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Light and Corporate Identity; Using Lighting for Corporate Communication

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ABSTRACT

The central focus of this study is to investigate what potential exists for brand communication in the lighting of retail outlets. Lighting not only facilitates the visual task, helping to present the merchandise and contributing to the feeling of wellbeing, but can also augment the communication of a brand's appearance. For this study, computer visualisations of retail outlets with different lighting variations are evaluated in terms of light, spatial setting and brand impression by regional and international groups using the semantic differential technique. A comparison between rooms with and without luminaires yet with the same lighting effect demonstrates the effect of luminaires as design objects. From the results it can be deduced that light can be used for brand communication in order to define the image of a company more clearly.

Keywords

Retail design, Perception, Corporate identity, Lighting, Marketing, Brand communication, Brand image

INTRODUCTION

In lighting engineering, the perception of lighting has long been evaluated in the context of safety and efficiency at the workplace. In recent times, however, there has been an increase in the proportion of studies looking at the atmosphere of the room – whether aimed at increasing the motivation at the workplace or at generally improving the feeling of wellbeing on the premises (Loe et al., 2000; McCloughan et al., 1999; Knez, 2000). As a result, quantitative lighting design has been expanded by the addition of an important dimension, that is to say, by the inclusion of this qualitative perspective. In the context of brand communication, the question raises itself as to what qualitative messages can be conveyed via architecture or architectural light, respectively, and how is this aspect incorporated in the marketing.

From the semiotics perspective, the architecture can be seen as a symbol (Nöth, 1985). A window, for instance, not only fulfils the practical function of allowing the permeation of light, but also communicates meaning

depending on its shape and position. Accordingly, many symbols in architecture have an intentionality and can be deciphered if the observer knows the code – maybe using architectural history for instance. Thus, for example, Krampen and Kotler (1979) used the semantic differential analysis to identify the factors of meaning that connect people and buildings; and Eco (1972) developed his semiotic model in which he distinguished between *denotation* as a physical function and *connotation* as a socio-anthropological function. Hence, the interest of brand communication is primarily directed at the secondary function of architecture, the connotation. Richter (2008), in his architectural psychological work, describes how, for instance, consumer worlds now make use of insignia from the sphere of religion in their spatial symbolism.

Conversely, the findings of brand management form an important framework for dealing with the concept of brand communication. The analysis of the consumer market and buying behaviour creates an essential pre-condition for developing new strategies (Kotler, 2000). Cultural, social, personal and psychological factors make a considerable contribution to the decision to buy. Knowing the preferences of the respective target group will simplify the propagation of brand messages aimed at transmitting the image of a brand from the company to the customer (Foscht et al., 2008).

The American Marketing Association defines the term “brand” as follows: “A brand is a name, term, sign, symbol or design, or a combination of them, intended to identify the goods or services of one seller or group of sellers and to differentiate them from those of competitors.” The dimensions of meaning embodied by the term “brand” can go off in six directions: attributes, benefits, values, culture, personality or user (Kapferer, 1992). In addition to the service, which reflects the brand values, the atmosphere in the particular retail outlet also plays a significant role and must fit the target group (Kotler, 1973).

To investigate an effective communication strategy, marketing uses image analysis, which in turn is often measured using the semantic differential (Osgood et al., 1957; Florack et al., 2007). Kotler explains that image “is the set of beliefs, ideas and impressions a person holds

regarding an object.” Conversely, Stern defines the term “image” more in terms of communication theory, when she writes: “Image is generally conceived of as the outcome of a transaction whereby signals emitted by a marketing unit are received by a receptor and organized into a mental perception of the sending unit” (Stern et al., 2001). In this present study, the term “image” is related to the external environment when the consumer evaluates photographs of retail outlets – in the sense of store image. “Psychologically-orientated definitions locate image in the consumer’s mind and treat it as a cognitive and/or emotional construct based on consumers’ feelings” (Stern et al, 2001). Brand image and brand awareness together form the two components of brand knowledge (Keller, 1993). In this context, the architecture of stores can be categorised as a non-product-related attribute. It achieves a symbolic benefit which is appreciated by the customer because it corresponds to his or her self-concept. When making the decision to buy, the emotional dimension can even be greater than the functional aspect (Pawle, 2006). Consumers and their emotions, social standing and value orientation are classified using milieu studies (Florack et al., 2007). The value orientation theory in social psychology was developed by Kluckhohn and Strodtbeck and assumed that understanding and communication could be facilitated by analysing people’s orientation in a cultural context (Kluckhohn et al., 1961). A survey consisting of different situations with associated questions served as a basic assessment instrument. Silberer drew the value orientation more into the context of companies and consumer behavior (Silberer, 1991). The allocation into groups within this study makes use of the Sinus milieu, which plots the value judgement on the Y-axis and social standing on the X-axis (Florack et al., 2007).

