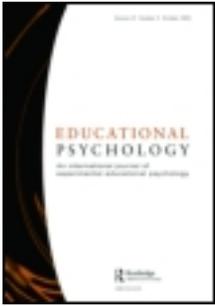


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Educational Psychology: An International Journal of Experimental Educational Psychology

Publication details, including instructions for authors and
subscription information:

<http://www.tandfonline.com/loi/cedp20>

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Available online: 29 Sep 2006

To cite this article: Maureen V. Cox & Matt Lambon Ralph (1996): Young Children's Ability to Adapt their Drawings of the Human Figure, *Educational Psychology: An International Journal of Experimental Educational Psychology*, 16:3, 245-255

To link to this article: <http://dx.doi.org/10.1080/0144341960160302>

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Young Children's Ability to Adapt their Drawings of the Human Figure

MAUREEN V. COX & MATT LAMBON RALPH, *Department of Psychology, University of York, UK*

ABSTRACT *5-year-olds, 7-year-olds and 9-year-olds were asked to draw three figures, one standing still and facing them, one standing still in profile and one running in profile. Half drew from imagination and half drew from models. The 5-year-olds made fewest distinctions in the way they drew the figures, the most notable being the greater spread of the legs of the running figure. With increasing age, more features were used to differentiate the three figures. There was little evidence of 5-year-olds adapting their figures in the presence of a model. Only among the older children was there a significant effect of the presence of a model when the 7-year-olds and, to a greater extent, the 9-year-olds drew their running figure with bent arms and legs and also with more transparencies and partial occlusions.*

According to Piaget and Inhelder (1956), young children below the age of about 7 or 8 years have not yet developed the projective concepts of space which will enable them to consider the way objects appear when viewed from different angles; they are confined to thinking about an object only in terms of its identity and not in terms of the fleeting shape and appearance it will have for any particular viewer. So, when these young children are asked to draw an object they will concentrate on drawing only 'a person', 'a car', 'a horse', etc. and not on how a particular person, car or horse appears from their own angle of view. What children tend to draw for each of these objects is a *canonical* view, that is, an orientation in which the defining features of the objects are displayed most clearly. For example, their human figures face the viewer, but cars and horses are shown from the side (Ives & Rovet, 1982).

Even when a model is presented in a non-canonical orientation, children will use it only insofar as it informs them *which* object they are supposed to be drawing. They will not draw the orientation they see, but the canonical version. For example, Freeman and Janikoun (1972) asked children to draw a cup which had been turned so that its handle

(a defining feature) was out of sight; the children drew the cup with its handle firmly attached to the side.

Thus, despite the variations in the orientation of objects that children are asked to draw, their drawings of these different orientations are actually very similar. Luquet (1913, 1927) referred to this as *type constancy*. He claimed that young children are drawing not from the object in front of them, but from an internal model of the object. When asked to draw the human form, for example, children 'call up' their visual concept of a person and this concept or internal model is in the form of a generic, canonical representation.

Van Sommers (1984) has also argued that young children are constrained by their mental representation of what it is they are trying to produce. However, whereas the internal model in Luquet's account is a more general model for a class of objects such as people, horses, cars, etc., the mental representation for van Sommers is one established when the child first works out how to draw the particular object in question and which then has a conservative effect, acting as a kind of visual goal towards which subsequent efforts are directed. For Luquet, the internal model exists independently from the drawing, whereas for van Sommers it is directly linked to the drawing activity. But, like Luquet, van Sommers also predicts that young children may have difficulty in adapting their figures to take account of different views.

