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Colour Meaning and Consumer Expectations

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Abstract: Deciding a colour for a product is a significant task for designers to attract consumer attention and communicate brand messages. It requires an initial analysis that explores consumer expectations within the sector, and this information is then used to inform development of a product design. This article discusses the application of the product colour development process during the initial phase of product design. Using a case study approach, one particular product category – a washing-up liquid product was selected based on the suggestion from a leading UK consumer goods manufacturing company that colour is a major design factor for this product category. In the first phase of the study, interviews and an online survey were carried out with consumers (to explore what elements are important when they purchase a washing-up liquid product). In the second phase of the study, a colour meaning experiment was conducted to explore possible colours for washing-up liquid packaging using a semantic differential method. The results show that yellowish and bluish green colours evoke positive responses while saturated and dark green colours are perceived more negatively.

Key words: colour meaning, consumer expectations, washing-up liquid packaging

INTRODUCTION

Colour conveys meaning. As this property of colour can be used to communicate product or brand messages, colour meanings have been widely researched in design. Aesthetic theorists differentiate between two types of meaning: embodied and referential.[1] Embodied meaning is the meaning that colour has *per se*; for example, yellow might be associated with optimism. However, there is evidence that colour meanings depend upon the context and this meaning is referred to as referential.[2] For example, in one study participants were asked to rate colours against a number of bi-polar semantic scales (such as beautiful-ugly) both in an abstract sense and when used with an object (such as a chair); colour meanings were found to vary with the context.[3] The effect of context or culture on colour meaning has also been found in other studies[4-8] and the theory of colour and context has been reviewed.[9] However, although colour meanings do sometimes depend upon context there is also some recent evidence that some colour meanings are invariant to context.[6,10,11] Both embodied and referential are therefore often important in the design of product colour and the colour of product packaging. Moreover, while consumers may have some awareness of colour associations (especially those that are embodied), activation often occurs without conscious awareness of it.[12]

Colour also can influence consumer expectations. Consumer expectations are related to subjective feelings based on previous experience of a product or brand images shaped and communicated from marketing activities.[13] These feelings can also affect consumer satisfaction that occurs when consumer expectations are realised which is a key factor that may influence purchase decisions.[14] Numerous studies have explored the relationship between colour and consumer expectations. For instance, Deliza *et al*.[15] identified six features such as colour, price, information, brand, language and shape in product decision making and found that colour has significant effects on expectations. In the field of packaging and branding, previous studies of colour meaning have suggested that colour (including colours of product itself and colours on packages) can affect consumer expectations such as quality, flavour intensity, and

product texture, etc.[16-20]

Although colour meaning is an important attribute in branding and packaging[21,10,22,23] and choosing an appropriate colour for a product is important to meet consumer expectations,[24] it should be highlighted that, so far, no attempt has been made to explore the influence of colour on expectations that are related to specific elements of a particular product category on consumer buying decisions. In other words, prior colour meaning research generally adopts a semantic differential (SD) method to measure people's thinking on colour stimuli. Participants are typically asked to rate colour stimuli with and without context on a scale between two bi-polar words. This self-completed rating technique was introduced in a book titled *The Measurement of Meaning* written by psychologist Charles Osgood and his colleagues.[3] The focal point of the SD method is assessing the subjective meaning of a concept using bi-polar adjective pairs (e.g. warm-cold) as an index of perceived meaning. Although in terms of study of referential colour meaning, the context effect is significant, many studies on colour have focused on bi-polar terms which were selected randomly from previous studies or based on researchers' assumptions that the bi-polar words might be relevant to the context they examined. In selecting bi-polar words, Jayne[25] highlighted relevance to the study as important in order to obtain meaningful data rather than using a set of words that simply sound appropriate or, worse, are generic. As mentioned above, Deliza *et al*.[15] presented six main features including colour, price, information, brand, language and shape in fruit juice product. However, in their study, participants were asked to give scores for the expectations of wetness, pureness, sharpness, refreshing, freshness, naturalness and liking for each stimulus. The bi-polar term (e.g. expensive-inexpensive) could be generated that is more related to 'price' rather than selecting them relying on researchers' assumption.

Hence, in order to gain a more sophisticated understanding in relation to the influences of referential colour on expectations, the current study first explored which elements were considered to be important when consumers purchase the product. In this case study, a washing-up liquid packaging was used as the context. For such a product although both embodied and referential colour meanings are likely to be present, it is probably that referential colour meanings will be particularly important. Based on the generated features of a washing-up liquid product which were considered importantly,

the relevant bi-polar terms were chosen. Then, a range of options for green colours that match consumers' expectations was investigated. The realisation of the abovementioned goal will provide valuable support in design process and strategy, which would strengthen marketing and design potential.