Lighting in the form of neon advertisements has long been used for brand communication (Schivelbusch, 1992). Luminous texts or company logos have increased a brand’s presence in the urban area and, as a luminous feature at a shop’s entrance, have made it easier to identify a brand-name store. Seen in terms of semantics, light is directly used as a sign. Yet when consumers enter the store, they are no longer confronted by the brand’s luminous signage but are standing in the light of that brand, experiencing a specific atmosphere that is deliberately linked with the brand via the lighting. The consistent use of a uniform lighting concept for all the retail outlets of a brand helps a company to build up a uniform image for a clear brand identity. From the marketing point of view, the lighting not only fulfils the function of facilitating vision and of creating a hierarchy of perception using differentiated brightness levels for the presentation of special products, but also reflects a brand identity. Within the corporate architecture, the lighting then becomes an information medium for the corporate identity (Messedat, 2007). The value of a lighting system for salesrooms is therefore no longer seen solely in terms of how attractive it is in the sense of a good general sales lighting for generating more sales turnover (Cuttle et al., 1995), but also in terms of how

well it conveys the brand image. The existence of uniform design guidelines for store lighting is evidence of how light has now become a strategic component of companies’ corporate design manuals (Scheer, 2001). The study sought to demonstrate how the lighting can create different brand images within the same room. The qualitative lighting design approach helps to consider the principles of perception-oriented lighting design as well as how luminaries are integrated into architecture (Ganslandt et al., 1992).

METHOD

To investigate the hypothesis that solely changing the lighting concept is sufficient to change the brand identity of a retail outlet, an empirical consumer investigation was conducted. It was further assumed that the appearance of the ceiling in a standard shop can produce a prestigious impression all on its own. The background for this assumption lies in the observation that heterogeneous merchandise below eye level dominates the visual field, whereas – speaking of architectural lighting design - the ceiling is mainly influenced by the architecture itself and thereby the ceiling could contribute significantly to the appearance of a store and likewise to the corporate lighting image. An additional assumption was that light on its own makes classification in the sense of social milieus possible and that luminaires are not absolutely necessary. This aspect could clarify the role of the lighting concept in relation to the product design of the luminaries within corporate lighting design guidelines. A further hypothesis was that a high-class store impression does not necessarily equate to simply increasing the brightness.

The sample group was selected from volunteers who had mainly little to do with architectural lighting professionally. To analyse global differences, part of the study was conducted with an international sample group. To obtain an evaluation of different lighting situations, the test participants were asked to give their judgement on the light, spatial setting and brand. The psychophysical method of “semantic differential” for quantifying stimulus and subjective reaction, which is frequently used in lighting research, was reduced to just a few dimensions in order to reveal clearer relationships (Houser et al., 2003). Eleven pairs of adjectives covered the different dimensions. The light was evaluated via the following factors: “bright – dark”, “high-contrast lighting – diffuse lighting”, “cold – warm”. The room’s characteristics were rated using the paired adjectives “spacious – defined”. The adjective pair “attractive – unattractive” directly rated the subjective emotional impression in the sense of an affective evaluation (Schierz, 2004). Attributive components, representing a cognitive evaluation of mental concepts, were rated using: “natural – technical”, “dramatic – relaxed”, “uniform – differentiated” and “unobtrusive – expressive”. The dimension of the brand was evaluated relative to the social milieus of the consumers and to the possible allocation of brand fields to the attributive adjective pairs “traditional – modern” and “low budget – high class”. The spectrum of

evaluative tasks for the participants ranged from photos depicting real architecture, combinations of photography and graphic art through to lighting visualisations that enabled different lighting concepts to be created for the same location. The test participants were surveyed online to keep the workload and costs within appropriate limits, especially for the international survey. The results were evaluated using descriptive statistics and correlation analysis.

