Dynamic Full Spectrum Digital Lighting of Retail Displays Positively Affects Consumer Behavior

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WHITE PAPER

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"Light profoundly affects our feelings of well-being, of awe and wonder of mood, of comfort, of motivation."

– Louis Erhardt

"Pay respect to human needs, then use your own judgment. People require varying, cycling stimuli to remain sensitive and alert to their environments."

– Faber Birren

"Visual and emotional comfort demand constant change and variety. The functional use of color is designed around the use of a *variety* of colors in order to keep human responses continually active and to avoid severe visual adaptation or emotional monotony."

– Ralph M. Evans

Abstract

Quantitative and qualitative analyses of 480 customers comparing a prototype storefront design of a "high-end specialty retail" chain to a traditional storefront design of the same chain at a different location revealed that the new design, which significantly incorporated full spectrum digital color changing luminaries manufactured by Color Kinetics of Boston, MA, effectively increased the foot traffic, salience and stopping power of the storefront area. More shoppers stopped to look at storefront displays and they spent more time in front of those displays looking at products. The customer's propensity for handling and purchasing products in the storefront area increased. Customer traffic flow into the store rose significantly compared to the same store (prior to redesign) from the same period of time a year earlier. Subjectively, increases in customer's mood, ratings of the quality of time spent in the store, the use of color within the store and overall impression of the store were found at the prototype location. In summary, from the standpoint of customer behaviors and impressions, the prototype storefront has shown to be a more effective selling space as compared to the traditional storefront design.

Introduction

Extensive previous analysis of consumer behavior in retail environments has led to the establishment of several tenets regarding correlations between the behavior of customers within a store and the probability that they will purchase items from that store. For instance, a positive correlation has been demonstrated between the length of time a customer spends in the store and the probability that the customer will make a purchase in the store. There is also a positive correlation between the length of time a customer physically interacts with a product (i.e., handling it) and the customer's purchase of that item. Of course, the more people that enter the store, the more products the store will sell.

Affective state is another major influencer of customer behavior. Emotional state, mood and arousal level all have all been hypothesized to hold predictive value in determining the proclivity of a customer to purchase products. This effect has also been suggested to occur as a result of increased arousal levels or excitement. It has been suggested that customers who are in a positive emotional state or a good mood while within a store are more likely to make purchases and the dollar value of those purchases tend to be greater. Further,

changes in affective state while in the store are likely to be associated with the context in which the change occurred (i.e., the store itself). Thus, if just the experience of being in the store can increase a shopper's mood or effectively maintain a positive mood level or emotional state, then that shopper will be more likely to convert to a customer and the value found in the store by that customer will extend beyond the simple value of the purchase to include the experience of being in the store as well. This is a sure way to increase the odds that a customer will return.

Previous field research efforts have revealed that the entrance of a retail store (usually considered the first 10-15 feet of the store) has a reduced ability to serve as a selling space. This is due to what has been referred to by Paco Underhill, of Envirosell, Inc., as the "decompression zone," referring to the observation that when a customer enters a store, they usually require about 10-15 feet (or about 5-10 seconds) after entering the store to acclimate to their new surroundings. For instance, they must slow down from the generally quicker pace of walking they were engaged in when outside the store. They must adjust to new environmental conditions as well as adjust to a general change in goal directed mental processing. Essentially, this period of acclimation renders customers significantly insensitive to the marketing messages presented to them during that time. Given that many customers are in the process of walking deeper into the store during that period, any displays and products presented to them within that first 10-15 feet have a greater potential for being ignored, thus greatly reducing the effectiveness of valuable selling space. Thus, if customers can be slowed down or otherwise caused to spend more time in that area, it follows that the effectiveness of that selling space should be enhanced.

From examination of current psychological and physiological research, it appears that there are several ways to reduce the size or negative effects of the "decompression zone," increase the affective states of shoppers, as well as enhance the attentional and mnemonic value of displays and products in general. Much of this research focuses on the use of color, color changing, lighting or motion to direct attention, increase the duration of attention, or enhance the salience, memory and mood regarding things visually experienced while in the store. In a fundamental sense: Get more people in the store, put them in a good mood, keep them there as long as possible, keep them aroused and motivated, and they will be more likely to make purchases.

