

Emocard – An Approach to Bring More Emotion in the Comfort Concept

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ABSTRACT

In modern society the automobile is an essential companion in everyday life. Be it commuting to and from work or during our leisure time – every week most of us spend many hours sitting in their car. In this context the seat is the main interface between the human being and the automobile itself. Functioning well, this close relationship can foster the well-being of the passenger and raise his spirit; being flawed, it can cause severe pain in the back after a long journey. Thus, for car manufacturers, the aspects of seat comfort are becoming more and more prominent in distinguishing themselves from their competitors. Despite its importance, the development of comfort parameters in automotive seating still is consigned to the subjective judgements of a small number of seating experts or randomly selected test subjects. Easily influenceable by parameters like affection, physical conditions, environmental factors and a lack of standardization, these subjective evaluations have a big intra individual and inter individual range.

A first approach to improve the objective judgement of an automotive seat was made by the concept of “optimal” load distribution (Mergl, 2006; Zenk, 2006), based on the identification of a close interconnection between the pressure on the seat and the discomfort felt by the person sitting on it. In the next step further objectification of seat comfort will be achieved by an in vivo measuring of the pressure in the spinal disc (Zenk, 2007), which is a reliable indicator for the load in the spine.

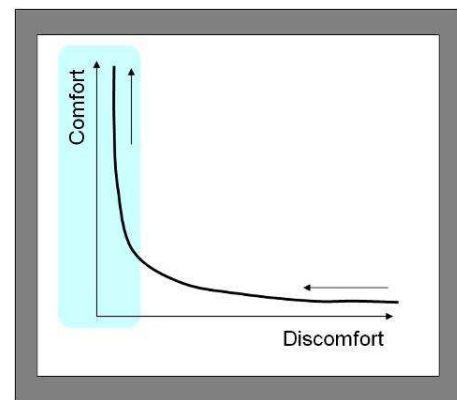


Figure 1: Hypothetical model of discomfort and comfort (Zhang, 1996)

There is more than just discomfort in seat evaluation, which is connected to the aspects of poor biomechanics, fatigue and strain. In the near future there will be an increasing demand for the customer-specific development of well being in order to fulfil the need for a more comfortable live (Bubb, 2004). In the next step we have to concentrate more on the comfort factors which deal more with the impression, aesthetics and sense of well being (compare Figure 1).

In this article a new questionnaire will be developed to bring more emotion and design aspects to the seat comfort evaluation. In this approach both things will be brought together – the haptics and feelings from the seat and the optic influence of the seat design which will give an overall seat comfort evaluation.

From these results we will be able to improve our knowledge of how to avoid uncomfortable seating in automobiles, and also make well-founded recommendations for seat design.

INTRODUCTION

Automotive seat designers traditionally have focused their design efforts on optimizing the so-called 'ergonomic fit'. Although the effort to design seats that support physical comfort is commendable, the focus on ergonomics neglects the possible impact of emotional responses on the general comfort experience. The general experience of comfort experienced when sitting in a seat not only is influenced by the ergonomic fit but also by the 'emotional fit'. In this paper, a study is reported that was designed to measure emotional responses evoked by automotive seat appearance. The emotional responses of the haptic feelings and the design of the seats were measured by 40 subjects with the Emocard method, a non-verbal self-report instrument. With the assistance of a semantic differential a connection between a linguistic answer and a psychological correspondence of the Emocard should be determined. Some differences of evaluation were found in the categories of seat haptics, seat impression and seat design.

The results indicate that Emocard provides a quick method for evaluating the emotions elicited by a seat – for seat design and the impressions evoked by seating in it. Therefore the Emocard method can be a useful tool for automotive seat designers that want to 'design for an emotional fit'.

METHODOLOGY

Discussing emotional responses to products with users is difficult. In daily life studies at BMW, we found that subjects are embarrassed when asked to express their feelings and their emotional response to seat comfort. First, emotions are difficult to verbalize, especially the type of subtle, low intensity emotions elicited by products. Furthermore, asking subjects to describe their emotional response will require cognitive involvement, which may influence the response itself (Desmet, Hekkert & Jacobs, 1999). Already in 1980 Russel created a 'circumplex of emotions' on two dimensions – 'pleasantness' and 'arousal'. In psychology, these are the two most accepted dimensions of emotions (e.g. Schlosberg, 1952). According to this approach, another tool was developed by Desmet (2001) which was based on cartoon faces: the 'emocards'. In this way the subjects are supported in expressing their emotional response by the avoidance of any words. In order to make the selection of emocards simple to the users, all emocards were shown to the participants at the same time in one picture, like shown in Figure 2.

