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Children's developing beliefs about art as a basis for sequencing
in art education.

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Abstract: This paper advances a developmental foundation for sequencing content in critical evaluation in visual arts education. This foundation is based on differences in representational autonomy mapped between children in the primary school years and early adolescence. The notion of representational autonomy in the visual arts is characterised as the varying degree to which, in the evaluation of art works children between these ages are able to conceptualise as transparent, an opaque referential relation between pictures and the subject matter they depict.

In conjunction with Perner's theory of meta-representation (where "opacity" is conceived as the faculty of a person to re-register understanding within the constraints of an alternative representational perspective, or theory of mind) children's responses to questions, based on six opaque referential relations amongst entities entailed in the critical evaluation of art, revealed a conceptual re-organisation whereby an understanding of the causal role of an artist's agency was integrated into pictorial reasoning, somewhere around the middle of the primary school years. However, even by the end of those years, an understanding of the beholder's (picture spectator's) mind remained largely unintegrated into children's reasoning.

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Daniella Sanger of the Department of Psychology at the University of Bristol was instrumental in the collection of data and acted as one of the judges.

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Significance of the Project.

The proposal seeks empirical support for the controversial view, that art is composed of real entities the making and appreciation of which is dependent upon networks of explanatory belief. Because of its emphasis upon explanatory accounts of an extant art world, the proposal signifies a shift in the psychology of art from a structural to an intentional theory of mind. From a more practical perspective, the proposal anticipates a relaxation of the traditional nexus in Anglo Saxon psychology between descriptions of artistic and scientific cognition. Any relaxation in this nexus has practical and political utility for art education since, without sacrificing sensitive precepts of imagination and creativity, it offers a reduction in the isolation of art from more general diagnostic, sequencing, and communicative functions in education.

Background to the Problem

The topic is 'metarepresentation'. Following Perner (1988-91) we know that school age children build stored representations about representations itself. Without this metarepresentational faculty the perception of reality, which includes the perception of art, could not be brought into descriptive and evaluative consideration (Freeman 1991). Indeed the fanciful and figurative properties of objects are made coherent as a potential of metarepresentation (Leslie 1988). However, the function of metarepresentation in visual arts research has been neglected

(Freeman 1990, Brown 1991).

Children are never without a critical stance in art, albeit a lay rather than an informed stance (Freeman 1991 and Brown 1989). Children's metarepresentation of objects as art, that is their deployment of a theory of art, is dormant but existent. This dramatic state of affairs has received little attention from researchers largely because of presuppositions researchers have held about art and the methodologies these implied (Brown 1989). Researchers into the cognition of art have typically placed respondents in a passive position in relation to the way information about artistic understanding is elicited. In Perkins (1979), for example, children are asked to make critical remarks about poems. However, it is Perkins who converts children's remarks into values which he interprets within a theory of art. Parsons (1987) also contracts children and adults to talk about art but like Perkins, interprets the nature of children's understanding of art through inferences he makes about art on their behalf. There is further work to be done.

Perner's Theory of Representation

The focus is on knowledge representation in art. The aim is to chart the acquisition of knowledge about art as a body of representation, that is how children and adults set up stored representations about artistic representation itself, often referred to as 'metarepresentation' (Perner 1991, Leslie 1988). As the child begins to distinguish between representations of the world (either as the beliefs of others, or as depictions) and the world itself, she comes to see that the conditions of a representation are not simply determined by the truth of the state of affairs being represented. This intransitive property of representations is often explained more effectively as misrepresentation (Dennett 1987). The grasp of misrepresentation

is an implicit metaphysical realisation that knowledge bears an opaque rather than a transparent relation to the world. It is the dawning of the idea that the existence of a misrepresentation is not automatically an untrue or counterfactual account of any state of affairs. It may, in other words turn out to be an untrue account of the world but an account which is never-the-less believed to be true or a "mis-represented" state of affairs (Perner 1988: 144). With a development in the tendency for knowledge to be seen by the child as part of a person's belief, rather than as a projection of reality comes a parallel growth in cognitive autonomy.

Implications for Previous Research

Parsons' Work

Parsons' (1987) work is the most significant recent attempt to show how people come to understand art. From Parsons we glean the insight that when shown a good painting of an ugly thing, 9 year old children tend to express a low opinion of it. Such an opinion brings into conjunction values used for the appraisal of pictures, with values that are used for the appraisal of things pictures depict. We learn that young children like beautiful things and thus representationally 'transparent' pictures of them. Changes in responses from 5 year olds to 7 year olds are interpreted by Parsons in terms of changes in the objectivity of references they make to art works. Parsons does not ask the question 'can an ugly thing make a beautiful picture?' because it does not comply with his presuppositions about the way artworks are interrogated in the first instance. The difference is crucial for teachers. For although Parsons detects sea changes in children's reasoning their explanations are inferred from his Platonic and neo Platonic insights. It does not occur to Parsons that the conflation of the two above mentioned values is the result of limitations in the causal relations entailed within a child's theory of art. This is most likely because in Parsons' inquiry children are only asked to respond to pictures not to explain them. Why is this?

Despite his desire for detachment Parsons' ontological presuppositions constrain his notion of artistic cognition and choice of methodology. His choice of questions reflects a general assumption of aesthetic 'immediacy' and 'personal viewpoint' about the way in which facts, descriptions and values in art are made accessible to understanding. None of his questions presuppose a net of underlying explanation. They are mostly presented as "what?" questions (1987: 19). Questions represent an extension to art of Baldwin's (1906) cognitive development account of aesthetic experience, a belief in the self evidence of the aesthetic, and that responses to questions about art are appropriately non-inferential and tacit in origin. For this reason Parsons' cognitive explanation for each answer and his grouping of explanations into stages, tend to be taken as an intentional inference made on children's behalf.

Parsons' retrospective application of a 'stage' analysis to his data commits the inductive fallacy. The reasons why a particular description of a picture is classified as "expressive" in "Stage Three" cannot be induced by the researcher simply from the context in which it was given (Goodman 1968, Wittgenstein 1952). That his "Stage Two" characterisations of the things 7 to 9 year

olds prefer in art works conform to characterisations in earlier studies (such as Lowenfeld's (1953) stage of "dawning realism") is reassuring, but begs explanation. We do not learn the reason for variations in response amongst stages because Parsons recruits his stages to fit the data. Part of the gap that Parsons set out to fill still remains.

Artistic Understanding and Artistic Intelligence

Our view is that thought about art entails ontological positioning by the child (Feldman 1987). This positioning can only be mapped when there is as little prospective or retrospective confounding of answers as possible by the researcher. In this respect we find difficulty with the two most influential extant constructs of artistic intelligence those of Clark and Zimmerman (1982), and Gardner (1983).

Clark and Zimmerman's construct of 'talent' and giftedness in art is expressed as a normally distributed induction modelled on Terman's construct of I.Q. The difficulty with this model is that it begs a theory of mind, and thus an intentional explanation of artistic cognition. Gardner's theory of multiple intelligences is advanced within a structuralist theory of mind but his structuralist presuppositions beg an explanation of art in children's terms. Beliefs about art are circumscribed by Gardner's structural account of the way art represents.

In general these two constructs conflate taxonomies for individuating the nature of art with those for the nature of thought about art (Brown 1989b).

Why there is a problem of pictorial competence?

Concept maps for science are based on the premise that people make objective discoveries about pictures about the real world. What discoveries can be made about pictures as a distinct class of objects? The pictorial discovery singled out by Schier (1986) as the foundation of a competence account, is that a picture can trigger (a) a recognition of a referent at the same time as (b) a recognition that the picture has properties that simply cannot be found in the referent. For example, an outline drawing of a buttercup done in red pencil does not induce the misconception that it is necessarily true that a real buttercup has a heavy

line round the petals and a red pin-stripe down its stem. From here on we shall use the term 'depiction' to label the relation between picture and referent where natural recognitions of referents are triggered.

A depiction relation may well appear experientially transparent -
- "I saw it was a dandelion in the picture at first glance, it's
got it to the life" - - but a relation in which one of the
relations cannot be committal about all the referent properties
is necessarily opaque. That follows from the fact that a picture
of, say, an ice cream is not a sort of ice cream, but a token of
a different type. there are ice cream properties that a picture
cannot have (e.g. 3-Dness), referent-resemblances that may or may
not appear (e.g. in a charcoal drawing of a rainbow), and
pictorial properties that may be entirely fictional (like lines
in an instantly-recognisable caricature). In short, one cannot
predict precisely how a novel picture will trigger a recognition
of its referent, because a picture does not sample reality
(Goodman, 1968), but is used to represent reality. A picture is
thus 'tied' to its referent by all the constraints that govern
the 'representing relation' (see Perner, 1991) without
transporting the properties of the referent into itself.

