Methodological challenges in evaluating the cognitive constraints of children's reasoning in art

Research has shown that during middle childhood children's theories of mind undergo significant qualitative change. Understanding such shifts in cognitive resources has significant implications for teachers in gauging the breadth and flexibility in children's theory development according to age within specific domains of inquiry. Psychologists have linked children's use of defining ontological discrimination to the development of more complex theories of mind when dealing with different kinds of phenomena in the world. In domains of knowledge within the humanities little is known about the constraints underlying theories children have about cultural artefacts. When dealing with artefacts, evidence of this qualitative cognitive shift in children's theories of meaning is manifest in reasoned explanations that favour recourse to beliefs about intentionality and agency. This paper proposes a methodology used to map characteristic-to-defining shifts in the pictorial reasoning of younger and older children when asked to curate an exhibition of portrait paintings. Curatorial reasoning is analysed according to classifications representing aesthetic and psychological constraints of different kinds of pictorial reasoning, thereby describing the terms underlying increasingly sophisticated theory development in relation to art.

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This paper outlines the major theoretical considerations for the development of a methodology suitable for evaluating the cognitive changes in children's understanding of cultural artefacts. The aim of this study is to classify the qualitatively different kinds of beliefs younger and older children have about artworks as cultural artefacts. Whilst discussion reports research in progress located in the area of Visual Arts, the focus on how children's cognitive theories develop and are converted into language has implications for understanding fundamental aspects of children's learning in other disciplines. I investigate the significance of previous research used in studies of children's cognition and evaluate the contribution these accounts make to this study.

In the artworld, when artworks are selected for exhibition, curators usually provide a statement or curatorial point of view about why particular artworks are assembled within a body of work. This thesis is a form of critical evaluation, an explanation of aesthetic judgements according to particular beliefs about art which serve as criteria for their choices. If these rules for selection were challenged or 'pushed' by an enthusiastic reviewer or critic, the ensuing justification made by the curator would be in the form of curatorial reasoning. This reasoning about art is the declaration of a theory of critical meaning in art which is manifest in the explanation given by the curator. What is revealed are the cognitive resources used by the curator to understand and value artworks which represent a form of aesthetic knowing. This research proposes a methodology that can be used to the structure and development of a person's cognitive resources when dealing with artefacts such as artworks.

The development of appropriate experimental conditions for the assessment of the cognitive constraints of children's curatorial reasoning has involved consideration of previous research from the areas of cognitive psychology and art education. This investigation takes into account the nature of aesthetic knowing in art and how theories of knowing are constructed and identified within linguistic representations. An account of experimental tasks and stimulus material used to elicit reasoned responses about what is understood when children of different ages value artworks is also provided. In the context of curating an exhibition of portraits, two groups of children, one mid primary school age, the other lower secondary school age, are asked to explain and justify their curatorial selections, providing insights into the qualitatively different terms on which value in art is ascribed.

Typically, studies dedicated to understanding the nature of knowing in art have compared the activities and judgements of naïve and more experienced participants, however few have explained the differences in cognitive function in relation to the qualitative character of aesthetic judgements. Many of these studies have relied on experiments requiring subjects of different ages and experience in art to rank artworks in order of preference to establish an understanding of interpretive style (Cupchik and Gebotys, 1988). Others focus on personal interpretations of artworks within which stages of development can be identified (Parsons, 1987) or represent particular interpretive approaches (Turner, 1983). The measurement of aesthetic responses to works of art (Newton, 1989) and responses to subject matter (Taunton, 1978; Hardiman and Zernich, 1977) are also represented, however, very few investigations have connected the relationship of reasoning, language and cognition.

Johnson (1982) investigated aesthetic preferences according to age in relation to the role of cultural beliefs as the basis for understanding in art. This study goes some way to connecting the role of language with the development of theories about art, however the relationship of language to cognitive change is not addressed. Few of these studies have entailed an explicit mapping of the relationship of language and aesthetic knowing in the domain of visual arts.
Koroscik, Osman and DeSouza (1988) found that the intellectual demands of art experience are supported by a background knowledge structure which can be reconstructed in the form of language exchanges which facilitate learning in art. They investigated the relationship of language to interpretations of meaning in art and identified basic cognitive resources recruited to the comprehension of unfamiliar experiences in art. Cognition is demonstrated when 'a 'good fit' occurs between a schema and sensory information, expectations are met, thus permitting the encoding of new information into memory" (p. 92). Perhaps more interesting, in light of the interests of the present study, is the situation of new knowledge development whereby 'incoming information is not in line with expectations, it cannot be encoded unless it is somehow distorted to better fit the schema' (p. 92). Language is then the medium within which manifest thoughts about artworks are converted into forms of communicable exchange fitted to cognitive structures or theories of mind.

