COLOUR EMOTION EFFECTS IN CREATING PRODUCT PREFERENCE IN ADVERTISEMENTS

Predicting purchase intent of blue and yellow colors, in advertisements of low-involvement products

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Bachelor Thesis

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ABSTRACT OF
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The purpose of the present study was to investigate factors influencing colour preference and product preference. The HSL colour system was used to pick out varying degrees of saturation for a typical blue and a typical yellow at medium lightness. A black and white -coloured advertisement was predominantly coloured to one of these 6 hue-saturation combinations. In the carried out online survey, the advertisements were rated by participants on a 7-point scale in dimensions of preference, arousal, sadness, and their purchase intent. A quantitative analysis and discussion was carried out for the combined preference scale, combined arousal scale, sadness, and purchase intent. The results suggest that blueness is more important than yellowness for making an advertisement sadder, as well as that sadness is important in influencing purchase intent. No clear relationships were found between the other cross-compared variables.

Key words: *Colour emotion, colour preference, advertisement, purchase decisions*

Language: English

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1. INTRODUCTION

Visual elements influence individuals in the process of making decisions about whether to buy a product, and colour is often central to the visual schema. (Yu et al., 2017). It is therefore important for marketers to understand how to construe effective marketing messages using colour.

There have been some general observed trends in the research concerning emotions and how hue and saturation may affect them. People are less prone to react to changes in lightness, instead focusing on hue and saturation (Deng, 2010 and Lichtlé, 2007). It would seem that blue and yellow are respectively the most and least preferred colour (Lichtlé 2007, Yu et al. 2017, Schloss 2015), yet this 'polar opposite' pair of colours have not been compared together in an investigation in-depth.

It would seem that there are very few focused investigations comparing two hues in general. Investigating differences between two hues at different saturations might reveal useful information about how colour emotions are linked to consumer decision-making (Gorn et al., 1997).

2. COLOUR-EMOTIONS AND CONSUMER DECISION MAKING

2.1 Effects of colours on emotions

A colour as a human sensory experience is a fundamental part of the everyday life of the society and marketing messages. For instance, it is integral in packaging and logos (Elliot and Maier, 2014). However, investigations on colours and their effects on emotions have not been consistently investigated and thus not thoroughly understood, especially in market research applications (Lichtle, 2007, Gorn et al., 1997).

For the purposes of this thesis, the components that are used to construe colour are from the three-dimensional model of the Munsell Colour Space used by, for example, two respective significant works in the area of study; Deng (2010) and Lichtlé (2007). This is called the HSL (Hue, Saturation, Lightness) colour space.

Hue is the wavelength of the visual stimuli and it is traditionally perceived as the 'dominant' factor in giving a colour its psychophysical emotion effects (Gong et al., 2017).

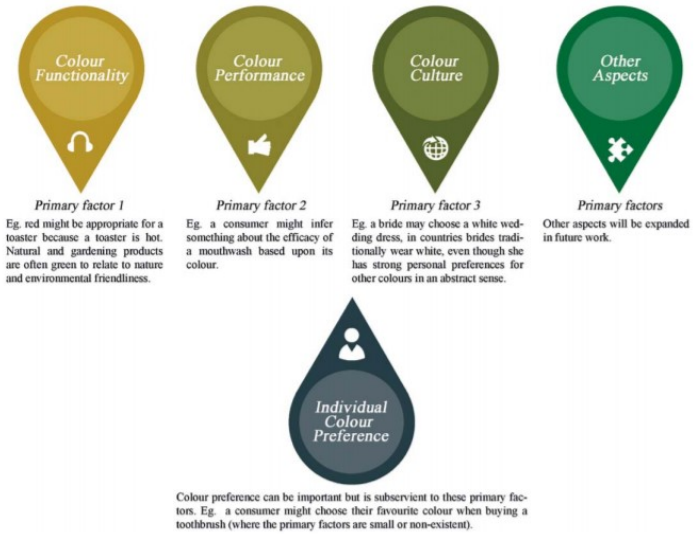
Saturation is the intensity of a given hue against a background, which has also been termed 'the difference from grey', where a maximally unsaturated colour is a certain shade of grey depending on the lightness, and maximally saturated shows the hue the most vividly (Valdez & Mehrabian, 1994). Recently, saturation has gained more attention, and some have posed it to be more important than hue in colour-emotions.

A high lightness colour is a hue-saturation combination that tends towards being white, while a low lightness colour tends towards being black (Suk, 2010). Lightness seems to be not nearly as impactful as either the chosen hue or saturation (Elliot 2014), but very high and very low values can diminish the colour-emotion effects of saturation and hue by making a colour harder to view or to distinguish from similar colours, such as dark blue and dark purple, or dark yellow and dark orange (Deng, 2010 and Lichtlé, 2007).