We will argue that the problem of pictorial opacity has to be
solved more than once in the acquisition of a theory of
depiction, and that the process takes many years. At a basic
level, preschoolers come to understand that a picture of a crayon
will not tear if the crayon becomes broken, and that the process
takes many years. At a basic level, preschoolers come to
understand that a picture of a crayon will not tear if the crayon
becomes broken, and that tearing the picture will not break the
crayon (Beilin and Pearlman, 1991) a grasp of non-transportation
of a physical property bi directionally between picture (P) and
world (W).

Parsons' (1987) work suggests that 'Stage 1' understanding is
private rather than public, in the following respect. A child
might explain a liking for a picture of a dog because 'We've got
a dog and its name is Toby' (Parsons, 1987:22) even without
depiction of Toby as an individual or even of that breed of dog.
The child's criterion could be formulated as one where the
picture was the occasion of being pleased by a pleasant thought
of something in the world, so that was sufficient condition for
judging the picture itself to be good. Above age 4 years or so,
children progressively apply more publicly objective judgements,
first by demanding that a specific referent be recognisable and
then by demanding that it be clear how the picture maps onto the
referent (eg by linear perspective) -- see Feinberg (1987),
Golomb (1992), Taunton (1980).

There is wide agreement that some time around 8 or 9 years of
age, children's judgements of pictures comes to be dominated by
criteria of 'realism' (Golomb, 1992; Winner, 1982). 'Realism'
here denotes that children will judge a picture to be good
according to how veridically the referent is depicted (e.g.

colour-matching, details, size-distance scaling). It is possible that children come to focus their pictorial conceptions on just one of the functions of pictures, namely to secure a recognition of a referent (see Schier, 1986, for a functional account). The price to be paid is that 'to see only why a picture represents is to fail to perceive the picture as a work of art' (Winner, 1982:129) to fail to accord 'style' a place in judgement, for example, or the aims of a school of artists. It has been suggested that it is feasible to undertake experimental testing of the 'theory of pictures' that might underlie the realism bias (Freeman, 1991) by setting children intellectual problems to

solve about pictures in general, rather than eliciting explanations of their direct experience (usually liking/disliking) of particular pictures.

Such problems have to be set in terms which go beyond the basic dyad of picture-referent. At the most basic level, one can ask for children's views of facts about agents (artists) who produce pictures, or beholders who make use of the pictures. For example, in the pilot phase of the experiment reported below we asked 24 children (12 aged 11 years and 12 aged 14 years in a Sunday art class in Anguilla) whether artists get ideas from other artists. If children have a conception of public pictorial ideas used by agents of picture production, why do they apparently not consult that conception when judging pictures, instead of merely focusing on the referent-properties? To answer such a question, one can directly ask children about causal relations: a property can be predicated of an artist and a question asked about the consequences for the picture. Thus, if an artist does not like a referent, will that cause her to paint a bad picture? All bar one (an older child) in the pilot sample answered in the affirmative. Further, one can ask children whether they are prepared to make inferences between picture and artist. Thus, do children think that artists project their emotions into pictures such that an untutored beholder of the picture can detect the emotion? Only 11/24 pilot children gave an affirmative answer when asked whether they could tell anything about an artist from a picture, but this rose to 20/24 when we subsequently narrowed the question to whether the artist felt happy or sad.

Questions about children's conceptions of facts, causal relations, and legitimate inferences, in any domain serve to identify the children's conceptual problem-space of the domain. Clearly, there has to be some constraint on the type of questions asked, so one task is to formulate a map of the basic entities and relations in the domain. Another task is to identify what it is about the basic picture-referent dyad that makes pictorial

judgement seem transparently obvious to children in a way which can allow a realism bias to obscure children's underlying knowledge from their reflective awareness.

In sum, there are discoveries to be made of how pictures depict referents. Such knowledge is focused on the P-W relation, and the value of the knowledge is that the child learns to detect how the craft of depicting can give an experientially transparent effect to an opaque relation. But there are further discoveries to be made about what pictures can do for people beyond giving them a clear view of a referent: pictures invite interpretations. Underlying interpretations are sets of inferences, such as the following, put in question form about primary-school children from Freeman (1991).

The Proposal

Do children believe that someone can draw a picture to make you think or feel in one way or another? That would be a causal-explanatory link between artist's intentionality and spectator reaction. Do children believe that a happy artist will necessarily make a more beautiful picture than a sad artist? That would be a causal-explanatory link from producer to product. Do children understand that someone can intend to make an interesting picture and mistakenly make a dull one? That would be an inference about unfulfilled intentions. The totality of such inferences would characterise the degree of coherence of the child's theory. Clearly, such inferences involve treating depiction as more than a two-term relation between P and W. We

next show how $P > W$ is set within a network of opaque relations, and use the net to yield a constrained set of probes of the child's theory.

We have proposed four entities which we defend as the minimal ontological components of depiction in art. We have configured these four entities into a concept map. This map articulates the entities and is used to plot the ontological geography of children's theory of art. The mapping of children's simplest responses to questions about art reveals their systematic recursion to the four entities. It is how children fill these entities with properties, as well as regularities in the way these properties qualify children's causal and logical reasoning amongst the entities themselves, which characterises the nature of a children's theory of art. By means of the map we adduce that from quite early on children make untutored, critical inferences about pictures which they base on a rudimentary theory about art. We have characterised this earliest appearance of theory as 'naive realism' (Freeman 1991). It is hypothesised that

differences in the coherence of these recursions amongst 7, and 11 year olds can be registered on our concept map, as shifts of theoretical autonomy in the critical understanding of art. These differences model the nature of cognitive readiness in the visual arts.

Methods and Materials

A Concept Map of Pictorial Competence

Representation has been identified as an aspect of intentionality: 'Intentionality is that property of many mental states and events by which they are directed at or about or of objects and states of affairs in the world (Searle, 1983:1) A picture that is directed at a referent is an intentional object, so it seems sensible to refer to the first step in specifying facts about depiction as the construction of an intentional net - the network of intentional relations comprising necessary conditions for depiction to occur.

The map and its entities emerge from our critique of the literature in terms of (a) ontology of the topic of art and its representation and (b) the causal and conditional assumptions that are made. In mapping the acquisition of the understanding of a topic it is essential to distinguish between what entities people consider, what properties they assign to any entity, and what relations they think the entities contract. Our innovation is to ask people to undertake to make conditional inferences about depiction and to use a 'concept map' scheme for diagnosing their patterns of reasoning.

What is the origin of the configuration of the concept map? The map places the art work or in our case the 'PICTURE' into a central position and considers the causal context of art in which a picture might be explained (SEE FIGURE 1). This context is exhaustively represented by the configuration of entities that are derived from answers to the questions:

1. Where does the subject matter for a picture come from?
The WORLD (the genesis of the work)
2. Who created the picture?
The ARTIST (the intention of the work)
3. Who is 'consuming' or observing the picture?
The BEHOLDER (the affect of the work)

These entities P, W, A, B were developed into a map which clearly laid out the network of relations between the picture at the centre, the world, the artist, and the beholder.

The map is a defence against what we demonstrate is the way ontological assumptions about art distort the psychological reality of conclusions drawn by researchers about artistic cognition (Brown 1993). Yet what are our assumptions? The concept map was innovated to accommodate the belief that adults and children already possess a vernacular theory of art. The pressing need is to avoid setting up the empirical work in such a way that it imposes a sophisticated metaphysics on the child (Lakoff 1987: 43).

At the same time, however it was important to avoid producing an instrument that was seen to be acceptable for the most basic level but discredited for its lack of applicability to the mapping of more esoteric levels of theory. To test this we have plotted on the map three widely canvassed aesthetic 'fallacies'. These fallacies prove to be collateral with the logical and causal implications of our entities 'W', 'A', and 'B' for 'P', the PICTURE (Beardsley 1981). The fallacies are an adducent to the relevance (or irrelevance) of an aesthetic judgement by their systematic way of analysing the influences external to the art work. We can show, however, that ontological presuppositions about P prefigure the causal and logical relations on the concept map. These ontic presuppositions may be established either as the result of limitations in representational development ("naive realism") or as autonomous stipulation as represented by Beardsley's aesthetic phenomenalism.