Experiment 1:

Evaluating the photography of real projects

Experiment one aims at existing projects and reveals for an outdoor and indoor situation that the lighting design can influence the mood and brand appearance even if the building structure appears similar. Surveying several architectural situations in real environments is a highly complex process, especially regarding the proximity of the buildings to each other, the influence of the surroundings, the architectural differences and the coordination of a sufficiently high number of participants. As an initial step, therefore, an image evaluation was conducted using photographs in an online survey. Because petrol stations have been using uniform lighting design principles for quite some time now (Stichting Prometheus, 1994), night-time photos of petrol stations were used, whereby all the specific brand information in the form of text and logos had been deleted using image processing (Figure C1, Situation A).

Furthermore, to test what effect the luminaires have on the appearance of the ceiling within a store, two outline perspectives of the room with the cut-out in the ceiling were first given to the observer for evaluation, followed by the complete photos. In this way, an integrated lighting approach was set over and against an additive concept with spotlights (Figure C2, Situation B). The personal details collected not only included age, sex and experience in lighting design but also the participant's value orientation, the size of their hometown and their current mood (Table T1).

The online survey (n=101) used the Limesurvey software, which worked with a seven-point scale for the semantic differential for each question. The two ends of the scale corresponded to "very much"; the middle was labelled "neutral". The first image evaluation used an image format of 500 x 375px and the second series used 600 x 390px so that the design and the scales could be viewed together on one monitor.

Table T2 summarises the descriptive statistics for both series of tests. Figure 1 provides a graphic overview of the mean values of the eleven scales. First of all, from the petrol-station situations A1 and A2, it can be seen that the architecture combined with the two different lighting concepts does indeed have an effect on the components relevant for the social milieu since it affects both the basic orientation of "traditional – modern" and the value rating of "low budget – high class". In contrast, the scales of "attractive – unattractive" and "dramatic – relaxed" only show marginal differences.

For situation B showing the interior of two stores, figure 2 shows that a strong analogy is evident within each of the situations B1 and B2 when it comes to the evaluation on the emotional and cognitive levels. Although a large spatial area can only be recognised from its contour and only the ceiling permits a statement about light it reveals a clear similarity to the evaluation of the total shop image. Striking features can be identified not only with the attributes "traditional – modern" and "low budget – high class" but also with "dramatic – relaxed" and the spatial perception "spacious – defined". These points produce a greater contrast than the light attributes "bright – dark" and "high-contrast lighting – diffuse lighting".

In contrast to situation A, where it could perhaps be noted that the petrol stations differed in design and size, a comparable differentiation of the social milieu is evident with situation B where the perspective and proportion are identical. The examples chosen here illustrate how the differences with the petrol stations largely concern the "low budget – high class" scale, whereas the two stores differ more in the "traditional – modern" scale (figure 3). The strong to very strong correlation (0.6-0.8 to 0.8-1 respectively) between the ceiling cut-out on its own and the entire room (Table T3) justifies the assumption that the appearance of the ceiling alone can be taken as an indicator for the appearance of the store as a whole.

Table T1 Test groups for experiments 1, 2, 3

Group	1	2.1	2.2	3
N	101	18	22	99
Female %	48	38	50	67
Male %	48	50	45	31
Age average	28	28	25	31
Light experience %	18	28	41	60
No light experience %	79	61	50	38

Table T2 Descriptive statistics for experiment 1: Mean (M) and standard deviation (S). Situations A1 and A2 petrol-stations, situations B1 and B2 Retail shop with a for ceiling detail and b for total shop image.

Situation	A1		A2		B1a		B1b		B2a		B2b	
	M	S	M	S	M	S	M	S	M	S	M	S
attractive unattractive	-0,2	1,6	-0,2	1,6	0,4	1,7	0,4	1,6	-0,1	1,8	-0,7	1,8
dramatic relaxed	-0,2	1,4	0,0	1,4	0,0	1,4	-0,4	1,3	0,4	1,3	0,9	1,4
spacious defined	-0,5	1,4	0,0	1,5	-0,4	1,5	0,0	1,4	-0,6	1,5	-1,2	1,4
uniform differentiated	-1,5	1,3	0,1	1,6	-0,8	1,8	-0,1	1,7	-0,6	1,7	-0,7	1,5
natural technical	1,7	1,4	1,2	1,3	0,7	1,5	0,4	1,5	0,9	1,5	0,6	1,6
bright dark	-1,0	1,3	-0,1	1,6	-0,9	1,3	-0,7	1,3	-0,4	1,3	0,0	1,3
cold warm	-1,5	1,4	-0,2	1,4	0,6	1,4	0,3	1,4	0,6	1,5	0,8	1,5
high-contrast lighting diffuse l.	-0,5	1,5	0,1	1,5	0,2	1,4	0,0	1,4	0,2	1,5	0,5	1,4
traditional modern	0,6	1,8	1,3	1,4	0,1	1,6	0,0	1,6	1,5	1,3	1,4	1,5
low budget high class	0,3	1,4	0,7	1,5	0,1	1,7	-0,3	1,3	0,8	1,4	1,4	1,3
unobtrusive expressive	0,7	1,5	0,4	1,4	0,2	1,5	0,4	1,4	-0,1	1,5	-0,6	1,5

