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Automobile design: A co-relation technique to assessment of human emotion, visual expression and product form

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ABSTRACT

Today, body designs of vehicles such as personal cars differ from brand to brand. The challenges of globalization have led to situations wherein manufacturers are prone to introduce an already existing model into new markets, especially emerging ones in developing countries. When such new markets get crowded with competition, manufacturers start customizing the designs developed elsewhere, to suit local preferences.

Designers involved in conceptualizing car forms are increasingly being inspired by a close study of human emotions including facial expression in the generation of product form. In this paper an attempt has been made to assess users response to automobile design based on drawing a co-relation between human emotion vis-a-vis the product expression and visual form of the front fascia of the car. Respondents were involved in assessing the front fascia of a set of 35 cars of reputed global car brands vis-a-vis two selected human bi-polar emotions chosen from amongst a set of 14 human facial expressions to state if they felt the product expression was 'in correspondence with'; 'in contrast with' or 'nether of the above' against a set expression. The responses were summarized and the results matched between respondents from India with those of the Iranian respondents. This resulted in drawing a cross cultural comparison of results of form expression and emotion associations for the two cultures.

The paper reports the findings from the above study. The results give leading directions to designers in mapping 'glocal' preference patterns of responses from two diverse cultures one Indian and the other Iranian.

Keywords

Emotion, semantics, automobile form, Co relation technique.

1. INTRODUCTION

Successful business models over a period of time have evolved a fairly sophisticated approach to product planning and Design. It is seen that leading design agencies such as Design Continuum,

Frogdesign, and IDEO have opened their own branches in Asia in order to cooperate more directly with clients there by having staff on the spot.

European corporations, particularly in the electronics and automotive industries, have opened offices abroad (especially in California) in order to follow current lifestyle trends more closely and to integrate the results of foreign studies more quickly into product development at home. The Audi TT is reported to be a good example. While the concept was born on the drawing boards of a Californian agency it has enjoyed equally spectacular success in America and Europe.



Figure 1. Audi TT

Köhler (2002), refers to another form of globalization that involves utilizing differences in manufacturing conditions. Design is conducted centrally, while production is decentralized. For example, Braun, based in the German town of Kronberg, has some of its electric shavers assembled in Shanghai. The motors are actually Chinese, while the rechargeable batteries come from Japan, and the heads for the high-quality blades are from Germany'

However these practices seem increasingly limiting considering the rapid rate of change in the development of technologies. The plethora of products that surround us reflect the diverse range of technologies embedded in these products that continuously get added to the market place. However are these reflecting the true needs of society? Do their presence influence lifestyles changes and have a significant bearing on the cultural ethos of the society at the

same rate of change? Obviously not. The cultural ethos seem to evolve at a much slower rate of change. This widening gap has resulted in a problematic of strategizing business throwing up unpredictable challenges to product planning and marketing initiatives in business. A good example of this is reflected amongst the leading global players of automotive industry in the USA. It is increasingly evident to these global players that not only is competition intensifying for all firms but the basis for competition is changing. It is evident that market growth or retention will ultimately rely on delivering superior value to consumers that make inclusive parameters beyond the conventional ones. Focusing on the auto industry, there are good business opportunities emerging amongst culturally rich and diverse developing countries such as India, China, Brazil who have opened their economy to global players. Domestic markets in these countries are opening up to foreign competition, stimulating greater awareness of international market opportunities and of the need to be internationally competitive. These markets need to be probed to understand their cultural needs. The success in these emerging global markets may depend on initiatives in local knowledge accumulation.

‘The degree of the socio- cultural differences between users means that assessments conducted from afar cannot produce adequate conclusions for product policy and design.’

Global Design initiatives will have to consider these added cultural dimensions and make inclusive considerations beyond the presently adapted approaches to product planning if they have to succeed in evolving design strategies.

In this paper an attempt has been made to propose an alternative insight/strategy to globalization. It suggests designers to search for ‘glocal meaning’ to the product form. In this approach the designer focuses upon collecting information and knowledge about local cultures, and especially knowing about commonalities between them (Krippendorff, 2006).

2. Hypotheses

Can a designer from one particular culture design for another culture? - In a broader quest to seek answers to the question an experiment was planned. The aim of this experiment was to evaluate if a common ground exists of shared perceptions and understanding amongst end users for visual form of products such as a car, between peoples of two diverse cultures. It was hypothesized that this understanding would help designers to understand the parameters for the form of the car design better.

3. Plan of the Experiment

To examine the above hypotheses, a semantic framework was considered for form analysis drawing co relation between emotion (Signifier), its manifestation in human expression (Signified) and this was evaluated for correspondence or contrast in the visual from expression of the object (Car front facia).

