emotions act, at least partially, as a 'mediator', representing the general mechanism through which store-color is able to influence approach/avoidance intentions towards the store. This appeared to be particularly the case for store-color-evoked feelings of pleasure and excitement.

5. CONCLUSIONS

Store interior color was demonstrated to affect feelings of pleasure and excitement, but also tension. Moreover, such store-color-evoked emotions were found to be significantly related to approach and avoidance intentions towards the store. Specific effects of store color hue, brightness and saturation could be discerned.

REFERENCES

1. POPAI Europe, (1998). *The POPAI Europe Consumer Buying Habits Study*. Point-of-Purchase Advertising Institute. Co-ordination by Retail Marketing In-Store Services Limited, Watford, Herts : POPAI Europe.
2. Sherman, E., Mathur, A., & Smith, R. B., (1997). Store Environment and Consumer Purchase Behavior: Mediating Role of Consumer Emotions. *Psychology & Marketing*, vol. 14, n° 4, 361-378.
3. McGoldrick, P. J., & Pieros, C. P., (1998). Atmospherics, Pleasure and Arousal, the Influence of Response Moderators. *Journal of Marketing Management*, vol. 14, 173-197.
4. Babin, B. J., & Attaway, J. S., (2000). Atmospheric Affect as a Tool for Creating Value and Gaining Share of Customer. *Journal of Business Research*, vol. 49, 91-99.
5. Mehrabian A. and Russel J.A., (1974). *"An Approach to Environmental Psychology"*, MIT Press, Cambridge, MA.
6. Donovan R.J. and Rossiter J.R., (1982). "Store Atmosphere: An Experimental Psychology Approach", *Journal of Retailing* 58 (Spring), p34-57.
7. e.g. Bitner, M. J., (1992). Servicescapes: The Impact of Psychical Surroundings on Customers and Employees. *Journal of Marketing*, vol. 56, n° 2, 57-70.
8. Turley, L. W., & Milliman R. E., (2000). Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence. *Journal of Business Research*, vol. 49, 193-211.
9. Brengman M., (2002). *The Impact of Colour in the Store Environment. An Environmental Psychology Approach.*, doctoral dissertation, UGent, Belgium.
10. Bellizzi J.A., Crowley A.E. and Hasty R.W., (1983). "The Effects of Color in Store Design", *Journal of Retailing* 59, (Spring), p21-45.
11. Bellizzi J.A. and Hite R.E., (1992). "Environmental Color, Consumer Feelings and Purchase Likelihood", *Psychology and Marketing*, 9, p347-363.
12. Crowley A.E., (1993). "The Two Dimensional Impact of Color on Shopping", *Marketing Letters*, 4, p59-69.
13. Gelineau, E. P., (1981). A Psychometric Approach to the Measurement of Color Preference. *Perceptual and Motor Skills*, vol. 53, 163-174.
14. Munsell A.H., 1905. *"A Color Notation"*, Boston: GEO. H. Ellis.
15. Valdez P. and J. Mehrabian, (1994). "Effects of Color on Emotions", *Journal of Experimental Psychology: General*, 123, 4, p394-409.
16. Gorn, G. J., Chattopadhyay, A., Yi, T., & Dahl D. W., (1997). Effects of Color as an Executional Cue in Advertising: They're in the Shade. *Management Science*, vol. 43, n° 10, October, 1387-1400.
17. see Brengman, M. & M. Geuens, (2004). "The Four Dimensional Impact of Color on Shoppers' Emotions", in B. E. Kahn and M. Frances (eds.), *Advances in Consumer Research*, vol. XXXI, Valdosta, GA: Association for Consumer Research, p122-128.
18. e.g. Ziemis D. and Christman S., (1998). "Effects of Mood on Color Perception as a Function of Dimensions of Valence and Arousal", *Perceptual and Motor Skills*, 87, p531-535.
19. Bateson J.E.G. & Hui, M.K.M., (1992). "The Ecological Validity of Photographic Slides and Videotapes in Simulating the Service Setting", *Journal of Consumer Research*, vol. 19, September, 271-281.
20. Areni, C. S., Sparks, J. R., & Dunne P., (1996). Assessing Consumers' Affective Responses to Retail Environments: A Tale of Two Simulation Techniques. *Advances in Consumer Research*, vol. 23, 504-509.