Young Children's Use of Symbolic Resources in an Experimental Setting Testing Metaphor Comprehension

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Literature on the development of child's metaphor comprehension is essentially focused on cognitive mechanisms. Thus most of the research pertains to a cognitivist paradigm. Within this epistemological framework, any child utterance that does not fit in the cognitivist's expected comprehension model is then considered as erroneous and is coded as either magical or as mere digressions. By extending the analysis to child-experimenter verbal interaction and by carrying out a psychosocial analysis of the experimental setting, the value of these supposed erroneous productions is increased and the cultural artefacts that are used by children to answer the experimental questions -which are neglected in a traditional cognitivist approach- are pointed out. Furthermore, the hypothesis is suggested that these cultural artefacts have a function for the young child when facing a new and unpredictable situation such as an experimental setting: they are used as a resource to both maintain communication with the adult and to be able to provide an answer in the context of the experiment. Lastly, cultural elements such as comic strips or cartoons that are used by children to turn this unfamiliar situation into a manageable one act as symbolic resources.

The aim of this paper is to point out the cultural artefacts used by children in an experimental setting and which are neglected in a traditional cognitivist approach. In particular, the function of cultural artefacts such as comic strips, cartoons, books will be examined in an experimental setting. Thus an experimental situation testing metaphor comprehension will be taken as an example to show how and why children import cultural elements into it.

In order to achieve this aim, the reasoning of this study will be presented in detail. To begin with, the application of the cognitivist approach to children's metaphor understanding (e.g. Billow, 1975 ; Cometa & Eson, 1978 ; Vonèche, 1986 ; Laganaro, 1997 ; Cerchia, 2004) and the limitations of such approach will be discussed. In order to overcome these limitations, the study moved from this initial framework to a socio-cultural approach. The reasoning is outlined as follows :

- First, a Piaget-indebted cognitive model on children's development of metaphor understanding completed with Searle's cognitive and pragmatic conception of metaphor (1979) will be presented. In order to outline the limitations of the cognitive model, the procedure, data coding and qualitative results will be presented.

- Secondly, cultural references introduced by participants were not taken into account as they do not fit in the pre-conceived categories pertaining to the

cognitivist model. In order to overcome this model's limitations, it is necessary to leave out normative judgement and break away from the epistemological framework so as to examine them in a second analysis.

- Finally, participants' utterances were analysed a second time, using a socio-cultural approach (see Vygotski, 1962, Bruner, 1990 ; Cole, 1996 ; Valsiner, 2009). Such stance proved more useful to outline the cultural elements of the data which had been neglected in the previous cognitivist analysis.

A NEW COGNITIVE MODEL OF CHILDREN'S METAPHOR COMPREHENSION

A new cognitive model of metaphor comprehension, which takes into account some remarks and conclusions from a critical review carried out by Franquart-Declercq & Gineste (2001) over twenty years of research on child and metaphor, will be presented. The authors showed that most of the experimental studies claim that children understand metaphors by the age of seven, due to the development of cognitive and metalinguistic abilities. However, children only fully master metaphors after the age of ten, once they have a sufficient grasp of language to understand metaphor in all its manifestations. One of their particular findings was that literature on the development of child's metaphor comprehension is essentially focused on cognitive mechanisms. And therefore, most of the research pertains to a cognitivist paradigm, in particular to the Piagetian theory of operatory activity (e.g. Billow, 1975 ; Cometa & Eson, 1978 ; Vonèche, 1986 ; Laganaro, 1997). They also showed that numerous methods were employed in such research. Although the procedures were varied, it appears that they all have in common the fact of confronting the child to a non-meaningful and non-familiar activity with language. The young child is asked to move away from the everyday use of language, which they are used to, in order to consider words or sentences out of their genuine context of enunciation, which implies spohisticated metalinguistic abilities (for a discussion on child's metalinguistic competence, see Gombert, 1990).

Based on some of the conclusions and limitations drawn from this critcal review, an experimental study was designed to test an original cognitive model of metaphor comprehension, which still remains within a cognitivist paradigm. Akin to most research, a Piagetian view of cognitive development was adopted, taking into account more recent literature on 'Theory of mind'. Based on Bradmetz's theory of concept acquisition (2001a, 2001b), metaphor comprehension is conceived as a particular case of coordination of perspectives. Such 'perspectival' conception of cognition applied to metaphor comprehension is going to be developed (For a more detailed presentation of that model, see Cerchia, 2004).