4. Methodology

The methodology followed involved the following steps:

1) Initially a set of 14 words for different emotions were selected as a signifier (signifiers in table 2). This was used in creating the

visual database for front facia of cars based on emotion representation of human expression (Fig. 3)

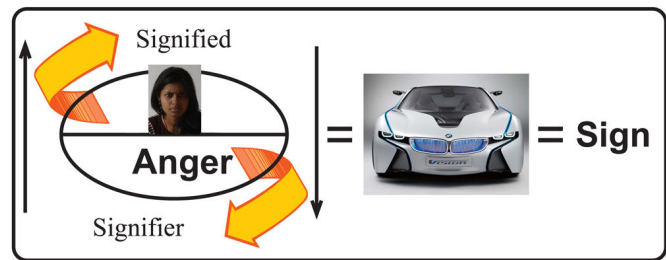


Figure 2. Semantic of anger sign

-This was followed by short listing of the emotional reactions (signifiers) that were reflected in a set of front facia of cars (signs) selected from the web site www.netcarshow.com This constituted our hypothesis for the particular form (table 2).

-Next cross verification and confirmation of hypothesis of the visual form of car facia for their representation of an emotion by an expert group of trained car stylist was done.

2) Creating two set off facial expressions that depict the 14 emotion (Fig. 4) (for example we asked our model to facially express ‘happy’ expression (Signifier) and this was captured through a photograph (signified)

3) Identification of co-relationship correspondence between car facia and emotion correspondence (Table 1)

4) Formation of Visual sets of 5 car form (L,K,J,H,G,F,D) arranged in set such that they are in correspondence with; in contrast with and neither of the two for a paired couple of emotions . (Figure 4)



Figure 3. Car face samples.

5) Creating the complete visual database comprising of 35 car faces, 5 in a set, and 7 sets in all that capture the 14 emotion set for user response testing (Figure 4)

6) Conducting the User response Test through an online survey (Figure 5).

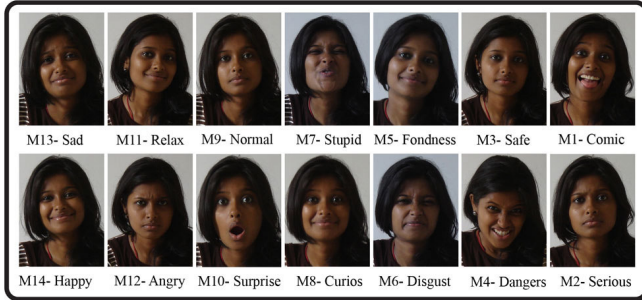


Figure 4. Human faces: 'Similarities' face reactions (Top row) 'contrasting' face reactions (Bottom row).

Table 1. relationships

List 1	List 2	List 3
Human, Normal	H	Human, Surprise
Human, Sad	D	Human, Happy
Human, Relax	J	Human, Anger
Human, Fondness	F	Human, Disgust
Human, Safe	L	Human, Dangers
Human, Comic	K	Human, Serious
Human, Stupid	G	Human, Curios

Table 2: Hypothesis

N	Cars	Signifier	No.	Cars	Signifier
1	F1	Disgust	19	H4	Normal
2	F2	Disgust	20	H5	Normal
3	F3	Fondness	21	L1	Danger
4	F4	Disgust	22	L2	Danger
5	F5	Fondness	23	L3	Danger
6	D1	Happy	24	L4	Danger
7	D2	Happy	25	L5	Danger
8	D3	Happy	26	K1	Comic
9	D4	Sad	27	K2	Comic
10	D5	Sad	28	K3	Serious
11	G1	Stupid	29	K4	Serious
12	G2	Curios	30	K5	Serious
13	G3	Stupid	31	J1	Anger
14	G4	Curious	32	J2	Anger
15	G5	Curios	33	J3	Anger
16	H1	Surprise	34	J4	Relax
17	H2	Surprise	35	J5	Anger
18	H3	Normal			

5. Experimentation Processes

The experimental set up and data collection were as depicted on internet (Fig. 5). The questioner explained the purpose of data collection and with an example introduced the respondent the method of filling up their responses. The questioner had an explanation for each question set. There were 7 questions.

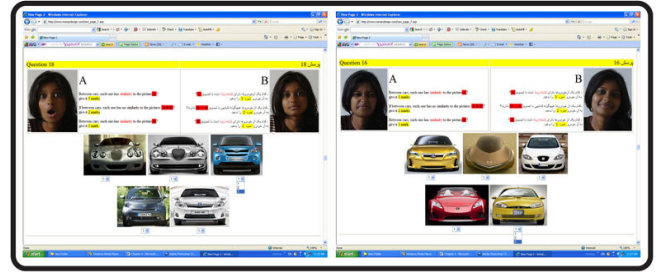


Figure 5. Questioner in the internet.