attractive | unattractive
dramatic | relaxed
spacious | defined
uniform | differentiated
natural | technical
bright | dark
cold | warm
high-contrast lighting | diff. l.
traditional | modern
low budget | high class
unobtrusive | expressive

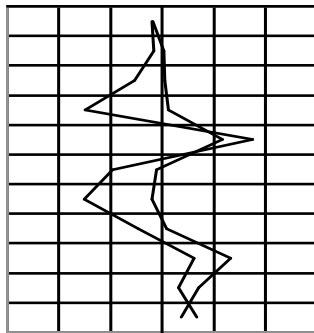


Figure 1 Comparison of mean semantic differential appearance for situations A1 and A2

attractive | unattractive
dramatic | relaxed
spacious | defined
uniform | differentiated
natural | technical
bright | dark
cold | warm
high-contrast lighting | diff. l.
traditional | modern
low budget | high class
unobtrusive | expressive

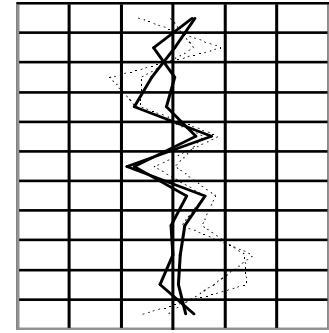


Figure 2 Comparison of mean semantic differential appearance for situations B1 (line) and B2 (dashed line) each with ceiling detail and total shop image

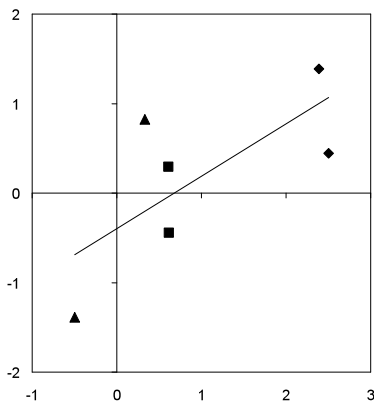


Figure 3 Relation traditional – modern (x-axis) and low budget – high class (y-axis): ■ Situation A, ◆ Situation B1, Situation B2

Table T3 Correlation between ceiling detail and total shop image for situation B retail shop.

Situation	B1a	B1b	B2a
B1a			
B1b	,758**		
B2a	,634*	,191	
B2b	,398	-,208	,871**

Table T4 Descriptive statistics for experiment 2: Mean (M) and standard deviation (S). Situations 1a-8a shop with luminaires (Group 2.1) and situations 1b-8b shop with erased luminaires (Group 2.2)