METHODS

A case study approach was used focusing on a washing-up liquid product to develop a range of bi-polar words and possible options for green colours that match consumers' expectations. To achieve this, a series of tasks were conducted as shown in Figure 1. The first step was to carry out a market survey in order to build an understanding of packaging colours of current UK washing-up liquid products. This study focused on green colour to design experimental stimuli in the step 4. In steps 2 and 3, semi-structured interviews and an online survey with consumers were conducted to identify the elements they consider important when they buy washing-up liquid. The final step was to perform a colour meaning experiment using the semantic differential (SD) method to identify which green best represent four pairs of bi-polar terms. In this step, based on the outcomes of the interviews and survey, four features of a washing-up liquid product were chosen to elaborate the four pairs of bi-polar terms, namely: inexpensive-expensive, ineffective-effective, unsafe-safe and non-environmentally friendly-environmentally friendly.
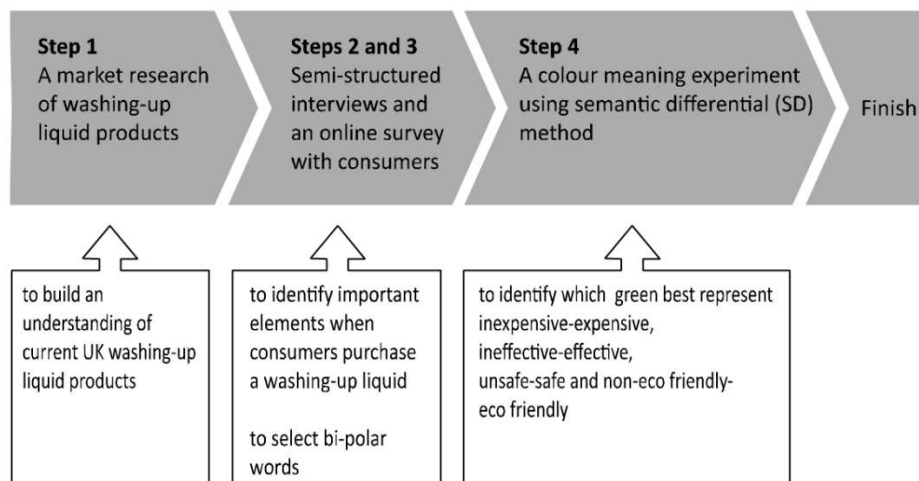
Fig.1: Colour development process of washing-up liquid packaging in this study.

Market Research: Colour Characteristics of Washing-Up Liquid Packaging in the UK Market

Forty-four washing-up liquid products of 10 brands in the UK market were collected and analysed (Appendix 1). The main characteristic of the packaging colours is that there is a generic colour code cross various brands: deep green for original, yellow for lemon, orange for orange and light green for apple. The use of deep green colour for original washing-up liquid product is arbitrary since there are no relations between colour and product whereas yellow, orange and light green colours are derived from original substance colours of lemon, orange and apple. In terms of differentiated colour use, Fairy also sells a silver packaging product for platinum and blue for eucalyptus flavour; Ecover sells a blue packaging product for camomile flavour and yellow for mango; Morning Fresh has light green packaging product for sensitive skin; and Waitrose has yellow packaging product for citrus flavour, red for apple and blue for sea grass. In addition, the majority of the packaging materials are transparent. Thus, packaging colour and colour of liquid are regarded as the same in this study. We might expect colour to be particularly important for such a product because consumers may infer properties of the product based upon its colour.

As mentioned above, the review of current UK washing-up liquid products revealed a generic colour code but that the use of deep green for the original washing-up liquid product is arbitrary. Thus, this study focuses on green colour as it is useful to explore the referential colour meaning.

Interviews with Consumers

In total, 10 participants (married=5 and single=5) between the ages of 25 and 45 were recruited. Participants were screened by asking whether they had bought a washing-up liquid product during the last 12 months. Semi-structured interviews were chosen, and a one-to-one interview format was selected. All participants were asked 9 identical open-ended questions. However, the interviewer probed the participants based on their responses[26]. The questions included issues such as: whether participants buy a washing-up liquid product, how often to purchase, where to shop and what elements are important. Before beginning the interviews, participants received an informed consent form. The interview time was generally within 15 minutes. In order to code and organise the data, a template approach[27] was used. All interviews were audio-recorded and transcribed verbatim. Then, the data were coded using NVivo 10.