These components of hue, saturation and value combined in different ways have been shown to evoke different emotions, such as sadness, happiness, excitement, energy, and calmness (Ou et al., 2004a), and these are what are called colour-emotions (Manav, 2007).

Colours like blue and yellow can be preferred more or less depending on the context. An important distinction will be made at this point, in order to narrow the scope in the study. Colours can be described as 'joyful', 'energetic', 'calm', 'pure', 'dangerous', etc. Congruency of these colour-emotions with a product can be how a colour of general low-preference can make a product higher preference than if that colour was instead a more preferred one (Gyoba, 2006). For examples, see Image 1 below. In this thesis, the effect of colours on 'general high-preference' will be the focus.

Figure 1: Factors of colour preference (Yu et al. 2017)



The understanding and application of colour-emotion relationship, such as 'high Preference', can make significant differences between whether a consumer purchases a product (Yu et al., 2017), as will be explained in the following section.

2.2 Colour-emotion effects on consumer decision making

Consumer decision making can be characterized as a consumer's approach to making a choice (Yu et al., 2017). Colour-emotion influence in purchase occasions can be understood as the colour-emotion effect that carries over from emotions (such as happiness vs sadness of the product) and preference to the colour in question, to an increase in preference towards a product. The following will establish whether evidence so far is suggesting that these colour-emotion effects do carry over to concrete effects to purchase occasions.

Schiller (1935) made one of the earliest relevant observations, posing that different colour combinations might be effective in one context of conveying messages but become less effective in another. Following this, Warner and Franzen (1947) found that for advertisement purposes, it seemed that colours yielded more desirable results than black & white advertisements. More recently, trends have been found about general preferences for colours. Yu et al. (2017) summarizes a number of prior studies and claims that the correct colour choice is an attractive method of conveying messages about product attributes at the point of sale. Colour choice has also been shown to facilitate reflexive or impulsive purchasing behaviour (Elliot, 2014).

To make a distinction between products that do and do not clearly fit into a symbolic paradigm, one can think of the many utilitarian products like kitchen towels, undershirts, or laptop covers (not seen or "shown off" to others). On the other hand, box of Valentine's chocolates is often red as the colour is congruent with the symbolism of 'love' or 'passion' (Mehta, 2017). What can be meant by the correct colour choice is either a colour that is generally preferred as a visual stimulus over other colours (Schloss et al. 2015, Manav 2007), or a colour choice that fits the context, such as how red is associated with 'excitingness' (Hanada, 2017), making it fitting to advertise thrill rides or war games (Lichtlé, 2007).

In both cases, through the colour-emotion link, colours play an important role for customers in making judgments about which commercial entities they like and dislike: e.g., changing a consumer's approach to making a choice (Ou et al. 2004c, Yu et al., 2017) which in turn leads to the desired behaviour from the seller's point of view. For instance, a consumer's approach to making a choice may start from aspects such as price, online reviews and word-of mouth. A marketer succeeds in making use of the colour-emotion link when they make use of, for instance, the symbolic qualities of cleanliness and purity in saturated blue (Schloss et al. 2015, Manav 2007) in amplifying the consumer's positive views about a toothpaste product beyond these factors of an explicit approach to making a choice (Ou et al., 2004a).

As can be noticed from the mention of work of Schiller (1935) and Warner & Franzen (1947), links between colour and emotion have been established long ago. It has become increasingly clear how important it is for marketers to understand how

strongly and consistently different colour-emotion associations exist across cultures and varying demographics, both for innate and learned sources (Manav 2007, Palmer 2009). Yet, many colour cue choices in advertisements have recently still been made based on intuition and anecdotal evidence, which can be attributed largely to the complexity of colour research (Gorn et al., 1997).

Yet, understanding and applying these complex connections is particularly important for global marketers who should seek to understand the colours that can be translated between different cultures and still carry similar meanings. These links are often very complicated for combined colours (Deng et al.), but also for other elements such as sounds and scents, which can further explain some of the lack of focused market research for colour, as other sensory cues can create destructive interference (Gorn et al., 1997). These effects of complexity and interference has been observed in Oakes's (2007) work on cross-modal congruency of visual and auditory features. This brings us to the challenges in coming to a thorough understanding of colour-emotions and the most preferred colours for neutral products.

