DOCUMENT RESUME

ED 390 878 TM 023 048

AUTHOR Caramelli, Nicoletta; Montanari, Angela
TITLE Animal Terms in Children's Methaphors. No. 53.
INSTITUTION Lund Univ. (Sweden). Cognitive Science Research.
REPORT NO ISSN-0281-9864
PUB DATE 95
NOTE 36p.; Paper presented at the International Congress for the Study of Child Language (6th, Trieste, Italy, July 18-24, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Age Differences; Animals; Child Development; *Children; *Comprehension; Foreign Countries; Interpretive Skills; *Language Acquisition; Language Proficiency; Language Skills; *Metaphors
IDENTIFIERS *Lexical Access

ABSTRACT

Whether children shift their interpretations of a metaphor according to the social role of the speaker and the addressee of the sentence or the degree of lexicalization of the metaphor and the child's age was studied using a simple metaphorical sentence and animal terms. The 12 animal terms produced 6 lexicalized and 6 new metaphors. Metaphors were embedded in short stories with: (1) speaker and addressee both children; (2) child speaker and teacher addressee; (3) teacher speaker and child addressee; and (4) speaker and addressee both teachers. The 48 stories were told to 72 children aged 6, 9, and 11 years, and each child was asked what the speaker intended to mean and whether he or she had positive or negative feelings for the addressee. The paraphrases children gave for each metaphor were analyzed, and data were tabulated as to perceptual dimensions. Children aged 9 and 11, but not 6-year-olds, acknowledged the role of the speaker and the addressee, requiring more words to interpret the metaphor presented by a teacher to another teacher than to interpret the metaphor addressed by a child to another child. The meaning of the same metaphor also changed with the child's age. (Contains 7 figures, 9 tables, and 13 references.) (SLD)

Animal Terms in Children's Methaphors

Nicoletta Caramelli
Angeli Montanari

1995 No. 53

Animal Terms in Children's Methaphors

Nicoletta Caramelli
Angela Montanari

1995 **No. 53**

Cognitive Science Research

Lund University
Sweden

Postal address

Cognitive Science Research
P.O. Box 7080
S-220 07 LUND
SWEDEN

Editor

Bernhard Bierschenk
Department of Psychology
Lund University

Adm. editor

Helge Helmersson
Department of Business Adm.
Lund University

ABSTRACT

This research aims at showing that children shift their interpretation of the same metaphor according to the social role respectively of the speaker and the addressee of the sentence, to the degree of lexicalization of the metaphor, and to their age. We chose the simplest type of metaphorical sentence, i.e. the 'nominal' one in the form 'X is a B', where X was a proper name and B an animal term. The twelve animal terms used produced six lexicalized and six new metaphors. Every metaphor was embedded in four different short stories describing the setting in which it was uttered: in the first the speaker and the addressee were both children, in the second the speaker was a child and the addressee was a teacher, in the third it was the reverse and in the last the speaker and the addressee were both teachers. The forty-eight stories obtained were told individually to seventy-two children aged six, nine and twelve. At the end of the story the experimenter asked the child what the speaker intended to mean, why, and whether he had positive or negative feelings for the addressee. The paraphrases the children gave for each metaphor were analysed with instruments typical of textual data analysis. Furthermore the data were tabulated as to the perceptual dimensions: shape, color, sound, movement; the physical or moral evaluation; and positive or negative connotation. On these data too several statistical analyses were performed.

Metaphorical Comprehension: Some Prerequisites

In the last twenty years, psycholinguists have spent much effort in studying figurative language and metaphorical sentence comprehension. Child language scholars have played a leading role in highlighting how many interwoven aspects characterize its comprehension, greatly improving our knowledge in this field on both theoretical and methodological grounds. This rapid development has resulted in a wealth of approaches, some competing some complementary. The following points clarify the view adopted in this study.

1. The comprehension of metaphoric language does not differ from that required by literal language; in metaphor comprehension no stages are required since there is no need to recover the literal meaning of the sentence. This assumption can be advanced on two different and complementary arguments. According to the first, metaphorical sentences to be comprehended do not require longer response times than literal sentences as shown by Glucksberg (Glucksberg, Gildea & Booking, 1982). According to the second, inspired by the ecological approach, metaphor comprehension is direct as Verbrugge (1980) held when observed that 'meaning is a psychological relation' activated by a virtual experience relying on the direct biological processes of imagination and perception. In a slightly different perspective, Palermo (1986) has stressed the pervasiveness of ambiguity in language so that metaphor comprehension is not an exception but the rule in ascribing meaning to sentences.
2. Meaning is a construction largely based on inferences, world knowledge, language knowledge, and pragmatic abilities: particularly in children, the meaning of a metaphor rests on an intended meaning the grasping of which can be enhanced by inferences.
3. The information provided by the extrinsic, be it linguistic or situational, and the intrinsic context helps in directing inferences for the construction of the metaphorical meaning (Vosniadou, 1989).
4. Domain knowledge interacts with context information in making both inferences and meanings plausible (Keil, 1986).
5. Metaphors are not grounded on similarity which is their by-product, but on an analogical transfer of knowledge from one domain to another. Children transfer their knowledge of concrete, real properties of the natural and social world by shifting from one domain to another. As they grow up, they can transfer more and more abstract knowledge (Gentner, Falkenhainer & Skorstad, 1988).

The last three points, which are methodological in nature, introduce the research:

6. Metaphors are not a fixed linguistic construct, there are many types of them which differ in their conceptual complexity; moreover, if their comprehension depends on domain knowledge, children's failure in understanding them is due to their actual knowledge of the domains involved, not to a difficulty in grasping the intended metaphorical meaning. Very often metaphors of different complexity are used in the same research without checking children's knowledge of the domains involved. Only one type of metaphor, and the simplest type, the predicative one i.e. 'A is B' in which A is called the topic and B the vehicle, and only one familiar knowledge domain can reduce the stimuli variability to a minimum (about the inconsistent conceptualizations of metaphors see Siltanen, 1990).

7. As the beginning of metaphorical sentence comprehension is one of the most widely studied topics of research in this field, several tasks were devised which could be understood and performed by very young children. Some of these, however, required children to perform an extra cognitive work like choosing from different alternatives in artificial conditions (Siltanen, 1990). The simple paraphrase task is the most natural response and prevents the experimenter from over-interpreting children's responses as well as from narrowing their scope.

8. When children do not grasp the meaning of a metaphor as intended by the experimenter, very often their interpretation is labelled as a simple association, as a magical, fanciful and bizarre response. The unexpected response is considered as a failure in comprehension and for this reason it is discarded, even if it is meaningful to the child. It is our contention that a more careful analysis of the supposed 'deviant' responses could clarify the conceptual dynamic which grounds children's interpretation of metaphors and which leads them to construct a meaning different from the commonly intended one. An analysis of the sentences used by children to express what they think a metaphor means, the paraphrase task, could greatly improve our knowledge of the peculiar grounds on which children's construction of the meaning of metaphors rests.