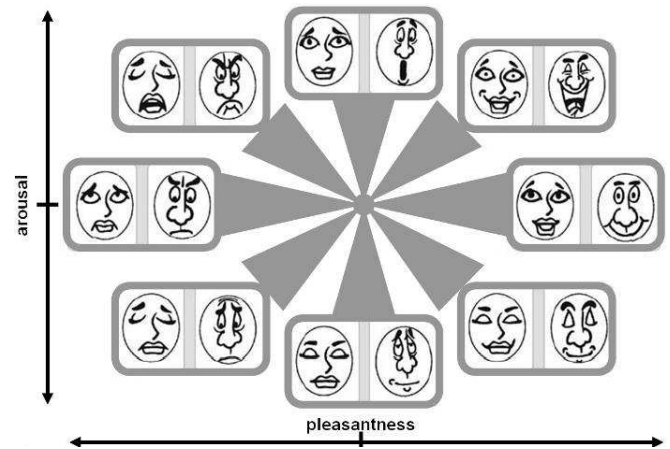


Figure 2: Emocard as it was shown to the subjects (similar to Desmet et al., 2001)

Each octant (emotion category) of the circumplex is represented by an emotional expression of a male and a female face. These expressions vary on the basis of the dimensions 'pleasantness' and 'arousal' (physical state of activation). Excited emotions for example come with high levels of arousal and are located on the upper part of the circle, while calm emotions come with low level of arousal on the bottom side.

In experiment, subjects can express their emotional responses of the evaluation of seat comfort by marking the face on the Emocard that best indicates their response. Generally, the Emocard-method itself does not reveal the reason for particular emotions. If the reason for emotions is wanted, in this study an additional method a questionnaire in form of a semantic differential is consulted.

Preliminary Study

To obtain a connection between a linguistic answer and a psychological correspondence (Emocard) attributes for the seat evaluation were searched. Therefore 102 subjects were asked to choose their favourite key-words for seat evaluation of a portfolio of 78 words. These seat defining words were divided in the categories of haptics, impression and design – each category with 26 words.

Portfolio for haptics of a seat:

soft	☐	plushy	☐
hard	☐	rough	☐
sportive	☐	flabby	☐
banal	☐	firm	☐
pretty	☐	supporting	☐
gluey	☐	simple	☐
fluffy	☐	taut	☐
formative	☐	sleek	☐
close	☐	mushy	☐
contour less	☐	rude	☐
boring	☐	slippery	☐
wide	☐	stiff	☐
flexible	☐	cold	☐

Portfolio for impression in a seat:

exciting	☐	insulating	☐
secure	☐	flexible	☐
reserved	☐	worn-out	☐
inviting	☐	lame	☐
unpleasant	☐	harmless	☐
dozy	☐	included	☐
close	☐	playful	☐
businesslike	☐	repulsive	☐
cosy	☐	insecure	☐
swinging	☐	challenging	☐
excluded	☐	connected	☐
technical	☐	sheltered	☐
cuddly	☐	costly	☐

Portfolio for design of a seat:

simple	☐	courageous	☐
luxurious	☐	stylish	☐
conservative	☐	fanciless	☐
plump	☐	presentable	☐
innovative	☐	clearly	☐
sedate	☐	pushy	☐
sportive	☐	flashy	☐
traditional	☐	cumbersome	☐
colourful	☐	distinctive	☐
fancy	☐	in bad style	☐
creative	☐	delicate	☐
general	☐	conventional	☐
novel	☐	lumpish	☐

The results of the preliminary study offered the most selected words of each category. In the next step for each of the top-7 words an antonym was created to fulfil the criteria of the semantic differential.

Semantic differential is a type of a rating scale designed to measure the connotative meaning of objects – here the seats. The respondents are asked to choose where their position lies, on a scale between two bipolar words, for example soft or hard. The development of this instrument provides an interesting insight into the border area between linguistics and psychology. So a further step is done to find out psychological factors of seat comfort evaluation.

EXPERIMENTAL DESIGN

Two black leather seats of the automotive upper class from two different OEMs were under examination in this research, because in this category of car seats a high level of comfort is provided. So the attention can be completely on the seat comfort – not so much on the seat discomfort – and is not influenced by other disturbing facts, such as wrinkling.

The research was divided up in two different parts: At first the seats were covered (Figure 3) to find out the

emotional response of the haptic impression. In the next step the seats were uncovered (Figure 4) to find out the emotional response because of the optical impression.

For both parts of the research an emotional expression on the Emocard was selected and additional for each part of the analysis a semantic differential was completed. For this study 40 subjects (30 men, 10 women) were consulted on these both seats. So at the end 160 questionnaires were analyzed and interpreted.

Haptics and Impression

To avoid any influence of the optical impression of the seat design and the resulting expectations of the seat comfort, both seats were covered by thin linen (Figure 3). The seats were also removed out of the cars and put on base frames to eliminate the implication from the car to the seat. In the last step the research was done in an Air-conditioned laboratory (temperature 23°C, rel. humidity 50%) so there was an elimination of environmental influence.



Figure 3: Seat evaluation for Haptics and Impressions (seats covered)

At all times, the subjects were not allowed to touch the seats with their hands. The subjects were only allowed to sit for several minutes in the seat and had the opportunity to get a haptic impression with thighs, buttock and back. For each seat the subjects gave general emotion rating on the Emocard (Figure 2) according to their emotional response.

In the next step, with the assistance of a semantic differential, a detailed connection between a linguistic answer and a psychological correspondence of the Emocard should be determined.

Therefore the following questionnaire of the semantic differential was subdivided in the parts 'haptics' and 'impression', as listed below.