3. CHALLENGES WITH COLOUR-EMOTION RESEARCH AND IN APPLYING COLOUR-EMOTION RESEARCH TO THE MARKETING CONTEXT

3.1 Issues in definition and methodology

According to Abramov (1994) it is unclear whether the different colour components necessary to describe a colour are separable from each other for practical purposes of visual observation. For instance, it is usually assumed in colour perception research, that brightness of a coloured area is not a fundamental colour component, yet it is unclear whether brightness and saturation can be separated from each other (Dael, 2016). These lead to problems in controlling the elements of colour (Wilms and Oberfeld, 2017). As an example, Valdez & Mehrabian (1994) and Camgöz (2001) positive emotions were correlated to brightness and saturation together, yet in other papers a colour had to mainly be saturated to be preferred (D'andrade & Egan,

Lichtlé, 2007). Also, studies have often included many variations of the hue, saturation and lightness yet in a well-controlled experiment on a hue, only either its saturation or its lightness should vary (Elliot 2014).

What further brings many prior colour-emotion studies' validity to doubt, are methodological problems in the often used Munsell chips. The main problem is that they do not cover all of colour space and are not equally spaced perceptually (Abramov, 1994). As the experiment of this research paper will use relatively few different colours with large spaces between each other (e.q, two hues far apart in the 360-degree colour spectrum, with 25% differences in saturation), the colour space size might not be particularly important. However, these are issues that have been affecting the generalizations and comparisons between past studies, and how they can be interpreted with regards to the experiment results from this thesis.

However, the often used Munsell colour system poses some implications for interpreting past results and the anticipating results in this thesis, as is evident from the work of D'andrade and Egan (1974). Firstly, the maximum saturation for the hues of blue is not as high as the maximum saturation for the hues in the yellow region); an issue that will be expanded upon in another section that compares the blue and yellow hue. Secondly, maximally saturated colour chip at each hue is dependent on the position on the light-dark dimension. In other words, chips of maximum saturation of yellow are very light, which can make the colour difficult to see and affect how 'full' or saturated the colour is. Another irregularity is in how one hue in Munsell colour chips is usually described by perceivers as "brown" when dark and unsaturated, but "yellowish-red" when medium lightness and more saturated (D'andrade and Egan, 1974). This will be expanded upon at a later section that focuses on yellow and blue colours.

This study will take an approach that might shed light to a very specific colour comparison: of only two hues with three equally spaced saturation levels in an advertisement. Special attention will be given to some peculiar findings in recent studies in the non-linear preference of blue and yellow, as will be further discussed in the next sections.

3.2 Blue and Yellow hues and effect of Saturation

Blues are generally 'cool colours', lower temperature colours that have higher maximum saturations than yellows (D'andrade and Egan,1974). Blue is often the most preferred colour (Fortmann 2011, Lichtlé 2007, Ou et al. 2004a, Schloss 2015, Yu et al. 2017). Blue is well-liked across countries, and its status as the most preferred colours is consistent with how it shares similar meanings across cultures (Madden, 2006).

Yellows are generally 'warm colours' (Palmer, 2010), e.g high temperature colours. Yellow is a colour that is observed and rated by research participants and is often the least preferred colour (Lichtlé 2007, Yu et al. 2017, Schloss 2015). Yellow has been deemed the least preferred colour by these studies both in the case of viewing yellows and rating them, and in viewing a range of colours and picking out what the participants prefer.

Camgöz (2002) and Cheng et al., (2009) found that the following characteristics were present, in summary. Preferred colours are blues as opposed to yellows, cool as opposed to warm, and saturated colours as opposed to unsaturated. These preferred colours resulted in positive views towards the shopping environment and shopping experience. There is an interesting piece of counter-evidence, however. Even though blue is more pleasant to look at, both women and men wearing red perceived themselves as more attractive than those who were wearing blue (Elliot, 2014).

Many further inconsistencies arise in qualitative and quantitative researches for blue and yellow. These have to do with the following aspects, each of which will be elaborated in the following discussion. Firstly, how both hues, but particularly yellow, has unclear support from the ecological valence theory. Secondly, how the pairing of colour, emotion and liking are usually the following, but not always: yellow-happy-unpleasant and blue-sad-pleasant. Thirdly, how arousal tries to explain colour preference in terms of colour wavelength (warmth vs coolness) and saturation level, but the relationship is nonlinear.

4. COLOUR HAPPINESS AND COLOUR SADNESS

Yellow seems to be associated with ‘happiness’ much more often compared to blue (Lindborg and Friberg 2015, Palmer 2013). Perhaps the reason is, that typical yellows are much brighter and saturated than typical blues, which could explain why ‘yellow’ as a word has generally positive colour-emotion associations (Cheng, 2009, Dael 2016) As an example of preference towards the ‘verbal’ yellow, in the study of Takahashi et al. (2017), participants were asked to imagine the colour for ‘joy’ and yellow was associated with the word the most out of all colours including blue. Furthermore, the word ‘light’ was recalled the most out of various words, and the most common trigger to the word ‘light’ was fully saturated yellow.