If extralinguistic knowledge plays a role in the construction of meaning in metaphorical sentences, the peculiar interpretation of a very simple predicative metaphor can reflect not only children's expertise in a specific knowledge domain, as shown by Keil (1986), but, more generally, their world knowledge.

Our hypothesis is that children give the same metaphorical sentence different meanings according to 'the intrinsic context' of metaphors which provides the 'culturally shared knowledge' as Vosniadou (1989) has suggested.

One knowledge domain spontaneously acquired by children concerns social relations and, first of all, the peculiar relationship between children and adults. Part of this knowledge is the pragmatic competence about the different roles played by the 'speaker' and the 'addressee' of language: so, for instance, when a metaphor is said by a child (speaker) about another child (addressee) or by a teacher (speaker) about another teacher (addressee) there is a peer relation condition while, when a metaphor is said by a child (speaker) about a teacher (addressee) or by a teacher (speaker) about a child (addressee), there is an uneven relation condition.

We argue that this knowledge provides children with the intrinsic context which allows them to ascribe different meanings to the same metaphor and, since this knowledge changes with age, the interpretation of metaphors, too, will change.

To test this hypothesis, as the field from which to select the terms to be used metaphorically, we chose a knowledge domain: the animal terms, which is well defined (Hemley, 1969) and well known even to very young children. Actually, many animal terms are frequently used in a figurative sense to address or characterize people: they produce frozen metaphors which have a more or less conventional or stereotyped meaning (Kelley, Keil, 1985). Many other animal terms, however, are hardly ever used in this way, but if they are used metaphorically, they produce novel metaphors.

Method

Subjects

Subjects were 72 children enrolled in a public elementary school; they were chosen at random from different classes in order to have three groups with 12 male and 12 female children each; the average age in each group was 6.4, 8.7 and 10.9 respectively. They were tested at school in a separate room individually.

Materials

Twelve predicative metaphors of the form 'A is a B', in which A is called the 'topic' and B the 'vehicle' of the metaphor, were formed with a proper name as the 'topic' and the name of an animal as the 'vehicle': for instance 'John is a rabbit'. We had six frozen metaphors made up of the terms elephant, fox, lion, sheep, snail and wolf, and six novel metaphors made up of the terms cod, crow, grasshopper, kangaroo, ladybird, and zebra.

Each metaphor was preceded by a short story which explained the relationship between the speaker and the addressee of the metaphorical target sentence. The speaker could be a child addressing another child or a teacher, or a teacher addressing a child or another teacher.

The stories setting the pragmatic condition when the child was the speaker were:

- Child addressing another child - condition (CC): 'There was a boy called Paul. He lived next door to a boy called David. They used to play together. One day David said: 'Paul is a ...'
- Child addressing a teacher - condition (CT): 'There was a boy called Mark: Mark went to school and his teacher was called Mr Smith. One day Mark said: 'Mr Smith is a ...'

The stories setting the pragmatic condition when the teacher was the speaker were:

- Teacher addressing a child - condition (TC): 'In St. Paul school there was a teacher called Mr White and one of the pupils was called Robert. One day Mr White said: 'Robert is a ...'
- Teacher addressing another teacher - condition (TT): 'In St. Andrews school there was a teacher called Mr Jenkins. Another teacher was called Mr Parker. They used to spend break-time together. One day Mr Jenkins said: 'Mr Parker is a ...'

As can be seen, the stories were always the same, except for the names of the boys, the teachers and the animals. So twelve metaphorical sentences, six of which ending with a frozen metaphor and six with a novel one, were presented embedded in a story in the four conditions: a child as the speaker and a child as the addressee (CC), a child as the speaker and a teacher as the addressee (CT), a teacher as the speaker and a child as the addressee (TC), and a teacher as the speaker and a teacher as the addressee (TT). Accordingly, the experimental material consisted of 48 stories (12 animal terms metaphors embedded in the four conditions).

Design and Procedure

In order to avoid boring children too much, the experimental material, consisting of 48 stories, was presented in a balanced way in four different sessions, at school in a separate room, in a friendly atmosphere.

After reading to a child one of the twelve stories of the session, which were presented to all the children one at a time, the experimenter asked him or her what the speaker might mean, and then whether the speaker liked or disliked the addressee. The responses were transcribed word by word. Then another story was read and so on.

To verify whether children give different meanings to the same metaphorical sentence when uttered in different pragmatic contexts and whether the meaning they construct changes with age, different analyses were performed on the collected data.

1) The number of different words produced by children of different ages in each pragmatic condition, for the whole set of metaphors and separately for frozen and novel ones, has been analyzed by Friedman non-parametric analysis of variance[1], in order to assess the effect of the context on children's capacity of paraphrasing metaphors, while controlling for age differences. (See Tab. 2-4)

2) Furthermore, for each metaphor, the dependence existing between the pragmatic conditions and words used to paraphrase metaphors was analyzed through correspondence analysis performed on a cross-tabulation of words (only those used more than three times entered the analysis) by an "artificial" variable obtained compounding age and context (its states are 6CC, indicating 6 years old children interpreting a metaphor related to a child-to-child relation, 6CT indicating children of the same age dealing with a child-to-teacher context, and so on for each age class and each different pragmatic condition, up to a number of twelve different codings).

---

[1] Friedman Anova is a non paramet ic test based on ranks, purposely developed "to avoid the assumption of normality implicit in the analysis of variance" (Friedman, 1937). In the problem at hand, in fact, the number of different words could hardly be assun.ed to follow a normal distribution.

Furthermore Friedman test assumes a randomized block experiment, just like the one we performed. In fact, each age group represents a separate homogeneous group of test subjects (in other words it is a block). It was then appropriate to compare the subjects only within each block by ranking them separately within a given block. The ranks for each pragmatic condition are summed over the blocks and are compared with the ranks sums that would have been obtained the pragmatic condition having no effect on the number of words uttered. The test statistics is then:

$$T = \frac{12}{nk(k+1)}(R_1^2 + \ldots + R_k^2) - 3n(k+1)$$

where n is the number of blocks, k the number of different pragmatic conditions and R_i the sum of ranks corresponding to the i-th pragmatic condition.

The aim of the analysis is to measure the distance between the rows of the table and between the columns[2] and then to represent both rows and columns on a scatter diagram where words plotted far apart indicate that they have had a different use with respect to the different pragmatic conditions and distant age-context codings indicate that they have been characterized by a different use of words.

In our application up to 11 dimensions (the number of age-group codings minus one) could be determined to account for the words-context dependence, but just four or five seemed to give a good approximation to the global variability (*inertia*) and thus were examined in what follows. For clarity reasons only those words mainly contributing to the inertia explained by each dimension were graphically represented while all age-context codings appear in the graph independently of their role in the definition of the dimension. Furthermore, in order to highlight the most important aspects of each dimension the most relevant words or codings for the dimension represented in abscissa have been written in bold while those mostly affecting the ordinate are in italics. (See Figs.1-2, 4-5)

3) Correspondence analysis has been further completed by what is called "specificity analysis" (Lafon, 1980) performed, for each metaphor, on the table crossing all words (not just those detected more than three times) and age-context codings.