It may be, however, that in many drawing tasks young children simply are not aware that they are being 'tested' to see if they are capable of producing the actual view presented to them; they may interpret the task as a test of their best drawing ability, that is, being able to draw the object in a clearly recognisable and unambiguous way (Cox, 1992). Not only does the canonical representation present the object in a very recognisable form, but this drawing is also the one that children have practised and perfected. In fact, even Luquet (see Costall, 1989) considered that by the age of 6 years children may recognise the contradiction between the canonical representation they wish to draw and the way the object in front of them actually appears. So, even if young children tend to rely on some kind of stored mental representation to guide their drawing, they may not always be constrained to do so. Indeed, some more recent studies have identified circumstances in which children as young as 4 years of age will attempt to draw what they see and not be constrained to produce a canonical view (Davis, 1983; Davis & Bentley, 1984; Bremner & Moore, 1984; Taylor & Bacharach, 1982). However, in these experiments a cup has been used as the stimulus object to be drawn. Now, a cup is not a particularly common object in children's spontaneous drawings and, although relatively easy to draw, it is not an object for which they will have a well-practised schema. In contrast, the human figure is one of the earliest topics children draw and one which, in Western cultures at least, remains common throughout childhood (Cox, 1992). It may be that a well-practised schema such as the frontal view of the human figure is *less* amenable to adaptation, partly because the motor sequence and visual goal are well-entrenched, but also because children feel confident that they already know how to draw a person and may not look carefully at the particular model being presented. In the study reported in this paper, we concentrated on children's human figure drawing and investigated their ability to make adaptations to their figures.

Most studies of children's human figure drawings have simply asked children to draw from imagination. One of the few to give children a model to draw from was that of Partridge (1902). She reported that young children drew frontal views even though the female model in front of them sat in profile. It may be, however, that Partridge's

children did not realise that the orientation of the figure was a salient issue in the task. In the present study we compared children's drawings from a model with those drawn from imagination in which information about orientation was also provided. We predicted that adaptations would be made by children at a younger age when they drew from a model than from imagination.

We also compared children's drawings of a figure standing still with one which was running. A few studies have given children information about the figure's activity. For instance, Goodnow (1978) asked 4- to 10-year-olds to draw a person picking up a ball from the floor and 5- to 10-year-olds to draw a person walking and a person running. The youngest children showed the least adaptation. In the ball task, they would elongate one arm of their figure or place both arms on the same side of the body in proximity to the ball; they placed the legs of the running figure at a wider angle than those of the walking figure. With increasing age, the children altered the positioning and angle of the arms and the 'give' in the legs; changes to the torso were made only by some of the oldest children in the sample. Goodnow does not give full details about the orientation of the figures, although there appears to be an age-related shift from drawing frontal views to drawing figures in profile.

Similarly, Ives and Rovet (1979) found that when the figure is supposed to be in motion younger children generally draw a canonical view, but children over age 7 or 8 tend to use a profile view. More recently, Smith (1993) asked 4- to 10-year-olds to draw a person standing still and one walking very fast. Her findings echo those of Goodnow: the earliest adaptation for the walking figure was the angle or spread of the legs. Although a large number of 6-year-olds pointed both feet of their walking figure in the same direction, a majority of children did not orientate the head to the side until the age of 8 years.

Although these studies asked the children to depict figures engaged in certain activities, no information was given about their orientation. In the present study we predicted that when given specific information about orientation children would be able to make adaptations at an earlier age than had been previously reported.

The kinds of adaptation we were interested in include orientation of the face and the feet, the bend in the arms and legs, and the spread of the legs. We also investigated the children's use or non-use of occlusion or transparency, when, for example, the bent arm of a figure seen in profile cuts across the contour of the torso. It seems that younger children, below about the age of 7 or 8 years, avoid depictions in which one body part crosses or overlaps another (Cox, 1993), perhaps because, as Goodnow (1977) argues, they operate on a rule which states 'each to its own space'. However, the data presented by Cox on children's use of occlusion were based on children's drawings from imagination and the children may simply not have considered that one body part could be occluded by another. It would be more difficult for them to avoid this, though, if we presented them with a model in profile, so that the occlusion is clearly evident.

Method

Subjects

There were 80 5-year-olds (mean age 5;7, range 4;10-6;6), 80 7-year-olds (mean age 7;5, range 6;10-8;4) and 32 9-year-olds (mean age 9;8, range 8;10-10;6). Within each age group they were randomly allocated to one of two conditions: imagination or models. There were no significant differences between the two conditions either in

mean age or age range. There were roughly equal numbers of girls and boys in each group.