The potential of the map to mediate between lay and authoritative discourses of art extends the opportunity for mapping disjunctions between students, teachers, and the discourses which are both implicit and explicit in their reasoning about art. For example, teachers and students may agree superficially about questions of value in relation to a particular art work (I like the work) but differ in the way that they model its justification. Although values may be shared the basis for explanation and thus the tutorial conditions related to their understandings may be at odds.

Limitations of the Concept Map

It is acknowledged that the intentional net represented by the concept map is too simple for use uninterpreted. One must accept for example, that while each of the individual entities in the

map are expressed as elements of an intentional net, they are themselves composed out of an overlapping net of components from other realms. This enables the empirical possibility of children transporting intentional properties of entities into the map from competing belief systems. For example, a child's notional net of the artist as "a person within the community" may, with appropriate questioning, block beliefs she has derived from a net based on the relation between "artists and their paintings".

The Deployment of the Concept Map

The map satisfies our methodological need to provide children with an opportunity to register their explanations about the nature of art. When it comes to the analysis of children's responses any interpretations we advance should be confined to the inferences they rather than we make on their behalf.

Let us view the domain of the pictorial 'P' as an empty box. It is a box the child starts by knowing nothing about, gradually begins to fill with pictorial properties, and holds in place within a scheme of things which can be expressed in the pictorial relations amongst the entities:- Picture (P) World (W) Artist (A) Beholder (B).

Revisiting our metarepresentational intention we bear in mind from Perner (1988 p.145) that the progress of representational development anticipates a movement which proceeds from (a) the perception (causal "presentation") of objects (which entails their semantic mapping into knowledge), (b) to reality as a representation of knowledge, (c) to the metarepresentation of representation itself. These levels of representational development largely correspond in art criticism with the representation of fact, descriptions, and the making of value distinctions. We refer to this representational hierarchy as a critical or "C stance".

The C stance is taken whenever, as in this study respondents are asked to contract their knowledge of the domain of art in order to make inferences, or whenever resolving the way to go on in circumstances where artistic progress is blocked by the opacity of the representational relation. Traditionally, that has been the role of the critic. The guiding conception of the research report below is that much of the previous research has been confounded by first-person considerations (e.g. asking children to explain what they think of a particular picture on the table - a B-stance method), whereas a third-person stance, and C-stance, is typical of investigations of knowledge structures in scientific domains.

How does the child attribute properties to the representation of

reality at level (b)? Presumably by recruiting from perception at level (a). It is well to remember here that recruitment for representation is intransitive. Thus a perception once recruited takes on different properties to those it possessed prior to representation. Transposing onto our concept map first the child, as predicted by "naive realism", attributes properties to the picture P by projection that is, by direct correspondence with what the picture depicts (W). Latter, at level (c), properties are attributed more autonomously by means of metarepresentation . At level (c) the child makes use of a representational analysis which might be expressed, for example, in the relation $W>A>P$ on the map, where the properties of the artist A are represented as

an explanation of the depicting relation $W>P$. In this case a theory of the artist (as a component in a theory of art) is recruited as a warranting principle which justifies the drawing of inferences between the grounds W and the claim P (Toulmin 1979).

How do we put the map to work to gain evidence of the child's representational account of pictures? We invite the child to make and judge inferences about properties and relations, in an orderly manner, from a "birds eye view" of the map. In other words we can avoid as much as possible what we have criticised as the 'B > P assumption', the 'passive' point of view assumed by researchers in the questions they have tended to use when inviting people to talk about art. The basic question to answer is what properties the child transports into the 'empty box' from properties predicted of A, B and W, by virtue of the different relations that P contracts with the three entities. One looks for illegal transportations (eg. a misconception that in order to paint beautiful pictures of beautiful people, the artist himself must look beautiful). In addition, one looks for justifications which go beyond the terms posed in a question (eg. and an answer that spontaneously referred to a causal role for A in response to a question that mentioned only $P > W$); explanatory recruitments can be viewed as a sign of an underlying generative theory.

Characterising the Concept Map

Pictures are products of human agency (even where mechanical pictures, photographs, are concerned, see Beloff, 1985; Ziller, 1990). A relation of production between agent and product can be labelled on the map as $A > P$. Some causal inferences follow an A-to-P direction, as when an A (Artist) draws exclusively with a red pencil it follows that the picture will be red. But redness is not thereby transportable across $P > W$ (since that red P may be a recognisable depiction of a dandelion). Neither is 'happiness' necessarily transportable, since an A does not need

to be happy in order recognisable to depict someone as being happy. Now imagine that the artist views that particular P a decade later in a gallery: the artist is assuming the stance of a beholder, B, of P; perhaps being in a different state to that in which she drew P. For publicly-recognisable depiction, B may be member of the public other than A, so a B > P link may characterise a relation of usage of the product. There are B>P inferences to be made.

The links between the entities (A, B, W) - to - (P) form the core ontology of the intentional net involved in pictorial understanding, and those three relations -- depiction, production and usage -- are shown as the inner links in Figure 1. The outer bi directional links are made up of A > W (eg. the artist inspecting the world for affordance of referents to depict), B > W (e.g. the beholder's capacity to recognise states of affairs in the world which artists may or may not be able to depict) and A > B (cultural and psychological commonality between artists and the public). Note that just as an A may be a B, as in the previous gallery-exhibition example, so an A may form the W-referent of a depiction (a self-portrait) as may a B (a sitter for a commissioned portrait of herself).

Since the aim is to use the intentional net to probe a theory of depiction, it is necessary initially to constrain considerations to those properties which can, in principle, erroneously be transported over the entire net. The constraint involves identifying the target pictorial properties as those for which A, B and W are all necessary, but individually not sufficient. That serves to characterise a picture as (a) produced by an agent

(thus excluding a pattern on the shore left by tides), (b) accessible for assignment of meaning by a beholder of the same culture as the agent without a caption from A (thus excluding pre-school scribbles), and (c) having a non-fictional referent (thus excluding abstract art and unicorns). Inferences about the target class of pictures can be elicited from children by questioning them about (a) pictures they have just produced (i.e. getting them to adopt an A-stance) or (b) other people's pictures which they view (a B-stance), or (c) pictures in general (a C-stance).

Feinberg (1987) showed 19 pictures to children asking them if they could infer the age of the artist. Thus from a B-stance, the child was invited to make a production-inference. From age 4 years upwards, the primary criterion used by the children to infer an older A was that they could clearly see what the referent was, ie. a P-to-W criterion. As children passed the age of 9 or 10 years, another criterion was how P projected to W, eg.

further trees were drawn smaller. So primary school children are ready to use their knowledge of depiction to make an inference from P to A, using themselves as beholders, whose task they seem to take to be one of detecting $P > W$ relations. The data are congruent with those of Taunton (1980) on children's reasons for liking pictures -- 4 year olds largely based their judgements on what referent was depicted ('likeable'/'unlikeable') then with age there was increasing emphasis on clarity of recognition and fidelity to projection-systems.

In sum, when acting as beholders, primary school children show evidence of concentrating on scene recognition in explaining their liking and inferring something of the artist. It is conceivable that a unified conception of depiction, production, and usage is consolidated in the early primary school years, but C-stance research probing the entire intentional net is, to the best of our knowledge, missing from the literature. There is no reason to believe that children will gain simultaneous insights into all six relations in the intentional net in a stage-like way. What would one expect to be the locus of an advance for primary school in breaking out of using the qualities (e.g. 'likeableness') and recognisability of W in justifying P-judgements? Three sources of evidence that converge on an investigable conceptual problem.

Using the Net Represented by the Map to Interpret Evidence Drawn from Previous Studies

The first source of evidence comes from one of the pilot studies, on 7 year olds, for the present experiment. We simply converted Feinberg's (1987) questions whether the child in B-stance could infer As age, to a general C-stance question, as follows: 'If you see a picture and you want to know something about the artist, is there any way the picture could tell you what she is like?' One child explained that 'you could tell if an artist was bored because then he would rush his work'. That is a good answer in that it involved using one aspect of a P-property to infer a different A-property as causal: the child did not predicate 'bored' of the picture. Yet another child amongst three who also focused on affective state (all of them using the word 'happy') explained that 'if the picture is happy then the artist who made it must have been happy as well'. that seems to be an illegal P-to-A transportation. We also asked the children a question which reversed the order to terms, from A to P, and generalised what was predicated of P: 'will a happy artist make a better picture than a sad artist?' Five of the children said that would happen, and 4/5 used the referring-expression 'happy picture' in giving their justifications, (a use of language which

is supposed only to characterise pre-adolescence -- Matchotka, 1966).