Using the grid that had all five pictures of car faces, human pictures in sets of two at either end were shown on the internet. Subjects were asked to verbally rate (1 for contrast, 2 for being impartial (we show it with a circle and slant) and 3 for similarity). Depending on the ratings patterns groups were marked on the internet. This was repeated for all the seven human pairs and all the seven series of car faces (F, G, H, J, D, and K & L) one by one.

5.1 Sample Size

The total sample size of the survey was 126 respondents. 78 respondents (62%) were men (age 18-54) and 48 respondents (38%) were women (age 18-50).

All the subjects were Asians. Out of the total of 126 respondents there were 60 people (48%) from India and 66 people (52%) from Iran.

6. Results

This data collected by co-relation technique (Fig. 7, 8, 9 ... 20) was analyzed for frequency from a cross-cultural perspective to examine the correspondence and differences in the responses to the same car form in the two cultural context – Indian and Iranian.. The detailed findings are being summarized for each series.

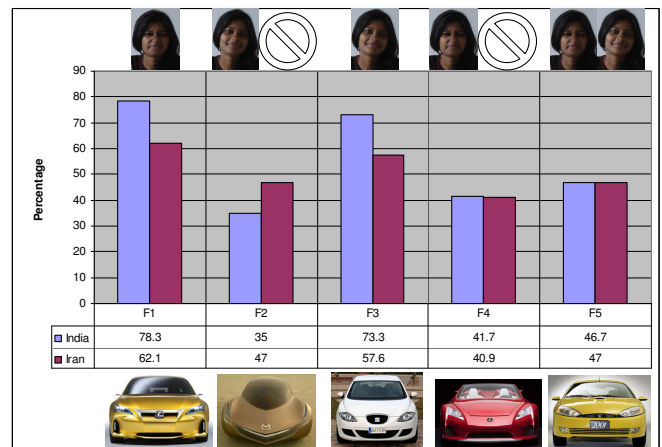


Fig. 6 Percentage of Indian and Iranian answers on group F

In F series (Figure 6) for human face with disgust expression and human face with fondness expression at either end.

-In car F1, respondents in both cultures have shown similar results stating that that car F1 has expression corresponding to disgust.

-In F2, the two cultural responses show dissimilar responses.

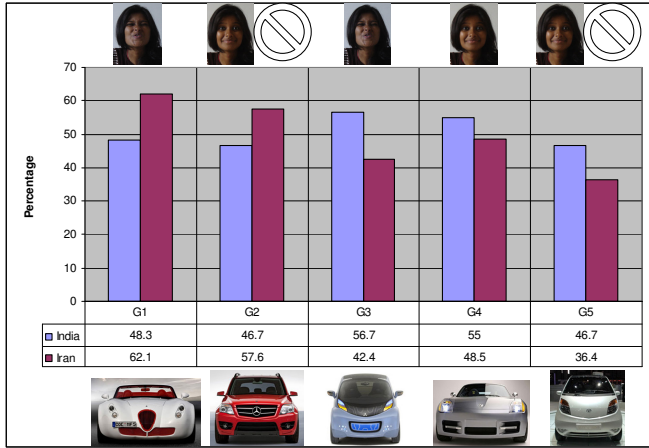


Fig. 7 percentage of Indian and Iranian answer on group G

- In response to F3 both cultures show the same response of form expression denoting fondness.

-In F4 , Indian subjects show that F4 has expression like disgust , but the same is not true for Iranian subjects.

-In F5 , both cultures have not shown same response .

In G series (Figure 7) for human face with Curios expression and human face with Stupid expression at either end , the results will show similarity and dissimilarity answer of both cultures

-For car G1 , respondents in both cultures have shown the same result that G1 has ‘Stupid’ expression.,

-In G2 , both cultures have not shown same result

-In G3 case, both cultures were shown same result that G3 has expression like Stupid reaction,

-In G4 case, both cultures were shown same result that G4 has expression like Curios reaction,

-In G5 , Indian subjects were shown that G5 has expression like Curios reaction, but Iranian subjects were not agreed.



Fig. 8 percentage of Indian and Iranian answer on group H

In H series (Figure 8) for human face with Surprise expression and human face with Normal expression at either end, it will show similarity and dissimilarity answer of both cultures.

-In H1 case, both cultures were shown same result that H1 has expression like Surprise reaction.