Situation	1a		2a		3a		4a		5a		6a		7a		8a	
	M	S	M	S	M	S	M	S	M	S	M	S	M	S	M	S
Shop with luminaires																
attractive unattractive	0,4	1,8	0,1	1,5	0,3	1,9	-0,2	2,0	0,5	1,9	-0,2	1,8	-0,1	2,2	1,1	1,6
dramatic relaxed	-0,1	1,4	-0,3	1,4	-0,8	1,8	0,2	1,6	-1,5	1,7	-0,3	1,3	-0,9	2,0	-0,8	1,5
spacious defined	0,2	1,3	-1,5	0,9	1,0	1,0	0,3	1,5	-0,1	1,7	-1,6	1,1	1,3	1,1	-1,2	1,8
uniform differentiated	0,1	1,3	-0,3	1,5	1,5	1,2	-0,1	1,4	-0,1	1,8	-1,3	1,4	0,8	1,8	-1,9	1,5
natural technical	0,9	1,6	1,2	1,4	1,5	1,6	0,8	1,5	1,4	1,5	0,9	1,8	2,7	0,6	1,7	1,4
bright dark	0,9	1,4	-1,4	1,5	1,2	1,3	0,8	1,5	1,1	1,5	-2,0	0,8	2,6	0,5	-2,2	1,0
cold warm	-0,8	1,6	-0,1	1,8	-0,1	1,7	0,8	1,5	1,1	1,2	-0,5	1,7	-0,4	1,8	-1,7	1,4
high-contrast lighting diffuse l.	0,5	1,7	-1,2	1,5	-0,8	1,7	0,6	1,9	-0,4	1,6	-0,1	1,4	-0,2	2,2	0,3	1,6
traditional modern	0,6	1,6	0,7	1,4	1,7	0,9	0,4	1,3	1,4	1,2	0,6	1,8	1,6	1,7	-0,3	0,9
low budget high class	-0,2	1,4	0,6	1,6	0,0	1,6	0,3	1,4	0,4	1,8	0,7	1,5	0,5	2,0	-0,5	1,5
unobtrusive expressive	-0,4	1,6	1,3	1,3	1,2	1,6	0,1	1,5	2,1	1,3	0,9	1,4	1,6	2,0	0,3	1,7

Situation	1b		2b		3b		4b		5b		6b		7b		8b	
	M	S	M	S	M	S	M	S	M	S	M	S	M	S	M	S
Shop with erased luminaires																
attractive unattractive	0,9	1,3	-0,2	1,8	-0,1	1,6	-0,3	1,6	0,7	1,7	-0,2	1,8	0,2	2,1	1,2	1,4
dramatic relaxed	0,2	1,4	-0,9	1,2	-1,0	1,6	0,6	1,5	-2,1	0,8	-0,5	1,0	-1,9	1,3	-0,7	0,8
spacious defined	0,0	0,8	-0,4	1,2	0,9	1,2	0,1	1,2	0,0	1,6	-1,5	1,4	1,1	1,6	-0,4	1,8
uniform differentiated	-0,6	1,6	-0,1	1,4	1,7	1,2	0,3	1,4	0,0	1,7	-0,9	1,7	1,3	2,0	-1,2	1,6
natural technical	1,2	1,2	1,6	1,3	1,9	0,8	-0,3	1,4	1,5	1,3	0,4	1,8	2,4	1,0	1,4	1,6
bright dark	0,7	1,6	-1,9	0,9	1,2	1,1	0,8	0,9	1,1	0,8	-2,2	1,0	2,7	0,6	-2,0	1,0
cold warm	-0,8	0,9	-0,6	1,3	0,4	1,5	1,6	0,9	1,4	1,4	-0,7	1,2	-0,6	1,8	-1,9	1,0
high-contrast lighting diffuse l.	1,2	1,3	-1,1	1,2	-1,2	1,4	0,4	1,3	0,4	1,2	-0,4	1,4	-1,0	1,9	0,3	1,7
traditional modern	0,4	1,6	1,3	1,1	2,1	0,8	0,1	1,4	2,1	1,0	0,2	1,6	2,3	0,8	-0,7	1,6
low budget high class	0,2	1,1	0,2	1,5	0,0	1,4	0,6	1,2	0,1	1,1	0,4	1,3	0,7	1,3	-1,0	1,6
unobtrusive expressive	-1,3	1,1	1,3	0,8	1,8	1,1	-0,5	1,3	2,3	0,8	-0,1	1,4	2,3	1,0	0,2	1,6

Table T5 Correlation analysis for situations 1a-8a shop with luminaires (Group 2.1). *Indicates correlations coefficients that are significant at the 5% level. **Indicates correlations coefficients that are significant at the 1% level.

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
P01 attractive unattractive										
P02 dramatic relaxed										
P03 spacious defined										
P04 uniform differentiated										
P05 natural technical										
P06 bright dark										
P07 cold warm										
P08 high-contrast lighting diffuse l.										
P09 traditional modern										
P10 low budget high class										
P11 unobtrusive expressive										

Experiment 2: Evaluating the lighting visualisation

To evaluate one and the same room with different lighting situations, the study used lighting visualisations based on Dialux Renderings. Various investigations have shown that the comments made about computer simulations compare favourably with observations made about the real space and that the comparison is therefore valid and acceptable. (Newsham et al., 2005; Mahdavi et al., 2002; Rohrmann et al., 2002). The aim of the visualisations was to show how the appearance of the same interior changes solely due to the lighting. Refitting a room or constructing several otherwise identical salesrooms would be logistically and economically highly impractical and therefore simulations were used here. The simulated salesroom measured approximately ten by fifteen by three and a half metres.