Through this analysis one evaluates the probability that a given word is used in a given context the observed number of times or more (or less) under the assumption that the number of occurrences of the word is random, that is, in other terms, that there's no preferred association between the word and the context considered (the total number of occurrences of the word, the total number of words used and the total number of words used by children in the pragmatic condition considered being fixed).

One then compares the calculated probabilities with a pre-set threshold value. If the probability to obtain the observed number of occurrences or more is less than the threshold one concludes that the word considered is over-represented with respect to what the probability model predicts, and so one can say that the word has a positive specificity for the given context. On the contrary, if it is the probability to obtain the observed number of occurrences or less that is lower than the threshold it means that the word is under

[2] To be more precise, one indeed measures the distance between "row profiles" and between "column profiles", that is row entries divided by the row total and column entries divided by the column total.

represented or that, to put it in another way, it has a negative specificity. If neither of the above mentioned probabilities is below the threshold one says the word is banal for the given context.

Table 1.

Scored dimensions on which Friedman Anova and multiple correspondence analysis where performed

SEX			
Male	M	Female	F
VISUAL RESEMBLANCE (V.R.)			
appearance (a)		0 absent 1 present	
shape (sh)		0 absent 1 present	
colour (c)		0 absent 1 present	
sound (s)		0 absent 1 present	
movement (m)		0 absent 1 present	
PHYSICAL JUDGMENT (PhJ)			
absent	(0)		
big	(b)		
small	(s)		
fine	(f)		
ugly	(u)		
MORAL JUDGMENT (MJ)			
absent	(0)		
good	(g)		
bad	(b)		
neutral	(n)		
clever	(c)		
stupid	(s)		
ACTION DIMENSION (Act)			
(as expressed for instance by verbs)			
absent	(0)		
present	(1)		
LIKING DIMENSION (Lik)			
negative		(0)	
positive		(1)	
half and half		(2)	

4) The paraphrases of the metaphors were also coded according to the dimensions shown in Table 1 and a Friedman Anova was performed (both on the whole set of metaphors and on novel and frozen ones separately), for each age group, on the number of times each dimension (with the exclusion of sex and visual resemblance) had been used in the different pragmatic conditions, making a block of each metaphor.

5) In the end, the same coding shown in Table 1 was also used to perform a multiple correspondence analysis[3]. This technique may be viewed as a generalization of correspondence analysis to situations in which more than two variables are involved. It is performed on a data matrix whose rows represent the individuals and whose columns are the set of the states the different characters considered can assume. The entries of this Table are 1 or 0, 1 indicating that the individual bears the modality represented in the column in which it appears. This technique too produces a graphical output that is really helpful in highlighting the interrelationships existing among the observed characteristics. (See Fig. ~ and Figs. 6-7)

Results

The results of Friedman Anova on word frequencies (see Tabs. 2-4) suggest that the number of different words used by children to paraphrase the metaphors does not significan y change with the pragmatic conditions. A careful analysis of data however shows that this result is entirely attributable to the behaviour of six year old children; in fact the rank order of the number of words uttered by aged six children differs completely from that shown by 9 and 11 children's productions. In the child speaker/child addressee condition children aged 9 and 11 use the least number of different words, while in the teacher speaker/teacher addressee condition they use the largest number of different words. The number of different words used means that children put greater effort into interpreting what a teacher may have intended to say of another teacher than into interpreting what a child may have intended to say about another child. Aged 6 children, on the contrary, do not show a sensible difference in the number of words produced in each pragmatic condition and this seems to mean that they do not yet differentiate the different pragmatic roles.

[3] Contrary to the analysis described in 3) also the sex of the child and the liking dimension (as expressed by the responses given to the second question) were considered.

Table 2.
Number of different words produced by children on the whole set of metaphors in each pragmatic condition

Age	CC	CT	TC	TT
6.4	996	986	972	956
	(4)	(3)	(2)	(1)
8.7	782	920	989	1332
	(1)	(2)	(3)	(4)
10.9	809	900	905	999
	(1)	(2)	(3)	(4)

Note. The numbers in brackets are the scores inside each block used to perform Friedman Anova.

Friedman Anova: $T = 1$ $p = 0.80$

Table 3.
Number of different words produced by children on the set of frozen metaphors in each pragmatic condition

Age	CC	CT	TC	TT
6.4	493	476	510	504
	(2)	(1)	(4)	(3)
8.7	346	389	468	686
	(1)	(2)	(3)	(4)
10.9	349	389	423	473
	(1)	(2)	(3)	(4)

Note. The numbers in brackets are the scores inside each block used to perform Friedman Anova.

Friedman Anova: $T = 7.4$ $p = 0.06$

Table 4.

Number of different words produced by children on the set of novel metaphors in each pragmatic condition

Age	CC	CT	TC	TT
6.4	503	510	462	454
	(3)	(4)	(2)	(1)
8.7	436	531	521	646
	(1)	(3)	(2)	(4)
10.9	460	521	482	526
	(1)	(3)	(2)	(4)

Note. The numbers in brackets are the scores inside each block used to perform Friedman Anova.

Friedman Anova: $T = 3.4$ $p = 0.033$

The pragmatic conditions affected also the devised dimensions according to which we scored the responses. As to the whole set of metaphors, the paraphrases by children aged six were affected by the pragmatic conditions on three out of the four dimensions we considered. In fact the Friedman Anova (see Tabs. 5-7) showed the effect in the physical judgment, moral judgment and action dimensions while the liking dimension was not affected. The action dimension was affected by the pragmatic conditions also at nine and eleven; it was the only dimension affected in the interpretations given by nine year old children, while in children aged eleven the relationship between the speaker and the addressee of the metaphor affects not only the action but also the liking dimension. This same pattern of influences can be found in the set of the novel metaphors, except for a minor difference: at six the moral judgment dimension is not affected by the role of the speaker and the addressee. On the contrary, in the frozen metaphor set, the pragmatic conditions affect only the action dimension at six and nine.

Table 5.

The effect of the pragmatic conditions on the scored dimensions of children's interpretations. Friedman Anova on the whole set of metaphors

Age	Ph.J.	M.J.	Act	Lik
6.4	T=8.04	T=7.83	T=23.11	T=4.51
	p=0.045	p=0.05	p=0.000	p=0.21
8.7	T=1.05	T=4.4	T=21.37	T=4.18
	p=0.79	p=0.22	p=0.000	p=0.24
10.9	T=6.52	T=4.84	T=14.87	T=8.33
	p=0.09	p=0.18	p=0.002	p=0.04

Table 6.

