

Understanding Context: The Influence of Graphics on the Emotions of Surface Textures

Brian Henson, School of Mechanical Engineering, University of Leeds - UK

Donald Choo, School of Mechanical Engineering, University of Leeds - UK

Cathy Barnes, School of Mechanical Engineering, University of Leeds - UK

Abstract

Designers are increasingly aware of the influences that affect the way people emotionally engage with products. These include previous experiences, society and culture, and the situation in which the product will be used. Whilst recently developed generative techniques usefully provide insight into consumers' contexts, it remains useful to determine the interaction of product features at a more fundamental level. If one cannot examine the influence of a product feature separately from its broader context, then can one determine the extent to which any particular sensation contributes to the consumers' emotional engagement? The experiment described in this paper explores the influence of graphic design on peoples' emotional engagement with surface textures. The semantic differential technique was used to identify adjectives to describe touching transparent surface textures that had been screen printed onto clear acetate and shown against a plain, white background. Then, the same technique was used to characterise peoples' emotional engagement when looking at 'smileys', small graphical representations of faces, or emoticons, depicting various emotions. The first experiment with the surface textures was repeated but with the smileys behind and showing through the surfaces and finally by asking respondents to look at, but not touch, the smileys. Comparison of the principal components of the semantic differential experiments gave an objective evaluation of the influence of the graphics on peoples' engagement with the surfaces. Whilst the results of the experiment are themselves to some extent context dependent, the experiment demonstrates a process for making decisions about product packaging at a product type or brand level.

Keywords: surface texture, Kansei engineering, affective design.

Introduction

Product designers understand that context affects the feelings that consumers have towards products. A graphic design that attracts consumers to, say, a bottle of shampoo probably would not be suitable for a jar of coffee. The components of context are complex and include the function of the product, the environment of its use, and the personality, attitudes, culture and education of the consumer. Nevertheless, it remains useful to attempt to determine the effects of different components of context on peoples' emotional engagement with products. This might allow designers in the future to concentrate their efforts on elements of a design that can be demonstrated to have most effect on consumers. And it might allow designers to understand how different elements of designs can be mixed. The colour blue might be right for a particular product, and consumers might like a curvy shape, but there is little literature about whether colour and shape are simply additive.

The experiment reported in this poster is an initial attempt to measure the effect of graphics on peoples' emotional engagement with surface textures. The semantic differential technique (Osgood 1957) was used to identify adjectives to describe touching transparent 'soft-touch' surface textures that had been screen printed onto clear acetate and shown against a plain, white background. Then, the same technique was used to characterise peoples' emotional engagement when looking at smileys, small graphical representations of faces depicting various emotions. The first experiment with the surface textures was repeated but with the smileys behind and showing through the surfaces and finally by asking respondents to look at, but not touch, the smileys. Comparison of the principal components of the semantic differential experiments gave an objective evaluation of the influence of the graphics on peoples' engagement with the surfaces. It was found that for most surfaces, the effect of the graphic was dominant over feelings elicited by the surface texture. However, for one surface type, and associated with emotions of interest, the combined effect of the surface and the graphics were additive.

Methodology

A focus group of ten students was held to identify the Kansei adjectives used for the semantic study (Nagamachi 1995). The candidate words were reduced to fifteen based on an initial semantic questionnaire which identified neutral words and words resulting in a high variance. The bi-polar Kansei adjective are shown in Table 1.

	Adjectives		Adjectives
1	funny - stern	9	domestic - industrial
2	unique - ordinary	10	vulgar - subtle
3	happy - sad	11	artificial - natural
4	smart - stupid	12	fashionable - retro
5	simple - complex	13	cool - snobbish
6	smooth - coarse	14	witty - serious
7	practical - impractical	15	relaxed - tensed
8	like - hate		

Table 1, List of bi-polar Kansei Words.

The samples for the semantic study were in the form of 20mm by 20mm patches of different clear surfaces textures printed onto 180mm by 155mm clear acetate. The square patches are made of dots (think Braille dots used by the visually disabled) printed onto the sheet. The dots were printed with two different materials resulting in two types of surface designated ‘Tex’ and ‘588’. The patches differed in the lines per inch and the size of the dots. The details of the surfaces are detailed in Table 2.

Patch	Surface Finish	Dot size %	LPI
1	588	45	60
2	Tex	75	80
3	588	45	20
4	Tex	45	20
5	Tex	75	20
6	588	75	20
7	Tex	15	40
8	588	75	80
9	Tex	15	20
10	588	15	40
11	Tex	100	60
12	588	15	20
13	588	100	20
14	Tex	100	20
15	588	100	60
16	Tex	45	60

Table 2, Physical properties of surface textures

One sheet was placed against a white background and surrounded by a card border (Figure 1). Another identical sheet was placed against a background made of a random selection of smileys and was also surrounded by an identical card border (Figure 2).