However, this does not result into a solid hypothesis that would be assuming that fully saturated yellows would be the type of yellow that would be useful for marketing purposes. Fully saturated yellow was found to be disliked or ‘boring’ and ‘depressive’ in Manav’s work (2007), which is in conflict with being a memorably, joyous colour. Yellow showed variations of negative/positive responses depending on the saturation level. Medium saturation yellow was found to be “dynamic, striking, warm”. Therefore, it is unclear whether a high saturation level would make yellow more preferred than average or low saturation level. There is no trend that would suggest that a particular saturation of yellow in a particular lightness would increase its preference significantly from the present ‘norm’ of being preferred less to blues in a general sense.

Blue seems like a more straightforward colour than yellow, in terms of findings across different studies. However, another major issue arises in formulating a relationship between yellow and blue in varying saturations. Blue is seemingly much more often the most preferred colour than yellow, but contrastingly, yellow is more often associated with – or described as a colour of - happiness (Lindborg, 2015).

As a contrasting example to the norm, a study found ‘sadness’ and ‘bad’ being both paired to the yellow region as opposed to the blue region. (D’andrade and Egan, 1974) Therefore, the three-step relationship is not clear. In how, blue vs yellow and saturated vs unsaturated colour, derives into a colour-emotion, and further derives into positive marketing effects such as product preference.

According to Garg and Lerner, 2013) sadness generally increases consumption While consumers in the mental state of ‘sadness’ can be more prone to consume, this does not explain why a ‘sad’ colour would be liked or preferred. Furthermore, a formidable paper in the field of colour-emotions by D’andrade and Egan (1974) is in conflict with the usual association of blue-sad-preferred and yellow-happy-unpreferred.

This does not directly suggest that, or explain how, blue can be preferred regardless of its ‘sad’ colour-emotion property. However, it does provide reason to believe that the sadness of a colour increases purchase intent for both blue and yellow. In, summary, it seems that a colour can be ‘happy’ and ‘high preference’ (sometimes blue), but also ‘happy’ and ‘low preference’ (usually yellow), ‘sad’ and ‘high preference (usually blue)’, or ‘sad’ and ‘low preference’ (sometimes yellow).

Based on the above discussion on blue, sadness and saturation, it seems likely that:

H1: Blues are sadder than yellows

H2: Sadness of the advertisement increases purchase intent

Since blues have been generally preferred colours, but with particularly so with higher saturation:

H3: Saturation increase for blue increases colour preference

5. IMPLICATIONS OF THE PAD MODEL AND THE ECOLOGICAL VALENCE THEORY

5.1 Ecological valence theory

Ecological Valence Theory offers the point of view that average preferences over all objects tend to be more positive for certain colours than others due to evolutionary influences. It offers an explanation for how preference to blue colours, and highly saturated blues in particular, is from the association to clean water and clear skies (Schloss et al. 2015, Manav 2007).

EVT gives appealing arguments for the high preference of saturated blues. However, there seems to be no straightforward reason for why yellow is often the least preferred colour. One part of the explanation could lie with Munsell colour space. In the Munsell colour space, brown and yellow are very close to each other. According to ecological valence theory, average colour-emotions for brown are dictated by rotten food and faeces (D'andrade and Egan, 1974), which could explain the phenomena partially (Palmer, 2010).

However, the colour-emotions evoked by different saturations of yellow is also unclear. In the study of Manav (2007), high saturation yellow was rated lower than medium saturation yellow. Furthermore, he found that fully saturated yellow was 'boring' and depressive, instead of dangerous', which does not allow for extension to the evolutionary EVT argument, that fully saturated yellows are less preferred because of signalling danger, such as red would (Abramov, 1994).

The more clearly visible or vivid a yellow colour is, the more venomous or poisonous it tends to be in the animal kingdom (Elliot, 2014, Ou et al., 2004c) which is in direct conflict with the adjectives given by the participants in Manav's (2007) study, such as 'dull' and 'boring'. Therefore, the EVT is not offering a clear explanation for why yellows are less preferred, or whether certain yellows should be more preferred than other yellows, such as for saturation.