Recent studies in cognitive psychology focus on the development of explanations of the domain of art. These studies argue that the nature and causes of theory development can be revealed in linguistic representations and are central to understanding how knowing in art is structured. Studies by Freeman and Sanger (1993) and Freeman and Brown (1993) indicate that a shift typically occurs in children's conceptualisation of pictures at around 11 years of age. This shift in thinking is demonstrated by the ways younger and older children distribute causal explanations of the functional relationships between the artworld agencies of artist, beholder, picture and world. In order to access this reasoning Freeman and Sanger (1993) asked two groups of children aged 9 and 14 years a series of questions which required them to reason across the relationships of artist-picture, artist-world, beholder-artist, beholder-picture etc. For example, in the case of artist-picture relations the question "Will a happy artist make a better picture than a sad artist?" 9 year olds typically reasoned that the artists who were happy would produce better pictures. These responses indicate younger children's naïve beliefs about art which posit the value of the picture in what is represented without recourse the causal function of the artist, whereas the 14 year olds invoked the artist's skills as the factors causing the production of better pictures. The differences in the two explanations of the relationship illustrate respectively the development of characteristic theories of art as opposed to theories of art involving an understanding of pictures as artefacts or products of intentional practice.

From Freeman's work we gain an understanding of how to challenge children to push their reasoning about art to ascertain the extent of their resources and the relationship of language to cognition. We can also identify the age bracket within which a qualitative shift within theory of meaning in art is likely to occur in the domain of visual arts. However, whilst Freeman's research enables the identification of relationships within a framework that can be used to map reasoning about art, his claims that this research represents a form of pictorial reasoning can be questioned. Freeman's explanations are limited to theoretical concepts and do not involve reasoning about actual artworks and their attendant conceptual and material properties. In other words, there is no provision for the consideration of aesthetic knowing, a central challenge for the development of the present study. Similarly, Freeman and Sanger (1993) also claim that this research 'brings to the surface children's hidden mental work' and exposes their theories of mind, however an explanation of how an intuitive theory can be transformed into a more explicit theory of mind is not explored.

In order to design an experiment to test aesthetic knowing, it is evident from the previous discussion that constraints must be established which make possible the analysis of reasoned talk as evidence of theory building in relation to an explanation of artworks as aesthetic
artefacts. The domain of visual arts, like other domains within the humanities and social sciences, comprises artefacts. For Searle (1995) cultural artefacts such as artworks are entities that are made and invested with social values. In order to understand and make sense of these kinds of entities judgements about their significance must involve 'the assignment of function, collective intentionality and constitutive rules' (Searle, 1995, p. 13) as they are products of practice. Brown (1993) characterises the complexity of the relationship between artefacts and viewers and explains that 'the perception of artworks is confounded by their artefactuality. The effect of their being already made things, invests artworks with nested properties of motive and setting, of choice, of commitment and uncertainty – all of which are causally related to the satisfaction of (rather than being satisfied by) the artist’s memorised and perceptual experiences. Artistic intentions are represented in the work and account for its interpretation. However, artworks present and represent the events of their formation in such concatenation, that the pathway between the beholder’s encounter with the artwork and what it means is concealed...meaning is perceptually opaque' (p. 50).

Wollheim (1987) extends this definition, describing artworks as ‘intentional manifestations of mind’ necessarily invested with intentional properties. As products of human thought and action, they require the retrieval of intentional content through a twofold kind of aesthetic experience which involves recognising and identifying pictorial properties according to background beliefs about representational relationships. The background capacity of the viewer is the intellectual capital available for the correct and reasonable interpretation of pictorial properties according to what can be seen in the picture.

