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Finnish and English children's colour use to depict affectively characterised figures

Short title: Cultural influence on colour choice

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Abstract

Recent research has shown that children use colours systematically in relation to how they feel about certain colours and the figures that they draw. This study explored cultural differences between Finnish and English children's use of colour to represent figures with contrasting emotional characters. One hundred and eight children (54 Finnish, 54 English) were divided into two age groups (5-7 years and 7-9 years). All children coloured three emotionally characterised drawings and rated their affect towards the ten colours provided and the three differentially characterised figures. It was found that Finnish and English children differed in their use of colour for drawings of neutral and nasty figures. The findings are discussed in terms of the need to explore the role of culture in mediating children's use of colour when drawing figures they feel negatively and positively towards.

Introduction

Psychologists have argued that certain properties of children's drawings can be seen as a product of factors beyond the perceptual-motor and cognitive factors required to produce a drawing. There is a long-standing tradition of research that has investigated whether the positive or negative feelings children hold towards topics they draw are reflected in certain properties of their drawings. It has been suggested that such feelings can be reflected in the size of the drawn figures (e.g. Burkitt, Barrett & Davis, 2003a, 2004; Craddick, 1961, 1963; Koppitz, 1966, 1968; Machover, 1949), through the spatial organisation of figures in their drawings (Bombi & Pinto, 1994) and through differences in the details children use to show positive or negative characters (e.g. Burkitt, Barrett, & Davis, 2004, 2005).

A further property used by children to signal how they feel about a topic is colour. It has frequently been argued that children's colour choices are affected by the feelings that they hold towards the drawing topics (e.g., Alschuler & Hattwick, 1943, 1947; Arnheim, 1956, 1974, 1986; Brick, 1944; Golomb, 1981, 1992; Hammer, 1997; Winston, Kenyon, Stewardson, & Lepine, 1995). However, the majority of claims to the effect that colour choice is emotionally significant in children's drawings have been based on professional observation rather than on formal experimentation (Hammer, 1997; Malchiodi, 1998; McNiff, 1992). Yet, recent experimental research has addressed previous methodological concerns (see Burkitt et al., 2003b, 2004, 2005) and shown that children systematically alter their choice of specific colours depending on the emotional descriptions of the figures and the way they felt about specific colours.

It is important to understand how children from different cultures might use colours to signify how they feel about what they draw. Children's drawings continue to be interpreted for emotional information about the child (Dalley, 1984; Hammer, 1997;

Hunsley, Lee & Wood, 2003), and in their own right to determine how the child artist feels about topics in their life (Forrest & Thomas, 1991; Kelly, 1984). It is also important to study cultural differences in colour use in relation to affect as it is unclear whether children are influenced by cultural pictorial conventions or by a more generalisable affective mechanism when they choose certain colours in relation to their feelings towards drawing topics and their colour preferences. Recent systematic research has only sampled children from across England (e.g. Burkitt et al., 2003b, 2004, 2005) and has not included a direct comparison between two cultural groups in one study.

There is reason to believe that colour use would vary between cultures in relation to children's affect towards different colours and different drawing topics. Children's acquisition of colour terms, range of colour terms, preferences for specific colours, and categorisation of colours have been shown to vary across certain cultures (Gesche, 1927; Nelson, Allan, & Nelson, 1971; Robertson, Davies, & Davidoff, 2000; Stabler & Johnson, 1972; Subes, 1959; Zentner, 2001), as have children's associations of different kinds of affect with different colours (Adams & Osgood, 1973).

English and Finnish children's use of colour was compared in the present study. English children were selected as a control group as previous research showing that children represent positive topics with favoured colours and less positive topics with less favoured colours (Burkitt et al., 2003b, 2004, 2005) was based on English samples. Finnish children were chosen as a comparative group as they have been found to offer the most differentiated affective associations of colours from a sample of twenty-three countries (Adams & Osgood, 1973). Moreover, Finnish and British groups have been found to vary widely on various dimensions of cultural values, for example, on the dimensions of individualism-collectivism and masculinity-femininity (Hofstede's,

1984), with the Finnish group showing more feminine and less individualistic values than British group. Finnish and English children were therefore chosen for comparison in the present study due to such cultural differences in generalised values and specific colour-affect associations.

