How Focus of Interest in Pictures Changes with Age: A Cross-cultural Comparison

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British and Chinese participants ranging from 4 years of age to adult were presented with sets of drawings of everyday objects, and asked to match two out of three. The drawings could be matched on colour, subject matter, or visual metaphor. In both cultures there was a significant progression from matching on colour to subject matter, and then from matching on subject matter to metaphor. These age-related differences in the selected basis for matching may reflect age-related changes in focus of interest, and provide experimental data that is consistent with Parsons’ (1987) claims towards the development of understanding about art. The findings of broadly similar age differences in Chinese as well as British children suggest that this pattern of development is not culture-specific. Chinese children, however, showed an earlier and more pronounced progression to matching on metaphor than did the British children, which is hard to reconcile with previous suggestions (see, for example, Parsons, 1987; Winner, 1989) that a progression of interest beyond subject matter may not take place in Eastern cultures. The training Chinese children receive in monitoring detail in pictures and in Chinese characters may facilitate attention to the graphic devices that communicate metaphorical messages.

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Research into our understanding of pictures has often highlighted the ways in which pictures develop our knowledge of the world. It is widely held, for example, that pictures may facilitate language development (e.g., Ninio & Bruner, 1978; Whitehurst et al., 1988), be used as educational tools (Rowher, 1970), and provide models for children’s own productions (Golomb, 1992; Moore, 1986; Rosenblatt & Winner, 1988; Wilson & Wilson, 1977). The educational benefit of pictures is further underlined by the consistent finding that some material presented pictorially facilitates children’s learning to a greater extent than verbal material, and that the effect is maintained into adulthood (Kail & Sigel, 1977; Reznick, 1977; Wright & Berch, 1992).

A number of researchers have noted that many adults assume that pictures are easily understood, and that children interpret pictures in much the same way as adults do (e.g., Ninio & Bruner, 1978; Sigel, 1978; Thomas, Nye, & Robinson, 1994). Although there is evidence to suggest that recognition of objects depicted in pictures requires no special learning about pictures per se (DeLoache, Strauss, & Maynard, 1979; Hochberg & Brooks, 1962), research examining children’s understanding of the dual nature of a picture as a representation and as an object in itself suggests that picture comprehension develops over the preschool years (e.g., DeLoache, 1991; DeLoache & Burns, 1994; Dow & Pick, 1992; Robinson, Nye, & Thomas, 1994; Thomas et al., 1994). Little research attention has been given, however, to any further developmental patterns in our attitudes towards pictures. For instance, once a child can recognise and comprehend a picture (see DeLoache & Burns, 1994; Sigel, 1978, for distinction), is a child’s focus of interest in pictures also different from that of adults?

What we attend to when viewing a picture is likely to depend in part on our understanding of, and preference for, the variety of messages that pictures can convey. Although it is commonly acknowledged that our aesthetic responses have both cognitive and affective components, Goodman (1976) cautioned against the usefulness of analysing the components separately. He claimed that feelings function cognitively, stating that aesthetic responses can be described best as “thoughtful feelings”. Indeed, studies that have concentrated on children’s preferences for particular works of art (e.g. Machotka, 1966; Rosenstiel, Morison, Silverman, & Gardner, 1978), and a recent cognitive-developmental account of art understanding (e.g. Parsons, 1987), suggest consistent shifts in our focus of interest in paintings. That is, younger schoolchildren are mainly interested in colour, older schoolchildren are preoccupied with subject matter, with some adolescents and (perhaps more) adults focusing on the painting’s formal and expressive qualities.

There are a number of reasons why we should be cautious in presuming that this sequence applies to all forms of picture. First, although children produce many paintings, few children have much experience of serious
works of art. Thus, children’s responses to examples of modern art may not mirror their understanding of other pictorial forms with which they are more familiar (e.g. line drawings).

Second, much previous research has relied on verbal explanations as the sole measure of aesthetic understanding. Aesthetic experience should not be confused with the ability to express verbally the experience, and the aesthetic understanding of children is particularly vulnerable to underestimation if only their verbal responses are analysed (see Rosensteil et al., 1978).

Third, many studies have lacked a systematic analysis of the children’s responses to pictures. This is perhaps not surprising considering the many complex problems involved in coding verbal responses (see Housen, 1983), but the lack of systematic analysis nevertheless leaves us wondering about the validity of the authors’ claims. For instance, in formulating his developmental stage account of art understanding, Parsons (1987) merely inspected the interviewees’ verbal responses and abstracted what he felt were the predominant themes. Consequently, no systematic data or statistical analyses were provided to substantiate his assertions (see Dixon, 1989; Freeman, 1991; Winner & Gardner, 1988, for reviews). Even with research examining the criteria cited for judging paintings, an approach that readily provides quantitative data, the children’s verbal responses are often reported only in percentages and not subjected to the rigours of statistical analysis (e.g. Machotka, 1966; Rosenstiel et al., 1978).