An Online Survey with Consumers

A total of 74 participants (male=31 and female=43) between the ages of 20 and 60 participated in the web-based survey. The survey commenced by asking whether the participants had bought a washing-up liquid during the last one-year period. The main questionnaire consisted of 10 questions covering gender, age, living status, purchase frequency, place to shop and important factors for a washing-up liquid. In terms of the online question of selecting important factors among the eight elements (price, smell, efficacy, colour, safety, brand, size and shape) generated from the interviews, a multiple-choice rating type was used and the order of questions was randomised. Survey Monkey was used for online survey creation and distribution. Data from the survey were analysed using conventional descriptive statistics quantifying the frequency for the questionnaire criteria. For qualitative data from open-ended questions, a template approach was used.

A Colour Meaning Experiment

In total, 25 participants (male=9 and female=16) between the ages of 26 and 40 took part in the study. All participants were students at the University of Leeds and their nationalities were British or European (20%), Asian (60%), and Arabic (20%). Participants were screened and any who reported that they had a colour deficiency were excluded. A semantic differential-based method using a direct magnitude scale was used to measure people's thinking on washing-up packaging colours. In the interviews and online survey, price, efficacy, safety and environment were identified as product choice determinants for washing-up liquid. The relevant bi-polar terms of inexpensive-expensive, ineffective-effective, unsafe-safe and non-environmentally friendly-environmentally friendly were selected. One particular colour (packaging ID 1 in Figure 3) was randomly selected from a leading brand in the product category, and 19 colours were elaborated based on different lightness, chroma and hue ranges. The simplified packaging images (e.g., to remove any brand information) allowed for a controlled experiment where the only variable was colour. Participants were presented with each of 19 packaging images in turn (the order was random for each observer) and were asked to rate each image against four bi-polar terms using slider bars. The left-most position was denoted zero and the right-most position was denoted 100. A dark experimental room (3m x 3m) was prepared and all participants viewed the images with the same computer in the same room. The means and standard

deviations for each of the 19 images were calculated (Appendix 2) and paired t-tests were carried out to check for statistical significance in certain cases.

RESULT: Interview and Online Survey

Selection of Colour Stimuli and Bi-Polar Words

The interviews with consumers revealed eight elements that participants considered to be important in their washing-up liquid product purchase decision. They were price, smell, efficacy, colour (of packaging or liquid), safety, brand, size and shape of packaging (in order of importance). An online survey further explored the importance of the eight elements that the interviews had identified. The interview and online survey data were compared as shown in Figure 2 which shows the per cent participants from face-to-face interview and online survey that indicate that a feature is important to them. There was strong agreement between the two studies ($r^2 = 0.69$). Therefore, the average of the per cent over the two studies was calculated. The conclusion can be drawn that price (60.1%), smell (47%), efficacy (38.9%), colour (34.2%), brand (30.3%), safety (24.9%), size (11.1%) and shape (9.1%) are important (with the average score in parentheses). Additionally, a new theme, environment (10.8%), emerged from the online survey. Note that although colour only scored about 34% importance in the two studies it is likely that colour plays a more significant role than this in the purchase decision. For example, the consumer may infer information about efficacy or safety, for example, based upon the colour and this process may be subconscious (Horcajo *et al.*, 2010). Indeed, this study will later show that the colour of the product or product packaging does indeed affect these judgements.