The following analysis evaluates how a new prototype storefront as implemented by a "high end specialty retailer," which significantly incorporates full spectrum digital color changing lighting technology manufactured by Color Kinetics of Boston, MA, achieves the types of consumer behavioral changes necessary to improve the potential selling ability of the storefront. The Color Kinetics lighting system makes use of color, color changing and dynamic motion effects to capitalize on findings in psychological and physiological research to enhance the effectiveness of retail displays towards positively affecting consumer behavior within a retail environment.

During the first quarter of 2000, Color Kinetics quantitatively and qualitatively evaluated a "high end specialty retail" prototype storefront design as compared to a demographically, geographically and operationally matched control storefront. Customer interactions with the storefronts were video monitored for a period of 21 days. 200 customers from each location (400 customers total) were randomly selected for inclusion in the quantitative analysis. Customers were measured on quantitative variables including the length of time spent in the store, which side of the store they entered/exited, how long it took them to enter/exit the store and the length of time they spent in the storefront area. Customers were also measured along four levels of interaction with the three major storefront displays (considered the two wall displays and a centrally located display) and products. In addition, customers were measured as to the length of time they spent interacting with each individual storefront display.

Qualitative data on customer impressions of the two store designs were obtained through exit surveys. Results from 40 randomly selected customers from the prototype store were compared to results obtained from 40 additional customers surveyed at the control location. Data were obtained on such qualitative variables as the customers current mood upon exit of the store, to what degree customers felt that day's experience with the store altered their mood, a rating of the use of color in the store's displays, the area of the store customers found most attractive, the aspect of the store that most caught their eye, and an overall rating of the store.

Quantitative Methodology

Prior to data collection, each of the two stores participating in the evaluation was outfitted with video surveillance equipment consisting of two color digital cameras, a four channel digital duplex multiplexer, and a time lapse VCR. The cameras were installed in positions within the stores as to maximize the coverage of the storefront in addition to a small amount of overlap into the rest of the store. The cameras had the ability to zoom in on customers that were randomly selected to provide more detailed evaluation of their interaction with the storefront. The storefronts were recorded for 21 days. Store managers had the responsibility of placing a new tape into the VCR and beginning the days recording each morning prior to opening. Each week, tapes were collected from the stores for analysis.

For the video analysis, customers were selected randomly using a two level randomization process. 200 customers from each store were included in the final analysis. For the monitoring of the customers while they were in the store, the customers were "tagged" by the clothing they wore, their general age (teen, adult, elderly), and gender. Once "tagged," they were assigned a customer number and the time they entered the store was noted. The side of the store they entered was noted. They were watched as they made their way from the lease-line into the store.

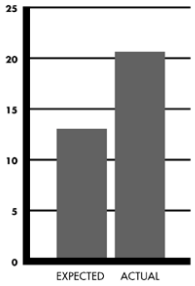
Any obvious, casual glance at any of the three storefront displays was marked down as an "obvious glance at display" and the display glanced at was noted. If the customer stopped in front of any storefront display and engaged in a passive observation of the display (i.e., no items in the display were handled), the customer was marked as having "engaged" the display and the duration of the engagement was noted. If the customer handled a product from the display, the handling was noted, as was the display from which it was handled. If the customer removed the item from the display, supposedly with the intent to purchase the item, it was noted. The display the product was removed from was also noted.

The time at which the customer passed from the storefront area to the remainder of the store was noted. When the customer returned to the storefront, the time of the passing into the storefront area from the middle of the store was noted. If the customer performed any of the aforementioned interactions with the storefront displays/products, they were recorded. If the customer returned to the middle of the store, the time of passing out of the storefront area was again recorded along with the time of return to the storefront. When the customer exited the store, the time of exiting was noted, as was the side of the store from which the customer exited.

Quantitative Results

graph 1

% INCREASE OF FOOT TRAFFIC INTO COLOR KINETICS ILLUMINATED STORE COMPARED TO RETAILER'S EXPECTATIONS.