In addition to these methodological issues, there is also the question of whether the progression in focus of interest in pictures is independent of cultural factors. Parsons (1987) casts doubt on whether many Russians and Chinese participated in the art social world, progressive entry into which Parsons (1988) restated as crucial for aesthetic development beyond a literal interpretation of the properties found in pictures. Indeed, in describing her experiences in Chinese art classes, Winner (1989) reported a strong emphasis on teaching children to represent subject matter realistically, with little encouragement given to produce creative and imaginative works of art (see also Lowry & Wolf, 1988). Winner further claimed that Chinese teachers were reluctant to accept that any drawing is nonrepresentational, preferring to read subject matter in cases where Westerners may only read abstract forms. In conclusion, Winner (1989, p. 57) stated: “I never saw pictures that had a personal voice”, and that, in general, the Chinese do not perceive art as a form of self-expression. If this is the case, we would expect that the appreciation of pictures in Eastern countries, such as China, normally does not develop beyond consideration of subject matter.

The present study was planned as a systematic examination of whether there is an age-related shift in focus of interest in the properties found in pictures, and investigated whether such progression is observed universally.
across British and Chinese children. Line drawings were used as stimuli as they represented a medium with which both British and Chinese children are familiar. Participants of various ages were presented with choices which could be matched to a sample either on the basis of colour, subject matter, or visual metaphor. These properties were selected for study because they represent hierarchical levels of interpretation of the graphic symbols found in pictures: colour is a surface characteristic, subject matter communicates through the literal representation of a real-life referent, and metaphor expresses a theme (e.g. a mood, an idea) that is not literally depicted. Furthermore, previous research using verbal responses to paintings have indicated that these properties may represent dominating themes of interest that are loosely related to age (e.g. Machotka, 1966; Parsons, 1987; Rosenstiel et al., 1978).

Although matching tasks are normally regarded as a test of the viewer’s comprehension of the stimuli, some pairings may be made on the basis of preference. In the light of Goodman’s claims stated earlier, the instructions were designed so as to avoid cues to either a cognitive or affective response. Hence, participants were instructed to select the drawing which they considered to match the sample in the most important or interesting way.

The benefits of a matching task are twofold. First, the mode of response should provide a better estimate of children’s understanding than analysis of verbal explanations. Second, drawings are presented simultaneously; a display which may be the optimum method for allowing young children to discriminate between properties of paintings (Freeman, 1991). Selecting from a set of three choices, however, may overrun some children’s ability to compare properly each choice with the sample. Indeed, in a test of visual metaphor comprehension, Kogan, Connor, Gross, and Fava (1980) found that presenting children with only two choices to match to a sample greatly reduced attention demands and improved performance compared with that reported in a three-choice version. Thus, children in the present study were presented with two comparison stimuli in each of three versions of the task. For example, in one version, one alternative could be matched to the sample on colour, the other on subject matter. In the other two versions, metaphor was contrasted with colour and subject matter, respectively.

For most items the content of the drawings was chosen from the Snodgras pictures (Snodgras & Vanderwart, 1980); as these pictures are calibrated with age of acquisition data, only those drawings that could be presumed to be recognised by the youngest children tested in this study were selected. An artist then copied these representations by hand, adding colour into those drawings designated as a colour match. With respect to the drawings representing a match on metaphor, the artist represented the subject matter in a depreciated state in one of a variety of ways (e.g. dirty, dying, broken,
closed, etc.). Inspection of the drawings in one of the trials employed in the present study (see Fig. 1) reveals how the pictorial device of depreciation serves as a basis for a match on metaphor between one choice and the sample drawing, and how this match represents a higher-order match compared to the alternative pairing. That is, pairing the two chairs is a literal match on subject matter as both items represent the same category of object. Abstracting dying from the tree/flower drawing and brokenness of the chair, however, represents a thematic link from items that cannot be literally associated.

Although the subject matter of the drawings had been carefully selected to maximise recognition of the representations among all the participants, it was considered prudent to check independently that children at the youngest age tested in the sample (4-year-olds) could recognise each depiction. Furthermore, it was considered particularly important to establish awareness of the depreciated state of the metaphor items as research in analogical reasoning has shown that, contrary to claims dating back to Piaget, children as young as 3 years of age can reason by analogy only as long as the stimuli used are familiar to them (Goswami, 1991). It seems likely that understanding of analogy and of metaphor may be related. In order to test for recognition of the stimuli among 4-year-olds, therefore, each drawing was presented to 12 British 4-year-olds and 12 Chinese 4-year-olds. In this pilot study each picture was presented sequentially and the child asked: “What can you see in this picture?” The question was chosen to encourage the children to report what they were focusing on without cueing any particular property. It was possible, however, that the question would underestimate the level of recognition of the depreciated states of the metaphor items (e.g. a child having noticed the depreciated bike may simply report a bike without mentioning that it was broken). Hence, a further question: “Can you say anything more about the … (bike) in the picture?” was asked just for the metaphor items (and only when the depreciated state had not been initially commented on).