Based on the literature reviewed, the hypothesis posed for modelling the approximate trend for yellows of varying saturations is as follows:

H4: Saturation increase for yellow increases colour preference between low (25%) and medium (50%) saturations, and decreases colour preference when saturation is raised to high (75%) from medium (50%)

5.2 The PAD model

The PAD model uses 'Pleasure', 'Arousal' and 'Dominance' to describe different colours. For the purposes of this study, 'pleasure' will be dubbed as 'preference' even though there might be some dispute about using particular adjectives as 'pleasure' vs 'preference'.

According to Wilms and Oberfeld (2017), Arousal is a positive correlate of saturation. Short-wavelength hues (e.g., blue, green, cool colours) are more pleasant (Cheng, 2009) and less arousing than long-wavelength hues (e.g., yellow, orange, warm colours)

In the literature, a vast array of different adjectives is used to describe pleasure, arousal and dominance. This makes it hard to compare research findings about the experience and perception of the physical environment (Bakker et al., 2014)

However, Russell and Lanius (1984) categorized adjectives on pleasure (x-axis) and arousal (y-axis). Several of these adjectives close to the 'arousal' axis and far from the 'pleasure' axis will be used to assess whether "strictly" arousal-describing adjectives are related to yellows as opposed to blues.

H5: Blues will be less arousing than yellows

Saturation seems to generally be a positive correlate for 'arousal'. Medium saturation of yellow has been preferred to high saturation yellow (Manav, 2007), whereas maximum saturation blue has been preferred to any lower saturations of blue. According to Gorn et al. (1997), recent findings suggest that arousal is not unidimensional. This could explain why yellow at its low-medium saturation potential, and blue with its low arousal potential (Cheng et al., 2009) would be preferred at all saturation levels, or at least with each saturation level.

H6: Blueness will be a positive correlate of preference and purchase intent

After a certain point, a further increase in arousal results in increase in tension and decrease in pleasure, so for the low arousal potential blue, a high saturation is perhaps needed to attain what has been termed 'optimal stimulation level' (OSL) (Lichtlé, 2007), while yellow only needs medium saturation for the OSL.
It is notable, that in a very recent study, the positive emotions' ratings were higher for blue than for the remaining hues, but this was significant only for highly saturated colour (Wilms and Oberfeld, 2017). Therefore, it could be that the differences between blue and yellow will not be as pronounced in the lower saturation levels.

6. THE EXPERIMENT

6.1 The respondent profile

The data was collected through the survey medium 'Qualtrics'. The survey was distributed mainly through the Aalto University e-mail system. The study needed data for six different versions of ads, so there were no set restrictions for demographic variables for whom could take the study, as to gain as many responses as possible.

The participants comprised largely of undergraduate and postgraduate students with a gender breakdown of 29 males vs 35 females. Approximately 50% of the respondents were Finnish, and the remaining larger nationalities (total approx. 40%) were either Vietnamese, American or from the UK.

6.2 The procedure

The subjects were randomly assigned to one of six experimental conditions. The condition was a function of whether the hue was blue or yellow, and saturation (e.g either 25%, 50% or 75%). Each condition had 10-12 participants.

A brief introduction to the survey described the purpose of the study broadly without specific reference to colours. The respondent would then answer a few demographics-questions before moving on to the main questions of the survey.

On the main page of the survey the respondent would first see the advertisement coloured with one of the 6 conditions. The first set of questions used a 5-point scale and asked the respondent to rate their perceived importance of some characteristics of paint as a product. This set of questions was designed to deter participants from specifically thinking about the paint colour. 5-point scale was used as this data would not be processed in relation to the 7-point scale questions and would make this part of the survey faster for the participants.

The next set of questions was measured with a 7-point scale, in a mixed order to also deter the participants, and included two types of questions. The first question type was about preference, e.g. scales of ugly-beautiful, like-dislike of the ad, low-high interest in trying the product. In this manner, two different types of 'preference' could be combined to a single variable to make for a comparison that might be more accurate than using just one. In the measures 'ugly-beautiful' and the 'like-dislike of the advertisement' the participant was not really reminded of the nature of the stimuli as a device for selling them something. The 'interest in trying the product' made the participant even more aware of the intent of the visual stimuli as an entity of which purpose was to make them commit to a trade between their money, effort and time in exchange for the product. The second question type was about arousal, e.g calming-exciting, low-high arousal, relaxing-stimulating.

6.3 Reliability analysis

Two scales were used to describe the degree to which respondents had a high or a low preference towards the advertisement. The two scales for measuring preference were ugly-beautiful and like-dislike (of the advertisement). The inter-item correlation was deemed acceptable at 0.274. The remaining third preference was actually measuring whether participants would want to buy the product based on the other

two scales, and therefore was not included in the combined preference scale. Three scales were used to describe the degree to which respondents found the advertisement arousing. The mean inter-item correlation was deemed acceptable at 0.345.