The present study was therefore designed to explore whether past findings (Burkitt et al., 2003b, 2004, 2005) would generalise across English and Finnish cultural groups. Specifically it was designed to assess whether there would be differences in colour use for the three characterised figures, whether children would use colours in relation to their preference for individual colours and the emotional valence of the drawn figure and whether both groups would rate the three characterised figures in the anticipated directions.

Method

Participants

Children in both cultural groups were selected from age appropriate kindergartens and schools on the basis of having lived exclusively in either Finland or England. The groups were matched for socio-economic background on the basis of school and family demographics. Table 1 shows the mean age, age range and number of boys and girls in each cultural and age group.

INSERT TABLE 1 ABOUT HERE

Materials

Children were provided with a pre-drawn outline of a man on a standard sheet of white A4 size paper for each colouring task (see Figure 1).

INSERT FIGURE 1 ABOUT HERE

Ten coloured crayons were provided for the children by the experimenter. The colours were selected on the basis of familiarity to the children, pilot work which established typical examples of each colour (cf. Burkitt, 2000), and to be consistent with colour ranges used in past research (Burkitt et al., 2003b, 2004, 2005). Ten individual laminated colour cards (5cm²) coloured with the ten colour crayons (white, black, blue, red, pink, green, purple, brown, yellow, orange) were provided for the colour preference task. A five-point Likert scale was used to measure affect towards the colour range and the characterised figures.

Procedure

All children completed two counterbalanced sessions. All instructions were translated into Finnish by the experimenter whose first language is Finnish and checked by another Finnish adult fluent in English.

Session 1: Colouring session

Children in both groups completed three differentially characterised outline figures; a baseline figure first followed by a positively (nice) and negatively (nasty) characterised figure presented in counterbalanced order. The instructions for each colouring task are presented in Appendix 1. Children were asked to rate their affect towards each coloured figure immediately after completion of each colouring task using a five-point Likert scale (see Appendix 2 for the instructions). The responses were scored between 1 (very unhappy) to 5 (very happy).

Session 2: Colour preference session

All children completed a colour preference task where they were asked to rate each colour separately using the above five-point Likert scale. Children were presented with one colour card (red, orange, yellow, green, purple, pink, white, brown and black) at a time presented in random order between children. The instructions for this task are presented in Appendix 3.

Results

Colour use

In order to assess whether children used different colours for the contrasting characterised figures, a series of cross-tabulation analyses were conducted. A main cross-tabulation for all subjects was run for each drawing type separately using chi-square tests to see if the observed values would be significantly different from the expected values for each colour. For these cross-tabulations observed counts were taken and one sample chi-square tests run for significance.

Baseline figure: The cross-tabulation for the baseline figure showed that none of the children used white, which was therefore removed from further analysis. Table 2 shows the observed and expected that differed significantly ($\chi^2 (8) = 28.50, p < 0.01$).

INSERT TABLE 2 ABOUT HERE

Nice drawing: A cross-tabulation for all subjects for the nice drawing showed that all ten colours were used. Table 3 shows the observed counts, expected counts, chi-square statistic and the significance level. The result was significant ($\chi^2 (9) = 34.41, p <$

0.01) suggesting that children's use of colour in the nice drawing was significantly different from the expected values.

INSERT TABLE 3 ABOUT HERE

Cross-tabulation revealed again that white was not chosen by children for the nasty drawing and therefore white was excluded from the analysis. Table 4 shows the observed counts, chi-square statistic and significance level. The result was significant suggesting that the children's use of colours in the negatively characterised drawing was significantly different from the expected values ($\chi^2 (8) = 218.00, p < 0.01$).

INSERT TABLE 4 ABOUT HERE

Cross-tabulation analyses were run for each drawing type again but with separate rows for Finnish and English subjects to investigate whether there was an association between the children's nationality and their colour use in any of the three drawing types. The likelihood ratio was significant ($\chi^2 (8) = 17.27, p < 0.05$) suggesting that there was an association between the children's nationality and the use of colour in the baseline drawing. From Table 5 it is clear that Finnish children did not use black whereas English children did use black and Finnish children used green more often than English children. Neither Finnish nor English children used white in the baseline drawing. Both English and Finnish children had the highest observed count for pink and orange (see Table 5).