The effect of the pragmatic conditions on the scored dimensions of children's interpretations. Friedman Anova on the set of frozen metaphors

Age	Ph.J.	M.J.	Act	Lik
6.4	T=2.51	T=4.85	T=9.88	T=3.75
	p=0.47	p=0.18	p=0.02	p=0.29
8.7	T=1.98	T=3.96	T=12.05	T=1.77
	p=0.58	p=0.27	p=0.007	p=0.62
10.9	T=5.26	T=5.20	T=7.26	T=2.58
	p=0.15	p=0.16	p=0.06	p=0.46

Table 7.
The effect of the pragmatic conditions on the scored dimensions of children's interpretations. Friedman Anova on the set of novel metaphors

Age	Ph.J	M.J.	Act	Lik
6.4	T=6.5	T=3.28	T=13.86	T=4.2
	p=0.09	p=0.35	p=0.003	p=0.24
8.7	T=3.27	T=6.69	T=11.07	T=6.8
	p=0.35	p=0.08	p=0.01	p=0.08
10.9	T=1.87	T=6	T=7.8	T=7.2
	p=0.6	p=0.11	p=0.05	p=0.07

This fact is not surprising: as we have seen, frozen metaphors were affected by the pragmatic conditions as to the number of different words used to paraphrase their meaning but not so much by the dimensions of the interpretation they generated: the shifting of their meaning depends on the intrinsic context in which they are produced rather than on what we can call an effort after meaning which is evident when we ask children to paraphrase novel metaphors. Frozen metaphors are given a meaning by default according to the specific communicative setting, in a way it is a ready made meaning, while novel metaphors to be understood have to be given a meaning whose construction is directed by the world knowledge of the interpreter.

If, in the light of the evidence put forward in this study, this argument may appear a bit speculative, the other analyses performed on the paraphrases produced by the children, show that it is not the case.

Actually, we began our analysis of the data from the correspondence, specificity and multiple correspondence analyses which were performed on the whole set of metaphors. However, for brevity sake, only two examples, one from the frozen (the lion) and the other from the novel (the zebra) metaphor set will be given here.

As can be seen from the graphical representation of correspondence analysis of the lion metaphor, four dimensions account for about sixty per cent variability in the responses. (See Figs. 1-2)

In this case the dimensions can be interpreted as:

1. Age: six year old children clearly cluster together on the basis of 'play', the 'sign Leo', 'carnival' and the 'mane', which clearly are produced by 'culturally shared knowledge'; nine and eleven year olds, on the other hand, are characterized by the common moral judgment: at nine the meaning of the metaphor is that the addressee is strong; at eleven that he is brave.
2. The second dimension is a pragmatic condition, namely the condition child speaker child addressee, characterized by 'play' at six, by 'strength' at nine and by 'capability' at eleven, as opposed to the other pragmatic conditions characterized by fictitious physical aspect at six, and by moral evaluation related to bravery and power at eleven.
3. The third dimension is the moral judgement linked to age since for nine year olds the intended meaning of the metaphor is that the addressee is 'violent' with a negative connotation, while for the other children the connotation is positive: 'brave'.
4. The fourth dimension is again related to the pragmatic conditions since at eleven as well as at nine the teacher addressee is opposed to the child addressee, but this does not hold for six year old children. This result confirms what we argued from word frequency analysis.

The words over-represented in the children's responses, as shown by the specificity analysis, are mainly the same highlighted by the correspondence analysis, as can be seen in Table 8.

More or less the same pattern of results can be found in the multiple correspondences analysis, which will be briefly illustrated (see Fig. 3). Again the first dimension accounts for age differences: children aged six relay exclusively on visual resemblances; children aged eleven on moral judgment while nine years olds are in between. The second dimension expresses liking related to a positive moral judgment as opposed to disliking related to a negative moral judgment. As to the third and the fourth dimensions, the results are not well defined and clear.

As to the novel metaphor on zebra, the correspondence analysis (see Figs. 4-5) shows that, in this case too, age is the first dimension and six year old children are opposed to the older children since their interpretation is based on the concrete visual resemblances between the animal and the humans: humans can be dressed like a zebra if their clothing has black and white stripes: pyjamas may be an example of such clothing - perhaps in another context this interpretations could be viewed as a bizarre response, but not here. Older children, instead, base their interpretation on the culturally shared knowledge about the colours of an Italian football team: Juventus, and so the addressee of the metaphor becomes a fan of that team.

Table 8.
Specificity analysis for the "lion" metaphor

6CC	6CT	6TC	6TT	9CC	9CT	9TC	9TT	11CC	11CT	11TC	11TT
lion	bad	hair	to go	clever	to get angry	is	beautiful	character	aggressive	clever	pupils
Paul	teeth	tail	hair	perhaps	bad		teacher	brave	brave	leader	to lead
animal	teacher	does	mane	strong			screams	was	strict	class	brave
to walk	likes	deceit	many	is				strong	scolds	courage	king
perhaps		lion	like					grit	nice	brave	succeeds
me									everybody	king	to respect
lot										school	wants
Leo											
has	is	strong	bad		lion	lion					
		is	strong								
			is								

Note. Upper table: words with positive specificity; lower table: words with negative specificity.

The second dimension can be interpreted as the contrast between the clothing as a concrete object and the dress as the symbol of the football team. The third dimension distinguishes the nine year old children from the others since their interpretation is based on a moral judgment as 'capable' or 'bad' as opposed to the physical aspect characteristics. Finally, the fourth dimension acknowledges the pragmatic conditions in children's interpretations: the child as both the speaker and the addressee of the metaphor determines a condition which differs from the remaining pragmatic conditions.

As to the specificity analysis, it confirms that at eleven children give a culturally bounded interpretation to metaphors (see Tab. 9).

In the multiple correspondence analysis (see Figs. 6-7) the first dimension is still related to age: at six visual resemblance is opposed to moral and physical judgments at nine as well as at eleven. The second dimension is liking *vs* disliking. The third dimension opposes good and bad moral judgments. Finally the fourth dimension does not show a clear pattern.

Table 9.
Specificity analysis for the "zebra" metaphor

6CC	6CT	6TC	6TT	9CC	9CT	9TC	9TT	11CC	11CT	11TC	11TT
painted	to ride neck weak zebra	had white tail stripes	white black pyjamas	clever to play wears is	perhaps they have escapes vegetarian	school	wears clothing	contrasting juventino fast wants	tall animal juventino	juventino was fast to be a fan	juventino quickly
stripes clothing is		juventino is		clothing	clothing	was zebra					

Note. Upper table: words with positive specificity; lower table: words with negative specificity.

So, several tests verified the hypotheses we started with: we have demonstrated that 'world knowledge' and 'culturally shared knowledge' play an important role in the comprehension of metaphors. The intrinsic context of metaphors shapes the construction of metaphorical meaning providing the interpreter with different contents at different ages. Moreover, the pragmatic conditions in which metaphors are uttered play a relevant role in shaping their meanings.

The interest of this research consists also in showing that the verbal analysis through correspondence analysis of the interpretations given to metaphorical sentences highlights the conceptual dimensions underlying the comprehension of metaphors avoiding to impose on our data the structures we are expecting. Scoring dimensions can guarantee comparability between experiments and materials but, at the same time, may conceal the implicit structure of the data.

Discussion

At the beginning of the paper, a number of assumptions about the comprehension of metaphors and their meanings were advanced. The inferential character of the intended

meaning of metaphors as the role played by the extrinsic and intrinsic contests in which the metaphor is used, and by the world and language knowledge of both the speaker and the addressee of the sentence was highlighted.