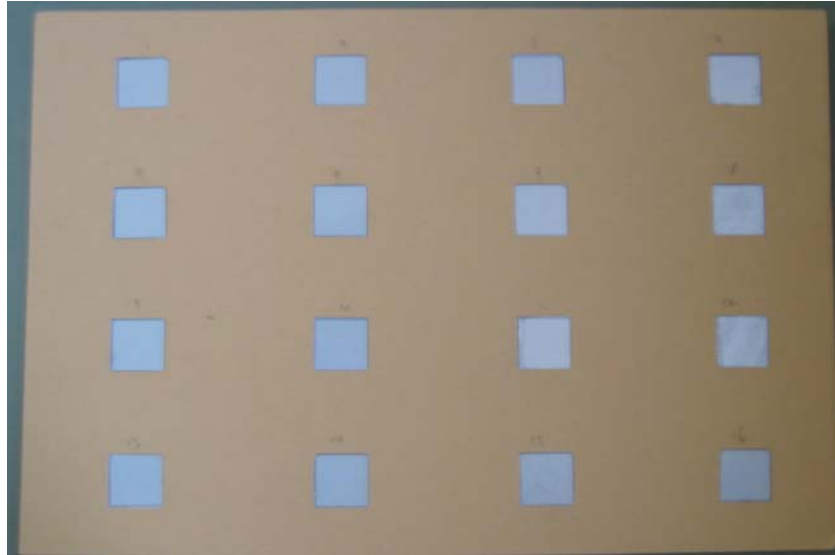


Figure 1, Patches of surface textures



Figure 2, Patches with Smileys

Sixty three respondents were asked to answer a questionnaire indicating on a five point Likert-like scale between the polar opposites of the Kansei adjectives in Table 1 in three experiments:

- 1- The participants were asked to respond to touch the square patches without the smileys.
- 2- The participants were asked to touch the patches with smileys as a background.
- 3- The respondents were asked to respond to the questionnaire by looking at, but not touching, the smileys.

Finally, a principal component analysis was carried out to identify the factor loadings of the samples and hence determine the effects of the smileys on peoples' engagement with the surface textures.

Results

A principal analysis, carried out using SPSS version 11.0, identified the principal components associated with the three experiments. The results for the two types of surface textures were analysed separately. The rotated component matrix for the 'Tex' surfaces in the first experiment without the smileys is shown as Table 3. The word loadings were visualised by plotting them against axes of the principal components. The factors were consistent across the three experiments, although the third component for the 'Tex' surfaces did not result in significant variance.

Rotated Component Matrix ^a			
	Component		
	1	2	3
FUNNY	-.204	.777	.445
UNIQUE	-.357	.820	.122
HAPPY	.686	.522	.133
SMART	.445	.837	6.680E-02
SIMPLE	.954	.173	9.637E-03
SMOOTH	.875	-.118	-.300
PRACTICA	.300	.489	.528
LIKE	.787	.564	-1.80E-02
DOMESTIC	.930	-.224	9.688E-03
VULGAR	-.966	8.432E-02	-3.73E-03
ARTIFICI	-.787	-6.87E-02	.510
FASHIONA	-.174	.400	.736
COOL	.531	5.101E-02	.555
WITTY	-.335	8.005E-02	.896
RELAXED	.896	1.881E-02	-.150

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 5 iterations.

Table 3, Rotated component matrix for 'Tex' surfaces, touch alone.

The factor scores for each patch in each experiment was determined and the results plotted as histograms. Figure 3 shows the factor loadings of the ‘588’ patches on principal component 1 and Figure 4 shows the loadings of the ‘588’ patches on principal component 2.