According to Bradmetz (2001a, 2001b), metaphor has the same cognitive organisation as most concepts. The author argues that all the analysis agree on the fact that a young child before about 4 years of age cannot keep in mind two different representations of the current state of the world, for example his own belief and that of Maxi in the famous 'false belief task' (Wimmer & Perner, 1983). But as soon as he is 4-5 years old, the child is able to generate and to keep in mind two contrasting representations of the world which are primarily antagonistic. By means of a mental operation which becomes reversible, he's able to pass from one representation to another.

Regarding metaphor, the following example illustrates the cognitive organisation of child's metaphor comprehension : in the expression 'Oh it's a rocket !' used by a speaker to describe a fast-galloping horse, the child has to coordinate two conflictual representations, a horse and a rocket. Metaphor condenses these two simultaneous representations based on the same world state, in that case a fast-moving horse. Therefore, the child has to keep both of them in mind at the same time to build an overordinate category which brings them together on a shared similarity.

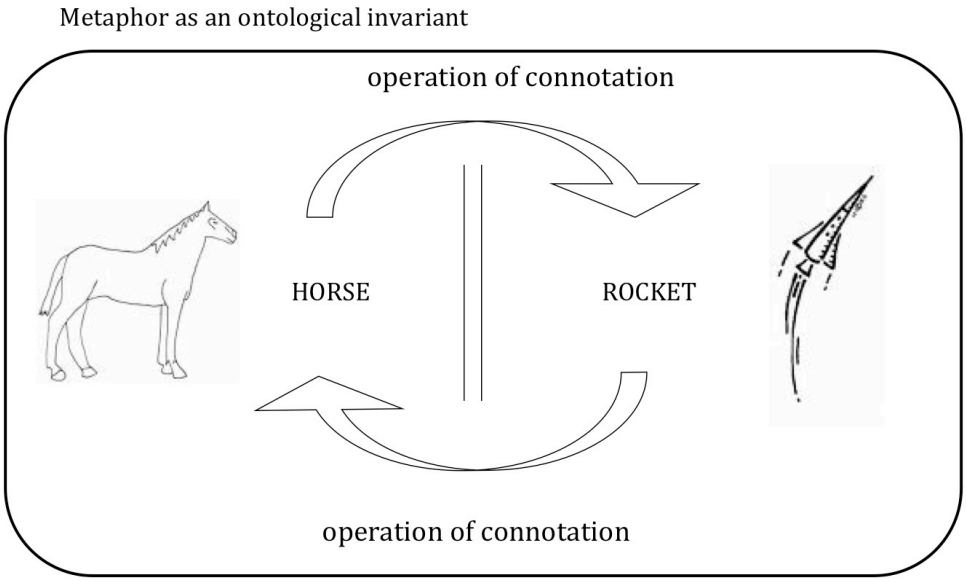

Figure 1. A cognitive model of metaphor comprehension according to Bradmetz

Figure 1 above schematizes child's reasoning when confronted with that metaphor. At first, there is a galloping horse, then a speaker says '*Oh! It's a rocket!*'. For a young child, the representations are antagonistic, and there is a conflict. He turns to one *or* the other but he is still unable to keep both in mind at the same time and to compare them on a common feature. When he is able to pass from one to the other and back, he can compare them on a similarity. In that particular case, on speed. Hence, metaphor becomes an ontological invariant, enabling the child to go from one representation to the other by a reversible operation of connotation (Bradmetz, 2001a, 2001b). This is clearly a Piagetian view on concept acquisition, even though in Bradmetz's conception, operations are not logico-mathematical ones operating on physical objects but ontological ones operating on identity.

To test this cognitive model of metaphor comprehension, an experimental study was designed. Contrary to previous studies, children were asked to interpret dialogues between two speakers, in order to put them on a 'natural' level of language to which they are used in their everyday conversations. According to Searle's cognitivist and pragmatic point of view (1979), metaphor is a particular type of discrepancy between the 'sentence meaning' – what a speaker litterally says – and the 'speaker's utterance meaning' – what the speaker actually communicates which usually diverges from what is literally said. Thus relying on their tacit pragmatic knowledge, children would be sensitive to this discrepancy and would be further able to build an ontological invariant to understand metaphors.

Method

Participants

96 French-speaking children aged 4 to 10 were divided into four groups according to age and to different experimental conditions[1].