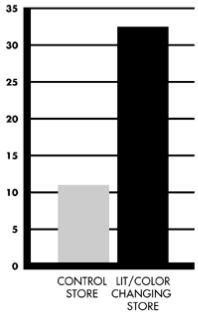


More people entered the store and they stayed there longer. Store traffic for the prototype location increased by 20.7% from levels obtained from that store during the same time period a year earlier. There was also an average 26 seconds (6.2%) increase in the total time customers spent in the prototype store (7:24) compared to the control store (6:58). (graph 1)

Customers received greater exposure to items located in the storefront displays. Overall, customers took an average of 13 seconds (81.25%) more time to pass through the prototype storefront (29 seconds) as compared to the amount of time it took customers to pass through the control storefront (16 seconds). It took customers an average of 11 seconds (91.6%) more time to exit through the prototype storefront (23 seconds) compared to the control location (12 seconds). Customers spent an average of 28 seconds more total time (100% increase) in the storefront of the prototype location (56 seconds) than the storefront region of the control location (28 seconds).

graph 2

% SHOPPERS STOPPED AT DISPLAY COMPARED TO THE ANALAGOUS SIDE OF THE CONTROL STORE

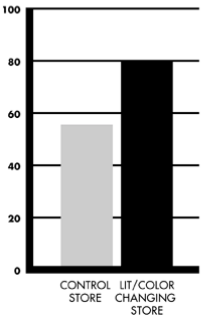


The percentage of customers who actually stopped and "engaged" any of the three storefront displays increased 7.5% from 37.0% at the control location to 44.5% at the prototype location. The percentage of customers who actually stopped and "engaged" the Color Kinetics lighted display in the prototype storefront was 34.0% as compared to 12.5% for the analogous display in the control storefront, an increase of 21.5%. (graph 2)

Customers who stopped in front of or "engaged" any of the three storefront displays (but not necessarily handled an item or removed an item from the display for purchase) spent an average of 24 seconds more time in front of those displays in the prototype storefront (average time of 48 seconds). This was an increase of 100%. compared to the control storefront (average time of 24 seconds). Customers spent an average of 24 seconds more time in front of the Color Kinetics lighted display wall in the prototype storefront (46 seconds) as compared to the analogous display wall in the control storefront (22 seconds), an increase of 109%.

graph 3

% SHOPPERS WHO ENTERED STORE FROM THE ILLUMINATED/COLOR CHANGING DISPLAY SIDE COMPARED TO THE ANALAGOUS SIDE OF THE CONTROL STORE



The Color Kinetics color changing illumination display was effective in directing traffic flow. The percentage of customers who entered the store on the right side (from the customer's point of view) of the center display at the prototype location (the side with the Color Kinetics lighted display) was 80.5% compared to 55.5% who entered on the right side at the control location, an increase of 25.0%. Upon exiting the stores, 52.0% customers at the prototype location exited via the left side (from the customer's point of view) of the store (the side with the Color Kinetics lighting) compared to 38.0% of customers who exited from the left side of the store at the control location, an increase of 14.0%. (graph 3)

The color changing display attracted more visual attention. The percentage of customers who casually glanced at *any* of the three storefront displays while walking through the storefront area increased by 19.0% from 65.5% in the control location to 84.5% in the prototype location. The percentage of customers who made such casual glances at the Color Kinetics color changing lighted display in the prototype storefront was 67.0% compared to 27.0% for the analogous wall in the control storefront, an increase of 40%.

Storefront displayed products were found more appealing to handle. The percentage of customers that, while engaging any of the storefront displays, picked up and examined products located in any of the storefront displays increased 10.0% from 26.0% at the control location to 36.0% at the prototype location. The percentage of customers who made such contact with products in the Color Kinetics lighted display in the prototype storefront was 25.5% compared to 8.0% for contact with items in the analogous wall display in the control storefront, an increase of 17.5%. (graph 4)

graph 4

Finally, the percentage of customers that, while engaging any of the storefront displays, picked up and actually removed a product located in any of the storefront displays increased 7.0% from 2.5% at the control location to 9.5% at the prototype location. The percentage of customers who removed a product from the Color Kinetics lighted wall display in the prototype storefront was 6.0% compared to 1.5% for removal of an item from the analogous wall display in the control storefront, an increase of 4.5%. Supposedly, if a shopper removes a product from a display, they are intending to purchase the item.