In this frame of reference, our research aimed at showing how the meaning metaphors can be given depends also on the knowledge the metaphor comprehender has of the social role played by both the speaker and the addressee of the metaphorical sentence. To this purpose an experiment was devised from the results of which it is possible to conclude that even children aged nine and eleven, but not six, in paraphrasing a metaphorical sentence acknowledge the socio-pragmatic role of both the speaker and the addressee of the sentence. Actually they need more words in order to interpret the metaphor when it is produced by a teacher and addressed to another teacher than when it is produced by a child and addressed to another child.

The meaning of the same metaphor changes also with the age of the interpreter: at six children rely on the physical and moral judgments as well as on the action dimension; at nine only on the action dimension, while at eleven to this dimension the connotative meaning of the sentence (positive or negative character of the intended meaning of the metaphor) is added. Finally, the novel metaphors paraphrases require children to rely on more dimensions for giving them a meaning than the frozen ones; it seems that they require a greater effort after meaning than the frozen metaphors the meaning of which is, in a way, a stereotyped one.

Correspondence analysis of the lion metaphor.

Plot of words and groups on the plane defined by the first two dimensions

(the first dimension explains 21.25 % of the total inertia, the second dimension 13.77 %)

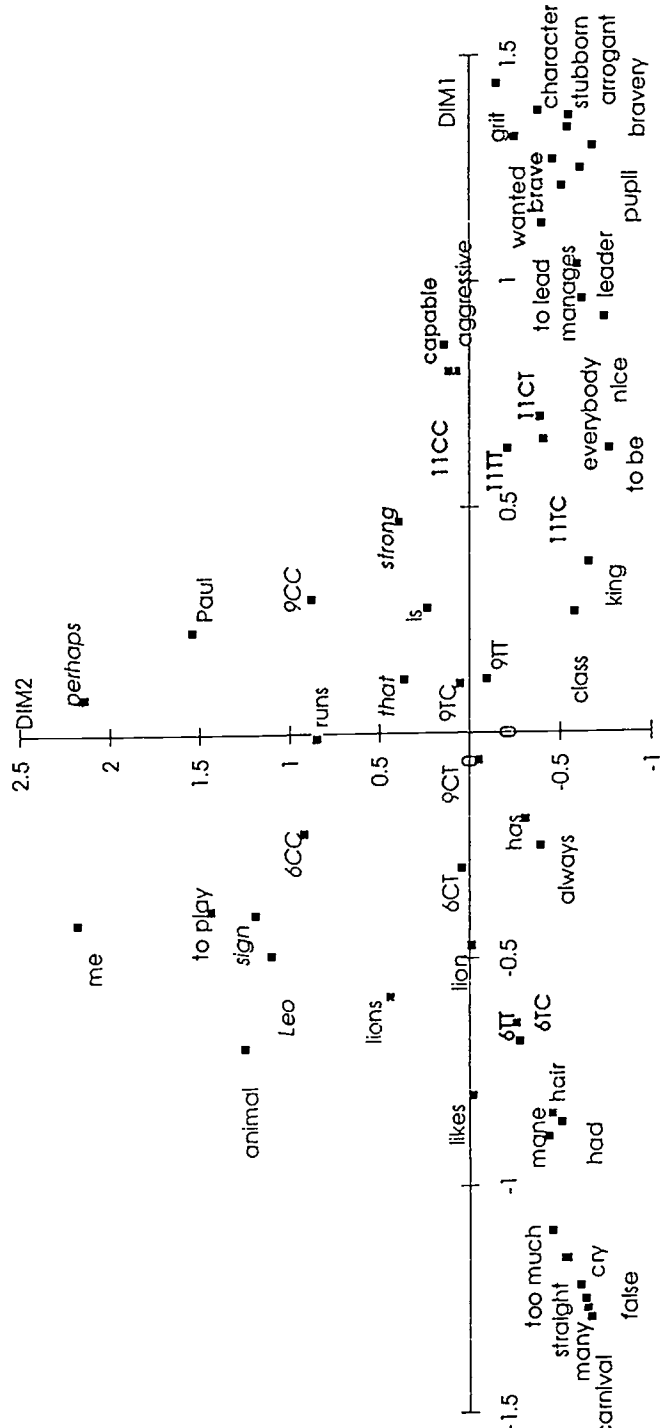


Figure 2.

Correspondence analysis of the lion metaphor.

Plot of words and groups on the plane defined by the third and fourth dimension

(the third dimension explains 12.27 % of the total inertia, the fourth dimension 9.99 %)

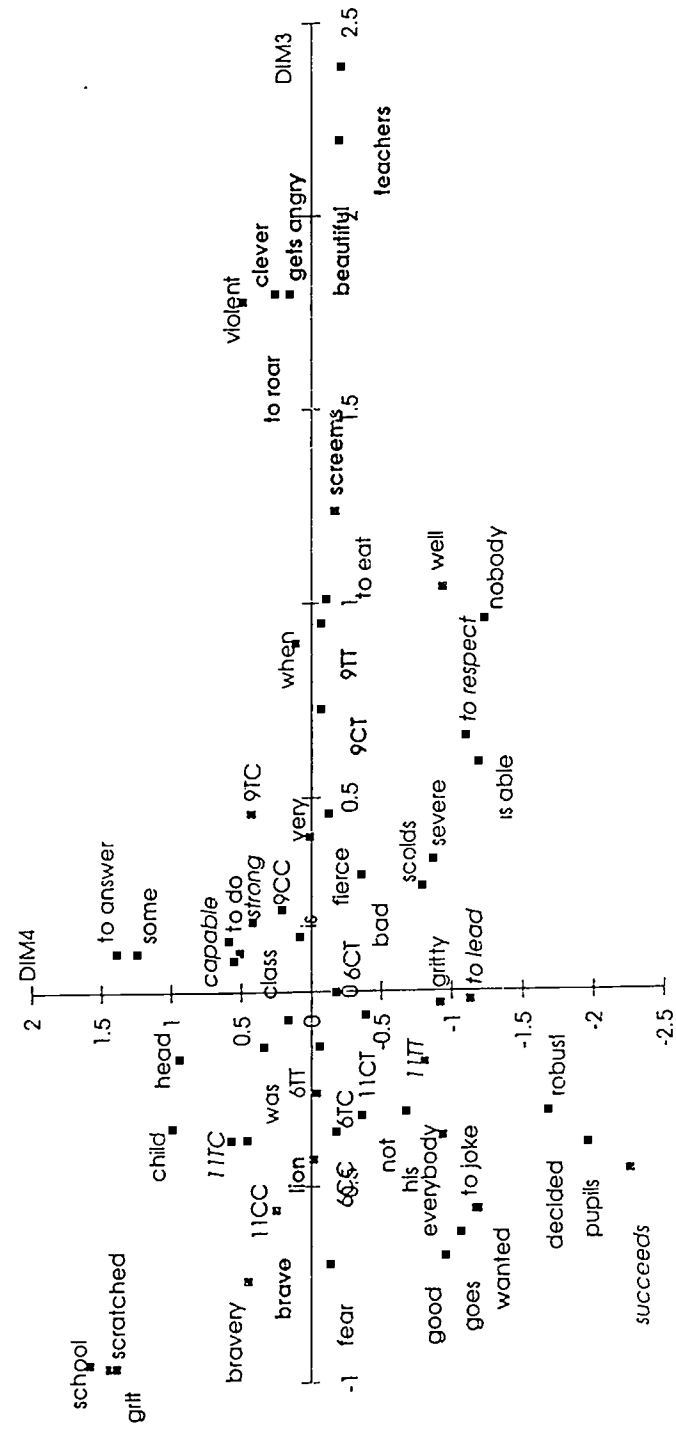


Figure 3.