Material and procedure

Children were shown short dialogues between two puppets discussing potentially metaphoric utterances and were then questioned on their utterances. Four dialogues corresponding to four items taking place in a farm setting using many props such as animals, houses, a couple of farmers called 'Fabien' and 'Laura' and varied objects were presented to the children. The discursive genre of the dialogues was disagreement. Here is the example of item 4. The experimenter tells a child :

> *One evening, Fabien and Laura put the horses in the paddock to avoid them escaping during the night. But one of the horses doesn't want to go in and runs very quickly, far away.*
>
> *Fabien tells Laura: 'Oh! It's a rocket !'*
> *(C'est une fusée!)*
> *Laura answers him: 'No, it's not a rocket'*
> *(Mais non, c'est pas une fusée)*

Then the experimenter asked the child: 'Why is Fabien talking about a rocket?'. The topic of metaphor varies with each item. Verbal interactions were recorded and transcribed.

Coding

Children's responses were coded according to the following criteria :

- detection and mention of the conflict of representations
- construction of an ontological invariant
- presence of metalinguistic verbs to reveal metaphor as an expression

Qualitative Results

Four developmental categories were drawn from the data.

I. *Elementary answers*

This category refers to digressions and magical responses. Here the children either do not answer or say they do not know. They can start playing with the puppets and make up a story, sometimes with a flying horse taken from cartoons or comic strips. They can also mention an event in their own lives to which the scene is related in their mind.

II. *Representations conflict*

[1] It was decided not to give further details here on the experimental conditions and on the quantitative results of the variables manipulated. Since the aim is to demonstrate that children's verbal productions can be interpreted in very contrasting ways according to the chosen epistemological stance, it is more important to describe precisely the qualitative results.

In the second category, the children take into account the conflict between the representations but still cannot go beyond it. For example, in a first type of productions, they say 'Because it's a rocket !' and starts explaining how horses can fly in films and cartoons. Or they answer 'No it's not a rocket, it's a horse'. In this second case, the children, in restoring reality demonstrate their realistic thinking. The same applies when they describe the differences between the representations not the similarities or non-relevant ones. In both cases, one representation deletes the other, there is no coordination with an ontological invariant.

III. *Ontological invariant*

In the third category, the children are able to build an ontological invariant. At that point they understand the metaphoric utterance. For example, they answer 'Because the horse is running very fast like a rocket'. Speed is the relevant category that coordinates the two conflictual representations, horse and rocket.

IV. *Figurative feature explicitation*

Finally in the fourth category, the children make the figurative feature of the metaphorical utterance stand out by using metalinguistic words or expressions such as : 'It is an expression for saying that the horse is running very fast', or 'It is a way of saying that the horse… ', or 'He wanted to say that the horse… '.

It was considered that children understand metaphor in categories III and IV but not in categories I and II because they are still blocked in the conflict between the two representations within the metaphor.

Interestingly, during the coding, it was noticed that each child's response that did not fit into the cognitivist comprehension model as expected beforehand by the researcher was considered as wrong and was coded either as magical or as mere digression in the 'elementary answers' category. It can be suggested that all these responses should be described in a more positive way, but it is difficult to do so within a cognitivist framework. The multiple meanings of the children's responses seem not to be taken into account, as the analysis is focused on confirming or infirming the cognitive model of comprehension.

Criticizing the Normative Model

It appears that this kind of cognitivist comprehension model is normative, in that it uses a pre-conceived coding scheme which defines *before* the experiment what 'right' and 'wrong' answers are. For instance when children begin to tell a story by using the puppets of the experiment, the researcher considers their story as being irrelevant or out of the spectrum of expected answers, and therefore codes their production as erroneus or magical.

To avoid the trap of judging beforehand the children's responses, it was decided to suspend normative judgements, in order to see what the children are effectively doing in that particular situation when confronted with the task and the experimenter.

Moreover, metaphor research is usually based on made-up utterances, and commonly utterances which one cannot imagine ever saying. The sentence that is focused on in the

cognitivist analysis –'it's a rocket'– appears like another case of a rather 'academic' metaphor for the purposes of academic enquiry. In this context, the children who are quoted are making a very good job of trying to find some sense in this.

Therefore, the same data was explored from a different stance based on a socio-cultural approach (see Vygotski, 1962 ; Bruner, 1990 ; Cole, 1996 ; Valsiner, 2009). This implied an espistemological rupture from the previous analysis, in order to expose the *sense* children make of the situation and to bring out the cultural elements they use and their function in communication.

A SOCIO-CULTURAL APPROACH OF CHILD'S METAPHOR INTERPRETATION IN AN EXPERIMENTAL SETTING

For the purpose of this second analysis which takes a socio-cultural perspective, it is necessary to examine all the answers that the cognitivist model cannot explain and that are considered as wrong or merely digressions.

To begin with, a psychosocial analysis of the experimental situation (Grossen, 1988 ; Schubauer-Leoni & Grossen, 1993) was carried out before the clinical analysis of the empirical data.