Materials and Conditions

Each child was in only one condition, drawing from imagination or drawing from models, and was asked to produce *three* drawings, each on a plain A4 sheet in 'portrait' orientation. The children used pencil only and were asked not to colour or shade their figures.

Imagination Condition. The instructions for each drawing were as follows: (1) "I want you to draw me a picture of a man. He's standing still looking straight at you"; (2) "I want you to draw me a picture of a man. He's standing still and he's facing that way." (Experimenter pointed to the right.); (3) "I want you to draw me a picture of a man. He's running that way." (Experimenter pointed to the right.) The order of the three drawings was randomised for each child. As there is evidence that children's profile drawings, drawn from imagination, generally face to the right (Cox, 1993), the profile figures always faced to the right in this study.

Models Condition. In this condition three identical model figures (height 12 cm) were presented, one at a time, on a raised platform (height 20 cm) on the table in front of the child. Again, each child was required to make three drawings and the order of these was randomised. (1) The model figure was standing and was facing the child. The experimenter said: "I want you to draw me a picture of this man. He's standing still looking straight at you"; (2) The model figure was standing and facing to the right. The instructions were: "I want you to draw me a picture of this man. He's standing still and he's facing that way." (Experimenter pointed to the right); (3) The model figure was running and facing to the right. The instructions were: "I want you to draw me a picture of this man. He's running that way." (Experimenter pointed to the right.)

Classification of Figures

Two judges independently classified the figure drawings. The standing-facing and standing-in-profile figures were classified as having a full-face or a face in profile, occlusion or no occlusion of legs, feet drawn in profile or not and an arm in profile or not. The standing-in-profile and running-in-profile figures were classified as having straight or bent legs, straight or bent arms, greater spread of legs in the running figure or not and occlusion or no occlusion of the arms. There was agreement in 94% of judgements; initial disagreements were resolved through discussion.

Results

A Comparison Between the Standing-Facing and the Standing-in-Profile Figures

First of all, we compared the two standing figures, the figure facing the child and the figure in profile. We predicted that if children take note of the instructions, then, compared with their facing figure, they would make certain adaptations to their profile figure, namely a face in profile, the occlusion of the legs, feet drawn in profile and the adaptation of an arm to indicate a profile orientation. For each of these features we

TABLE I. Percentage of children making adaptations to their profile figures compared with their facing figures

Age	Face in profile		Leg occlusion		Feet in profile		Arm adaptation	
	Imagination	Model	Imagination	Model	Imagination	Model	Imagination	Model
5	20	38	0	10	3	15	8	18
7	93	78	25	43	48	68	65	65
9	94	94	56	81	50	81	69	88

predicted that there would be an age-related trend and that the models condition would elicit them more than would the imagination condition.

The 7- and 9-year-olds made significantly more adaptations to the face ($\chi^2(1) = 66.62, p < 0.001$), feet ($\chi^2(1) = 49.25, p < 0.001$) and arms ($\chi^2(1) = 57.34, p < 0.001$) of their profile figure compared with 5-year-olds; there were no significant differences between the 7- and 9-year-olds. Although there was a slight tendency for more adaptations of the profile figure in the models condition rather than in the imagination condition, this difference was not in fact significant overall or at any particular age level.

The majority of children did not make adaptations to the legs of their profile figure compared with the facing figure until age 9. Significantly more of this age-group adapted the legs compared with the two younger age-groups ($\chi^2(1) = 38.57, p < 0.001$). There was no significant difference between the 5- and 7-year-olds; both these groups drew two distinct legs in the same way as they did in the facing figure. Although there was a tendency for the models condition to elicit more adaptations than the imagination condition, the difference was not significant overall or at any particular age level.

It can be seen from Table II that there was an age-related trend in the number of adaptations each child made (contingency coefficient = 0.59). The 5-year-olds made few, if any, adaptations, the most frequent being the drawing of the face in profile. There were no significant differences between the imagination and models conditions.