For each of the British and Chinese samples, the number of responses that correctly identified the subject matter was calculated as a percentage of the total number of responses. The British and Chinese 4-year-olds showed similar high levels of recognition of the subject matter of the items (95% and 99%, respectively). The same procedure was employed to establish the degree to which the depreciated nature of the metaphor items was reported. Similar levels of reporting between the British and Chinese samples was shown in response to the first question (49% and 51%, respectively) and combined first and second responses (72% and 71%, respectively). The weaker performance at identifying the depreciation was mostly accounted for by responses to the telephone box and tree/flower drawings in both samples, the shop and rug drawings in the British sample, and the settee and
shirt drawings in the Chinese sample. These drawings were included because the subject matter of the depictions were consistently recognised among both samples. In addition, a previous study (Jolley, Zhi, & Thomas, 1998) had shown that both British and Chinese 4-year-olds correctly identified the shop and tree/flower drawings as sad when directly asked about the mood expressed. Furthermore, it was considered that children who had not commented on the depreciated nature of some of the metaphor items may have done so if a similar direct question had been asked. In any event, the similar performances between both samples in reporting the subject matter and depreciation of the items indicated that the materials were equally relevant to both cultures. It is also reasonable to expect that as approximately three-quarters of these 4-year-olds’ responses to the metaphor items included appropriate identification of the depreciation, recognition among older children would be close to ceiling.

Considering the variety of metaphors found in pictures, Kogan et al. (1980) described three types of visual metaphor; in each case, there is a thematic link or similarity between items that cuts across distinct domains; configurational metaphors that have a perceptual similarity (e.g. a snake and a river), conceptual metaphors that are linked by a nonperceptual theme (e.g. death, as in an old man and a candle on the verge of extinction), physiognomic-affective metaphors in which the items express a similar mood or emotion. Kogan et al. note that the distinctions between these three subsets of metaphor can be somewhat blurred, and indeed raters disagreed on some of the items in terms of whether there was a conceptual or emotional link. Nevertheless, items representing subject matter in a depreciated state featured strongly in Kogan et al.’s test of visual metaphor comprehension. We suggest that many of the metaphor items used in the present study express mood through the depreciated state of the subject matter. Indeed, depreciation is an important metaphorical device used in art to express mood. For instance, the depreciation displayed in Albright’s “Into the world came a soul called Ida”, through the age and decay of the furniture and Ida’s body, metaphorically expresses the same depressing mood as that literally depicted in her face. Furthermore, the Chinese idiom, “old and ailing like a candle guttering in the wind”, suggests that depreciation as a device to convey metaphoric meaning is also familiar to the Chinese.

Although each of the alternative drawings was designed to be either a colour, subject matter, or metaphor match to the sample, it is still possible that a participant could have chosen on a different basis than on the property represented in the selected drawing. To clarify the basis of matching, the participants were asked to provide a justification for their choice after each selection. As all the stimuli were simplified drawings and only short verbal responses were required, we anticipated that not even the youngest children’s verbal skills should be overstretched.
Concerning the age groups tested in the matching task, 4-year-olds were chosen to test for a primary interest in colour, 7- and 10-year-olds for subject matter. These age bands were selected largely on the basis of developmental shifts in children's stated criteria for judging paintings (e.g. Machotka, 1966). As class and age have been highlighted as significant factors affecting aesthetic development (Housen, 1983), undergraduate students were selected to represent a group likely to have a prime interest in expression. Indeed, the majority of comments Parsons (1987) reported as characteristic of a stage three understanding of art (i.e. dominating theme: metaphorical expression) were quoted from undergraduates. The British children were tested from lower-middle class areas. The Chinese children were tested in Yunnan which is an underdeveloped area of China.

Within cross-cultural research the matching of samples on possible confounding variables is often less than straightforward, particularly in the case of the present study that tested cultures as diverse as Britain and China. Although the different styles of the art programmes in the two countries were of particular interest to the present investigation, it was important to test children from mainstream schools only and not from schools that specialised in art education. Thus, any differences in task performance could be attributed to differences between the two national programmes and not to further training or natural giftedness from one sample. Similarly, it was important to ensure that both samples were receiving an overall education. This is potentially problematic in China, particularly in a state such as Yunnan which is less developed than the East Coast. To ensure that the Chinese sample were receiving an overall education, a school attached to a University in Yunnan was selected. With respect to the socioeconomic class of the two samples, it was considered better to ensure that the two samples were comparable relative to the own cultures than to match on absolute criteria. Matching on the latter basis would have led the Chinese group to be unrepresentative of the Chinese population. Some of the parents of the Chinese children tested teach at the Yunnan Normal University, but most work at lower-grade levels in the service industries. In the opinion of the Chinese experimenter who had worked as a research associate in Britain for one year, the social class of the Chinese children was lower-middle class within China, and hence comparable with the class of the British children. Clearly, the economic status of the Chinese sample would be lower than that of the British sample in absolute terms, but comparable on a relative basis.

The first and second authors acted as experimenter for the British and Chinese participants, respectively. Although experimenter differences could have affected the results, it was considered that the benefits of using an experimenter from the same culture as the participants outweighed any potential problems with experimenter differences. In any event, every effort
was made to ensure both versions of the instructions conveyed the same meaning within each culture, and that culturally equivalent presentations were used.

METHOD

Design

Participants were presented with 12 trials, 4 on each of the 3 contrasts. The trials within one contrast were not presented as a “set”, but mixed in with the trials of the other contrasts. The order of presentation of the 12 trials was varied so that no participant completed the trials in the same order as any other participant. Furthermore, the positions of the alternatives were counterbalanced. For example, in the four colour/metaphor trials, the colour-match alternatives were placed on the left on two trials.