Wollheim’s theory gives rise to the consideration of the ways concepts recruited during the perception of pictures are anchored to deeper underlying and more complex mental entities. These beliefs function as the rules for engaging concepts in recognising and identifying pictorial properties under certain pictorial conditions depending on how they are obligated to fit with what is seen in the picture according to its intentional content. Recognitional and identificatory distinctions substantiate the qualitative differences that characterise the approaches taken by more naïve and autonomous viewers. If one relies merely on recognising what is in the picture as the basis on which is valued and deemed meaningful, then the interpretation of the pictorial properties avoids ascriptions of value that designate its artefactual provenance. If, on the other hand, a viewer ascribes properties of the picture that are identified within the context of cultural beliefs and practices with which an artist would be familiar and may consult in the making of the work, then the artworks is considered on artefactual terms. This distinction is an important one, as it enables the differentiation of kinds of judgements about artworks to be made on qualitative terms.

Brown (1987) asserts that children are disposed to be critics and that 'aesthetic description is both articulated by and dependent on an extension in the knower of ideas already in place and which have been shown to represent true properties elsewhere' (p.217). ‘Ideas already in place’ refers to the ‘cognitive stock’ a spectator recruits or consults when looking at a representation. The corollary of this is that what is recognised and identified in the picture is conditioned by the cognitive stock the spectator holds and is brought to bear on the experience of the picture. How he sees the physical and intentional properties of the picture is determined partly by the form of the picture itself, but also by the kinds of concepts and beliefs that are mobilised to make sense of the experience of it. From this we can begin to grasp what Wollheim means by the ‘permeability of perception by cognition' (1986, p. 48) which implicates thoughts as central to the aesthetic experience of intentional content of pictures.
An assessment of the cognitive resources children use to make sense of cultural artefacts must involve an investigation of the kinds of beliefs underlying thoughts they have about them. The beliefs a person has about artefacts are represented in the kinds of concepts a person has about such things which can be mapped according to their reasoned explanations. Keil (1992) proposes a taxonomy of conceptual kinds representing ill-defined things called natural kinds (eg. animals and plants) through to artefactual kinds of entities that are well-defined concepts (eg. meals, books, machines and artworks).

Keil's experiments have informed some of the thinking behind the development of the present methodology. Keil asked young children to consider logical puzzles involving natural and artefactual kinds of entities. They were asked to reason about the feasibility of different kinds of conceptual entities transforming into others and were asked to look at pictures of natural and artefactual kinds of things and speculate about the propensity of natural things to turn into artefacts. Their explanations revealed how we can track the depth of theory change from characteristic to definitive terms of reference according to age. Keil asserts that cognitive development requires an explanation of conceptual change on the basis of the ontological distinction of different kinds of concepts. How concepts are treated gives rise to a child’s ontological positioning of ideas, hence their level of cognitive flexibility.

In this research, the stimulus materials for the experiment will be confined to 30 portrait paintings of various representational styles. What will be of interest is how the younger and older children ascribe ontological status to this selection of artefacts. This will be achieved by looking at the kinds of ascriptions that are made about such objects on the basis of beliefs about how such objects exist. In other words the ontology assigned to the portrait gives rise to the kind of theory the child has about it. For example, if the representational properties of a portrait are assigned the a function of the subject rather than the artist whose intentions shaped the properties of the artwork, then the child's theory of the portrait's function remains naive. In line with Freeman's research (1991, 1997), it is anticipated that the younger children will rely on naïve realist theories of representation as the basis for curatorial judgements. In other words, it is hypothesised that they will regard the portraits in the terms of natural kinds, rather than extend their reasoning to embrace more complex beliefs about the properties of works that are the responsibility of the artist implicated within conventions of cultural practice. The spectator's use of either natural or artefactual beliefs substantiates recourse to qualitatively different kinds of reasoning about the meaning of the portraits. Similarly, studies by Cupchik and Gebotys (1988) identified qualitative differences in interpretive styles of naïve and trained participants who were asked to rank triads of images in order of preference. They found that naïve participants valued realistic images over more abstract representations of subject matter, and the reverse was true of the trained participants. I am also interested in tracking the different aesthetic preferences which may be exhibited in the actual selections of images by younger and older children and suspect that younger children will favour more realistic representations.

Now that I have an understanding of the kinds of concepts that are available for use in the judgements of artefacts and how these represent underlying beliefs about art, I can proceed with establishing how conceptual theories are structured and developed according to linguistic representations.