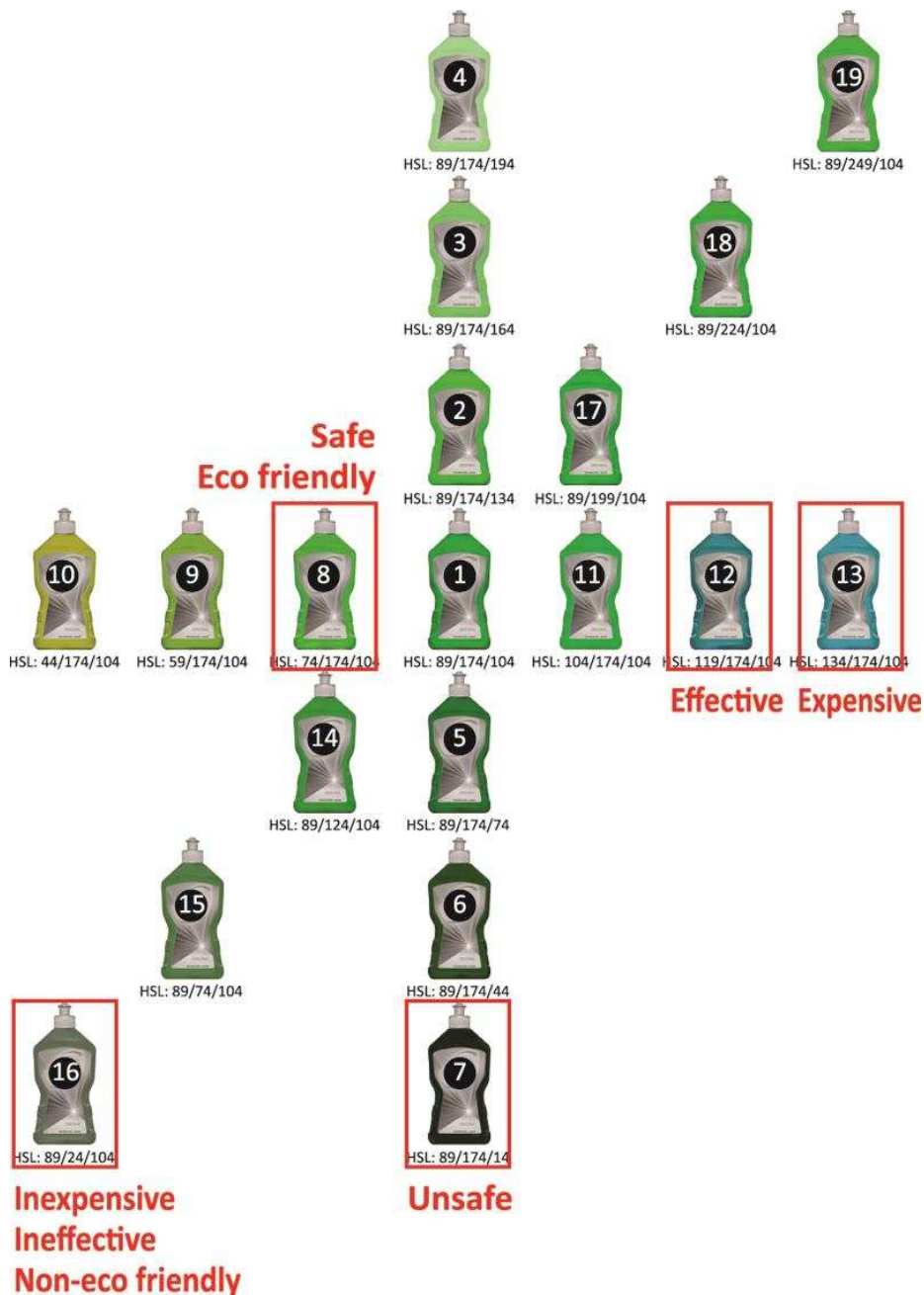The bi-polar terms of inexpensive-expensive, ineffective-effective, unsafe-safe and non-environmentally friendly-environmentally friendly were selected based upon the data in Figure 2. Note that the environment term was raised by participants in the online survey as an additional feature we had not considered and therefore it does not appear in Figure 2. Figure 3 presents packaging ID for the 19 packaging images used for this colour experiment. One particular colour (packaging ID 1) was randomly selected from a leading washing-up liquid, and 19 colours were elaborated based on different lightness, chroma and hue ranges. The images were then presented to observers on a display screen. The CIE Yxy values were measured with a