INSERT TABLE 5 ABOUT HERE

For the nice drawing, the likelihood ratio was non-significant ($\chi^2 (9) = 5.96, p > 0.05$) indicating that there was no association between children's nationality and their use of colour in the nice drawing. As shown in Table 6, the likelihood ratio was highly significant ($\chi^2 (8) = 22.30, p = 0.01$) for the nasty drawing, suggesting that there was a strong association between the children's nationality and their use of colour in the negatively characterised drawing. The cross-tabulation showed that black had the highest observed count for both Finnish and English children. White again did not appear in the analysis. The rest of the colours were used with similar frequency except for blue, which was not used by Finnish children. The English children used a wider range of the colours for the nasty drawing, brown being another prominent colour, as compared to the Finnish children.

INSERT TABLE 6 ABOUT HERE

Children's affect ratings for colours used in the three drawing types

To explore whether more preferred colours were used for the positively characterised figures and less preferred colours were used for the neutral and negatively characterised figures children's affect ratings for the colours they used to colour each drawing type were analysed by a two-way mixed 2 (condition) x 3 (affect) ANOVA, with condition (Finnish, English) as the between subjects factor and affect ratings for the colours used in the three drawings (baseline, nice and nasty) as the within subject repeated measure. The affect ratings for the colours used in the three drawings (baseline, nice and nasty) were taken from the children's colour rating task. Children were asked to rate each of the ten colours using the five-point Likert scale with 1

indicating the lowest rating and 5 indicating the highest rating. There was a significant main effect of affect ratings for colours used in the three drawings ($F(1.88, 199.74) = 27.35, p < 0.01$). Observed power was high for this medium sized effect ($\eta^2 = 0.28, P = 0.87$).

Planned comparisons ($p < 0.05$) were conducted to locate the differences between the affect ratings for the colours used in the three different drawings. There was no significant difference between the affect ratings for the colours used for the baseline and nice drawings (baseline drawing $M = 4.08, SD = 1.27$, nice drawing $M = 4.06, SD = 1.23$), yet the colours used for the baseline and nice drawings were more highly rated than those used for the nasty drawing (nasty drawing $M = 2.89, SD = 1.25$). There were no further main or interaction effects.

Children's affect ratings for the three different drawing types

To investigate whether children rated the three figures differently and whether this interacted with cultural group, a two-way mixed 2 (condition) x 3 (affect) ANOVA was conducted with condition (Finnish, English) as the between subjects factor and affect ratings for the three different drawings as the within subjects repeated measure. There was a medium sized main effect with high observed power ($\eta^2 = 0.30, P = 0.90$) main for the affect ratings given to the three different drawings ($F(1.86, 196.64) = 54.86, p < 0.01$). Planned comparisons ($p < 0.05$) revealed that the nice drawings ($M = 4.17, SD = 1.20$) were rated significantly more positively than the baseline ($M = 3.21, SD = 1.24$) and nasty drawings ($M = 2.49, SD = 1.54$) and that the baseline drawings were rated more positively than the nasty drawings. There were no further significant main or interaction effects.

Discussion

Overall, this study found evidence in support of past findings in that children used colours in relation to the emotional character of the drawn figures and their colour preferences (Burkitt, Barrett, & Davis, 2003b, 2004, 2005; Nelson, Allan, & Nelson, 1971) and rated their contrasting affect towards the figures in the anticipated direction. In extension of past findings, cultural differences and similarities in the use of specific colours were also found.

Colour use

Finnish and English children produced a different pattern of specific colour use for the baseline and nasty drawings. In the baseline drawing, Finnish children used green, pink, and orange but not white or black. English children used pink, orange and red and also did not use white or black. For both groups of children the range of colours used in the nasty drawings was narrow. Both groups used black frequently. This is in line with clinical claims and past research (Burkitt et al., 2003b, 2004, 2005; Hammer, 1997; Miljkovicjh de Heredia & Miljkovicjh, 1998; Mumcuoglo, 1991). It may be the case that, at least for the two cultures studied here, the association of black with negativity is salient. The two countries do maintain similar rituals for negative events that entail the association of black (e.g., funerals).