6.4. Results

As a reminder, purchase intent is identified as a type of 'preference' variable, but it is looked at separately from the two grouped variables of 'ugly-beautiful' and 'like-dislike of advertisement'.

H1: Blues are sadder than yellows

Table 1: Hypothesis 1

Tests of Between-Subjects Effects

Dependent Variable: Happy or Sad?

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	10.834[a]	1	10.834	5.252	.025
Intercept	1168.959	1	1168.959	566.653	.000
Color	10.834	1	10.834	5.252	.025
Error	127.901	62	2.063		
Total	1355.000	64			
Corrected Total	138.734	63			

A two-way ANOVA was run between the happy-sad scale and the hues of yellow and blue.

Blueness vs Yellowness was found to affect the sadness-happiness scale ($F = 5.516$; $p < 0.05$)

H2: Sadness of the advertisement increases purchase intent

Table 2: Hypothesis 2

Tests of Between-Subjects Effects

Dependent Variable: How high is your interest in trying this product?

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	19.674[a]	6	3.279	2.445	.036
Intercept	308.896	1	308.896	230.353	.000
Q8	19.674	6	3.279	2.445	.036
Error	76.435	57	1.341		
Total	805.000	64			
Corrected Total	96.109	63			

a. R Squared = .205 (Adjusted R Squared = .121)

A two-way ANOVA was run between the happiness-sadness scale and purchase intent.

The relationship between perceived sadness and interest in trying the product was found to be significant ($F = 2.445$; $p < 0.05$).

H3: Saturation increase for blue increases colour preference and purchase intent

Commented [V1]:

Table 3: Hypothesis 3, part 1

Tests of Between-Subjects Effects

Dependent Variable: PreferenceScale2

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.454[a]	2	.727	.778	.468
Intercept	477.959	1	477.959	511.243	.000
Saturation	1.454	2	.727	.778	.468
Error	30.852	33	.935		
Total	509.000	36			
Corrected Total	32.306	35			

a. R Squared = .045 (Adjusted R Squared = -.013)

Table 3: Hypothesis 3, part 2

Tests of Between-Subjects Effects

Dependent Variable: How high is your interest in trying this product?

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.303[a]	2	1.151	.687	.510
Intercept	368.151	1	368.151	219.548	.000
Saturation	2.303	2	1.151	.687	.510
Error	55.336	33	1.677		
Total	425.000	36			
Corrected Total	57.639	35			

a. R Squared = .040 (Adjusted R Squared = -.018)

A two-way ANOVA was run for blue colours between saturation and the preference scale for blue colours, and between saturation and purchase intent scale.

Saturation increase for blue did not make the advertisement more preferred to a significant extent ($F = 0.778$; $p > 0.05$). In fact, the overall trend was slightly negative. Furthermore, saturation increase for blue did not increase purchase intent ($F = 0.687$; $p > 0.05$).

H4: Saturation increase for yellow increases colour preference and purchase intent between low (25%) and medium (50%) saturations, and decreases colour preference and purchase intent when saturation is raised to high (75%) from medium (50%)

A two-way ANOVA was run between saturation and the two respective scales of preference and of purchase intent.

As was expected, the preference towards yellow colours increased between 25% saturation and 50% saturation level (mean of 3.20 vs mean of 4.00), but this was not found to be significant ($F = 1.980$; $p > 0.05$). Furthermore, the purchase intent failed to increase as well ($F = 0.003$; $p > 0.05$).

As was expected also, the preference diminished between saturation 50% (mean 4.00) and saturation 75% (3.33). However, this decrease was not deemed to be significant (F = 1.143; p > 0.05). Also, purchase intent was not increased to statistically significant extent between these two saturation levels (F = 0.971; p > 0.05).

H5: Blue will be less arousing than yellow

Table 5: Hypothesis 5

Tests of Between-Subjects Effects

Dependent Variable: ArousalScale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.834[a]	1	.834	.818	.369
Intercept	667.063	1	667.063	653.675	.000
Color	.834	1	.834	.818	.369
Error	63.270	62	1.020		
Total	735.778	64			
Corrected Total	64.104	63			

a. R Squared = .013 (Adjusted R Squared = -.003)

A two-way ANOVA was run between arousal and the colours yellow and blue.