It seems as though the children were showing signs of a unified conception of pictures where affective state is concerned, a misconception that corresponds to a classical fallacy of aesthetics (see Beardsley, 1981). One child answered 'No' to the question on the grounds that 'what is more important is how good the artist is - - a sad artist may make a good picture if he knows how to paint well'. That child was the one who connected 'bored' with 'rushed' production in answer to the first question, showing a conception of A's skill in the production relation from both directions of inference that proofed her against the 'affective fallacy'.

Although the data are only pilot data, there is a suggestion that a disciplined use of the intentional net approach might reveal the age at which the evaluative terminology of aesthetics, terms such as 'good', 'nice'; 'happy', 'beautiful' become differentiated out in a rule-governed manner over the intentional net.

The second source of evidence that converges on the above comes in the form of a testable proposal from Parsons(1987). He argued that once children passed the W-centred conception of properties noted in the previous sections, they progressed to applying the same conception to evaluative terms. Parsons (1987):39-40 suggested that in the eyes of the children 'A painting is best if it is about beautiful things and if it pictures them realistically Beauty is transferred, as it were, from the subject to the painting. And in general a painting will have the qualities of its subject, whatever they are. A painting could not be beautiful if it pictured my old and rusting automobile'. Parsons' inference about the child's unified conception of beauty came from B-stance work whereby children were interviewed about their reactions to a small number of paintings. We adapted the formulation to a C-stance question; and to avoid giving the child the impression we were posing a negation-question by asking whether an ugly thing would yield a beautiful picture, we generalised the P-term to 'Would an ugly thing make a worse picture than a pretty thing?' Five children answered 'Yes' on the grounds that ugly things are always ugly/bad to look at. those answers corroborated Parsons' inference. ;One of the children spontaneously extended his justification to a normative judgement on A: 'A good artist normally likes prettier things'. There is clearly scope for questions about A > W relations. The sixth child was the previously identified who had grasped something of A's agency, but even she evidently now found the question really taxing: 'An ugly thing can make a good picture if it is drawn really, really, really well -- but it needs to be drawn very well'.

The third source of evidence comes from A-stance work in which children produced a picture and were asked 'Is there anything you could do to make it better?' Golomb (1992) concluded that only after age 7 could children normally contemplate revision, grasping that an A-role extends to corrigibility of P. Further, the suggestion was that 'Usually, it is at this point in [children's] development that [they] can consider how [their] work may appear to a non-privileged outsider' (Golomb, 1992:32-3). In other words, from an A-stance an advance occurs both with A-to-P agency and B-to-P evaluation. But two interpretative problems arise. First, the children's answers may have been determined in an uncontrolled way by their opinion of the particular pictures they had been producing. Secondly, one cannot tell if the two are really linked, that is if the children could infer an $A > B$ link on the 'goodness' of a picture. We

probed the link by asking 'When an artist makes a picture, do you think he thinks about how other people will see it while he is actually making the picture?' three of the children explained that A would think about B's evaluation of P because A wants to make the picture look nice for others, one child balanced A against B -- 'he'd probably add a bit to the picture to try and please himself and the others' -- and two rejected B's role -- 'what [A] thinks is more important'; 'he would keep it the same, it's his picture and so it's up to him'. Interestingly, the previously-identified 'production-centred' child was one who said that A would change the picture but gave an instrumental explanation in terms of A's aims as a producer beyond the terms used in the question -- 'because he wants to sell the picture and he can't if no-one likes it'.

In short, the suggestion is that children only gradually come to differentiate out terminology and explanatory attributions over the entities and relations in the intentional net. We suspect that 7 year-olds can avoid obvious transportation errors such as inferring that only ugly people can draw ugly pictures; but we know of no research that would enable one to identify when a C-stance breakthrough occurs such that it would be legitimate to infer that children have an aesthetic theory of depiction. Further probe-tests (Freeman and Sanger, 1992), suggested that a conceptual advance typically occurs around age 9 years or so. The experiment reported below was the outcome of an attempt to satisfy the minimum requirements of the intentional net approach in documenting children's advance. The term 'minimum' is warranted, since a full investigation of all the entities and relations in Figure 1 using all the evacuative terms available will take many years.

Summary

A conceptual-problem space can be constructed by asking children whether they accept inferences and causations, and assessing children's justifications. Children's reasons for regarding judgements as applicable to a domain are indices of their underlying theory of the domain. The minimal conceptual space of depiction involves four entities and six intentional relations which are reverentially opaque. Preliminary data suggest that the intentional net characterises the conceptual problem-space for evaluative predications in primary school. The following experiment used the net to collate the indications cited from Feinberg (1987), Golomb (1992), and Parsons (1987), by casting questions into C-stance format, inviting children to access their reflective awareness of depiction.

Method

Summary of the Methodology:

The method is descriptive. Procedures used divide into three groups:

1. (i) Controlled experimentation in accordance with two methods of data collection each entailing the use of semi-structured interviews. Interviews were composed of a 12-item questionnaire derived systematically from a concept map which is exhaustive of the entities and relations of the visual arts.

(ii) Questions must provide a simple yes/no categorisation for the uninterpreted comparison of groups, and a controlled system of probes to elicit justifications which enable the analysis of reasoning in each answer.

(iii) The analysis of modal justifications given in children's answers for:

(a) the pattern of recruitment amongst entities on a concept map of the visual arts as evidence of the intentional net.

(b) an explication of variations in the quality of reasoning expressed as a measure of representational autonomy, that is the character of age related differences in dependence on the net.

2. Foremost amongst our methods is the application of a concept map of art. In making art, just the manipulation of materials within a context of expressive interests does not address the preconceptions the learner brings to the task. Nor does it explain how critical choices in the making and appreciation of art are resolved, developed, or at any level significant to the child. Researchers in science education such as Cohen (1981), and Nussbaum and Novik (1981) show how the network of beliefs which

children consult in the learning of a subject, is an indicator of the level of autonomy they are able to exercise in understanding and performing the tasks which knowing the subject entails. We can use this insight for the diagnosis of developmental readiness in art.

In order to satisfy our need to give space for the child to show what she has grasped of a pictorial representational relation, the entities of the concept map must be of the highest ontological neutrality. The entities, in other words, are empty boxes waiting to be filled with properties. The map is a model for theoretical coherence and completeness in art. When configured in all its permutations the map provides our basis for the generation, articulation, and interpretation of the questions.

Subjects

There were 24 children used as subjects, in a London primary school serving a middle-class catchment area. All had English as their mother-tongue. Half the children were from the younger end of the school, mean age = 7 yr 8 mo (SD 5 mo) and half from the older end, mean age = 11 yr 3 mo (SD = 2 mo). The art teacher was also interviewed.

The children's background in art was as follows. The younger children had two 35-minute sessions of picture-production per week, plus two outings to a gallery per term. The older children had one session per week alternating between picture-production and studying Van Gogh (drawing his paintings) with an outing to a Van Gogh exhibition. The teacher's statement of aim for both groups was to encourage creativity and appreciate creativity in others '.... to free the children's imaginations, giving them a chance to express themselves in any way they desire.... to observe their environment precisely enough to reproduce it on paper'. Thus the children can be characterised as primarily trained in production, expression, and observation, rather than in critical studies, with the older have had a term of half-time study of one mature artist's style and subject-preferences.

Materials

Materials took the form of a 12 item questionnaire.

Principles for generating and administering questions

Most of the rules for designing the questionnaires relate to those which articulate and

control the extension of the concept map and thus govern the extension of the intentional net of pictorial art. Rules fell into the following groups (a) a balanced reference to all entities and relations on the map (b) questions to be administered in alternate format and alternate order over sample in order to avoid the anticipation of answers (c) terminology was considered, where possible with respect to the quality of demand upon logical space, with care to be taken in distinguishing amongst conditionals, causals, normatives, descriptives, and evaluatives (d) control exercised in relation to the representational relation itself:- its intransitivity, the proportional distribution of representational and non-representational properties in a referent, and the causal conditions of its origination (e) administering tests to those people such as teachers of art who stand with a direct formative influence on each group (f) designing questions and interviewing procedures comprehensible to different age groups, the rephrasing of prompts, and the modality of recording answers.