Participants

The British children were randomly selected from lower-middle class schools in the West Midlands, England, to produce 20 participants in each of the following age groups: 4-year-olds (mean age 4;4, SD 3.72 months), 7-year-olds (mean age 7;5, SD 2.52 months), and 10-year-olds (mean age 10;3, SD 3.70 months). The Chinese children were randomly selected from a primary school attached to the Yunnan Normal University to produce 30 participants in the corresponding age groups to their British counterparts: 4-year-olds (mean age 4;1, SD 3.48 months), 7-year-olds (mean age 6;7, SD 4.33 months), 10-year-olds (mean age 9;9, SD 5.53 months). A larger number of Chinese participants was tested because the Chinese teachers wanted all the children in a class to participate in the study, so that no one would feel excluded (class sizes are much bigger in China). No attempt was made to find children who were gifted in the visual arts. The group of 20 British adults consisted of undergraduate volunteers from Birmingham University. The group of 30 Chinese adults consisted of undergraduate students at the Yunnan Polytechnic University. Most undergraduates from both samples were aged between 18 and 25 years; a wide range of degree subjects from humanities to sciences were represented, although humanities-based subjects were less represented in the Chinese sample. However, none of the undergraduates from either sample was studying art. All age groups contained approximately equal numbers of males and females. Two British 4-year-olds who failed on at least one of the three warm-up trials were replaced with different children.
Materials

For the warm-up trials we used 9 coloured line drawings (8cm × 10cm) representing subject matter, colour, and literal depiction of mood (i.e. coloured happy and sad faces). For the main matching task we used 36 line drawings (24 colour; 12 black and white) of everyday objects, placed inside 10cm × 7cm transparent plastic folders (see Appendix). The stimuli were presented on a mini-lectern (10.5cm × 9cm × 5.5cm).

Explanation of Representations used in Trials

(i) Warm-up Task. In each warm-up trial one of the alternative drawings matched the sample on all three matching criteria used in the main task (e.g. colour, subject matter, and mood); the other alternative could not be matched to the sample using any obvious criteria. Thus, the warm-up trials familiarised the participants with the matching requirements of the main task and with the three matching criteria, without cueing them to concentrate on any particular property match.

(ii) Matching Task. In the colour/subject matter contrast, all drawings were of nondepreciated objects (to hold expression of mood constant). The subject matter alternative represented the same object as represented in the sample, but of a different type, orientation and size (e.g. wall-mounted vs. table-top telephone), and a different colour. Thus, selection of the subject matter alternative could not represent a match based on colour or on being merely an exact copy of the sample. The colour alternative represented a different category of object (e.g. lamp vs. coat) to that of the sample, but was coloured the same. Thus, the colour alternative could not be matched on subject matter as the represented object had no obvious semantic relationship with that depicted in the sample.

In the subject matter/metaphor contrast, all drawings were represented in black and white to hold colour constant. The subject matter alternative represented the same object as represented in the sample, but of a different type, orientation, and size. In addition, the object expressed a different mood in the subject matter alternative (e.g. intact armchair: nondepreciated) to that expressed in the sample (broken wooden chair: depreciated). The metaphor alternative represented a different category of object to the sample (e.g. rug vs. leg) and thus could not be matched on subject matter. Both objects expressed the same mood (i.e. “sad”) but in a different manner (e.g. broken chair vs. dead tree), so that they could not be matched on a type of depreciation (e.g. brokenness).

In the colour/metaphor contrast, the objects represented in the two alternatives were of the same semantic category (e.g. car and bicycle) but of a different semantic category to the object represented in the sample (e.g.
book). Thus, neither alternative could be matched to the sample on the basis of subject matter. Concerning the colour alternative, the subject matter was coloured the same as the subject matter represented in the sample but expressed a different mood (e.g. intact car: nondepreciated) to that expressed in the sample (e.g. torn book: depreciated). Identical criteria for the metaphor alternatives described earlier applied in this contrast, except that the objects were represented in a different colour to those objects represented in the samples.

No object was repeated in the 12 trials to ensure that a previous trial could not affect a subsequent response (see appendix). In the eight trials that involved possible colour matches, different colours were used to control for any idiosyncratic responses to colour. Reproductions of the items presented in one of the subject matter/metaphor trials are shown in Fig. 1.

Procedure

The children were tested individually sitting next to the experimenter in an empty classroom. All instructions were given in the participants' native language (i.e. English or Mandarin). Before the preliminary and task instructions were given, adults were told that the instructions had been devised so that children would understand the demands of the task.

FIG. 1 Sample and two alternative drawings from one subject matter/metaphor trial.
All participants were then given these preliminary instructions in English or Mandarin as appropriate: “There are many different ways we can look at paintings. For example, we can look at what the painting is of, or at the colours or at any feelings in the painting (such as happy or sad). We can also look at pencil drawings in these same ways. For example, look at this drawing (e.g. show a coloured drawing of a [happy/sad] boy/girl). What is it of? What colours can you see? What feelings can you see?”

The task instructions were then given before each of the 3 warm-up trials and before the first of the 12 trials in the matching task (most participants became familiar with the task instructions so not to require a repetition before every trial). The instructions were, “Pick one of these drawings (point to the two alternatives) that you think goes with this drawing (point to sample) in the most important or interesting way”. The question: “Why did you pick this drawing?” was asked after each selection made in the main task. Only participants selecting the appropriate alternative on all 3 warm-up trials proceeded to the matching task (see Participants section for rejections).