Quantitative Summary

The above results indicate that significantly more customers are entering the prototype storefront, thus entering the store in general, compared to a year earlier in the same store. Once in the store, compared to a matched control store, customers are staying in the prototype storefront longer. They are noticing the display lighted with Color Kinetics luminaries more often, and thus the products in that display are receiving more attention and exposure. Further, customers are far more likely to enter that side of the store, which demonstrates a profound effect on traffic control. Compared to the control store, customers are more likely to browse the prototype storefront displays in general, and are browsing the prototype storefront displays longer as well. In addition, they are handling more products in the prototype storefront displays and are more likely to remove an item from those displays with the intent to purchase. Customers are entering the prototype store more slowly giving them more time to see the products in that area. Also, they are exiting more slowly allowing for an increase in last-minute exposure to displays and products. All these results are most noticeable regarding the display dynamically illuminated with Color Kinetics color changing luminaries. It would seem that the new storefront design, with special note to the Color Kinetics illuminated display, has significantly increased the potential selling ability of the storefront region of the prototype store.

Qualitative Methodology

The qualitative data were collected from each of the two locations that participated in the quantitative portion of the evaluation. The surveys were twenty questions in length and administered to customers, who were randomly selected, after they exited the store. The survey asked customers to rate aspects of the store and recall the most memorable and attractive aspects of the store. Several questions asked the customers to rate, on a 7-point scale, their mood or their impressions of the store. The survey was conducted over two consecutive Thursdays and Fridays. 20 people at the control store were surveyed on the first Thursday followed by 20 more customers surveyed at the prototype location on the first Friday. The days used for the second Thursday and Friday were switched to minimize confounds of shopping days. A total of 80 people (40 from each store) were surveyed in total.

Qualitative Results

- There was a 12.5% increase in the percentage of color changing illumination store customers over control store customers who felt they had spent “a little more” or “much more” time in the color changing illumination store versus other mall stores that day.
- There was a 22.5% increase in the percentage of customers who responded: “displays,” “lighting” or “color use” as the most memorable aspects of their visit to the prototype store as compared to the control store.
- There was a 7.5% increase in the percentage of customers in the prototype store who stated specifically that they browsed the color changing area of the store the longest during their visit compared to the analogous area in the control store.
- There was a 7.5% increase in the percentage of customers from the color changing illumination store compared to control store customers who decided to visit the store because of “seeing colorful displays.”
- Results from the exit surveys also revealed several differences in the perceptions and attitudes of customers toward various aspects of the compared stores.
- The average rating (on a 7-point scale) of customer mood upon leaving the prototype store was 5.8 compared to an average value of 5.3 for the control store. (1 = “very bad mood”)
- The average rating of customers’ impression of the prototype store versus other stores they shopped in the mall that day was 5.8 compared to an average value of 5.5 for the control store. (1 = “much worse”)
- The average rating of customers’ belief that their shopping experience at the prototype store changed their mood was 5.8 compared to an average value of 5.2 for the control store. (1 = “made my mood much worse”)
- The average rating of customers’ impression on the prototype store’s use of color in the displays was 6.3 compared to an average value of 5.2 for the control store. (1 = “very poor use of color”)
- The average rating of customers’ impression of the value of the time they spent in the prototype store was 5.8 compared to an average value of 5.3 for the control store. (1 = “a total waste of time”)
- The average rating of customers’ overall impression of the prototype store was 6.2 compared to an average value of 5.6 for the control store. (1 = “very poor”)

Qualitative Summary

The above results indicate that the prototype store customers (as compared to control store customers) felt as though they were spending more time in that store than in other stores they shopped that day and that their perception of the quality of that time in the prototype store was more positive. They liked the use of color in the prototype design more and rated their mood upon exiting the prototype store higher than did customers in the control store. Prototype store customers also felt that their store experience had a more profound positive affect on their mood compared to customers from the control store location. Customers who shopped the prototype store regarded that store more positively compared to other stores shopped that day than did customers from the control store. Customers from the prototype store demonstrated an increase in their preference for browsing the color changing displays in the storefront area of the store. Customers also showed an increase in their selection of the lighting and displays as the most memorable aspect of their experience that day while shopping at the prototype store. Finally, the overall rating of store was higher for prototype store customers than for control store customers.

General Summary

Extensive previous research both in the field and in the laboratory has revealed that color, light and dynamic motion effects may all have profound influences on various aspects of consumer behavior through changes in attentional, mnemonical, and affective states. Color Kinetics system of digital color changing lighting has capitalized on these influencers of behavior to enhance the potential selling ability of a particular region within a retail environment generally considered to be the most difficult area in a store to convey marketing messages and sell products.

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