(i) The provision of a yes/no modality for answering each question enables the administration of low inference inter-group comparisons, tests of significance and related measures.

(ii) (a) Mapping the properties of entities and their relations resorted to by children as a form of inferring 'principle' in their answers. The 'principle' shows up as an entity in its relational setting on our map. While not every entity or relation may be referred to, coherence can still be adduced in terms of our map. Thus we gain a model of children's theoretical coherence on our map. We affirm the findings of Carey (1984), Keil (1989) and others who assert the presence in children of organised explanatory networks of belief.

Content analysis of the entities resorted to by children in arriving at an explanation provides a register of the level of representational coherence in each answer. Expressing the relation $W > P$ on the map might be affirmed by a 7 year old but denied by an 11 year old. The 11 year old recruits properties from the entity 'artist' - A (eg. skill) which she uses to explain how ugly things can be represented in good pictures. The 7 year old accepts P in terms of W thus recruiting W as the principle warranting the acceptance.

(b) To avoid Parsons' inductive B-stance approach a theory of reasoning had to be used from which variations in the quality of reasoning was anticipated in the design of the questions and inferred in each answer. We use Perner's theory of representation. Representational power is interpreted across a continuum polarised by the concepts of "naive realism" and metarepresentational "autonomy". Each answer can be plotted and

interpreted within this differential.

The Questions

The questions used the most frequent terms (mostly, happy/sad; nice/nasty; good/bad; ugly/pretty) employed by children from the

pilot work on a sample of 30 ranging from 6 to 14 years of age. General organisation: The organisation of the questionnaire was based on the intentional net whereby questions were formulated to cover the net and then, to facilitate administration with young children were reduced to 8 questions plus probes attached to questions. that left room for two pilot questions to link the data with future extensions of the intentional net -- consideration will be deferred to the Discussion section. One question was focused on each of the 'inner' relations $w > P$, $A > P$ and $B > P$ (questions numbered 1, 2, 3 respectively below), one on each of the two-term causal problems in $A > P$, $A > B$, and $P > B$, raised by the former questions (numbered question 5 Probe, 6, and 7 Probe respectively), making a total of 12 entities mentioned; and another 12 mentions were in 4 3-term questions (questions numbered 4, 5, 7, and 8).

Specific questions: Each question below is followed by a coding of the entities and relations under scrutiny, the purpose of the question, and probe questions which, were more than one is noted, depended on the child's answer as to which was asked -- the first probe always corresponding to a more primitive answer.

1. 'Would an ugly thing make a worse picture than a pretty thing?'

[$W > P$; test for spontaneous consultation of A agency as determinate of quality of P using non-mentioned part of the net rather than accepting transportation from W to P.]

Either: 'Could you have a good picture of an ugly thing?'

Or: 'What does it depend on?'

2. 'Will a happy artist make a better picture than a sad artist?'

[$A > P$; test for whether children accept direct transportation by explaining that a better picture means a happy picture or invoke A agency as producer whose accomplishment may be affected by mood.]

Either: So, do you think that an artist's picture will always turn out the same whatever mood he's in or however he's

feeling?"

[Probe serves as obverse version of probe to question 4 below.]

Or: 'In what way?'

3. 'Does how you are feeling affect the way you look at a picture?' [B > P; test for agency of B in 'looking' rather than accepting 'seen' transportation from P to B.]

Either: 'O.K., let's imagine that you will paint a picture and one day you are very happy and the next day you walk past the picture again but you're very sad -- do you think that would make any difference to the way you looked at the picture?' Or: 'tell me about it -- how could that work?'

4. 'Imagine that you have two. They each make a picture of a dog. One of the artists loves dogs, the other artist hates dogs. Do you think their pictures would turn out differently or the same?'

[W > A > P; test for whether W > P relation can be inferred to be mediated through A's attitude to W, thus bearing on question 1 and serving as subsidiary evidence on answers to question 2.]

Probe: 'O.K. so could you tell which picture was which if

they were placed in front of you?'

[Serves as obverse of probe to question 2, and forced-choice variant of probe to question 10.]

5. 'An artist wants you to think that he is a really nice person or a really bad person. Do you think that he could paint a picture that would make you think that about him?'

[A > P > B; test for conception of P as vehicle for transporting intentionality from A to B, and as variant of question 7.]

Probe: 'do you think a nice man could paint a nasty picture -- do you think a nasty man could paint a nice picture?'

[A > P; probe serves as dispositional variant of mood-state question 2.]

6. 'When an artist makes a picture, do you think he thinks about how other people will see it while he is actually making the picture?'

[A > B; test for conception of A as guided by potential B reactions mediated through a particular P in common.]

Probe: 'let's imagine that the artist made a picture which he really liked but he thought everybody else would think it is stupid -- do you think he'd be likely to change his picture before he put it on show?'

[Probe of conception of A as autonomous producer or market-

controlled.]

7. 'there is an artist who wants to make you happy - could he make a picture on purpose to make you feel happy or sad?'

[A > P > B; test of whether A can cause a state in B by virtue of P, and serves as variant of question 5 whereby the effect A wants to cause is a response centred in B rather than an inference by B.]

Probe: 'Can pictures make people happy or sad?' [Contraction of question to the two-term form P > B]

8. 'If you see a picture and you want to know something about the artist, is there any way the picture could tell you what he is like?'

[B > P > A; a test of what inferences children allow to run from consumer to producer, the obverse direction of question 7.]

Probe: 'What sort of things can pictures tell you about? Can you tell the age of the artist? Can you tell the artist was feeling when he made his picture?' [A mood-state variant of the dispositional probe to question 5.]

'Could an y picture be produced by anyone at any time?'

[An open-choice variant of probe to question 4.]

The questions were administered in randomised order.

Results

The tapes were transcribed and submitted to two judges for assessment on whether children's justifications of their answers accepted the terms of the question, added to them, dropped an entity for consideration, or substituted one entity for a mentioned entity. There was 84.2% agreement. Disparities were submitted to a third judge for resolution. Considering the 12 main questions, overall there were 8 unclassifiable justifications (3 from younger, 5 from older), and $X^2(1) = 16.9$, $P < .001$. The younger tended to accept the terms of a question more than the older (85 and 53, respectively), to substitute terms in reformulating a problem to a lesser extent (1 and 10, respectively), to add terms less (3 and 15 respectively), with fewer reductions of a question to fewer terms (6 and 13 respectively). table 1 shows the distribution of the categories of answer over the 12 questions. It will be seen that the greatest age-related differences occurred with questions 1, 2 and 5. However, it is unprofitable to consider the individual questions without looking at the contents of the justifications, since two children may accept the terms of a question but one give an affirmative and one a negative reply.

Table 1 follows below.

Table 1 Classification of children's acceptance of the terms of the questions

-----		Accept		Add		Subtract		Substitute	
Other									
Question	Y 0	Y 0	Y 0	Y 0	Y 0	Y 0	Y 0	Y 0	
Y 0	1.	11 1	0 0	0 0	0 0	1 11	1 11	1 11	
0 0	2.	11 1	1 11	0 0	0 0	0 0	0 0	0 0	
0 0	3.	12 12	0 0	0 0	0 0	0 0	0 0	0 0	
0 0	4.	9 7	2 0	0 0	0 0	0 5	0 5	0 5	
1 0	5.	4 7	0 0	7 5	1 0	1 0	1 0	1 0	
0 0	6.	7 9	0 0	5 2	0 0	0 0	0 0	0 0	
0 1	7.	11 3	0 0	1 9	0 0	0 0	0 0	0 0	
0 0	8.	11 9	1 1	0 2	0 0	0 0	0 0	0 0	
0 0	9.	12 11	0 0	0 0	0 0	0 0	0 0	0 0	
0 1	10	11 8	1 3	0 0	0 0	0 0	0 0	0 0	
0 1	11.	10 9	1 2	0 0	0 0	0 1	0 1	0 1	

1	1								
	12.	12	12	0	0	0	0	0	0
1	1								

Key: Y younger children, 0 older children

The procedure is now to take one of the questions which was discussed in the Introduction together with questions that link the most closely to it. We start by considering potential causal links in the linear triangle of the intentional net, and then extend the analysis first to inferences about A and about B.