Carol Fleischer Feldman (1987, 1988) studied the relationship of language to theory development by tracking the formation of concepts through the recursive development of
topics from previous comments. Comments are mental attitudes used to mark out what is already known and signal the attitudinal stance of a person as they negotiate things in the world. The topic/comment structure of talk is distinguished by ‘a chain complexive quality’ (Feldman, 1987, p.136) whereby topics in discussion must be maintained by the existence of comments that are made about them. Feldman states that ‘there is nothing essentially different about information that appears in the topics and comments of utterances. What varies is how they are to be treated. The very same material that appears on one occasion in a comment as new may, for some other purpose, be treated stipulatively in the topics as old; and vice versa' (Feldman, 1987, p.137). In this sense, recursive relations between comments and topics are not arbitrated by linguistic meaning, but rather in terms of ontological function. The utterances may share meaning, however when they are dealt with through a recursive process they are ontologically redefined and function as organisational categories in speech.

The procedure of recursion enables the transformation of old concepts into new ideas that can be talked about. When new thoughts are generated from old concepts they are ontologically re-classified through a process of 'ontic dumping'. Ontic dumping evidences the changed designation or function of the speech act from an intuitive to a theoretical proposition arising from the beliefs held about things such as artworks. In this study when a child talks about properties of artworks that are attributed to the subject in the picture and then goes on to talk about those properties as if they are a new topic, then a qualitative shift has occurred in their conceptual structures. What is already known about the artwork in the form expressions about the epistemological function of its properties can be treated differently and relocated as topics which assume a new ontological status. They are thus things that are thought to exist in a certain way and can be talked about as new construals of ideas. This change of status is indicative of the spectator who regards the pictorial properties as features of intentional representation, and thus properties of an artefact, rather than merely seeing them as naturally occurring kinds of things. Under these conditions, the pictorial properties exist as intentional artefacts of the mind rather than as an immediately transparent, or presentational aspects of the world.

By tracking the topics and comments featured within a child's reasoning we can identify the formation of theory, or new knowledge. Topics and comments are therefore the categories we can use to mark out the patterns of theory development as children talk about the terms on which artworks can be valued.

Feldman’s research tracks the development of the curatorial reasoning of a graduate student in the selection of poems for a publication. The student is asked to select some poems for publication, a kind of curatorial task, and explain the reasons for the selection - the curatorial rationale for choices. Feldman illustrates how recursive development of topics from prior comments about the properties of the poems substantiate the development of 'rules' within which judgements of value are made and applied as criteria for selection. This work provides the basis for the ways to understand the linguistic structure of curatorial reasoning in art. Feldman's research also contributes the scenario of the construction of an exhibition for developing the experimental task within which curatorial reasoning can occur.

We now have an idea of the methodological conditions within which to consider the theoretical constraints that can be used to classify children's curatorial reasoning as evidence of aesthetic knowledge which is represented in forms of language. Aesthetic knowing is constrained by the twofold nature of experiencing artworks - the terms on which the recognition and identification of properties of portraits are made relative to natural ontologies.
or artefactual kinds of concepts. The development of such concepts can now be identified within the reasoned statements children make about their curatorial selections of portraits as we track the recursive development of comments and topics. When combined, these factors create 4 qualitatively different patterns of aesthetic reasoning which can be used to classify the extent of reasoning demonstrated by the respondents in the study (Maras, 2001). They are represented as:

a) Recognitional comments
b) Recognitional topics
c) Recognitional comments that are identified
d) Recognitional topics that are identified

I have described the theoretical considerations that have informed the development of a methodology suitable for investigating the knowledge younger and older children demonstrate as a condition of their approaches to reasoning about cultural artefacts. The causal function of artworks to act as input which is aligned with existing theories of meaning in art and represented in the reasoning about their experience of portraits goes some way to establishing an understanding of how children’s knowledge develops in the domain of art.

I have argued that learning is essentially concerned with building and renovating theories of mind. As with renovating a house, or replacing an existing home with a new improved structure, one contributes to the capital an owner might eventually claim. Theory building is a process of recycling and the re-presentation of what is owned as new intellectual capital. Existing knowledge is renovated through a recursive process to establish more powerful and complex mental resources with which to trade on new experiences (Feldman, 1987). Teachers have a vital role to play in constructing the circumstances within which children can build more complex theories about ideas and objects and use these to explain their understanding. In many cases teachers rely on their intuition about how this process occurs and approximate strategies to assist student learning. Freeman (1997) ascertains that if teachers can determine the kinds of intuitive theories children start with about things in the world, then teachers will have a better chance of guiding them to convert these into more explicit, reasonable understandings. The more reasonable the understanding, the closer a child is to demonstrating metacognitive skills, a higher order, more complex form of thought.

Bibliography