Multiple correspondence analysis of the lion metaphor.

Plot on the plane defined by the first two dimensions.

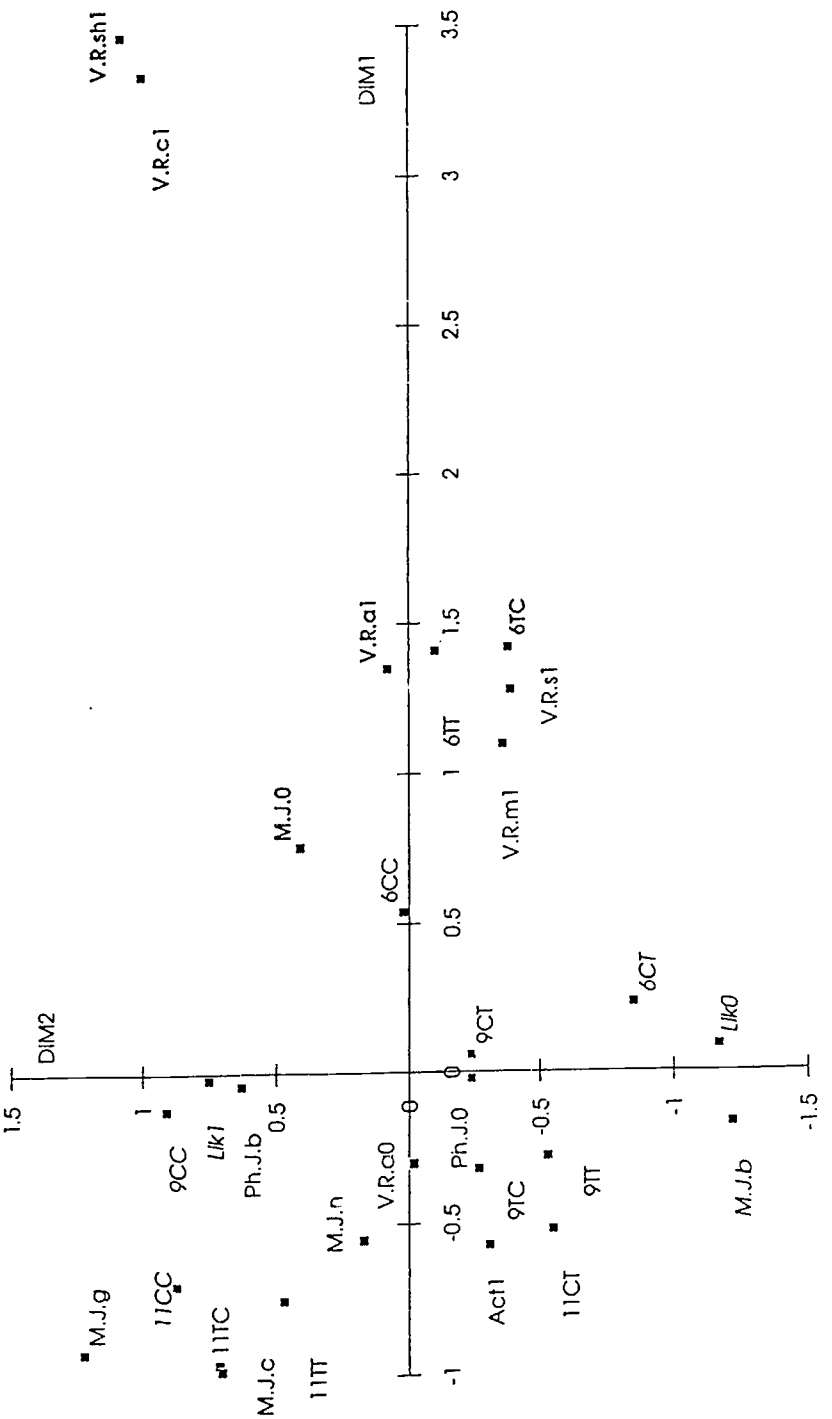


Figure 4.

Correspondence analysis of the zebra metaphor.

Plot of words and groups on the plane defined by the first two dimensions

(the first dimension explains 26.81 % of the total inertia, the second dimension 15.50 %)

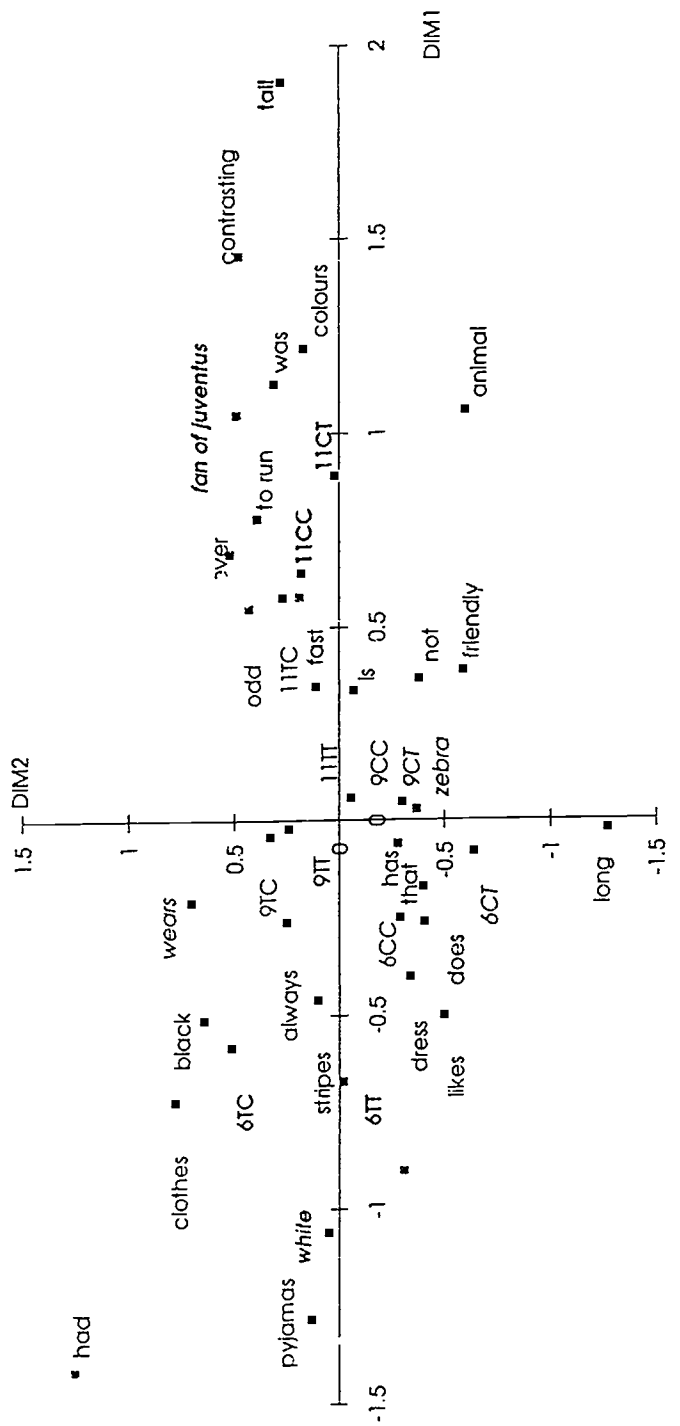


Figure 5.