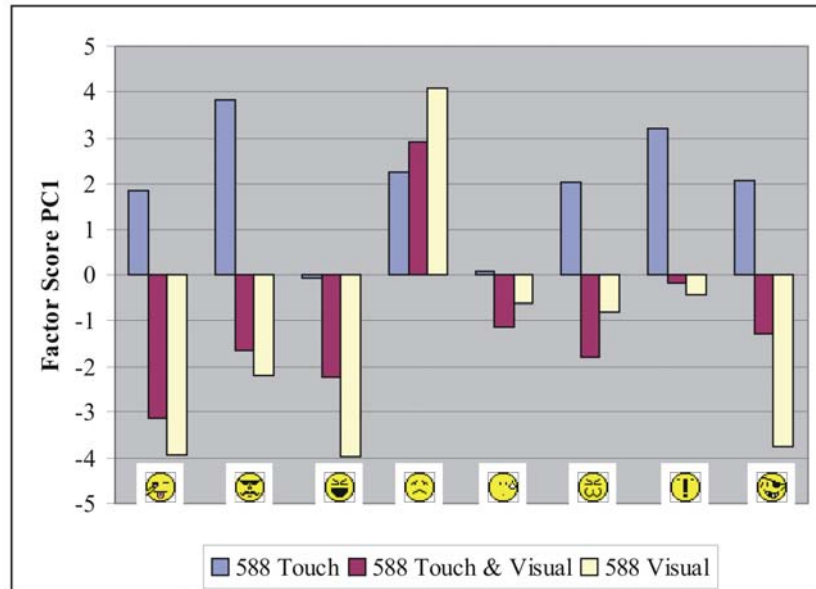


Figure 3

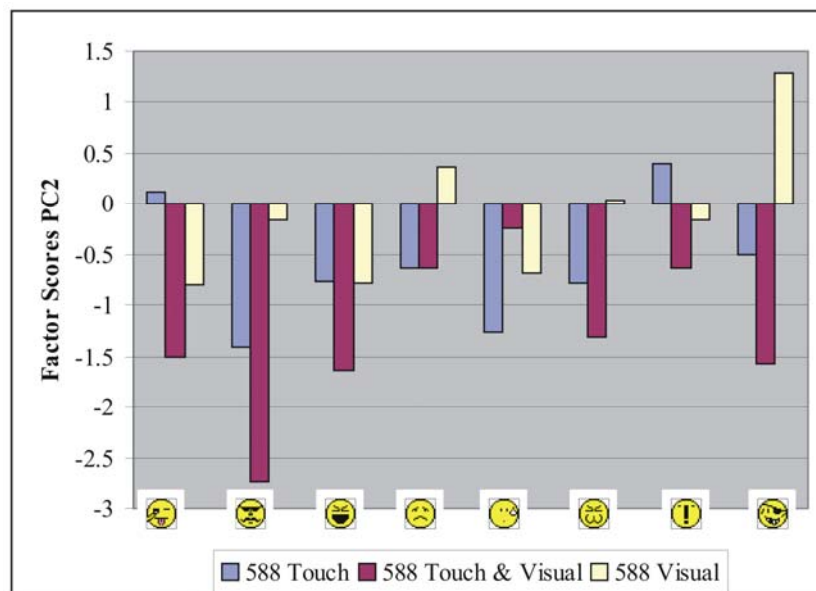


Figure 4

Discussion

Figure 3 shows that the effect of the graphic image is dominant. Even when the effect of the surface texture is opposite to that of the Smiley, the combination of the Smiley and the texture sways the overall effect towards that of the Smiley. The results for 'Tex' surfaces loaded on principal component 1 were similar. For these surfaces, combining the Smiley and the surfaces texture has an averaging effect.

Figure 4 shows the loadings of the '588' patches on principal component 2. This shows that for this principal component and this surface, the effect the Smiley and the surface texture together is additive. The results for the 'Tex' surface loaded on principal component 2 was similar but much less pronounced.

The loadings of the '588' surfaces against principal component 3 showed that the graphic image was dominant in a similar way to the results for principal component 1.

Conclusions

The experiment reported in this poster is an initial attempt to measure the effect of graphics on peoples' emotional engagement with surface textures. The semantic differential technique was used to identify adjectives to describe touching transparent 'soft-touch' surface textures that had been screen printed onto clear acetate and shown against a plain, white background. Then, the same technique was used to characterise peoples' emotional engagement when looking at smileys. The first experiment with the surface textures was repeated but with the smileys behind and showing through the surfaces and finally by asking respondents to look at, but not touch, the smileys.

It was found that for most surfaces, the effect of the graphic was dominant over feelings elicited by the surface texture. However, for one surface type, and associated with emotions of interest, the combined effect of the surface and the graphics were additive. Further work is required to investigate under which circumstances the emotional engagements are additive and under which circumstances they are averaging.

The results of the experiment are themselves to some extent context dependent and we are unable as yet to generalise the results. However, this work demonstrates a process for

investigating the effects of combining design elements of product packaging at a product type or brand level.

REFERENCES

Osgood, C. Suci, G., Tannenbaum, P. (1957) *The Measurement Of Meaning*. University Of Illinois Press, Urbana, IL.

Nagamachi, M. Kansei Engineering: (1995) A New Ergonomic Consumer-Oriented Technology for Product Development. *International Journal Of Industrial Ergonomics*, 15, 3-11.