Items of clothing were shown on shelves and tables. The shop window and the background featured decorative points with mannequins, which also gave an idea of the room's size. As the viewing angle, the view looking into the room through the shop window was chosen as the central perspective. This is a perspective that consumers would be familiar with when walking past a store and standing in front of the entrance. Two on-line questionnaires were conducted in order to assess what influence the design of the luminaires has on the appearance. Group 2.1 (n=18) were given visualisations with luminaires (800 x 294px); group 2.2 (n=22) received visualisations in the same format in which the luminaires were erased. As in experiment 1, the same semantic differential was used with both groups. Eight different

lighting scenes were given to each of the two groups for evaluation. The paired questions for each lighting situation were randomly put in a new order each time to avoid the effects of repetition.

Table T4 presents the results of groups 2.1 and 2.2 showing the mean and standard deviation. Where the spatial situation is the same but the lighting is different, great differences between the light scenes are apparent not only with the scales for light, but also with the attributes for the allocation to brand fields, i.e. with “traditional – modern”, “low budget – high class”. For group 2.1, for instance, the relationship between the “traditional – modern” scales and the adjective pairs “spacious – defined” and “bright – dark” shows strong to very strong correlations. The latter has a two-tailed significance of 0.05 (Table T5). The “low budget – high class” attribute shows a middle correlation to the “cold – warm” parameter.

The analysis of the mean values from the two series of situations, 2.1 and 2.2, vividly demonstrates that a strong correlation exists with the four factors “attractive – unattractive”, “natural – technical”, “high-contrast lighting – diffuse lighting”, “low-budget – high class” and all other factors have a very strong correlation (Table T6). In seven cases the correlation on the level of 0.01 has two-sided significance, in three others it is 0.05.

The comparison of store situations with and without luminaires but with the same lighting effect demonstrates that, in the examples presented, the significant impression can be made just with the light alone. The luminaires take on a subordinate role. This aspect can be quite different in real surroundings because the luminaires appear bigger in the room due to the perspective as the observer moves around. Nevertheless, for building a brand image, the importance of the lighting concept compared to the choice of luminaires should not be underestimated.

Table T6 Correlation analysis for Group 2.1 and 2.2.

Scales	Light-Luminaires
attractive unattractive	,743*
dramatic relaxed	,860**
spacious defined	,886**
uniform differentiated	,910**
natural technical	,638
bright dark	,995**
cold warm	,952**
high-contrast lighting diffuse lighting	,718*
traditional modern	,907**
low budget high class	,772*
unobtrusive expressive	,891**

* Significance at 5% level. ** Significance at 1% level.

Experiment 3: Evaluating the lighting visualisation in the international comparison

To analyse cultural differences in the context of global marketing strategies, group 2.2, which originated from Germany, was set in relation to group 3, which had an international composition (n=99): group 3.1 = Europe (n=24); group 3.2 = America (n=20); group 3.3 = Middle East (n=26) and group 3.4 = Asia (n=17). Table T7 lists the mean and standard deviation for the entire group 3.

Using the correlation coefficient, table T8 shows the relationship of how greatly the different regions distinguish themselves from each other or resemble each other. The strongest analogies are present in Middle East – Europe, followed by Europe – Asia and America – Europa. If the values are compared with respect to the attributes, it is shown that the strongest correlation exists for “bright – dark”, followed by “traditional – modern” and “uniform – differentiated”. If the mean of the correlation coefficients is considered, overall there is a very strong correlation between the regions.

If, for instance, only the parameters “traditional – modern” and “low budget – high class” are considered, it then becomes clear, as figure 4 shows, that the geographical areas each receive a similar evaluation yet can still be delineated from each other, and the extent to which regional differences can arise also becomes apparent. By dividing into groups 3.1-3.4 and 2.2, the graphic reflects how the salient points of the evaluations arise for the various lighting situations.