A Comparison Between the Standing-in-Profile and the Running-in-Profile Figures

If children differentiate between the two profile figures, then compared with the standing-in-profile figure we would expect to see the running figure's legs spread wider apart and also bent; we would also expect the arms of the running figure to be bent and with evidence of transparency or partial occlusion where the nearer arm overlaps the contour of the torso and the farther arm is partly hidden from view. For each of these

TABLE II. Percentage of children making 0-4 adaptations to their standing-in-profile figures compared with their facing figures (modal response in bold type)

Age	No. of adaptations				
	0	1	2	3	4
5	66	16	11	4	3
7	9	21	16	28	26
9	9	9	13	6	63

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TABLE III. Percentage of children making adaptations to their running figures compared with their standing-in-profile figures

Age	Greater spread of legs in running figure		Bent legs in running figure		Bent arms in running figure		Arm: occluded or transparent in running figure	
	Imagination	Model	Imagination	Model	Imagination	Model	Imagination	Model
5	48	35	10	28	5	33	0	18
7	75	80	25	68	15	70	13	58
9	88	100	31	94	25	94	44	81

features we predicted that there would be an age-related trend and that the models condition would elicit them more than the imagination condition. Table III shows the percentage of children in each age-group and in each condition who, in drawing a running-in-profile figure, made these expected departures from their standing-in-profile figures.

Even though quite a large minority of the 5-year-olds spread the legs of the running figure, significantly more of the 7- and 9-year-olds did so ($\chi^2(1) = 32.57$, $p < 0.001$). There were no significant differences between the imagination and models conditions.

For both bent legs ($\chi^2(1) = 24.20$, $p < 0.001$) and bent arms ($\chi^2(1) = 42.10$, $p < 0.001$), there were significant differences between the imagination and models conditions overall, in that the models condition elicited more bent limbs, whereas in the imagination condition children tended to draw straight limbs. For the bent legs this difference was significant for the 7-year-olds ($\chi^2(1) = 12.87$, $p < 0.001$) and 9-year-olds ($\chi^2(1) = 10.80$, $p < 0.001$), but not for the 5-year-olds. For the bent arms the difference was significant at all age levels. Within the imagination condition children at all ages tended to draw straight limbs and there were no significant age differences. Within the models condition, however, there was a shift with age: whereas 5-year-olds tended to draw straight limbs, the older children drew them bent (legs $\chi^2(1) = 19.41$, $p < 0.001$; arms $\chi^2(1) = 16.52$, $p < 0.001$).

There were overall differences ($\chi^2(1) = 24.23$, $p < 0.001$) between the imagination and models conditions in the extent to which children adapted the arms (nearer one across the torso, farther one partially occluded). Although all age-groups tended to adapt the arms in either or both of these ways in the models compared with the imagination condition, the tendency was greater among the older two groups ($\chi^2(1) = 19.29$, $p < 0.001$) than among the 5-year-olds ($\chi^2(1) = 6.81$, $p < 0.01$). Although the majority of children did not adapt the arms of the running figure in the imagination condition, there was nevertheless a significant increase of cases between the 5- and 9-year-olds ($\chi^2(1) = 16.20$, $p < 0.001$). In the models condition most 7- and 9-year-olds adapted the arms of the figure, whereas most 5-year-olds did not ($\chi^2(1) = 22.67$, $p < 0.001$).