In all of the warm-up and matching task trials, one drawing (i.e. the sample) was mounted on the mini-lectern with two alternative drawings placed side by side in front of the mini-lectern in direct view of the participants.

RESULTS

Participants’ Selections

A point was scored for each selection of the alternative that represented the higher-order property as defined by the first three stages of Parsons’ (1987) account. Thus, in the colour/metaphor and subject matter/metaphor contrasts, a point was scored for the selection of the alternative that had been designated the metaphor match. In the colour/subject matter contrast, a point was scored for each subject matter match. When all matching trials had been scored, each participant had a score of between 0 and 4 for each of the three contrasts. The means and standard deviations for scores by age and culture for each contrast are shown in Table 1. In order to highlight the focus of interest in the respective properties by age, the total number of selections by property type and by age combined for culture was calculated. The percentage responses for each property by age are presented in Fig. 2.

A two-way ANOVA examined the effects of age and culture on performance in each contrast. With respect to the colour/subject matter contrast, there was a main effect for age \([F(3,192)=29.09, P < .001, MS_{age} = 40.47]\). The Tukey post-hoc test revealed that 7-year-olds, 10-year-olds, and adults matched on subject matter more than the 4-year-olds. Thus, the shift from matching on colour to subject matter occurred between 4 and 7
TABLE 1
Means and Standard Deviations of Responses in Three Contrasts by Age and Culture

<table>
<thead>
<tr>
<th></th>
<th>4-year-olds</th>
<th>7-year-olds</th>
<th>10-year-olds</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour/Subject Matter</td>
<td>Mean</td>
<td>1.40</td>
<td>1.40</td>
<td>2.65</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.19</td>
<td>1.54</td>
<td>1.39</td>
</tr>
<tr>
<td>Colour/Metaphor</td>
<td>Mean</td>
<td>0.40</td>
<td>0.23</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.88</td>
<td>0.77</td>
<td>0.97</td>
</tr>
<tr>
<td>Subject Matter/Metaphor</td>
<td>Mean</td>
<td>0.90</td>
<td>1.37</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.12</td>
<td>1.27</td>
<td>0.82</td>
</tr>
</tbody>
</table>

years of age. There was no main effect for culture or interaction of culture with age.

With respect to the colour/metaphor contrast, there was a main effect for age \(F(3,192)=39.21, P < .001, MS_{age} = 61.10\) and culture \(F(1,192)=12.85, P < .001, MS_{culture} = 20.02\). The significant interaction between culture and age at the 5% level \(F(3,192)=2.66, P = .05, MS_{interaction} = 4.14\) revealed that the age-related shift towards matching on metaphor was more pronounced in the Chinese participants.

With respect to the subject matter/metaphor contrast, there was a main effect for age \(F(3,192)=14.01, P < .001, MS_{age} = 21.17\). A Tukey test revealed that the 10-year-olds and adults matched on metaphor more than the 4- and 7-year-olds did. There was also a main effect for culture \(F(1,192)=30.73, P < .001, MS_{culture} = 46.42\). Chinese participants across all ages matched on metaphor more frequently than their British counterparts did.

To conclude, there was an age-related progression from matching on colour to subject matter and then to metaphor. In addition, the Chinese participants matched on metaphor more frequently, and at an earlier age, than their British counterparts did.

Participants’ Justifications

Participants’ verbal justifications for their selections in the three contrasts were examined to check that the reported basis of each match corresponded with the designated property of the selected alternative (e.g. that explanations based on colour accompanied selections of colour alternatives). Justifications were categorised as either those that stated one of the three properties of interest to this paper (colour, subject matter, and metaphor), or other criteria such as style, personal preference, etc. A
justification was categorised as colour if reference was made to a perceived identical colour of the matched drawings (e.g. "both are blue"). A justification was categorised as subject matter if reference was made to a perceived category of object represented in the two matched drawings (e.g.
“both are chairs”). A justification was categorised as metaphor if reference was made to the depreciation or expression of mood in the two matched drawings (e.g. “the sock is old and the table broken”; “both are depressing”). All participants made only one category response for each trial.

Inspection of the justifications from both the British and Chinese participants revealed that drawings were predominantly matched on the property represented in the selected alternative. With respect to the British participants, 97% (309 out of 320) of comments concerned criteria that directly related to the property of the selected drawing in the colour/subject matter trials, 89% (284 out of 320) in the colour/metaphor trials, and 81% (259 out of 320) in the subject matter/metaphor trials. The justifications reported by the Chinese participants showed an even higher correspondence: 95% (456 out of 480) in the colour/subject matter trials, 99% (475 out of 480) in the colour/metaphor trials, and 95% (454 out of 480) in the subject matter/metaphor trials. The lower percentage of “related” justifications in the subject matter/metaphor contrast given by the British participants was due to 40% of the 4-year-olds providing justifications based on a perceived similarity of the colour white. As all the drawings in those trials were black and white and therefore could not be uniquely matched on colour, this finding suggests that the youngest children had a strong interest in colour (which was consistent with their selections in trials where colour was an alternative).