-In H2 case, both cultures were shown same result that H2 has expression like Surprise reaction.

-In H3 case, both cultures were shown same result that H3 has expression like Normal reaction.

-In H4 , both cultures were not shown same result

-In H5 case, both cultures were shown same result that H5 has expression like Normal reaction.



Fig. 9 percentage of Indian and Iranian answer on group J

In J series (Figure 9) for human face with Anger expression and human face with Relax expression at either end, it will show similarity and dissimilarity answer of both cultures.

-In J1 case, both cultures were shown same result that J1 has expression like Anger reaction.

-In J2 case, both cultures were shown same result that J2 has expression like Anger reaction.

-In J3 , Iranian subjects were shown that J3 has expression like Anger reaction, but Indian subjects were not agreed.

-In J4 , Iranian subjects were shown that J4 has expression like Relax reaction, but Indian subjects were not agreed.

-In J5 case, both cultures were shown same result that J5 has expression like Anger reaction.

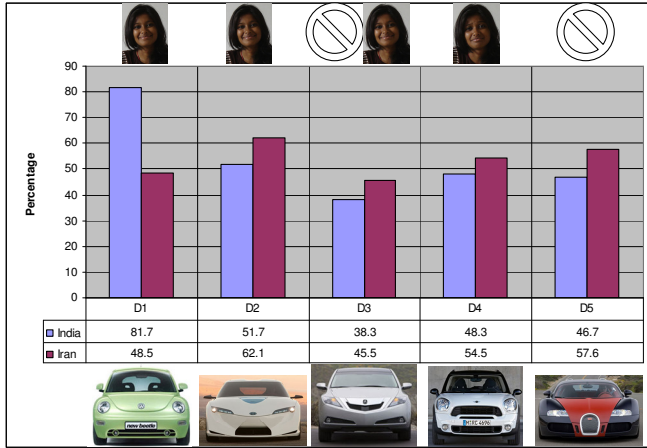


Fig. 10 percentage of Indian and Iranian answer on group D

In D series (Figure 10) for human face with happy expression and human face with sad expression at either end, it will show similarity and dissimilarity answer of both cultures.

-In D1 case, both cultures were shown same result that D1 has expression like happy reaction.

-In D2 case, both cultures were shown same result that D2 has expression like happy reaction.

-In D3 , Iranian subjects were shown that D3 has expression like happy reaction, but Indian subjects were not agreed.

-In D4 case, both cultures were shown same result that D4 has expression like sad reaction.

-In D5 case, both cultures were shown same result that D5 is not close to Sad and Happy reactions.

In K series (Figure 11) for human face with serious expression and human face with Comic expression at either end, it will show similarity and dissimilarity answer of both cultures.



Fig. 11 percentage of Indian and Iranian answer on group K

-In K1 case, both cultures were shown same result that K1 has expression like Comic reaction.

-In K2 case, both cultures were shown same result that K2 has expression like Comic reaction.

-In K3 case, both cultures were shown same result that K3 has expression like Serious reaction.

-In K4 case, both cultures were shown same result that K4 is not close to Serious and Comic reactions.

-In K5 case, both cultures were shown same result that K5 is not close to Serious and Comic reactions.

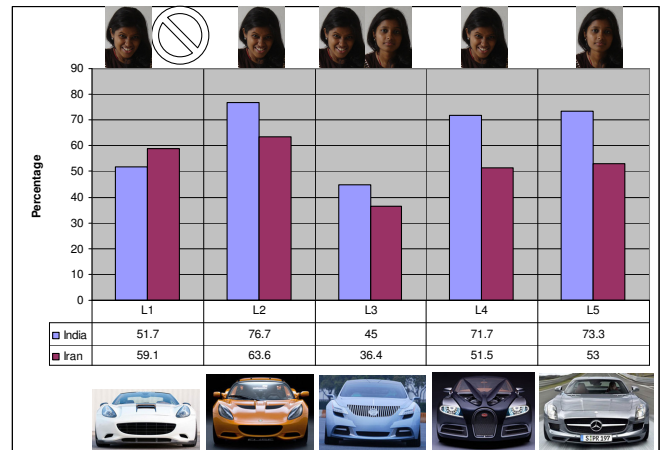


Fig. 12 percentage of Indian and Iranian answer on group L

In L series (Figure 12) for human face with Dangers expression and human face with Safe expression at either end, it will show similarity and dissimilarity answer of both cultures.

-In L1 , Indian subjects were shown that L1 has expression like Dangers reaction, but Iranian subjects were not agreed.

