Association and definition in school age children

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Association and definition are cognitive processes which themselves deserve definition. Faria (1996) has already begun to analyse what the term 'definition' can mean. As to the term 'association', this analysis is far more complex. In general it can be said that associations are what a word referring to an object makes you think of. On the other hand definitions convey the information necessary to distinguish an object of one kind from objects of all other kinds, the core of its concept. While even very young children are able to produce an association to a given word, definitions are produced later as they require what has been called metalinguistic ability (Keil, 1988; Snow, 1990; McGhee-Bidlack, 1991; Watson, 1995). Both associations and definitions show and rely on people's world knowledge and this is the reason why they are commonly used to assess conceptual organization. However they can convey different kinds of knowledge which are complementary, a fact not properly taken into account in studies on both children and adult categorization.

Our research aims to show that association and definition differ as to the relations they elicit. Moreover that the pattern of relations they yield varies according to both children's age and the knowledge domain which is concerned.

METHOD

Participants

Forty-five children, 15 aged ten, 15 eleven, and 15 thirteen, participated in the research.

Material

Twelve words were selected from among the 800 most frequent words produced by children in a previous research. There were 3 words for each of 4 different concept kinds: 3 nominal kinds (number, species, season), 3 natural kinds (cat, moon, mushroom), 3 simple artifacts (box, table, trousers), and 3 complex artifacts (computer, phone, airplane).

Procedure

The concept nouns were randomized and written each on a different page of a booklet. The researchers instructed the teachers to present the tasks - definition and association production - in two different sessions with an interval of one month. The children were asked to be as accurate

as possible since their productions would be used for the compilation of a dictionary for children written by children. For the definition task, the 12 page booklet had a word on each page and the children were asked to write their definitions one at a time. On each page of the association task booklet, there was a word written within the drawing of an oval. Several lines departed outward its border at the end of which children could write their associations to the word. They had to start from line number 1 and go on until they wanted as they could add new lines.

DATA ANALYSIS AND RESULTS

Codes

The collected data was coded as follows in order to highlight the kinds of relations children produced at the three age levels in both association and definition tasks: (a) thematic relations when the given concept prompted a theme or a situation; they included temporal, spatial, action-function, agent, patient, and instrument relations; (b) taxonomic relations when the given concept prompted a hierarchically superordinate, subordinate, or coordinate concept; (c) attributive relations when the given concept prompted the properties, qualities and components of the object referred to, i.e. partonomic, matter, perceptual (form, color, dimension), and evaluative relations (e.g. trousers-nice). Two experimenters coded the data independently; the few cases of disagreement were solved after a brief discussion.

Analysis

Many analyses were performed on the data using the correspondence analysis and chi square. Here we present only the data on the comparison between the relations produced in the association and in the definition task as far as the age levels and the different knowledge domains are concerned. The production of relations in the association task exceeds that in the definition task at the three age levels. This result is quite obvious; there are restrictions on the pertinent dimensions to be considered in defining an object. More interesting is the fact that almost half of the relations produced in the definition task are of the thematic kind and that this proportion is maintained across the three age levels.

Relations X Tasks
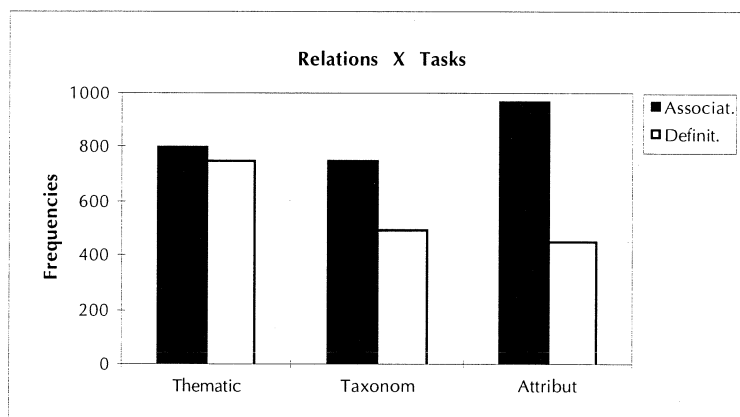
From the correspondence analysis it can be seen that the first dimension, which explains 99% of the variance, is the opposition between taxonomic relations produced by 10 year olds and attributive relations produced by 11 year olds. This means that between age 10 and 11 there is a shift in the role played by taxonomic and attributive relations, the last being more frequent. As the perceptual and physical dimensions of the object to be defined are also taken into account, definitions become more articulated.

Relations produced at 10, 11 and 13 years – Association task
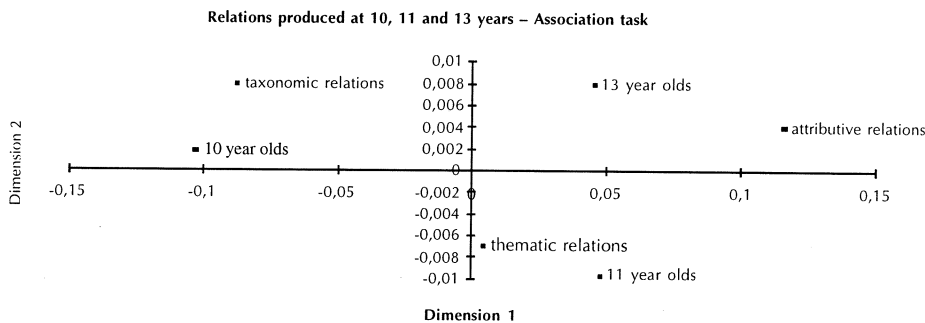
In the association task there is a more homogenous distribution of the relations underlying children's productions except in 10 years olds who, almost half of the time, make use of attributive relations in their associations. The correspondence analysis shows that the first dimension, that explains 61% of the variance, is the opposition between the associations produced at 10 and those, based on thematic relations, produced at thirteen. The second dimension, that explains 39% of the variance, is the opposition between taxonomic relations, that characterize 11 year olds' associations, and attributive relations. This means that different relations characterize children's associations at different ages: at 10 they are mainly attributive, at 11 mainly taxonomic, and at 13 mainly thematic.