Further analysis of the related justifications to the selections of the metaphor items was carried out to examine the proportion of mood-based comments. Unfortunately, due to experimenter error, this further categorisation was only possible for the Chinese sample. A justification was categorised as “mood” if a mood term was mentioned (e.g. sad, depressing, dull, etc.). A justification was categorised under “depreciation” if a link between the two types of depreciation (e.g. old, broken, torn, closed, dying, etc.) in the matched metaphor items was commented upon. All participants reported justifications that fell into only one of these two categories. The percentage of mood-based justifications out of the total number of justifications (i.e. mood and depreciation combined) for each age group in the Chinese sample was 16% (4-year-olds), 42% (7-year-olds), 37% (10-year-olds), and 65% (adults). Although it was not possible to quantify precisely the proportion of mood-based justifications for the British justifications, it was possible to verify that the vast majority of children aged 10 years old and under commented upon the depreciation of chosen items. It can tentatively be suggested, therefore, that the Chinese were more likely than the British to have matched the metaphor items on a mood basis.
FOCUS OF INTEREST IN PICTURES

DISCUSSION

The present study found that British and Chinese 4-year-olds selected colour as a basis of matching to a sample picture significantly more often than did older children and adults (cf. Parsons, 1987). Compared to both subject matter and metaphor, colour is a simple feature to attend to due to its immediate sensory appeal. A preoccupation with colour, however, need not mean that other properties are not recognised. For instance, from 5 years of age children respond with the same mood labels as adults do to abstract paintings depicting coloured nonrepresentational shapes (Blank, Massey, Gardner, & Winner, 1984; Jolley & Thomas, 1994). In addition, when attention is directed away from subject matter, preschool children can recognise mood (Jolley & Thomas, 1995) and style (Steinberg & DeLoache, 1986) in line drawings.

The shift from matching on colour to matching on subject matter was most prominent between the 4- and 7-year-olds in both cultures. The preoccupation with subject matter among 7-year-olds was confirmed by their responses where metaphor was the alternative match. In these trials, both the Chinese and British 7-year-olds selected the subject matter match more frequently than either the 10-year-olds or the 4-year-olds did. This performance of the 7-year-olds on the metaphor trials may not only reflect their preoccupation with subject matter, but also their views on how that subject matter should be depicted. Parsons (1987) argues that children of this age often hold that beautiful subject matter is important for pictures; an attitude that may have led the 7-year-olds in the present study to match items represented in an intact state.

The present finding of an age-related difference in focus of interest in colour and subject matter provides statistical support from a behavioural task for conclusions previously based only on descriptions of verbal responses (e.g. Machotka, 1966; Parsons, 1987). Indeed, the similarity of the results is striking when one considers that they are based on stimuli varying from paintings to line drawings.

The current study also found a subsequent shift to matching on metaphor. Despite the shift away from matching on the literal properties of the drawings, most British participants selected the metaphor match on less than 50% of the trials where metaphor was an alternative. In contrast, the Chinese participants selected the metaphor match to a much greater extent. This culturally related difference could be due to a number of factors. One possibility is that the nonfunctionality of some of the depreciated items was more salient for the economically less fortunate Chinese than for the British, and that “metaphor” matches were in fact selected on this basis (i.e. a literal link). It should be noted, however, that only some of the metaphor items presented subject matter in a nonusable state, and on many trials unusable
items were paired with depreciated but still usable objects. Furthermore, there is no independent evidence that the Chinese do in fact place more emphasis on the usability of materials, and then that this emphasis translated to pairing the nonfunctionality items. For instance, it is conceivable that the greater commercialism and materialism seen in Western countries could also result in British participants focusing on the state of materials. Finally, if the Chinese were matching the metaphor items on usability then we would expect the justifications to reflect this. The Chinese were more likely, however, to provide a mood term in their justifications than the British participants were. Thus, it seems unlikely that “metaphor” selections were based on functionality.

One further test of this possibility could be to examine whether the present findings can be replicated using more abstract stimuli for the metaphor items. Certainly, children as young as 5 years of age can read some moods expressed through abstract art (Blank et al., 1984; Jolley & Thomas, 1994), and hence this form of pictorial material would be appropriate to test young children’s focus of interest in visual metaphors (see later discussion on the importance of knowledge-based material). Although the present findings of a shift of focus from colour to subject matter paralleled that reported in studies using fine art stimuli, it is quite possible that a shift to focusing on metaphor may be more dependent on the stimuli employed. For instance, the visually realistic style of the pictures used in the present study may have cued the adults into a cognitive set of focusing on subject matter. Caricatures, as presented in many comic strips, might be less likely to cue such a cognitive set. It would be inappropriate, therefore, to draw too many conclusions from responses to one specific style of art. Indeed, Parsons (1987) was criticised for developing a general stage theory of art appreciation on the basis of only a narrow range of fine art (e.g. see Dixon, 1989; Freeman, 1991; Mayes, 1989).