Correspondence analysis of the zebra metaphor.

Plot of words and groups on the plane defined by the third and fourth dimension

(the third dimension explains 12.99 % of the total inertia, the fourth dimension 10.27 %)

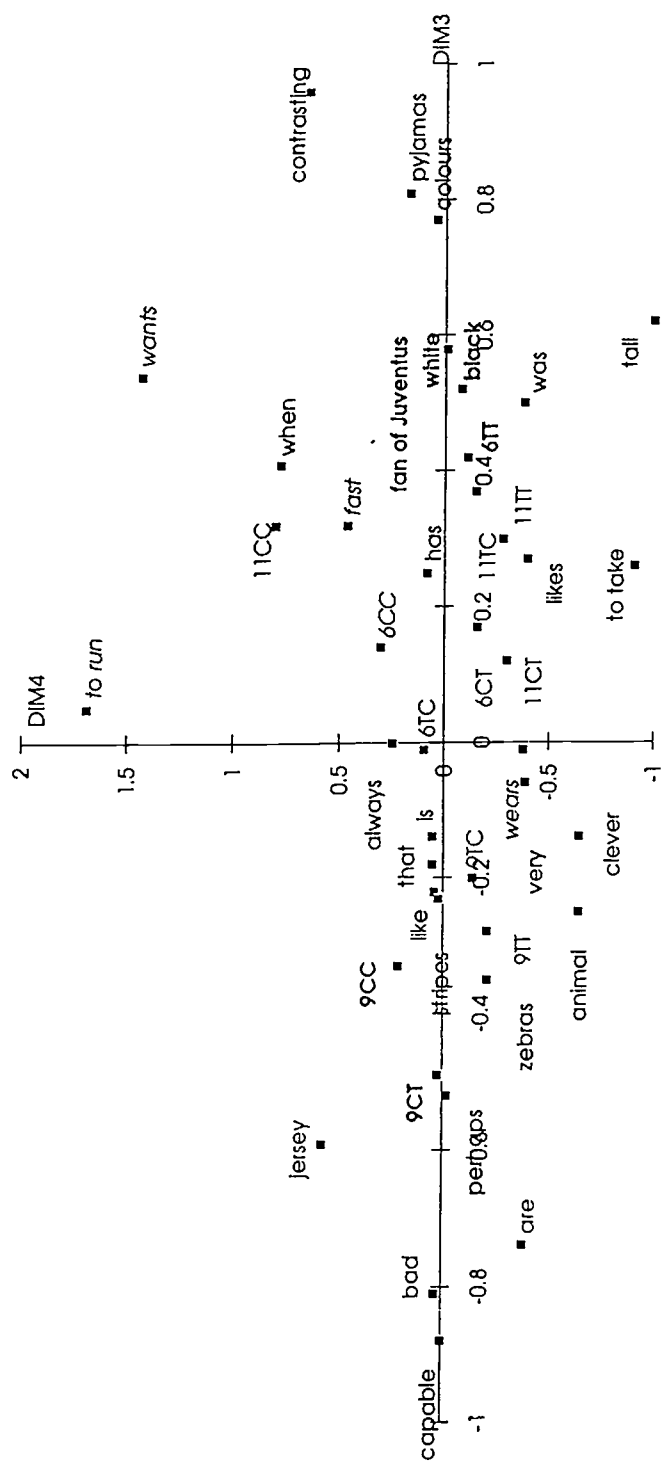


Figure 6.
Multiple correspondence analysis of the zebra metaphor.
Plot on the plane defined by the first two dimensions.