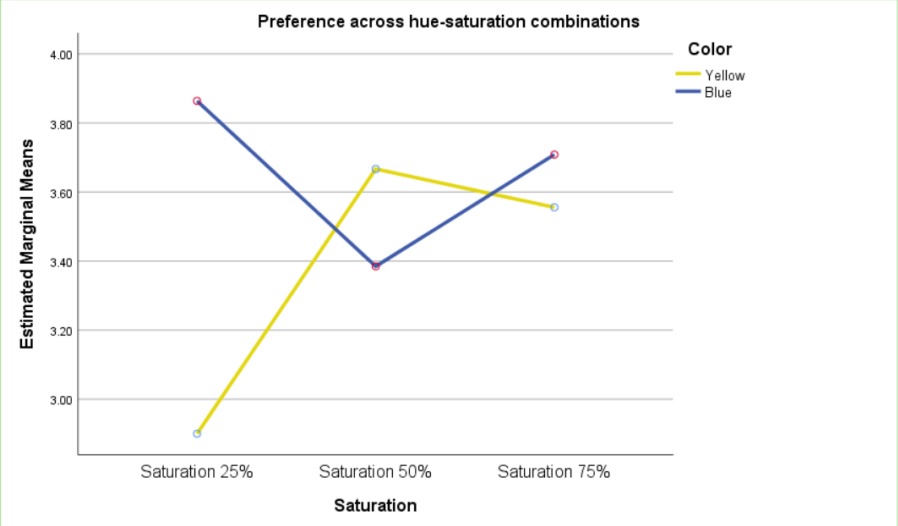
Overall, colour showed no significant effect on arousal level (F = 0.818; p > 0.05).

H6: Blueness will be a positive correlate of preference and purchase intent

A two-way ANOVA was run between the blue and yellow colour, and the two respective scales of preference and purchase intent.

Blue had a higher mean than yellow for preference (mean of 3.63 vs mean of 3.36), but this was not statistically significant (F = 1.188; p > 0.05). Similarly to preference, purchase intent was not significant (F = 0.963; p > 0.05). These findings are illustrated graphically in Figure 2 below.

Figure 2: Saturation plotted against the combined preference scale in yellow and blue colours



6.5 Discussion

The present study set out to address the inter-relatedness between arousal, sadness, preference and purchase intent. The aim was to predict how the scales would interact with one another, and arguably the set of hypotheses was not exhaustive of all the relevant connections that could have been made. However, some discussion can be drawn out of the found results, including statistically insignificant results for loose reference.

The primary statistically significant result was with the dimension of sadness. The two results in H1 are consistent with the majority of prior findings on sadness and happiness. Not only perceived sadness increases purchase intent, but also that there is a significant difference between yellow and blue in making an advertisement sad or happy.

An additional finding that was not part of the original hypotheses was the lack of the effect of saturation on making a product either happier or sadder. While the ‘colour

temperature', which is a function of both hue and saturation based on recent research source as not measured in this study, one would have assumed that an increased saturation would have increased colour temperature. By extension, one could suppose that blue is supposed to be a sad colour because of its 'coolness', and yellow is supposed to be a happy colour because of its 'warmth', and both more saturated blues and yellows are warmer than their unsaturated counterparts. Therefore, it is not unreasonable to suppose that more saturated versions of any colour would be happier and less preferred, but this was not the case. Therefore, this should be investigated in further studies perhaps using different lightness levels of the foreground colour (e.g the paint brush and trail) and background colour (behind the paint brush and trail), to see if saturation would have an effect.

There was practically no reason to expect that such a drastic increase from saturation, from 25% to 75%, would not generate a clear positive trend based on the discussed findings on blue through quantitative results and the EVT. As has been discussed from the perspective of the EVT, blue and saturated has been used as a certain kind of 'landmark' for the theory for pinpointing the most preferred combination of hue and saturation. Yet, in the present study the lowest saturation blue was very close to being just as preferred as the highest saturation.

As has been shown from previous research, yellow is often the least preferred colour, but it has differences between different saturation levels. In relation to the very unexpected results of saturation variations in the colour blue, it was interesting to see that yellow behaved largely as expected, even though these differences were not found to be significant. Peak preference for yellows was with medium saturation

Yellow has been established clearly as psychologically more stimulating than blue and to become more arousing than blue the higher the saturations become, as Lichtlé (2007) outlined. Yet the difference between any of the saturation levels was not significant, even for arousal for the high saturation of 75%.

Blue was surprisingly slightly more arousing than yellow in the case of 25% saturation, but this was also not significant. Perhaps this has something to do with the highly light (white) background, or about how yellow becomes much less arousing between the 50% -> 25% saturation transition, compared with blue in the

50% -> 25% transition. As an added point of interest, the largest difference in means was between a pair of saturations was at 75%, but even this was not significant.