A psychosocial approach of the experimental situation

Firstly, the analysis was extended to the child-experimenter interaction, so as to describe how their verbal exchange mediates the child performance in the task.

Secondly, communication takes place in a 'micro-social context' (Grossen, 1988, p. 70), which means in this particular and current situation that the children engage with the experimenter, within a particular experimental design. In this experiment, the children's role is predefined by the experimenter. The children are probably subject to an experiment for the first time, taking a new role and having no representation of what is expected from them. Thus acting in a very different situation from the adult-child relationship or teacher-pupil relationship children are used to.

This interaction is also rooted in a 'macro-social context' (Grossen, 1988, p. 71), which refers to social situations and their inherent rules, values, beliefs, symbolic representations, to which they had been confronted or could have been confronted in their own lives. In this experiment, both subjects have a different status : their relationship is asymmetric because the experimenter is an adult and the subject is a child.

Thirdly, intersubjectivity is also taken into account between people if they agree on a given set of meanings or 'definitions of the situation' (Rommetveit, 1985). Does the child's defintion of the situation match with the meanings confered by the experimenter to the situation? These attributions of meanings can differ according to their own interpretation of the micro- and macro-social contexts. They are negociated all along the verbal interaction.

Based on these psychosocial reflections, a clinical analysis of the data was carried out, aiming to provide answers to the following questions : What kind of resources do the children use to answer the task ? Where do they draw their references? And for what purpose do they use these references ? What are their function in this particular situation ?

Revealing Cultural Artefacts

The children's responses were analysed a second time, however without relying on a normative model as in the previous analysis. Particular attention was paid to children's utterances when they seem not to share the same presuppositions with the experimenter about one aspect of the experimental situation.

In the example of the fourth item, young Suzan (5 ;4) changes her answer after the experimeter reiterates the experimental question

1 Exp : Why is Fabien talking about a rocket?
2 Suz : Perhaps there's a rocket in the sky in the night.
3 Exp : 'Perhaps there's a rocket in the sky by night' ok… But why is Fabien talking about a rocket?
4 Suz : Because it [the horse] is running very fast !
5 Exp : Ah 'because it's running very fast' mmh ok.

In the example of this interaction, the first child's response (turn 2 Suz) does not fit in the model of understanding as there is no attempt to link the running horse with the speedy rocket. Therefore, the experimenter considers that the child's imaginative answer is irrelevant and blocks it by reiterating exactly the experimental question (turn 3 Exp). By doing so, the experimenter invalidates the child's first answer and implicitly communicates that it does not correspond to what is expected, and that the child should change the nature of the answer. Then the child provides a new answer referring the horse's speed, hereby showing an 'appropriate' understanding, according to the pre-conceived model. In a classic conservation task, Donaldson (1983) showed that when a child is asked to justify his answer by the experimenter, the child would change his judgement. In the present study, in view of the pre-conceived categories in the first analysis, repeating the experimental question lead the child to change his answer and to 'improve' the level of the response. Aronsson and Hundeide (2002) showed that questioning children's response invalidates their first answer and conduces to change it.

Several children refer to Yakari's horse, 'Little Thunder', who gallops very quickly across the meadow (see Figure 2).

Figure 2. Yakari and his horse Little Thunder

In Switzerland, Yakari is very famous among children. Yakari is a young Indian Sioux whose peculiarity is to be able to understand and speak the language of animals. Some children use the image of Little Thunder galloping fast to pursue the story in the experimental situation. In the cognitivist analysis, this kind of answer would have been coded as wrong because it was not expected from the experimenter and did not fit in the theoretical model of comprehension.

On the contrary, it was decided that this Swiss comic strip and cartoon is a cultural element shared and known by many adults and children. The hypothesis is suggested that this kind of cultural references has a *function* for young children when facing a new and unpredictable situation such as the experimental setting : they are used as a resource to both maintain communication with the adult and to be able to provide an answer in the context of the experiment when the child and the experimenter have two divergent definitions of the situation, in other words when there is no sufficient intersubjectivity for mutual understanding. According to the experimenter's viewpoint, the situation is a game by which they intend to assess the child's cognitive capacities. From the child's point of view, the situation could be either a game as in symbolic play, or a didactic situation because they are at school and could expect help and support from the adult who can be assimilated to a teacher. The child probably relies tacitly on a 'didactic contract' which implies a very different form of interaction than the one based on a 'test contract' (Rommetveit, 1979). In a didactic situation, the teacher gives assistance to the child to solve a problem, whilst in an experimental situation, the child has to find the answer by themselves. Elbers & Keldermann (1994) showed that unfamiliarity with the rules of testing contributes to poor results in a child's response in an experimental situation and that making explicit what is *intended* from the experimenter leads to better response.