spectroradiometer (Minolta CS-100A) and these values are provided in Appendix 3 so that other researchers can understand exactly which colours were used in the experiment.
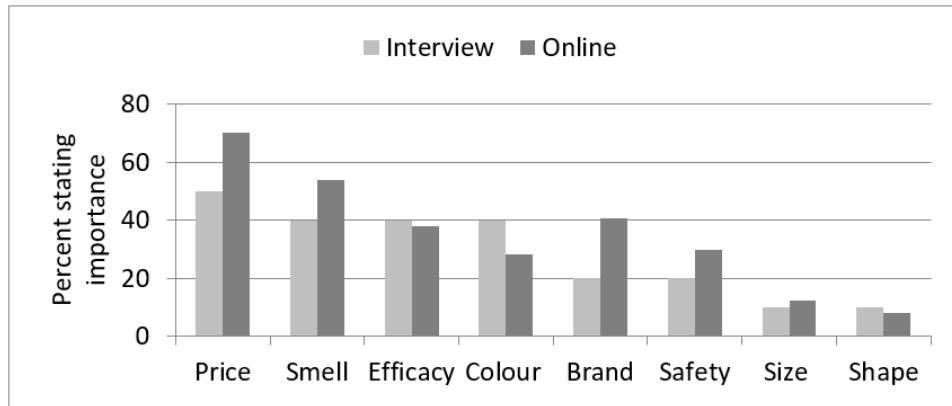
Fig.2: The per cent participants from face-to-face interview (light grey) and online survey (dark grey) that indicate that a feature is important to them.
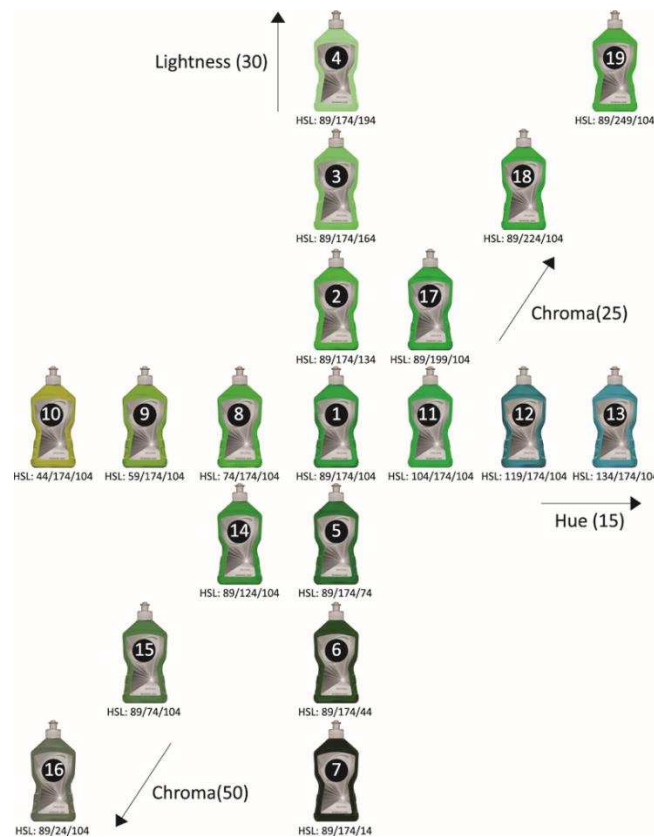
Fig. 3: Colour stimuli used for this colour meaning experiment (19 packaging ID with different lightness, chroma and hue variations).

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RESULT: Colour Meaning Experiment

Figures 4 to 7 present the results for inexpensive-expensive, ineffective-effective, unsafe-safe and non-environmentally friendly-environmentally friendly. The largest and smallest mean values are marked with a white colour to make visual inspection of the results easier.

Figure 4 shows the results that which green colours are the most expensive and inexpensive. The packaging ID 13 was perceived as the most expensive and the packaging ID 16 was perceived as the most inexpensive ($p < 0.01$).
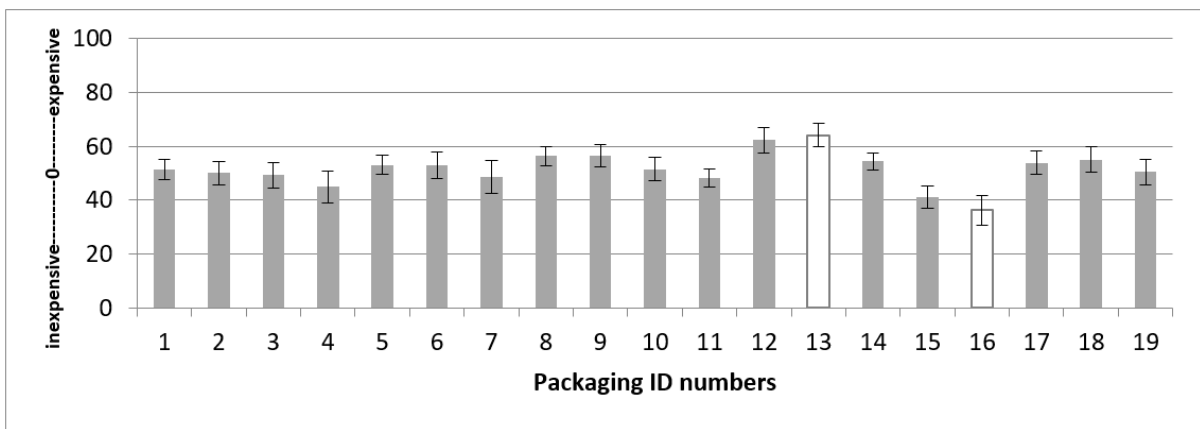
Fig.4: Means for the 19 packaging colours in terms of inexpensive-expensive (the error bars show the standard error of the mean).
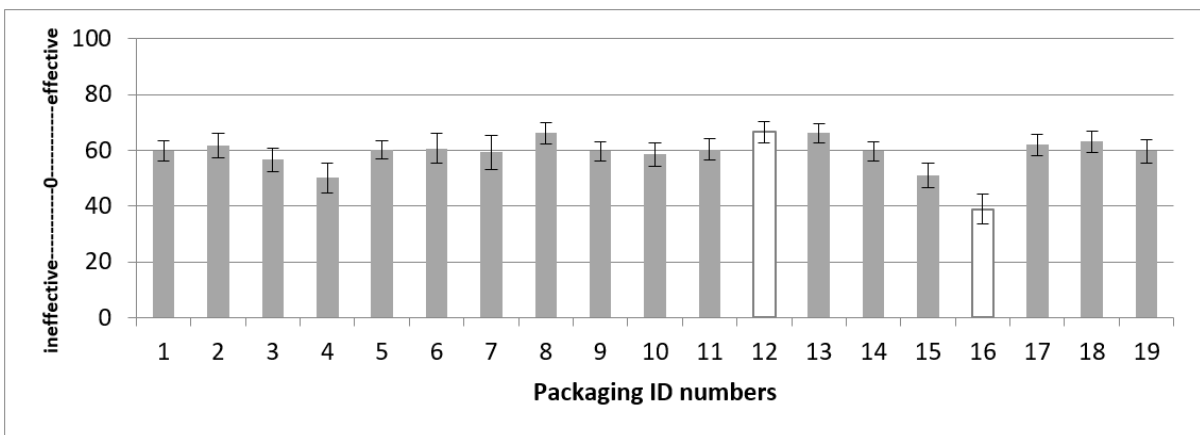
Fig.5: Means for the 19 packaging colours in terms of ineffective-effective (the error bars show the standard error of the mean).