Finnish children did not use any white or blue in their nasty drawings. This should not be taken to mean that Finnish children are not familiar with white or blue, especially given that these are the colours of the Finnish flag and would be strongly associated with Finnish nationality and identity. The key point instead is that Finnish children show a restricted breadth of colour choice for their negative affectively characterised drawings. In contrast, English children used a wider range of colours for

their drawings of nasty figures: they frequently used brown as well as black to colour the figures they felt negatively towards.

Overall, baseline and nice drawings were coloured with a wider range of colours than the nasty drawings. It seems that regardless of cultural background, children expressed the positive affect associated with the nice drawing with many different colours and applied a more restricted range to demonstrate the negativity associated with the nasty figures. It could be suggested that when colouring positive figures, children select their more favoured colours rather than observing cultural norms for figures that are positively regarded.

Previous research has found cultural differences in the strategies children use to depict emotion character, namely in the size of the topic, in the centrality of the drawn figure and the location of the figure on the paper (Aronson & Anderson, 1996). The acquisition of colour terms, range of colours terms and preferences for specific colours also varies across cultures (Gesche, 1927; Nelson, Allan, & Nelson, 1971; Stabler & Johnson, 1972; Zentner, 2001). This study suggests that there are cultural differences also in the use of colour when depicting figures with differing emotional significance. Children's favourite colours tend to change over time (Gelineau, 1981) and this change may help to explain the slight differences in the use of individual colours between the present patterns of findings and past research (Burkitt et al., 2003, 2004, 2005; Nelson, Allan & Nelson, 1971).

Adams & Osgood (1973) offered an account of the mechanisms that could influence group responses to colours in terms of the physiology of vision and a shared experience of the environment. This account could explain why the present findings showed both similarities and differences in colour use between the cultural groups. Both groups selected more liked colours for liked figures and less disliked colours for

disliked figures whilst different specific colours were associated with figures which were viewed positively and negatively. The specific colour-affect associations therefore seem to be specific to groups who share a common environment whilst the basis to select colours in relation to colour preferences may be less culturally specific.

Overall

The present study showed that children did rate the appropriate affect towards the three different figures and did select colours in relation to their colour preferences and their affect towards the three figures. In addition, the use of specific colours in relation to neutral, nice and nasty figures was found to vary between the cultural groups, especially in regard to the neutral and nasty figures. Thus, there is evidence to suggest that colour use in relation to the neutral and nasty figures used here is largely culturally determined, in line with Adams & Osgood's claim (1973) and that an underlying mechanism may be the observation of cultural conventions rather than a psychodynamic mechanism (Dalley, 1984; Hammer, 1997; McNiff, 1992).

Exploring the impact of cultural depictions of affect is important in order to gain a broader understanding of drawing development and to highlight issues surrounding the continued clinical use and interpretation of children's drawings for affective content. Drawing strategies can be independently and systematically investigated using this paradigm and although it cannot be asserted that actual emotion was activated during the colour preference and colouring sessions, the affect ratings do offer evidence that children discriminated between the figures and colours on an affective dimension. As with adult populations future research can further examine the role of brightness and saturation (Valdez & Mehrabian, 1994) on children's colour-affect associations and use of colour to determine which properties of colours children associate with specific moods between cultures.

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Tables and Figures

Table 1: Mean age (M) and age range for Finnish and English children

	Young age group	Old age group
Finnish group	(<u>N</u> = 24, 11 girls and 13 boys) <u>M</u> = 6y 2m Range = 4y 11m to 7y 11m	(<u>N</u> = 30, 15 girls and 15 boys) <u>M</u> = 7y 11m Range = 7y 4m to 9y 0m
English group	(<u>N</u> = 28, 16 girls and 12 boys) <u>M</u> = 6y 4m Range = 5y 9m to 6y 9m	(<u>N</u> = 26, 13 girls and 13 boys) <u>M</u> = 8y 1m Range = 7y 4m to 9y 2m

Table 2: Baseline drawing: observed counts, chi-square statistic and significance level for all subjects for all ten colours.