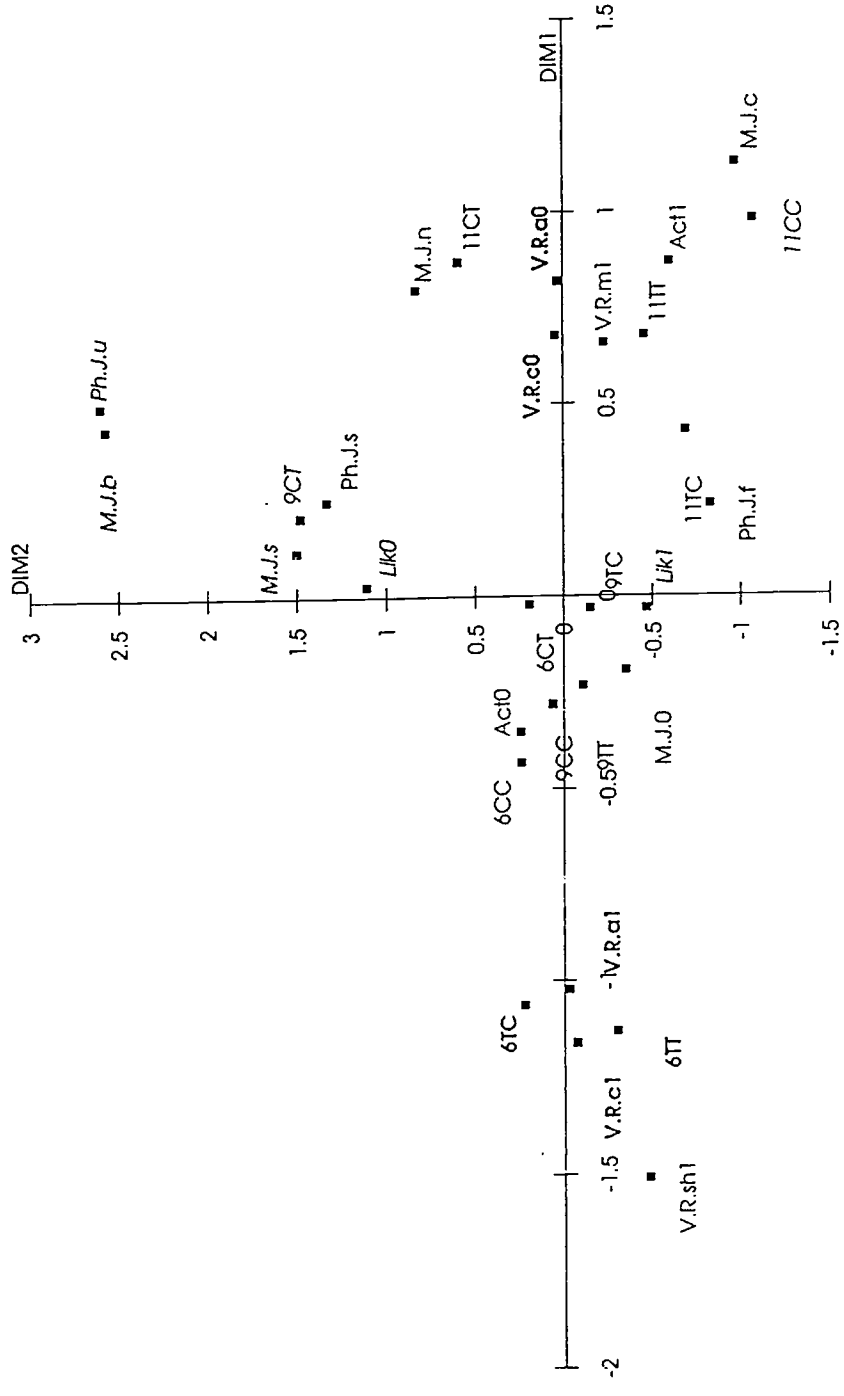
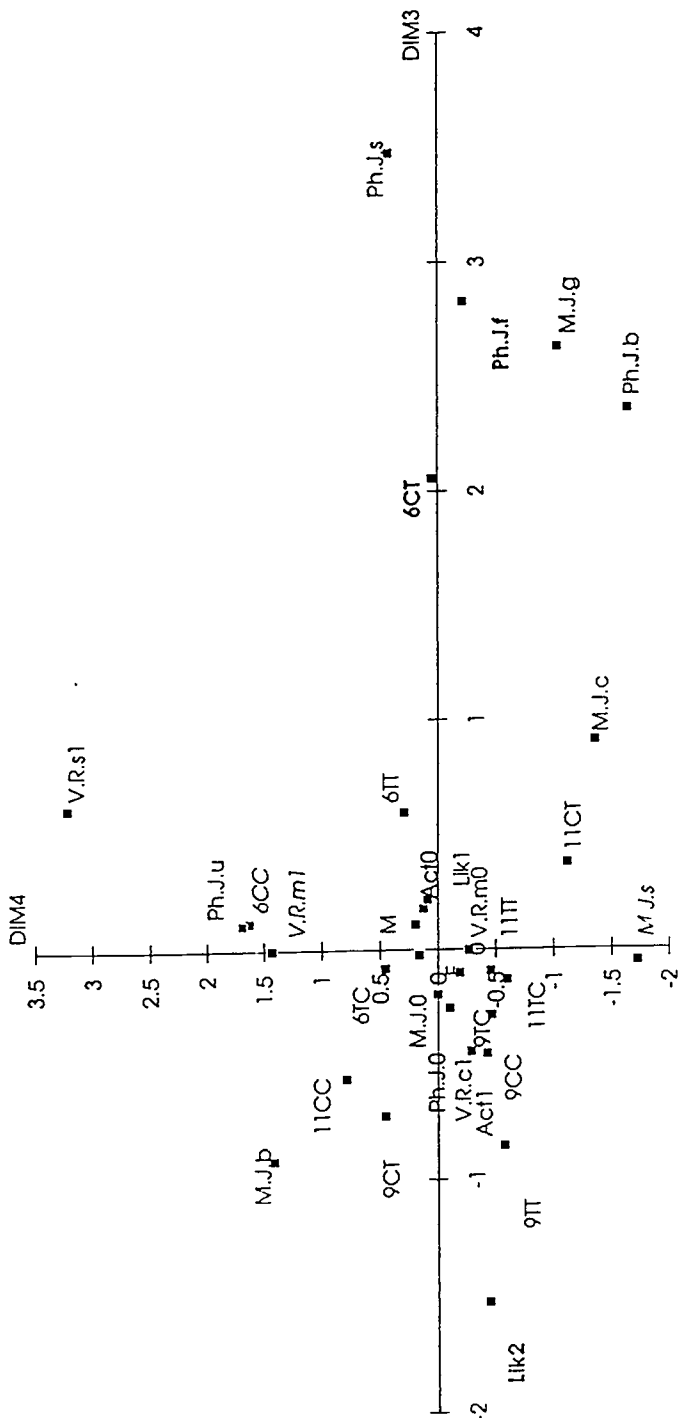


Figure 7.

Multiple correspondence analysis of the zebra metaphor.

Plot on the plane defined by the third and fourth dimension.



References

Gentner, D., Falkenhainer, B. & Skorstad, J. (1988). Viewing metaphor as analogy. In D.H. Helman (Ed.), Analogical Reasoning (pp. 171-177). Dordrecht/Boston/London: Kluwer Academic Publishers.

Glucksberg, S., Gildea, P. & Booking, H.B. (1982). On understanding nonliteral speech: can people ignore metaphors? Journal of Verbal Learning and Verbal Behavior, 21, 85-98.

Greenacre, M.J., (1993). Correspondence analysis in practice. London: Academic Press.

Henley, N.M. (1969). A psychological study of the semantics of animal terms. Journal of Verbal Learning and Verbal Behavior, 8, 176-184.

Keil, F. (1986). Conceptual domains and the acquisition of metaphor, Cognitive Development, 1, 73-96.

Kelly, M. & Keil, F. (1985). The more things change..., Cognitive Science, 1, 403-416.

Lebart, L. & Salem, A. (1988). Analyse statistique des donnes textuelles. Paris: Dunod.

Lafon, P. (1980). Sur la variabilité de la fréquence des formes dans un corpus, Mots, 1, 127-165.

Noether, G.E. (1991). Introduction to statistics. The nonparametric way. New York: Springer-Verlag.

Palermo, D.S. (1986). From the marble mass of language - a view of the developing mind. Metaphor and Symbolic Activity, 1, 5-23.

Siltanen, S.A. (1990). Effects of explicitness on children's metaphor comprehension. Metaphor and Symbolic Activity, 5, 1-20.

Verbrugge, R. (1980). Transformation in knowing. A realist view of metaphor. In R.P. Honeck & R.R. Hoffman (Eds.), Cognition and figurative language (pp. 85-125). Hillsdale, N.J.: Lawrence Erlbaum.

Vosniadou, S., (1989). Context and the development of metaphor comprehension. Metaphor and Symbolic Activity, 4, 159-171.

Authors' Notes

The research reported in this paper was carried out by Nicoletta Caramelli at the Dipartimento di Psicologia, Università di Bologna, Viale Berti Pichat 5 and Angela Montanari at the Dipartimento di Scienze Statistiche, Università di Bologna, Via delle Belle Arti 41. The research was supported by a grant from the University and Scientific Research Minister (40% - 1990 founds). It was presented at the Sixth International Congress for the Study of Child Language, 18-24 July, 1993, Trieste, Italy.

The first author is deeply indebted to Ann Dowker (Oxford University) for her kind advise when we planned this research as a possible cross-cultural study.