Figure 5 shows which green colours are the most effective and ineffective. The packaging ID 12 was perceived as the most effective and the packaging ID 16 was perceived as the most ineffective (p < 0.01). Figure 6 shows the results that which green colours are the most safe and unsafe. The packaging ID 8 was perceived as the most safe and the packaging ID 7 was perceived as the most unsafe (p < 0.01).
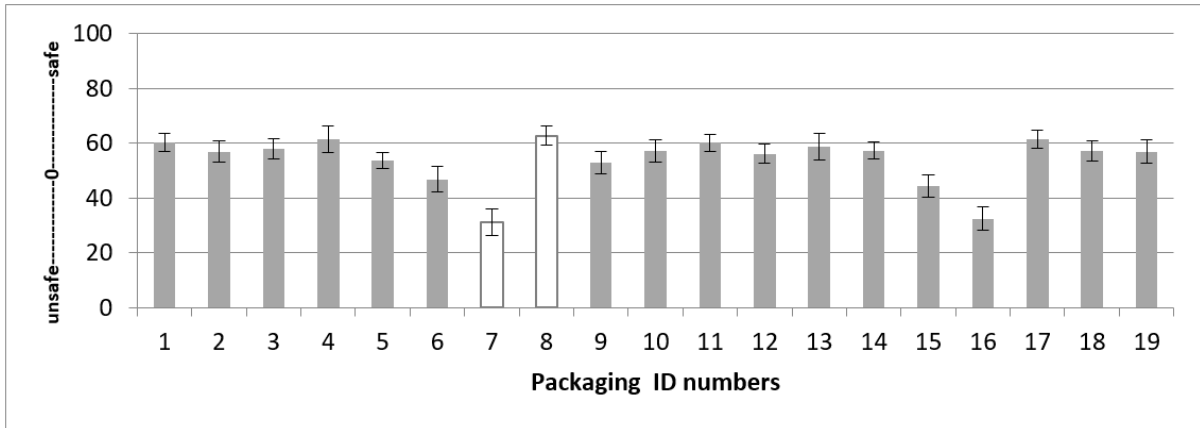
Fig.6: Means for the 19 packaging colours in terms of unsafe-safe (the error bars show the standard error of the mean).