A further issue on how the presentation of the metaphor items might have affected performance is that in each case a negative mood was expressed. As stated earlier, Parsons (1987) claimed that children (and perhaps adults) are prejudiced against paintings expressing negative themes, and a similar claim has been made by Winner and Gardner (1988) to reflect the understanding of art amongst the Chinese. Indeed, Jolley and Thomas (1995) reported that British 5- to 8-year-olds did not select a drooping tree/flower (the same stimulus as shown in Fig. 1) to complete a depressing scene of a shop (also used in this study), instead choosing to select a version of the tree/flower in bloom. The justifications these children gave indicated strongly that they had rejected the sad version of the tree/flower outright because the plants had lost their leaves. Furthermore, this response was not prevalent among Chinese children (Jolley, Zhi, & Thomas, 1998). One might argue, therefore, that the differences in performance between the British and Chinese
children in the present study could be due to a prejudiced view against pictures of negative themes held by the British children. However, not one participant dismissed the metaphor items in any of the justifications. This may be because the alternative drawing was an appropriate match (not so in the papers published by Jolley & Thomas, 1995, and Jolley et al., 1998) and therefore a dismissal of the depreciated item was not required. Hence, although there is no evidence in the present study that participants rejected the metaphor items because of prejudice, it is possible that a focus of interest in metaphor develops earlier for positively charged scenes than for negatively charged ones.

Children’s knowledge of the metaphor items clearly has notable implications for the likelihood of such items being selected. As stated earlier, the extent to which children know the material used in analogical reasoning tasks has been shown to represent an important predictor of their performance (for a review, see Goswami, 1991). Indeed, Vosniadou (1989) argued that it is not analogical reasoning that develops, but the knowledge of the domains used in analogical problems. Although pilot work to the present study established that the subject matter of the stimuli was highly familiar to the 4-year-olds tested, the depreciation represented in a small minority of the metaphor items was not consistently mentioned. However, the implications of any unfamiliarity with the materials on the selections made on the main task were only likely to apply to the 4-year-olds and would not be far-reaching even for the performance of these children. Inspection of the metaphor trials in the selection task that did include items where the depreciation had been consistently commented upon in the pilot study revealed that the 4-year-olds in the selection task still preferred the alternative match. Hence, the low number of metaphor selections seen among the three age groups represented by these children is likely to be due to their interest on colour and subject matter, and not to any inability to see the relation between the metaphor items. Nevertheless, future research could usefully examine the influence of domain knowledge on children’s ability to recognise a metaphoric link between pictures.

Research on analogical reasoning is also relevant to the present study because the processes involved in understanding analogy are likely to be similar to those in understanding metaphor. In the traditional analogical task (a:b::c:d), the relation between “a” and “b” (base) has to be recognised and applied to “c” in order to arrive at “d” (target). In a picture version of this task employed by Goswami and Brown (1989), the link within the base was presented between two pictures (e.g. of playdoh and cut playdoh), and needed to be recognised and transferred to another picture (e.g. apple) so that the appropriate target picture could be selected (i.e. cut apple). In the task described in the present study, however, the within relationship for both the base and target are presented in one picture in each
case. Ascertaining whether such a presentation helps or hinders recognition of the within comparison needs to be tested empirically. In any event, the type of metaphor employed is likely to affect performance. According to Gentner (1988), young children can understand only attributive metaphors that are based on surface similarities (e.g. “soapsuds are whipped cream”), whereas older children can also understand metaphors based on relational reasoning (e.g. “A cloud is a sponge”). The distinction is similar to the classification described by Kogan et al. (1980) referred to earlier (perceptual, conceptual, physiognomic-affective). Although the depreciation in most of trials reported in the present study represented an abstract link (e.g. torn book and a bent bicycle), the devices used in a few instances were perceptually similar (e.g. smashed telephone box and cracked vase). There are clearly parallels between the developmental shift described by Gentner and the shift in focus of interest from surface features (e.g. colour) to thematic links (e.g. metaphor) reported in the present study, and a similar developmental shift may also apply to the development of understanding different types of metaphor expressed in pictures.

The differences in performance of the British and Chinese participants are now discussed in the light of educational factors. The minority interest in metaphorical expression among older age groups in the British sample is typically reflected in the verbal responses of Westerners to Western works of art (e.g. Machotka, 1966; Parsons, 1987). The implication of findings from research carried out by Housen (1983) and Parsons (1987) is that experience with art is the most important factor determining where we end up in our appreciation of art, and the adults in the present study had not specialised in art beyond their school education. The frequent matching on expression made by the Chinese children and adults compared to their British counterparts, however, is particularly surprising in the light of claims made by Parsons (1987) and Winner (1989) that the Chinese may focus only on the literal properties of pictures.

Inspection of the art syllabus in the Chinese publication, Educational outline of infant schools (Education Department, 1981), reveals a programme of formal art training beginning at a comparatively early age for Chinese children (3 years). From this age, not only are they taught how a wide variety of shapes can produce different images, but also to consider how objects can be depicted in different ways (e.g. profiles, movement) and by different materials (e.g. pencil, crayon, oil paint, clay). Consideration given to the different ways in which objects can be depicted may be part of an eclectic approach in the training Chinese children receive in other disciplines. For instance, Chinese children are discouraged from making impulsive declarations, but encouraged to think about a problem from different viewpoints before they speak (“think thrice before you speak” is a common adage in China). Such training may transfer to their approach to
FOCUS OF INTEREST IN PICTURES

pictures in such a way that they are not satisfied by an immediate recognition of the literal properties of colour and subject matter (as is often the case with British children), but search instead for other messages, perhaps metaphorical, that are expressed in the picture. In any event, it is generally accepted that a greater emphasis is applied to technique in the Chinese art programme to that normally provided in Western art education. Consequently, a higher level of attention to detail is required which will be further encouraged by learning the complex nature of Chinese characters. For instance, compared to the British alphabet consisting of only 52 characters (including capitals), there are over 7000 common Chinese characters of which normal Chinese 7-year-olds are expected to have learned over 700 (Wong & Kao, 1991). This early and intense training that Chinese children receive in attending to detail may assist them in reading metaphoric devices (such as depreciation) in pictures.