If all the data of group 3 is considered in terms of the evaluation of “spacious – defined” and “bright – dark” in relation to the brightness of the image (Table T9), then it becomes evident from table T10 that the measurement of the overall image brightness correlates very strongly with these two factors and has a two-tailed significance level at 0.01. However, a stronger indicator for the impression of brightness and expanse is the brightness of the vertical surfaces in the image. These account for 70% of the image area and produce a higher correlation coefficient than that obtained with the overall image brightness.

If the “bright – dark” parameter is set in relation to “low budget – high class”, it then becomes apparent that the evaluation of the attribute for the price image remains largely constant despite changing brightness (Figure 5). The use of light to generate a high-price brand identity is therefore not dependent on higher luminous flux and thus higher energy consumption.

Table T7 Descriptive statistics for experiment 3: Mean (M) and standard deviation (S). Situations 1b-8b shop with erased luminaires (Group 3)

Situation	1b		2b		3b		4b		5b		6b		7b		8b		
	M	S	M	S	M	S	M	S	M	S	M	S	M	S	M	S	
Shop with erased luminaires																	
attractive unattractive	0,6	1,7	0,1	1,7	-0,8	1,6	-0,4	1,6	0,0	2,0	0,0	1,7	-0,6	2,2	1,1	1,8	
dramatic relaxed	0,0	1,4	-0,8	1,4	-1,5	1,3	0,0	1,7	-2,0	1,2	0,6	1,5	-2,2	1,4	0,5	1,2	
spacious defined	0,3	1,6	-0,2	1,7	0,7	1,6	0,3	1,4	0,5	1,7	-1,2	1,7	1,4	1,7	-1,0	1,8	
uniform differentiated	-0,4	1,7	-0,3	1,8	1,5	1,3	0,8	1,5	1,0	1,7	-1,0	1,4	1,6	1,6	-1,8	1,5	
natural technical	0,9	1,7	1,6	1,2	1,9	1,1	0,1	1,6	2,1	1,0	-0,2	1,6	2,5	0,7	0,4	1,7	
bright dark	1,0	1,5	-1,8	1,2	0,4	1,4	0,5	1,4	0,9	1,5	-2,2	0,9	2,5	0,9	-1,8	1,1	
cold warm	-0,8	1,5	-0,4	1,5	-0,1	1,5	1,4	1,4	0,5	1,8	-0,1	1,8	-1,1	1,8	-1,4	1,4	
high-contrast lighting diffuse l.	0,8	1,5	-1,0	1,5	-1,5	1,3	-0,7	1,7	-1,0	1,7	-0,1	1,6	-1,6	1,9	0,8	2,0	
traditional modern	0,5	1,7	0,6	1,7	2,1	0,9	0,2	1,4	2,1	1,1	0,1	1,8	2,5	0,9	-0,5	1,9	
low budget high class	-0,4	1,6	0,3	1,5	0,9	1,4	0,7	1,5	0,6	1,5	-0,1	1,7	1,2	1,5	-1,1	1,8	
unobtrusive expressive	-0,6	1,4	0,7	1,3	1,8	1,3	0,5	1,5	1,7	1,3	-0,4	1,7	2,0	1,4	-0,8	1,5	

Table T8 Correlation analysis for different regions within Group 3 (Situations 1b-8b shop with erased luminaires).

* Significance at 5% level. ** Significance at 1% level.

Scales	Region										Mean
	America-Asia	America-Europe	Europe-Asia	Middle East-America	Middle East-Asia	Middle East-Europe	Germany-America	Germany-Asia	Germany-Europe	Germany-Middle East	
attractive unattractive	,745*	,779*	,826*	,714*	,654	,927**	,529	,592	,818*	,763*	,735
dramatic relaxed	,911**	,800*	,937**	,956**	,961**	,924**	,698	,800*	,799*	,734*	,852
spacious defined	,826*	,883**	,740*	,912**	,806*	,942**	,922**	,949**	,826*	,865**	,867
uniform differentiated	,952**	,983**	,979**	,941**	,922**	,938**	,814*	,884**	,827*	,879**	,912
natural technical	,926**	,930**	,972**	,938**	,923**	,960**	,674	,828*	,859**	,721*	,873
bright dark	,931**	,983**	,965**	,981**	,966**	1,000**	,964**	,942**	,984**	,985**	,970
cold warm	,918**	,957**	,930**	,879**	,882**	,853**	,896**	,836**	,854**	,969**	,897
high-contrast lighting diffuse l.	,928**	,842**	,862**	,910**	,895**	,872**	,579	,650	,921**	,643	,810
traditional modern	,939**	,991**	,945**	,937**	,858**	,920**	,955**	,950**	,931**	,927**	,935
low budget high class	,763*	,914**	,924**	,678	,831*	,864**	,501	,677	,627	,755*	,754
unobtrusive expressive	,949**	,936**	,940**	,870**	,822*	,940**	,797*	,806*	,912**	,776*	,875
Mean	,890	,909	,911	,883	,865	,922	,757	,810	,851	,820	,862