Figure 7 shows which green colours are the most environmentally friendly and non environmentally friendly. The packaging ID 8 was perceived as the most environmentally friendly and the packaging ID 16 was perceived as the most non environmentally friendly (p < 0.01).
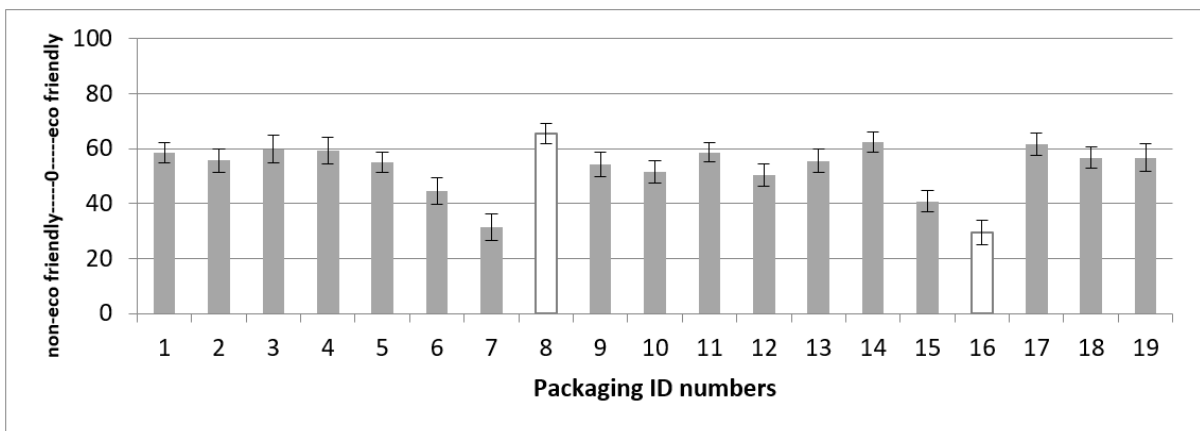
Fig.7: Means for the 19 packaging colours in terms of non-environmentally friendly-environmentally friendly (the error bars show the standard error of the mean).

Figure 8 presents a summary of the results from the colour meaning experiment. It showed that a bluish green colour was perceived as effective and expensive. A yellowish green colour was perceived as safe and environmentally friendly. Dark green was perceived as unsafe and saturated green was perceived as inexpensive, ineffective and non-environmentally friendly.

Fig. 8: Colours for inexpensive-expensive, ineffective-effective, unsafe-safe and non-environmentally friendly-environmentally friendly derived from the largest and smallest mean scale values.

Dark colours are generally perceived negatively. Compared with the original green colour, variation in yellow-blue (hue) seems to have the greatest effect on the attributes. Bluer means more effective and expensive but yellower means safer and more environmentally friendly. Does this mean that the original colour of the product is optimal? That would depend upon the design and marketing strategy and which attributes were considered to be particularly important. However, this analysis gives the marketing professional some information that can guide them and presents a methodology for generating the information.

DISCUSSION

This colour meaning case study makes a contribution to the understanding of the referential colour meanings that are communicated in washing-up liquid packaging. The results show that yellowish and bluish green colours produce positive expectations while saturated and dark green colours are perceived more negatively.

One slightly unexpected result was a tendency for both positive and negative colour meanings in the ways that consumers perceive colours of washing-up liquid packaging. Yellowish and bluish green colours for washing-up liquid packaging were inferred positively such as safe, eco-friendly, effective and expensive whereas saturated or dark green colours were perceived negatively such as unsafe, non-eco-friendly, ineffective and inexpensive. Green is generally associated with positive meanings such as reliable, safe, fresh, natural,[16] peaceful and gentle[10] and health.[28] In addition, green/sustainability is an emerging theme that refers to minimal negative impact on the global or local environment.[29] However, the results of this study indicate that even different green colours may be capable of evoking different consumer expectations. In a related filed, regarding the positive and negative responses to colours, Palmer and Schloss[30] proposed an ecological valence theory: People like colours linked to objects they like and dislike colours related to objects they dislike. In other words, people may link more positive things (e.g., clean water) for yellowish and bluish green colours for washing-up liquid packaging while associating with more negative things (e.g., dirty water) for saturated or dark green colours for washing-up liquid packaging. Thus, designers and brand managers should recognise how colours of packaging, logo or product are perceived differently by consumers. In this sense, it is suggested that

colour consideration should be done with a thorough understanding of what colour meanings are communicated in a product category.

Colour is a mechanism for creating brand packaging or logos that can arouse positive expectations. It is obvious that colour is a part of the brand packaging itself as shown in the results of the interviews and the online surveys with consumers in this study; the importance of colour was about 34% for washing-up liquid. Nevertheless, as the brand manager suggested in the interview session, colour can support and enhance perceptions for brand associations. In the other words, strategic use of this kind of colour meaning information can offer opportunities in design and marketing promotion evoking or reinforcing particular associations for packaging, logos and products. Thus, the insight from this study strengthens the useful value of a colour meaning information in design process and strategy.
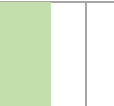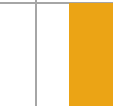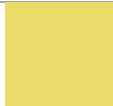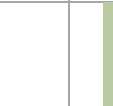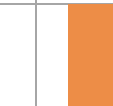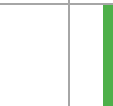
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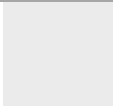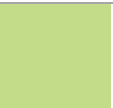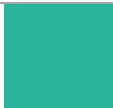
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Appendix 1: A list of colours of current washing-up liquid products available in UK[1]