There were no significant differences between the 5-year-olds in the imagination condition and those in the models condition in terms of the number of adaptations made to their running figure as compared with the standing-in-profile figure. Just over half made no adaptations (see Table IV), but those who did tended to spread the legs of their running figure and, to a lesser extent, bend the limbs of this figure when they could see the model. There were significant differences, however, for 7-year-olds ($\chi^2(4) = 28.18$, $p < 0.001$) and 9-year-olds ($\chi^2(4) = 14.82$, $p < 0.01$): children in the

TABLE IV. Percentage of children making 0-4 adaptations to their running figures compared with their facing figures (modal response in bold type)

	No. of adaptations				
	0	1	2	3	4
<i>Age 5</i>					
Imagination	52.5	35	10	2.5	0
Models	52.5	17.5	7.5	12.5	10
<i>Age 7</i>					
Imagination	17.5	5.0	22.5	7.5	2.5
Models	10	12.5	12.5	22.5	42.5
<i>Age 9</i>					
Imagination	19	37	12.5	12.5	19
Models	0	6.25	0	12.5	81.25

models condition made more adaptations than those in the imagination condition. There was also an age-related trend in the number of adaptations made in both the imagination condition (contingency coefficient = 0.45) and models condition (contingency coefficient = 0.55).

The adaptations made by children at each age level and in each condition are illustrated by the examples given in Figs 1 and 2.

Discussion

We set out to ascertain at what age children will adapt their drawings of the human figure in response to its orientation and the activity it is engaged in. The first comparison was between two standing figures, one facing the viewer and one facing to the right. The second comparison was between this standing-in-profile figure and one which was running to the right. We also predicted that the presence of a model would have a facilitating effect compared with children's drawing from imagination.

The results show that although some children in the youngest age-group (4;10-6;6 years) differentiated their figures, it is generally not until the age of 7 that most children did so. Typically, the figures of the 5-year-olds looked rather similar whether they were meant to be facing the viewer or in profile: both figures were drawn as if viewed from the front. There was a distinction, however, between the standing and running figures—those who were running were drawn with their legs spread wider apart—but, in general, there was little difference between those drawings produced by the 5-year-olds in the presence of a model and those produced from imagination.

Most 7-year-olds distinguished their facing and profile figures by the orientation of the face and the feet and, in the profile view, the adaptation of the arms and legs. These adaptations were even more marked among the 9-year-olds. In general, the effect of the model was not significant for the two standing figures, but was much more so for the running figure: when they had a model, 7-year-olds and, to a greater extent, 9-year-olds drew their running figures with bent arms and legs and made more use of transparency and partial occlusion.

Some of our findings confirm those of previous researchers that, with increasing age, children make more adaptations to differentiate their figures. More specifically, like Goodnow (1978) and Smith (1993), we found that one of the earliest adaptations is the greater spread of the legs to indicate a running figure. Like Smith, we also found that,

Standing-facing figure



Standing-in profile figure



Running figure



Drawn by boy aged 4 years 10 months



Drawn by boy aged 7 years 2 months



Drawn by girl aged 10 years 2 months

FIG. 1. Examples of children's standing-facing, standing-in-profile and running figures drawn from imagination.

although a few 5-year-olds adapted the faces of their profile figures, most children did not do so until the age of 7. Our findings, then, are in accord with previous research which shows that, to a limited extent, young children can and do adapt their figures. We have also confirmed Goodnow's (1978) and Cox's (1993) findings that adaptations such as the bending of the limbs and the crossing of one body part by another, either in the form of a transparency or an occlusion, is quite a late development.

In contrast with these previous studies, we gave the children information about the orientation of the figures even when they were asked to draw them from imagination. Even so, we did not find that this helped our children to differentiate their figures at a markedly earlier age than those in the other studies. We predicted that the presence of

Standing-facing figure



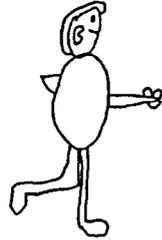
Standing-in profile figure



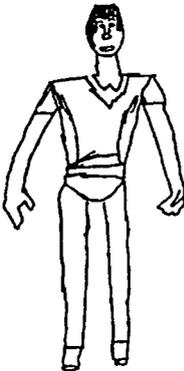
Running figure



Drawn by boy aged 5 years 6 months



Drawn by boy aged 7 years 4 months



Drawn by girl aged 10 years 3 months

FIG. 2. Examples of children's standing-facing, standing-in-profile and running figures drawn from models.

a model would have a facilitatory effect, as the child is provided with a visual cue of what to draw (in addition to the verbal description) and the model is also available for inspection throughout the duration of the task. It is perhaps surprising, then, that the models did not have a significant effect among the 5-year-olds. It was the 7- and 9-year-olds who seemed to take notice of the model and adapted their figures accordingly, giving attention to the bending and occlusion of the limbs, particularly in the running figure.