1. Three judgements.

The first concerns our generalisation of the conjecture of Parsons (1987) involving an early misconception that an ugly thing cannot yield a good picture. There was a decisive age-related shift, with 11/12 younger children affirming the W > P link and 10/12 older children denying it (P < .01, Fisher Exact Probability Test). Those children who accepted the W > P link confined their justifications to the two terms ('An ugly thing would make a worse picture because it's ugly'; 'Ugly pictures aren't nice, ugly things aren't nice to look at', etc), whilst all those who denied the link did so by involving a distinction between what referent-quality is the subject and how the picture is constructed ('An ugly thing drawn well could make a nice picture'; 'What is important is how the thing is drawn'; 'Maybe an ugly thing makes an ugly subject for the picture - - it may be drawn well though', etc). The teacher explicitly named A ('It depends on the artist's enthusiasm and skill'). Thus, on the basis of distinguishing between ugliness of W and goodness of P and spontaneously recruiting a notion of the production of an artefact, the older children showed evidence of consulting more of the intentional net than did the younger. It was noteworthy that not a single child invoked B. One might expect from the folk psychology that 'beauty is in the eye of the beholder' that some relativist insight would be available, but apparently not at the ages studied.

Those data form the top row of Table 2. The succeeding rows contain the data from the other questions along with succinct summaries of the modal justifications.

Table 2 follows below.

Table 2 Content analysis of children's answers

Question	Age-group	
Answer	Modal	Justification
No		Yes
No. Coding Synopsis		

1. W > P Ugly W-Worse P?
Younger
Older

11
1

1
11

Ugly/pretty P
Skill of A

2. A > P Happy A-better P?

Younger

Older

10

1

2

11

Happy/sad P

Skill of A

3. B > P Happy B- Use of P?

Younger

Older

2

9

10

3

B feelings irrelevant

B active observer

4. W > A > P A likes-Different P?

Younger

Older

12

10

0

2

Nice/nasty P

Activity of A

5. A > P > B A use P to influence B?

Younger

Older

11

3

0

2

Nice/nasty P

B inferences difficult

6. A > B A thinks of B?

Younger

Older

7

9

5

3

(Terse and diverse)

(Terse and diverse)

7. $A > P > B$ Can A do P to May B happy?

Younger

Older

12

11

0

1

P properties

P properties

8. $B > P > A$ B uses P to infer A?

Younger

Older

11

12

1

0

A mood expressed

A mood expressed

Note: Explanation of terms and synopses are in the text.

The second question listed in the Method section maintained the attribution of goodness to P and forced attention to A: 'Will a happy artist make a better picture than a sad artist? Again, an age-related change was evident in that 10/12 of the younger children affirmed the direct $A > P$ link as against 1/12 of the older ($P < .0$, Fisher)'. 'The teacher denied the direct link: Not necessarily - - the quality of the artist will determine how good the picture he produces is'. That sort of answer was given by a single younger child ('It doesn't really matter how you feel, how you think is more important - - if you think slowly then the

picture will be better'). There were 8 children (7 younger and 1

older) where justifications directly transported what was predicated of A into the quality of P (e.g. 'A happy artist will make a happy picture, sad things in pictures make you sad, so I think a happy artist will make a better picture, I think happy pictures are better'). Of the remaining 3 younger children who accepted the direct $A > P$ link, 2 resisted direct transportation by explaining what they take to be the phenomenon in terms of productive agency ('If he was sad he would be thinking about something else and not paying attention'; 'When you're happy you draw and think of happy things, that makes it easier to draw them, then they would be better'); and one child matched A mood to P and explained that 'A happy artist will probably make a better happy picture and a sad artist a better sad picture'.

It seems reasonable to categorise these answers as being in transition from transportation to a conception of A's autonomy; and it is noteworthy that one of the 11 older children who denied a direct link worked through precisely the same problem more explicitly to arise at the conclusion ('A good artist can make a better happy picture than a bad happy artist even if the good artist is feeling sad'). The remaining 10 older children who denied the link went straight for A skill and expressivity. In sum, where the younger children largely transported 'happy' from A to P, some of them with caveats, to explain the goodness of P, the older children focused on the goodness of P and reinterpreted the question to highlight what they thought was causal in production - - the goodness of A at her job.

Finally, Question 3 probed whether the happiness of B affected her usage of P. The question first asked whether how you are feeling affects the way you look at a picture. Here 10/12 younger and 3/12 older said it did not ($p < .01$, Fisher); and the probe offered a forced choice between viewing the same P either feeling happy or sad. The teacher explained that 'It depends on whether you are looking at the picture on an aesthetic basis or for visual entertainment or on an intellectual level as well: a statement that a B can make pictures serve different visual purposes. None of the children's justifications approached that level of sophistication. Whilst 10/12 of the justifications of the younger were simply brief assertions that mood would make no difference (except for one of those who explained that 'it's not important how you are feeling - - the picture can change that), one child seemed to have grasped a concept of projection from B to P (When) you are happy you see many pictures, and when you are sad you see sad things) though we could not ascertain whether she thought the 'things' were really in P and were just being detected; and one child deployed a concept of B power to choose

('When I feel happy pictures').

Of the 9 older children who affirmed that B's mood mattered, one clearly had grasped a concept of projection (If you're feeling happy you usually read happy things into a picture and when you're sad you tend to see a picture as more sad'), 5 expressed the effect as one of detecting pictorial qualities you would not notice if you were feeling sad, and 3 invoked B's ability to choose to look at pictures. In sum, for this probe of $B > P$, a clear age-related change was evident, as with the previous $W > P$ and $A > P$ questions, but the justifications were more varied. There appears to be an asymmetry in most of the younger children's conception of mood whereby the mood of A determines the quality of what gets produced but the mood of B does not affect her usage of the product. Some of the questions to be considered below directly focus on whether the younger children compartmentalise A and B, but before considering those questions it is more useful to return to the $W > P$ link with which the Results section opened. It was the case that the younger children

did not invoke A agency in breaking a link between W 'ugliness' and P 'goodness'. But since A was not overtly mentioned in the question, it is impossible to discern whether the younger children (a) were just conscientiously sticking to the terms as presented to them; or (b) were unable to conceive of a role for A in mediating between W and P. Accordingly it is convenient next to consider children's answers to question 4 in which two A's were posited as having different attitudes to a single W to assess whether children could envisage contrasting $A > W$ links as affecting a $W > P$ relation.

2. Agency in production.

Question 4 asserted that A liked a dog and one A disliked that dog, then asked the open question whether the pictures would turn out differently or the same. Only 2 children, both older, asserted that the pictures would turn out the same. There were two types of justification given by the 22 children who asserted a pictorial difference. Ten children (4 younger, 6 older) focused on pictorial qualities of the dog as 'nice'/'sweet'/'obedient' from one A and 'ugly'/'dirty'/'ferocious' from the other A. Twelve children (8 younger, 4 older) focused on A's productive skill on the grounds that the A with the positive attitude would be better informed ('the man who likes dogs knows how to draw

them as he has seen them a lot, he would know what to draw. The man who didn't like dogs would probably never have seen them properly before', from the younger child). Two of those younger children mentioned that an A who did not like dogs would probably never draw them. In short, there was plentiful evidence of opinions on $A > W$ as causal in P-production, with no clear age-difference; and that enables an inference to be made about the answers to question 1 where the younger children mapped straight from an ugly W to a bad P. Parsons (1987) had conjectured that direct transportation of W-properties into P was a 'stage' of pictorial misunderstanding, but the justifications to question 4 make it clear that even the younger children were prepared to accept P-properties as mediated by A from W. The age-related change with question 1 is thus presumably a change in readiness to consult different parts of the intentional net, an integration of earlier-established knowledge. Since 22/24 children asserted that A's attitude to W would be manifest in P, it is useful next to consider whether children could extend their conception of agency to encompass A's intentional attitude to B as causal in production.

Question 5 asked whether an A could make a B think that she was nice/nasty by making a P. Only 1/12 of the younger denied that it was possible compared with 9/12 of the older ($\chi^2 < .01$, Fisher). However, the justifications showed that the younger children's apparent grasp of the power of A to impel B to make an inference about A was based on the same rigid transportation of properties as had been evident with question 1 (ugly W - bad P), and question 2 (happy A - happy P). All 11 of the younger who asserted to the question gave a justification in dispositional terms, namely that a nasty A would draw a nasty P and a nice A would draw a nice P; and only one of those children assented to the probe question of whether it was possible for a nice A to produce a nasty P and a nasty A to produce a nice P. The only child who denied that an A had the power to impel the inference by B did so on the grounds that 'Pictures are all made up'.