Despite the aforementioned differences in performance, the present study revealed a similar progression from focusing on surface characteristics to an interpretation of surface features as a representation. A similar development has been noted in the production of symbols in drawings (e.g. see Lowenfeld & Brittain, 1975; Luquet, 1913). Although recognition of the representational nature of pictures may be a cultural-universal (see Hagen & Jones, 1978, Sigel, 1978, for reviews), the shift of focus of interest from surface features, such as colour, to subject matter is likely to reflect the expectations of parents and teachers across the world that, as children develop their experience of pictures, they should consider pictures as representations of reality. Thus, education is likely to play an important role in developing pictorial understanding. Indeed, Goldsmith and Feldman (1988) argue that aesthetic judgement in general is an example of a nonuniversal developmental domain.

One implication of the shift in focus from surface features to subject matter is whether this shift in interpretation is a reflection of the development of understanding of symbol systems in general. This question is part of the wider issue of whether there are general rules relating to understanding all symbol systems (e.g. drawing, music, language, play, etc.), or psychological processes that are specific to a particular symbol system (see Gardner & Wolf, 1987). Although the current trend is to examine processes peculiar to particular domains, the shift in interpretation of surface characteristics in pictures may be symptomatic of a general approach to symbol systems. For example, babbling may be regarded as using the surface features of language, whereas vocalising sounds in words and sentences to convey meaning reflects the representational nature of language. Furthermore, it has been suggested (e.g. Matter & Davis, 1975) that children intentionally use metaphorical language after a stage of highly literal linguistic behaviour. Thus, the age-related shift of focus on pictorial
properties reported in the present study may reflect a more general development of cognitive understanding across symbol systems.

To return to the main finding of the study, the Chinese children and adults were more likely than the British participants to match the drawings on visual metaphors. The children from both samples were in mainstream education and therefore the finding cannot be explained by any specialised attention to art training for the Chinese group. Similarly, none of the adults was majoring in art. Indeed, the degree subjects in the Chinese sample tended to be biased more towards business and science disciplines. In addition, the relatively superior performance of the whole Chinese sample cannot be easily explained by socioeconomic class as any absolute difference in socioeconomic status should have favoured the performance of the British group. Furthermore, the frequency with which the Chinese reported mood terms in their justifications for the metaphor selections questions the possibility that these selections merely reflected a hypothesised preoccupation with functionality of materials. Instead, it is suggested that the differences between the respective art programmes in the two societies best accounts for the reported difference in developing a focused interest in pictorial metaphors.

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REFERENCES


Education Department, The Republic of China (1981). Educational outline of infant schools. The People’s Education Publisher.


# APPENDIX

## Items Used in the Matching Task

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>ALT (1) COLOUR</th>
<th>ALT (2) SUB. MAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Lamp</td>
<td>Red Coat</td>
<td>Blue Lamp</td>
</tr>
<tr>
<td>Yellow Telephone</td>
<td>Yellow Banana</td>
<td>Brown Telephone</td>
</tr>
<tr>
<td>Grey Desk</td>
<td>Grey Saucepan</td>
<td>Black Desk</td>
</tr>
<tr>
<td>Green Door</td>
<td>Green Dustbin</td>
<td>Orange Door</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>ALT (1) SUB. MAT.</th>
<th>ALT (2) METAPHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Broken) Chair</td>
<td>(Intact) Chair</td>
<td>(Dead) Tree/Flower</td>
</tr>
<tr>
<td>(Torn) Settee</td>
<td>(New) Settee</td>
<td>(Broken) Racquet</td>
</tr>
<tr>
<td>(Cracked) Mirror</td>
<td>(Intact) Mirror</td>
<td>(Closed) Shop</td>
</tr>
<tr>
<td>(Tatty) Rug</td>
<td>(New) Rug</td>
<td>(Dirty) Leg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>ALT (1) COLOUR</th>
<th>ALT (2) METAPHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown (Torn) Book</td>
<td>Brown Car</td>
<td>Yellow (Broken) Bicycle</td>
</tr>
<tr>
<td>Red (Smashed) Tel. Box</td>
<td>Red Cup</td>
<td>Blue (Broken) Vase</td>
</tr>
<tr>
<td>Green (Torn) Shirt</td>
<td>Green Stool</td>
<td>Black (Broken) Table</td>
</tr>
<tr>
<td>Orange (Unmade) Bed</td>
<td>Orange (i.e. Fruit)</td>
<td>Green (Bad) Apple</td>
</tr>
</tbody>
</table>