-In L2 case, both cultures were shown same result that L2 has expression like Dangers reaction.

-In L3 , Indian subjects were shown that L3 has expression like Dangers reaction, but Iranian subjects were not agreed.

-In L4 case, both cultures were shown same result that L4 has expression like Dangers reaction.

-In L5 case, both cultures were shown same result that L5 has expression like Safe reaction.

7. Discussions

Based on the above co relational results we can summarize all car forms which match a particular emotion. study we can summarize the final results of the users responses to each car facia against the selected emotion

In this part, co-relational approach results of 35 car faces are summarized in which a cross cultural result is shown where respondents from both India and Iran are in agreement to the expression of the facia of the car and their corresponding emotion.

we selected only some of them that both of Indian and Iranian subject were agree about them. (table 3)

Table 3. final results.

No	Car	Result of co-relation	No	Car	Result of corelation
1	F1	Disgust	12	H5	Normal
2	F3	Fondness	13	L2	Danger
3	D1	Happy	14	L4	Danger
4	D2	Happy	15	L5	Safe
5	D4	Sad	16	K1	Comic
6	G1	Stupid	17	K2	Comic
7	G3	Stupid	18	K3	Serious
8	G4	Curious	19	J1	Anger
9	H1	Surprise	20	J2	Anger
10	H2	Surprise	21	J5	Anger
11	H3	Normal			

8. Conclusions

As can be seen from the results of such a co relational analysis it is evident that sufficiently exciting insights can be drawn to know the similarities and differences in perceptions that are influenced by culture specific tastes, likes and understanding.

Such a clarity of understanding of design parameters may help designers to make intelligent choices in designing global products that meet needs of local contexts. Designers in one culture can design for another cultural context quite successfully with such an understanding and insight.

9. References

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10. Appendix

List of cars that used in research.

Ca	Year	Com.	Model	URL
D1	2003	Volkswagen	New Beetle	http://www.volkswagen.com/
D2	2007	Toyota	FT-HS hybrid sports concept	http://www.toyota.co.jp/en/index.html
D3	2010	Acura	ZDX four-door sports coupe	http://www.acura.com/
D4	2011	Mini	Countryman	http://www.mini.com/
D5	2009	Bugatti	Veyron Fbg par Hermès	http://www.bugatti.com/
F1	2009	Lexus	LF-Ch Concept	http://www.lexus.com/

F2	2006	Mazda	Nagare Concept	http://www.mazda.com/
F3	2008	SEAT	Leon Ecomotive	http://www.seat.com/
F4	2008	Lexus	LF-A Roadster Concept	http://www.lexus.com/
F5	2001	Mercury	Cougar Zn	http://www.mercuryvehicles.com/
G1	2010	Wiesmann	Roadster MF5	http://www.wiesmann.com/
G2	2010	Mercedes-Benz	GLK	http://www.mercedes-benz.com/
G3	2009	Mitsubishi	i MiEV Sport Air Concept	http://www.mitsubishi.com/
G4	2004	Dodge	Sling shot	http://www.dodge.com/en/
G5	2008	TATA	Nano	http://www.tatamotors.com/
H1	2008	Jaguar	S-TYPE	http://www.jaguar.com/
H2	2004	Jaguar	S-Type	http://www.jaguar.com/
H3	2009	Toyota	Urban Cruiser	http://www.toyota.co.jp/en/index.html
H4	2010	Toyota	iQ3	http://www.toyota.co.jp/en/index.html
H5	2011	Toyota	Auris HSD	http://www.toyota.co.jp/en/index.html
J1	2009	BMW	EfficientDynamic	http://www.bmw.com/
J2	2012	Opel	Ampera	http://www.opel.com/
J3	2008	BMW	M1	http://www.bmw.com/
J4	2011	Bentley	Mulsanne	http://www.bentleymotors.com/
J5	2010	Alfa Romeo	2uettottanta Concept	http://www.alfaromeo.com/
K1	2005	Smart	crosstown	http://www.smart.com
K2	2007	Renault	Kangoo Compact	http://www.renault.com/
K3	2011	Audi	A1	http://www.audi.com
K4	2008	Peugeot	RC HYmotion4	http://www.peugeot.com/
K5	2009	Toyota	iQ	http://www.toyota.co.jp/en/index.html
L1	2009	Ferrari	California	http://www.ferrari.com/
L2	2007	Lotus	Hot Wheels	http://www.lexus.com/
L3	2007	Buick	Riviera	http://www.buick.com/
L4	2009	Bugatti	Galibier	http://www.bugatti.com/
L5	2011	Mercedes-Benz	SLS AMG	http://www.mercedes-benz.com/