Therefore, for a young child who is not familiar with all these different 'formats' of interaction (Bruner, 1982), the activity in this situation could be difficult to recognize. In order to overcome such difficulty, cultural elements such as characters in cartoons can be used as a potential resource to answer the researcher's questions and maintain communication in a situation in which only the adult knows what is explicitly expected. The example of Sebastian (4 ;6) who refers to Hercules' flying horse - a combination of horse and rocket taken from a cartoon- illustrates this :

1 Exp : Why is Fabien talking about a rocket?

2 Seb : Well there's a horse that I've seen flying in a film. It's Hercules' horse, who has wings and can fly.
3 Exp. : Ah ok it's Hercules' flying horse.
4 Seb : Yes and he's also white like the one who has just entered… and he's even got blue hair!

In this example, Sebastian imports Hercules and his flying horse (see Figure 3 below) in the experimental situation to compare it with 'the one who has just entered' (turn 4 Seb) in this particular experimental setting.

Figure 3. Hercules and his flying horse

Many other children refer also to Pegasus, the flying horse from the Greek and Roman mythology. In Switzerland, Pegagus is very popular among children because of the cartoon 'Knights of the Zodiac'.

Umberto Eco (2002) considers that some fictional characters, such as the very famous *Madame Bovary* in French literature or *Little Red Cap*, 'migrate' (p. 15)[2] from the text and enter into collective memory. To develop on Eco's metaphor, it can be supposed that they are like exiles who drift in the cultural space and provide cultural models in order to understand reality, in fact to make it understandable. By analogy, it can be suggested that Little Thunder, Hercules or Pegasus 'migrate from the screen' and help children to confer a meaning to the event happening in the experimental situation.

Cultural Elements as Symbolic Resources

In this second analysis, the hypothesis that these cultural elements are used by children as 'symbolic resources' (Zittoun et al., 2003 ; Zittoun, 2007) can be suggested. But what is actually a symbolic resource?

Zittoun (2007) notices that people do not always have the relevant knowledge or skills or experience to face ruptures or to address unfamiliar situations in their everyday life. Culture presents people with semiotic tools that enable them to deal with such uncertainties, because they encapsulate others' experiences and interpretations of the world and might thus support the transition processes of turning the unfamiliar into manageable environments. The author gives the example of Julie who has been told that

[2] Our own translation.

she would have to spend three months in Spain. She surprises herself reading Spanish novels, watching Spanish films and listening to Spanish music. She is using these various cultural elements as symbolic resources to develop some *representations* about the country she is going to visit.

As the concept of Spain was for Julie, the experimental situation could be unfamiliar for young children who do not have the clues to understand what is expected from them, what their role is and what the current activity is. Under the adult's tacit pressure of having to give an answer, the children use cultural elements to maintain communication and to provide an answer because they probably cannot identify exactly the experimenter's intentions. It is their personal and unique use of a cultural artefact such as comic strip heroes – Hercules, Yakari or Pegasus, in a particular situation, for a special purpose, that characterizes it as a symbolic resource.

CONCLUSION

By extending the analysis to child-researcher verbal interaction, and by carrying out a psychosocial analysis of the experimental setting, supposedly erroneous child responses that do not fit in a cognitivist model have their value increased, by revealing the cultural artefacts that the children use to answer the experimental questions.

In this paper, it has been demonstrated that cultural elements can be used by children to both maintain communication with the adult and to provide an answer in an experimental context, when there is no sufficient intersubjectivity between the child and the experimenter. In other words, the children use cultural elements as symbolic resources to turn this unfamiliar situation into a manageable one.

In conclusion, a child's response that does not fit within a theoretical cognitivist model could be interpreted as a lack of internal skill in a specific area of knowledge, in this very case metaphor comprehension. But the child's conduct can also be interpreted as another definition of the situation and of the interaction format. Therefore, it could be considered as a strategy employed by the child to maintain communication with the adult and to respond in some ways to their expectations, when it is difficult to acknowledge the adult's presuppositions.

Finally, on a more general level, it is noticed that shifting an epistemological framework, and correlatively changing the method of analysis allows the researcher to show how children use semiotic tools to mediate their relation to the world and to others (Vygogtski and Luria, 1930/ 1994) and how culture and cognition are interrelated: in that cultural elements structure the cognitive thinking which cannot be considered as isolated from a socio-cultural context.

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