	White	Black	Blue	Red	Pink	Green	Purple	Brown	Yellow	Orange
Observed										
Count	0	4	13	14	22	17	7	5	7	19

Chi-Square	Significance Level:
Statistic: $\chi^2 (8) = 28.50$	$p < 0.01$



Figure 1: Outline model provided for colouring tasks

Table 3: Nice drawing: observed counts, chi-square statistic and significance level for all children for all ten colours.

	White	Black	Blue	Red	Pink	Green	Purple	Brown	Yellow	Orange
Observed										
Count	3	3	11	14	17	10	9	6	24	11

Chi-Square	Significance Level:
Statistic: $\chi^2 (9) = 34.41$	$p < 0 .01$

Table 4: Nasty drawing: observed counts, chi-square statistic and significance level for all children for all ten colours.

	White	Black	Blue	Red	Pink	Green	Purple	Brown	Yellow	Orange
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Observed										
Count	0	60	5	7	5	4	4	9	8	6

Chi-Square		Significance Level:
Statistic:	$\chi^2 (8) = 218.000$	$p < 0.01$

Table 5: Baseline drawing and colour use for all Finnish and English children.

	White	Black	Blue	Red	Pink	Green	Purple	Brown	Yellow	Orange
Finnish										
Observed	0	0	7	6	10	14	4	1	2	10
	(0%)	(13%)	(11.1%)	(18.5%)	(25.9%)	(7.4%)	(1.9%)	(3.7%)	(18.5%)	
Expected	2.0	6.5	7.0	11.0	8.5	3.5	2.5	3.5	9.5	
Adjusted										
residuals	2.0	-.3	-.6	-.5	2.9	.4	-1.4	-1.2	.3	
English										
Observed	0	4	6	8	12	3	3	4	5	9
	(7.4%)	(11.1%)	(14.8%)	(22.2%)	(5.6%)	(5.6%)	(7.4%)	(9.3%)	(16.7%)	
Expected	2.0	6.5	7.0	11.0	8.5	3.5	2.5	3.5	9.5	
Adjusted										
Residual	2.0	-.3	.6	.5	-2.9	-.4	1.4	1.2		
Chi-Square										
Statistic: $\chi^2 (8) = 17.27$										
Significance Level: $p < 0.05$										

Table 6: Nasty drawing and colour use for all Finnish and English children.

	White	Black	Blue	Red	Pink	Green	Purple	Brown	Yellow	Orange
Finnish										
Observed	0	30	0	4	4	1	3	1	6	5
		(55.6%)	(0%)	(7.4%)	(7.4%)	(1.9%)	(5.6%)	(1.9%)	(11.1%)	(9.39%)
Expected		30.0	2.5	3.5	2.5	2.0	2.0	4.5	4.0	3.0
Adjusted										
Residuals		.0	-2.3	.4	1.4	-1.0	1.0	-2.4	1.5	1.7
English										
Observed	0	30	5	3	1	3	1	8	2	1
		(55.6%)	(9.3%)	(5.6%)	(1.9%)	(5.6%)	(1.9%)	(14.8)	(3.7%)	(1.9%)
Expected		.0	2.3	-.4	-1.4	1.0	-1.0	2.4	4.0	3.0
Adjusted										
Residual		.0	2.3	-.4	-1.4	1.0	-1.0	2.4	-1.5	-1.
Chi-Square										
						Significance Level:				
Statistic:	$\chi^2 (8) = 22.30$					$p < 0.01$				

Appendix 1: Colouring task

Instructions for the baseline neutrally characterised figure were:

“I’d like you to colour in this shape in front of you using one of these colours. Colour in the whole shape as well as you can. Do not include any details such as the face or the clothes.”

In Finnish the instructions were:

“ Haluaisin sinun varittavan taman edessa olevan kuvan kayttamalla yhtä naista vareista. Varita koko kuva niin hyvin kuin osaat. Ala lisaa mitaan yksityiskohtia kuten kasvoja tai vaatteita.”