What was presumed from inspecting prior research was that perhaps the most highly expected result was that blue and yellow would be preferred to significantly different degrees. The survey has failed to demonstrate significance in what should have perhaps been one of the two most expected relationships: a difference in preference for two hues that are largely deemed to be the very least preferred and the most preferred hues. For the least, the most preferred colour was blue while the least preferred colour was yellow. It is notable that the least preferred colour was a yellow (mean of 2.9) and the most preferred colour was a blue (mean of 3.9), with ($F = 5.92$; $p > 0.05$). but it is unclear why it wasn't a high-saturation blue.

7.CONCLUSIONS, IMPLICATIONS TO INTERNATIONAL BUSINESS, LIMITATIONS

7.1 Conclusions and implications for International Business

Based on the gathered theory and results, the described colour phenomena would have been as follows. Blue is overall liked across saturations, and particularly the highest saturation blues have been most preferred in prior research, so the 75% saturation was expected to be the most preferred and induce the greatest.increase in purchase intent. While a shade of blue was the most preferred one, it was the lowest saturation version. Furthermore, overall blue was not significantly preferred unlike the expectations.

This has several interesting implications for an advertiser. Foremostly, creative incongruency (e.g using a generally less preferred colour) might be becoming more and more relevant in the modern society (Oakes, 2007) where consumers are bombarded with ads that are using the most basic findings on colour. E.g., harmonious colours and colour combinations are commonly used, which can result in consumers finding advertisements nice to look at, but not necessarily liking and being interested in the advertisement as a whole with all their visual components.

Furthermore, the consumers might find an advertisement beautiful and indicate that they like it but dismiss the advertisement as just “one in the mass of advertisements” when it comes to tendency to buy the product.

Overall, this study suggests that similarly to the past studies blue is a sad colour and yellow is a happy colour, and that sadness increases purchase intent. However, it would also seem that sadness of an advertisement might circumvent the dimensions of preference when it comes to increasing purchase intent. An advertiser could consider anticipating the success of low-involvement -and non-symbolic products in terms of the perceived sadness of the product as opposed to scales of ‘like-dislike’ or ‘high preference – low preference’.

For highest preference and highest purchase intent, the colour was low-saturation blue. However, blueness was not found to be statistically important in generating high preference or high purchase intent. The peak preference and purchase intent for yellow was in the medium saturation level. While it was not statistically important, the trend conformed to the conducted qualitative analysis and calls for further focused research on whether medium saturation yellows are the best choice for advertisements in products in which yellow is a suitable colour symbolically.

Perhaps arousal should have been compared to various dimensions since it has shown promise as a means of affecting preference. There was no statistically significant difference between blue and yellow.

Discussing colour-emotions such as the pleasure (e.g preference), arousal and dominance in the PAD-model has only quite recently had studies taking the approach of ‘perceived colour temperature’, such as in the study of Hanada (2017). Another example of investigating colour temperature, that might explain the discrepancy between saturation- and hue effects in the finding of this thesis, is in the paper of Ou et al. (2004a). Ou found a connection between warm and cool colours, suggesting that a warm colour becomes warmer as its saturation increases (e.g, yellow becoming warmer and less preferred). This might be a part of the entire explanation that underlies the results of the present study. Ou’s result might explain why a warm and happy colour like yellow would be happier and less preferred at 75% compared with 50% saturation, but it fails to explain why yellow is the most preferred at medium

(50%) saturation as opposed to 25% saturation. Likewise, Ou's finding supports the preference of 75% hue blue over 50% hue blue, but not the preference of 25% blue over both 50%. In other words, it seems very difficult to relate arousal to other factors of colour emotions at least in the paradigm of comparing specifically blue and yellow colours, and this could warrant further study on the two colours.

7.2 Limitations

The first level of limitations is probably at least partially the result of the relatively low number of participants for each colour group, and the indiscrimination between different demographics. The limitation being, that the study aimed to link several variables together in order to offer a focused explanation on blue-yellow and low saturation – high saturation relationships in the paradigm of preference, arousal, and purchase intent. In other words, the aim was to offer a multi-sided perspective for explaining how an advertisement's colour's properties of arousal, preference, and purchase intent interrelate. When more than one of the hypotheses fails, it is difficult to suggest a framework for blue and yellow colours using the scales of preference, arousal and saturation levels. Arguably this was a very ambitious goal and there was no premeditation for how many responses would be sufficient or could be collected to a study that uses 6 different groups. Additionally, for the online experiment the settings of the displays or the lighting of the rooms could not be controlled which could have potentially affected the results.

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