This finding, that only at the age of 6 to 7 years are most children able to adapt their human figure drawings successfully to take account of the model, is in line with various

arguments put forward in the literature. Luquet (1913, 1927), for example, proposed that young children draw from their internal model or idea of how a person is represented, rather than from any externally presented model. Piaget and Inhelder (1956) incorporated his ideas into their own work and also believed that, because they lack projective spatial concepts, young children will not represent the different views of objects, but, rather, their static *concept* of the object. This concept is akin to Luquet's internal model and can be regarded as a generic, canonical view. For Piaget and Inhelder, children's pictorial representations of objects are more or less direct reflections of their mental representations of them.

As well as these more cognitive explanations for the relative lack of adaptations in young children's schemas for the human figure, it should not be forgotten that their schemas have been practised for some considerable time, even by 5-year-olds. Further, van Sommers (1984) has pointed out that this has a very conservative effect on children's drawing: They already know how to draw the figure and may not realise or accept that they need to adapt it in a new task.

Despite the fact that our findings are in keeping, to some considerable extent, with these established ideas, there is, nonetheless, some evidence that the 5-year-olds were not simply reproducing the same form for all three figures. Many could, for example, distinguish the running figure by spreading its legs farther apart; others, although not in significant numbers, made a variety of adaptations, particularly in the models condition. It may be that some of these children did not scrutinise the model, but may already have known 'how to draw' a running figure or they may have invented it there and then. And of those 5-year-olds who did attend more closely to the model, most may have attended only to one salient feature, namely the legs of the running figure.

In a previous study of children's depictions of different views of the human figure, Cox and Moore (1994) also demonstrated that many children as young as 4 years are able to make adaptations to their figure drawings. In fact, approximately 50% of these very young children attempted to adapt a figure seen in sideview. However, whereas older children would make a number of adaptations, such as drawing the head in contour, omitting a hidden arm and drawing an occluded leg, the 4-year-olds tended to make only one change to their normal schema, such as producing a front-facing figure but omitting one eye. These small alterations indicate that young children are sensitive to the model presented to them, but are not so skilled that they can adapt the drawing enough for judges to recognise it as a figure in profile.

The fact that the young children in this and previous studies were not simply duplicating a prototype is, in fact, in line with Luquet's further contention that, by the age of 6, many children can recognise that the use of the same schema for different orientations of a model is not very satisfactory. Although they may often 'fall back' on their well-practised schema, sometimes they may be prepared to try some alterations. They may do so when, for example, the instructions include information about the activity of the figure and when a model is available. Our present study provides evidence to suggest that this is so. With increasing age, children are more likely to interpret the task as a test of their ability to draw from the verbal instructions given to them and from a model set up in front of them; they are increasingly able to attempt systematically to draw a figure's features as they see them.

Our findings suggest that even quite young children, at age 5 and possibly even 4 years, might benefit from more structured tutoring in their attempts to draw. Whether this would be effective, however, awaits further research. It would be important to establish this from a theoretical standpoint in that, if teaching were successful, it would

give added support to Luquet's contention that young children by the age of 6 are aware of the desirability of adapting their schemas according to changes in the model; the tutorial assistance would help them realise this motivation for change. A demonstration that tutoring is successful would also be of practical value in that it could form part of a teaching programme for children in infant schools. Although many teachers might criticise the teaching of drawing as being too formal and might be concerned that it will inhibit children's creativity, we would argue that, on the contrary, programmes which introduce children to a variety of ways in which a single object can be drawn will encourage them to expand their repertoire of drawing skills and not rely on a very limited range of rather 'wooden' schemas.

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