For the positively characterised figure the instructions were:

“ Now pretend that the shape is of a very nice kind man who is very pleasant and friendly to everyone. Colour in the man in front of you using one of these colours, remembering what a nice person he is. Colour in the whole shape as well as you can, but do not include any details such as the face or clothes.”

In Finnish the instructions were:

“ Kuvittele seuraavaksi että kuva on erittäin mukavasta henkilosta joka on erittäin kohtelias ja ystavallinen kaikille. Varita edessasi oleva kuva kayttamalla yhtä naista vareista. Pida mielessasi kuinka mukava henkilo han on. Varita koko kuva niin hyvin kuin osaat. Ala lisaa mitaan yksityiskohtia kuten kasvoja tai vaatteita.”

For the negatively characterised figure the instructions were:

“ Now pretend that the shape is of a very nasty horrible man who is very mean and unfriendly to everyone. Colour in the man in front of you using one of these colours, remembering what a nasty person he is. Colour in the whole shape as well as you can, but do not include any details such as the face or clothes.”

In Finnish the instructions were:

“Kuvittele seuraavaksi että kuva on erittäin ilkeasta henkilosta joka on erittäin ilkea ja epäystävällinen kaikille. Varita edessasi oleva kuva käyttämällä yhtä naista väreistä. Pida mielessasi kuinka ilkea henkilö hän on. Varita koko kuva niin hyvin kuin osaat. Älä lisää mitään yksityiskohtia kuten kasvoja tai vaatteita.”

In Finnish the instructions were

“ Kirjoitatko oman nimesi paperiin niin että tiedetään kenenkä se on eikä se mene sekaisin kenenkään toisen piirrustuksen kanssa.”

Appendix 2: Affect towards characterised figures

Instructions to give affect rating for the figures:

“I would like to find out how you feel about the man. What I’d like you to do is point to the face to show how you feel about the man. Here are the faces that you are going to be looking at (pointing to each face). The first one is a very unhappy face; next one is a quite unhappy face; the middle one is neither unhappy or happy. The fourth face is quite a happy face and the last one is a very happy face. When you answer my question, I’d like you point to the face that describes how you feel about the man. OK?”

In Finnish the instructions were:

“ Haluaisin, etta kerrot mita mielta olet tasta henkilosta. Haluaisin sinun osoittavan sita kasvoa joka kuvaa mita mielta olet tasta henkilosta. Tassa on kaikkien kasvojaen kuvat. Ensimmäinen on erittäin surullinen kasvo, seuraava on aika surullinen kasvo, keskimäinen ei ole surullinen eikä iloinen kasvo. Neljas kasvo on aika iloinen kasvo ja viimeine kasvo on erittäin iloinen kasvo. Kun vastaat kysymykseeni haluaisin sinun osoittavan sita kasvoa mika kuvaa kuvaa mita mielta olet tasta henkilosta. Ymmarratko ohjeet.

Appendix 3: Colour rating task

The instructions for the colour rating task were as follows:

“I would like to find out how you feel about this colour. What I’d like you to do is point to the face to show how you feel about the colour. Here are the faces that you are going to be looking at (pointing to each face). The first one is a very unhappy face; the next one is quite an unhappy face; the middle one is neither happy nor unhappy. The fourth face is quite a happy face and the last one is a very happy face. When you answer my question, I’d like you to point to the face that describes how you feel about the colour. OK?”

In Finnish the instructions were:

“Haluaisin etta kertoisit minulle mita mielta olet tasta varista. Haluaisin etta osoitat 2sita kasvoa joka kuvaa mita mielta olet tasta varista. Tassa on kaikkien kasvojen kuvat. Ensimmäinen on erittäin surullinen kasvo, seuraava on aika surullinen kasvo, keskimmainen ei ole surullinen eika iloinen kasvo. Neljas kasvo on aika iloinen kasvo ja viimeinen kasvo on erittäin iloinen kasvo. Kun vastaat kysymykseeni haluaisin sinun osoittavan sita kasvoa mika kuvaa mita mileta olet tasta varista. Ymmarratko ohjeet?”