The 3 older children who gave the younger-type answers used the same dispositional justifications and showed some resistance to the probe question of whether a nice A would produce a nasty P by saying that the picture would not be as good (1 child), or that it would only happen if the A were very skilled (2 children). The remaining 9 older-children, who denied that an A would make you think he was nice/nasty by the way he drew, all commented on the difficulty of B making an inference: 6 saying that B could infer A's mood, and/or liking, 2 saying that the only permissible inference was about A's skill, and one denying that any inferences could be made (as had the exceptional younger child).

The data may be summed up as showing an age-related shift from

(a) the younger subjects focusing on A and rigidly transporting nice/nasty to P, to (b) the older children focusing on B's inferential problems in using P as a source of evidence on A. It had been suggested in section 1 of the Results that younger

children seemed to compartmentalise their conceptions of A and B, so the final question to be considered in this section on A agency overtly put A and B together. Question 6 asked whether, when A makes a P, he thinks about how other people will see it. That is, does a mental representation of a B > P link inform the A > P relation? If it is the case that the younger children transport A properties to P (nice A - nice P, and happy A - happy P) then there would be no productive role for A in mentally representing a B > P link.

There were 7 younger and 9 older children who said that an A does think of others when painting. One older child explained that it depended on A's level of confidence whether he needed to think of others at all during production. But with that exception, justifications tended to be surprisingly terse or blank assertions (e.g. 'He doesn't think of other people'), and it was the probe that elicited more considered justifications in answer to the forced alternative of whether an A who liked the P and found out that others did not like it would change the P. A minority of children 9/24 said that A would change the picture. The younger divided exactly, with 6 saying that A would make a change, and 6 saying that no change would be made because it is A's picture/what A likes. Four of the older said no change would be made because it is A's picture/A's style/what A thinks and feels, 4 said that A would change the picture in the interests of sale/because A's paint to please others, and 4 gave answers showing a grasp of diversity of B evaluation ('If he likes it that's all that counts, anyway he wouldn't please everyone'; 'You can't please everyone', 'Some people would like it and so he would sell it in the end') including one who explained 'He would change it because no artist wants another to laugh at their work, what is important is what other people think of the artist's work, after all, how good he is as an artist is judged by them'. In short, rather than a sharp age-related change, the children showed great diversity in considering an A > B link with P as the common term.

Diversity in justification had been noted in Section 1 of the Results where question 3 involved a B > P link, and it does seem as though children were hunting for a role for B in the intentional net. It was noteworthy that the teacher who had given a complex answer to question 3 stressing that B could have different purposes in looking at a P ('aesthetic', 'entertainment', 'intellectual') gave a complex answer here: 'An

artist would probably like people to understand what he is painting. The subtlety of his work is in doing that. But no, I would not say that he paints for his audience' (happy A - happy P) then there would be no productive role for A in mentally representing a $B > P$ link. There were 7 younger and 9 older children who said that an A does think of others when painting. One older child explained that it depended on A's level of confidence whether he needed to think of others at all during production. But with that exception, justifications tended to be surprisingly terse or blank assertions (e.g. 'He doesn't think of other people'), and it was the probe that elicited more considered justifications in answer to the forced alternative of whether an A who liked the P and found out that others did not like it would change the P. A minority of children 9/24 said that A would change the picture.

The younger divided exactly, with 6 saying that A would make a change, and 6 saying that no change would be made because it is A's picture/what A likes. Four of the older said no change would be made because it is A's picture/A's style/what A thinks and feels, 4 said that A would change the picture in the interests of sale/because A's paint to please others, and 4 gave answers

showing a grasp of diversity of B evaluation ('If he likes it that's all that counts, anyway he wouldn't please everyone'; 'You can't please everyone', 'Some people would like it and so he would sell it in the end') including one who explained 'He would change it because no artist wants another to laugh at their work, what is important is what other people think of the artist's work, after all, how good he is as an artist is judged by them'. In short, rather than a sharp age-related change, the children showed great diversity in considering an $A > B$ link with P as the common term.

Diversity in justification had been noted in Section 1 of the Results where question 3 involved a $B > P$ link, and it does seem as though children were hunting for a role for B in the intentional net. It was noteworthy that the teacher who had given a complex answer to question 3 stressing that B could have different purposes in looking at a P ('aesthetic', 'entertainment', 'intellectual') gave a complex answer here: 'An artist would probably like people to understand what he is painting. The subtlety of his work is in doing that. But no, I would not say that he paints for his audience'. It appears difficult to fit B into a simple role in the intentional net. Accordingly, we next consider answers to questions 7 and 8 that focus on B.

3. The role of the beholder in picture-perception

The answers to question 3, previously dealt with, on whether the mood of B can affect her perception of P revealed an age-related change towards accepting that mood had the power to alter picture-perception, along with very varied justifications. The converse to question 3 occurs in question 7 on whether A can produce P on purpose to make B happy or sad. Answers could focus on the production-power of A or on the power of P over B's mood, and in the eventuality, only one child explicitly mentioned A. The teacher, too, focused on the power of P in relation to B: 'Certain pictures would offend me, largely for moral reasons and not for aesthetic ones - - otherwise pictures may shock me because I am not used to them'. All the younger children explained that happy pictures and/or bright colours would make them happy, sad pictures and/or dull colours would make them sad, as did 11/12 of the older children. One of those older children added that A is more likely to make B happy or sad 'If he knows you, because he knows you he would know what you liked and disliked and what made you happy and sad'. That child thus gave an answer in terms of A's repertoire as a producer (but for the rest of the 22 children who assented to the question it is impossible to tell whether they conceptualised A's powers in terms of A's knowledge of B or A sharing common taste with B).

The solitary (older) child who dissented, did so on the grounds that 'You can like a picture or not like it but they cannot make you happy or sad'. In a previous section on age-related change it had been noted in the answers to question 5, on whether A can make B think that A's character was nasty/nice. The younger children accepted that B could interpret P to make such an inference about A and the older children resisted the suggestion, commenting on the problems of inference. Question 8 asked the open question whether there was anyway a P could tell you what A is like. Only 1/24 children (a younger child) denied that an inference could be made from P to A. In answer to the probe questions, 17/24 (8 younger, 9 older) said that A's age could be inferred; and 21/24 children said that A's mood could be inferred on projective grounds that bright colours and happy scenes indicate that A was 'happy'/'relaxed'. The older children's explanations were more elaborate than those of the younger, but

the main finding is the lack of developmental change - - children hold to an expressivity model of production in which B knows at least the salient rules of backwards inference. 4.

Individual differences

In the course of classifying the data, there were occasions when a younger child gave an answer appropriate to an older child, and

vice versa. That occurred a total of 19 times over the questions for which the age-related trends had made it possible to identify the occurrence of mature and immature answers as modal tendencies in each age-group. The question arises of whether the sample data has hidden an exceptional younger child or a backward older child. Cross-classification revealed no such children, in that only one younger child scored 3 advanced justifications and 4 older children scored 2. The rest of the 'anomalies' were scattered at one per individual.

Discussion

Realism is judging a picture by its fidelity to the referent. Naive realism is substituting a judgement of the referent for a judgement of the picture. Parsons' (1987) conjecture that children judge the beauty of a picture by the beauty of the referent was decisively borne out, and the method enabled one to take a further step - - the younger children substituted the beauty of the referent for the goodness of the picture. Parsons himself gave no tabulation of his B-stance data; and to the best of our knowledge this study provides the first experimental evidence on children for a naive realist transportation of one property (beauty) to displace another evaluative judgement (goodness).

The advantage of using the intentional net was in identifying that transportation and displacement was not confined to $W > P$ relations, since it occurred with an $A > P$ relation where a happy A was held to produce a better P on the grounds that the P would also be 'happy' in content. The older children resisted that transportation with question 2 on the grounds that A's agency (skill) was an intervening consideration, but when happiness was posited as integral to A's intention as an agent ('Can A make a P to make a B happy?') even the older children regressed to explaining the causal chain in terms of P-properties. Congruent with that, question 8 ('Can B use P to infer anything about A?') elicited the justification that A's happiness can be inferred from P by a B. The younger children showed very little understanding of B in contrast to the older children's grasp (a) that it is difficult for B to make inferences (question 5), and (b) that B's mood affects her usage of pictures (question 3).