Table T9 Image brightness (Minimum 0, Maximum 255) of situations 1b-8b: Total brightness, horizontal surfaces (30%), vertical surfaces (70%)

	Total		Horiz.		Vert.	
	M	S	M	S	M	S
1b	123,0	35,9	156,2	28,4	109,2	29,1
2b	136,7	62,8	160,1	67,7	127,1	57,9
3b	135,2	62,8	134,3	53,8	135,6	66,7
4b	108,7	57,2	126,8	61,8	102,4	54,1
5b	112,6	65,4	116,3	62,0	111,0	66,8
6b	153,6	63,3	151,5	58,5	154,7	65,7
7b	56,5	37,2	52,8	37,2	58,3	37,0
8b	152,3	66,4	134,9	51,0	159,5	70,6

Table T10 Correlation analysis for image evaluation factors and image brightness within Group 3.

Scale	spacious defined	bright dark
spacious defined		
bright dark	,930**	
brightness total	-,850**	-,874**
brightness horizontal	-,678	-,715*
brightness vertical	-,861**	-,877**

* Significance at 5% level. ** Significance at 1% level.

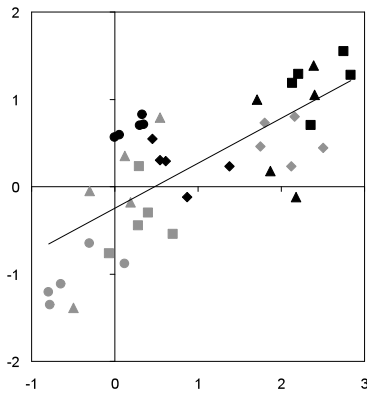


Figure 4 Relation traditional – modern (x-axis) and low budget – high class (y-axis). Situation 1b-8b for Group 3 and Group 2.2 with separate marks for five regions: America, Asia, Europe, Middle East, Germany

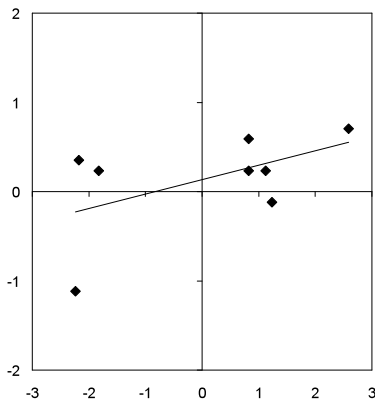


Figure 5 Relation low budget – high class (x-axis) and bright – dark (y-axis). Situation 1b-8b, Group 3

RESULTS

The different image analyses permit the conclusion that various relationships exist between the architectural lighting and the brand identity of a retail outlet. Groupings for strategic marketing can be undertaken based on the attributes for social milieu in order to analyse the image of lighting designs for target groups via aspects such as value orientation and social standing. The evaluation of the surveys shows that the rooms can convey a very different image in terms of brand identity simply through having different lighting. This phenomenon can be used for brand communication in order to clearer define the image of a business at the point of sale. The aspect of brightness, although much discussed in lighting research, actually only plays a subordinate role. A possible advantage of this is that using light to construct a striking brand image does not necessarily entail higher energy consumption. The comparison of situations with and without luminaires for the same lighting effect demonstrates that the essential impression is already reached via light and that visible luminaires are not strictly necessary. The appearance of the ceiling can give an indication of the store's image simply

by virtue of its lighting effect and design pattern. The international comparison reveals that different groups evaluate the brand image differently, although there is still strong correlation. Uniform lighting concepts could be implemented as global design guidelines for international markets if global variance is included. Lighting concepts that are able to augment the brand identity can generate added value for the business. The financial value of a lighting system would then no longer only consist of investment and running costs but also of the contribution to brand communication.

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