Brand name	Product colours								
Fairy	Original	Lemon	Apple & Lime	Pomegranate	Eucalyptus	Citrus	Rose	Aloe Vera & Cucumber	Platinum
Persil		Lemon	Apple			Orange	Pink blush		
Morning fresh	Original	Lemon	Lime					Sensitive	
Ecover		Mango & Shea butter	Lemon	Pomegranate	Camomile & Marigold				
Method		Lemon mint				Clementine		Cucumber	

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[1] The images show product colours, but not the exact images or branding of the named brands.

Surface								Sensitive	
Waitrose	Original	Citrus	Cucumber & Basil	Apple	Sea grass		Lavender	Sensitive	
Sainsbury's	Original	Lemon	Apple	Cherry blossom					
Tesco	Original	Lemon & Lime	Apple	Cherry & Orchid		Orange			
Morrison	Original	Lemon	Apple			Orange	Summer		

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Appendix 2: Means and standard deviations of 19 four semantic scales.

Packaging ID	Inexpensive-Expensive		Ineffective-Effective		Unsafe-Safe		Non-eco friendly-Eco friendly	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
1	51.45	18.01	59.65	17.98	60.30	17.29	58.49	17.99
2	50.10	21.71	61.74	22.36	56.93	19.64	55.61	20.54
3	49.37	23.96	56.60	21.35	58.02	18.96	59.68	25.06
4	45.06	29.85	50.10	26.92	61.56	24.28	59.31	24.59
5	53.10	17.83	60.26	16.27	53.57	14.92	55.01	18.98
6	52.99	24.01	60.60	27.06	46.81	23.33	44.43	24.19
7	48.73	30.39	59.25	29.98	31.18	24.65	31.34	24.28
8	56.50	17.90	66.09	19.00	62.80	17.49	65.47	18.49
9	56.61	20.01	59.59	17.76	52.90	20.56	54.28	22.68
10	51.52	21.79	58.57	20.91	57.06	20.09	51.40	20.52
11	48.28	16.58	60.31	18.35	60.10	15.88	58.66	16.83
12	62.45	23.62	66.57	19.44	56.15	18.10	50.35	19.42
13	64.20	21.00	66.13	16.85	58.78	23.99	55.50	21.23
14	54.46	15.93	59.68	17.53	57.29	15.81	62.41	17.83
15	41.24	20.08	50.92	21.52	44.26	20.56	40.85	20.11
16	36.41	27.40	38.86	27.02	32.42	21.57	29.45	22.01
17	53.94	21.45	61.91	19.57	61.50	16.35	61.59	19.68
18	55.02	23.53	63.07	18.88	57.14	17.90	56.74	19.72
19	50.47	23.69	59.64	20.70	56.95	21.02	56.69	25.33

Appendix 3: Yxy values measured by the spectraradiometer

Packaging ID	Colour	Y	x	y
1		72.5	0.307	0.566
2		117	0.305	0.562
3		143	0.306	0.486
4		168	0.307	0.418
5		36.8	0.306	0.561
6		13	0.309	0.515
7		2.34	0.3	0.388
8		79.9	0.328	0.562
9		86.8	0.371	0.53
10		100	0.418	0.499
11		77.9	0.281	0.487
12		49.8	0.222	0.296
13		64.7	0.216	0.28
14		60.7	0.304	0.519
15		46.4	0.306	0.442
16		39.7	0.313	0.366
17		86	0.306	0.592
18		96.1	0.305	0.586
19		109	0.306	0.595

Biographies:

Seahwa Won completed her Ph.D. in colour information in design, and worked for a project which explored packaging design opportunities for healthy eating at the University of Leeds. Her research interests are design and consumer behaviour, colour design, packaging and branding.

Stephen Westland obtained his BSc and PhD from the University of Leeds and then held academic posts at the universities of Keele and Derby before being appointed as Professor of Colour Science and Technology in 2003 at the University of Leeds. During his time at Leeds he has held several management positions including Head of School of Design (2006-2013) and Acting Faculty Dean (2013). He has published over 150 peer-reviewed book chapters, journal papers and conference proceedings in the areas of colour measurement, colour imaging and colour design. He received the Davies Medal for research from the Royal Photographic Society (2008) and is currently President-Elect of the Society of Dyers and Colourists.