The suggestion is that naive realism is a symptom of a failure to apprehend an opaque relation, the failure extends to relations in the intentional net other than the P W pair, and that as children build up a conception of depiction and production, it is the role of B that lags behind. The advance, somewhere around 8 or 9 years of age can be inferred to be predominantly a growth in the conception of A as a counterweight to $W \sim /$ as an explanation of P-properties.

Implications for previous research

Children have been asked to sort pictures (Gardner, 1970), to select their preferred pictures (Golomb, 1983), and to explain their reactions to a picture (Parsons, 1987). There is a sense in which the present work complements previous work. There is no reason for doubting the realism manifest in children's reactions

to pictures and their on-the-spot reflection on those reactions. But the use of the intentional net draws attention to limitations on the conclusions that previous researchers have drawn. It is now newly open to research on whether, below the age of 8 or 9 years, 'Little awareness is demonstrated of the boundary between the world of pictures and the world of objects represented' (Winner, 1982:140). Transportation of properties from A to P severely qualifies that $W > P$ formulation as a statement of children's underlying theory of 'f' pictures.

Turning to A-stance work, there is no reason to doubt that 7 year-olds as Golomb (1992:323) cogently pointed out, maintain 'Almost unanimously, that even if they disliked something they would not make changes in their drawings' and that they consider themselves as not paying attention to how their pictures 'May appear to a non privileged outsider' (Golomb, 1992). But there is reason to question Golomb's classification of such data under the term 'The Child as Critic'. The present C-stance work revealed that 7/12 of the 7 year-olds thought that A bears B in mind during production, and almost all of them thought that A can take B as a target (making B happy and making B think A is nice/nasty). The child as critic is usefully investigated by C-stance research.

We suggest that previous research is of most use in probing children's understanding of their pictorial experiences, and the present work is of most use in probing children's underlying general theory of the domain. Where previous authors took their concepts from aesthetics and experiential analysis (concepts such as the expression of feelings by A and by P) we prefer to view the child's aesthetics as emerging from an application of her theory to her experiences, e.g.. the child accepts 'expressivity' in production because she treats an opaque relation of production as transparent so that transportation of properties has to occur. We do not doubt that pictures are expressive, but we question the child's basis for making expressivity judgements.

Strengths and limitations of the present approach

There are four limitations to the new research. First, there is

no guarantee that the questions were cast into the sharpest form for use as an analytic tool. The investigation was a compromise between (a) using formulations arising in the literature in the interests of keeping empirical contact with previous research, and (b) devising new questions to exploit the range of the intentional net. Secondly, the questions had to be spread thin over the net, whereas ideally what one wants is a set in which any question put in inferential form has an alternative version put in causal terms. An example of \surd such complementary questions was with question 2 (will A's happiness cause a better P?) and question 8 Probe (can B infer A's happiness from P?). Such a matter is straightforward, though laborious, as a target of future research.

However, the third limitation will require greater technical development. The point is that there are limits to the usefulness of questioning children in a context-free manner since there is no guarantee that each child has an equivalent mental set. It would be possible to look through a book of pictures beforehand, with each child, but in our view a more powerful procedure would be to question children in the same way about different pictorial traditions. Thus children in Hong Kong have access to Chinese and European art, and by using 'Chinese' and 'European' as qualifiers of each term it should be easy to trace major points of divergence in their theories of two realms. The intentionality account focuses on problems for children with the relations in

the net, but cannot by itself predict what form the problems will take in any culture.

Finally, the intentional net as drawn up is too simple. Whereas an entity contracts more than one relation it is possible to subdivide the entity (e.g. P as a physical surface with markings and as an instrument of representation - - the traditional distinction between the depicting surface and the pictorial space). Further, although it was noted that the net could be contracted (e.g. A as W in self-portrait), we ignored the fact that real life involves a multiplicity of nets. The basic diagram can be overlaid with, and tessellated with, other basic nets. Thus, one B can view one P and communicate with another B who is viewing an alternative P. It was in recognition of the multiplicity that we added two questions (as noted in the Method section).

Question 9 asking 'So artist learn and get ideas from other artists?'. Only one younger and one older child maintained that A produced on an individualist basis ('They get ideas from looking round and practicing drawing what they see'; and 'Each is different they only learn from teachers and books'). All the

others agreed that A learns but there was no uniformity in what is learned - - ideas (7 children), inspiration (1 child), colour usage (1 child), 'good and bad' (2 children), what people like (3 children) etc, and 2 older children specifically mentioned that an A would not learn style on the grounds that style is inborn. Again there was no age-related change, with 22/24 children in agreement that A's productivity does not stem entirely from within. If even the younger children recognise the existence of public pictorial ideas, there is the empirical possibility that appropriate questioning will reveal an insight that blocks the transportation of mood (happiness) from A to P. Such research could, in principle, focus the methods of research into belief-desire reasoning (Wellman, 1990) onto the child's conception of A as an intentional agent as a member of a community. C5.

Similarly, question 10 focused on a B > B link, asking 'If a lot of people think a picture is good, do you think others will think it is good as well?' None of the children showed a conception of a community of picture-using experience. One younger child answered 'Yes' but could not explain why (I'm not sure), and one older child said 'Yes' on the grounds that 'It would be embarrassing to disagree'. That latter comment reveals the basis of the answer of 16 of the remaining 22 children (7 younger, 9 older) who answered 'No' but formulated their justifications in terms of social pressure, e.g. 'I don't think others would say they liked it just because others did'; 'They wouldn't say so just because everyone did, it depends on the individual, everyone has different tastes'; 'They wouldn't go along with what others say just to look good'. There was awareness of diversity of judgement by beholders, but no evidence for what a community may have in common. It has to be left open whether further research will unearth young children's conception of mass pictorial culture (see Radnoti, 1986), or corroborate the suggestion of a lack of conceptualisation of B as an agent in pictorial uses.

Overall view

The literature on children's understanding of pictures has identified the middle primary school years as the period in which a conceptual shift occurs; though it is not clear whether that is to be modelled as a discontinuous advance or a shift in weight of importance accorded different considerations. The results are difficult to synthesise because they stem from requiring children to adopt an A-stance or a B-stance. Yet A and B may be presented

as targets of third-person reflection, along with P and W to build up a model of children's conceptualisation of facts, inferences and causal relations. The most primitive intentional net that characterises depiction identifies a small set of opaque

relations to be conceptualised by the child. The most salient difference between the age-groups was manifest in question 1 whereby the older children spontaneously consulted their concept of A agency when asked about a $W > P$ link, and maintained that emphasis when questioned about $A > P$ and $W > A > P$ causal relations in questions 2 and 5, respectively (see Table 2). An apparent lapse to a simpler conception occurred with question 7 where an $A > P > B$ causal claim was presented and the children centred their answer on P-properties. They agreed that an A can produce a P targeted on B's mood, but failed to consider whether A's ability to do, that stemmed from what A knows about B or from what A shares with B (a commonality of taste and reactions to P). It must be left open to further research to probe such conceptions.

Even with the growth of understanding of the place of A's agency in the intentional net, a growth in understanding B's agency rather lagged behind. Some grasp was evident in most older children with question 3 when asked directly whether B's mood affects picture-perception, and with question 5 where the children maintained that it was difficult for B to make inferences from P to A. But B was never appealed to spontaneously even by older children in response to a question that did not mention B, in contrast to spontaneous appeals to A agency. We suggest that as naive realism wanes in the primary school years and illegal transportation of properties is curbed with the differentiation of a vocabulary of depiction, the role of B in the intentional net remains rather obscure to the children. It may be no coincidence that controversies in aesthetic theory mainly centre on the role allotted to B (see Beardsley, 1981; Nehamar, 1982).

Pictures invite interpretations to be carried out by B, but how does B do it? Pictures can present alternative worlds, possibilities and ideal states, but how does B recognise pictorial possibility? If for example artists communicate to B about W via P, how does B register when the pictorial communication has occurred (see Savile, 1992)? All such points require a theory of B's uptake of what is on offer in a P. We suggest that such conceptual work normally is researched for after the primary school years, and it may be that only a minority of children will progress to re-evaluating the intentional net in B-terms. To take such a step is to go from a theory of art to a theory of aesthetics. We can find nothing in the empirical literature that directly tests the emergence of a theory of aesthetics. Crude though C-stance questioning be, it may represent a way to probe when an intentional net shifts towards B.

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