Relations produced at 10, 11 and 13 years - Association task
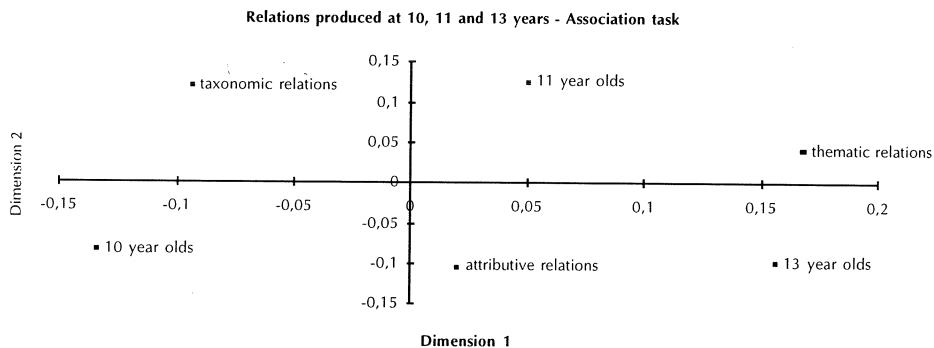
The different pattern of the relations prompted by the association and the definition tasks shows that, in performing these tasks, children's productions rely on different kinds of knowledge which convey complementary information.

Kinds	Thematic R.	Associations Taxonom. R.	Attribut. R.	Thematic R.	Definitions Taxonom. R.	Attribut. R.
Natural K.	204	141	290	201	96	126
Nominal K.	144	357	117	136	111	45
Sim.Art.	181	198	289	200	130	139
Comp.Art	290	70	270	233	134	83
Total	**819**	**766**	**966**	**770**	**471**	**393**

As to the relations prompted by different knowledge domains, in performing the definition task the correspondence analysis shows that the first dimension, that explains 86% of the variance, is the opposition between taxonomic relations and attributive relations. The first characterize nominal kind concepts and the second characterize simple artifacts and natural kind concepts. This means that, in defining nominal kind concepts, children rely on categorical knowledge as this kind of concept refers to abstract conventional entities like 'season'. In defining concepts of the other kinds, they can rely on their direct experience, mainly on the properties of the objects referred to.

In the association task the correspondence analysis shows that the first dimension that explains almost the total variance (97%), is the opposition between taxonomic relations and thematic relations. The first characterize nominal kind concepts, the second characterize complex artifacts.

Apparently, there is no difference between the definition and the association task as far as nominal kind concepts are concerned: in both tasks they are characterized by taxonomic relations. However, in our code 'taxonomic relation' three sub-kinds of relations were included: subordinate, coordinate and superordinate relations. While subordinate relations mean exemplification, i.e. more specific elements of the same kind, superordinate relations mean membership, the relation 'isa', that is a kind of definition, and coordination relations mean synonyms, i.e. uninformative tautologies. If we distinguish these three kinds of taxonomic relations, we find that nominal kind concepts are defined mostly by the superordinate relation, i.e. their membership, while in the association task they elicit mostly subordinate relations, i.e. exemplification. For this reason we can argue that also in nominal kind concepts the association and definition tasks differ as they prompt different kinds of taxonomic relation.

Discussion

Overall, the results of this research show that:

a. Thematic relations, that refer to a situation, a function, or an action are used more frequently in the definition than in the association task, a point often neglected in literature.

b. At least from the age of ten, associations and definitions are well differentiated as their production appeals to different aspects of world knowledge which varies with age. As to definitions, thematic relations apart, at 10 they are shaped by taxonomic relations of the superordinate kind (membership) , while from 11 on they are shaped by attributive relations. So there is a shift from a simpler kind of definition, based on mere membership, to a more complex kind of definition in which the properties of the objects to be defined

play a relevant role. As to associations, at 10 they are shaped by attributive relations, at 11 by taxonomic relations of the subordinate kind (exemplification), and at 13 by thematic relations. This pattern shows the growing world knowledge that children make use of in associations that, from being centered on the properties of the objects, become centered on their abstract functions.

c. In the association task, the concepts of all the kinds, except the nominal kind ones, elicit more attributive than thematic relations, while in the definition task it is the reverse. Associations rely mainly on the properties of the objects of the different kinds referred to by attributive relations. In the case of abstract concepts, as in nominal kind concepts, taxonomic relations of the exemplification kind are prompted. In the definition task thematic relations, referring to functions and situations, are produced as well as membership relations in nominal kind concepts. The pattern of relations elicited by simple artifacts differs from that elicited by complex artifacts in both the tasks. In the association task, complex artifacts elicit more thematic relations than simple artifacts and the other kinds of concept. In the definition task they elicit less attributive relations than simple artifacts and natural kind concepts.

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