Understanding Metaphors:
Preliminary Results with Children 9-14 Years Old

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We present the results of a study with a group of children aged 9-14 years old, on the understanding of metaphors. We describe the resource used, the TCM, Metaphor Comprehension Test for children aged 9-14 years and the results obtained with a sample. In this study, 95 subjects of both sexes participated, aged between 9 (4th grade) and 15 (9th grade), from a school in the region of Aveiro. The results revealed that, with increasing age, the rating level of responses tends to increase. The instrument used is in the process of gauging, or external validation, that is, meeting normative data, although it is already subject to adaptation procedures, as it is an original test in Italian. We will give an account of the data obtained and analyzed which, to date, seem to us to be quite promising. Although still preliminary and exploratory, with a sample that is still not very representative and significant, the results appear to be not very distant from the averages obtained by their Italian counterparts.

Introduction

The metaphor has been analyzed in various ways over the last few decades. It began by being seen as a resource to embellish the text, very typical of the Aristotelian view (Bailey 2003) and, more recently, it has been seen beyond language, as a process that influences the way of thinking, acting and perceiving reality (Siman and Sampaio 2021).

In fact, metaphor has been thought and conceptualized in different ways, however, in this context, we follow the definition of Pinto et al. (2006), considering it as a form of semantic conflict induced by the anomalous combination of the conventional meanings of its main constituents – tenor (tenor) and vehicle – with the understanding of metaphor framed as a metasemantic skill, based on the analysis of these meanings (Gombert 1990, in Pinto et al. 2006).

In this sense, in a metaphor, the vehicle is the linguistic figure itself, that is, the immediate image that embodies or "carries" the tenor (the theme or tenor of the metaphor). The interplay of vehicle results and content give meaning to the metaphor.

The authors, our references (Pinto et al. 2006), propose a Piagetian functionalist framework, based on Piaget's last equilibrium model (1975, in Pinto et al. 2006),

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to analyze how this semantic conflict can be faced and solved by children in the considered developmental period.

Thus, they question whether "Understanding metaphors is a "thing for children" or not?" Pinto et al. (2006) consider that yes, provided that metaphors similar to those that children of this age spontaneously produce are presented and that a "game" is established with them. Understanding and knowing how to explain the meaning of metaphors is a complex skill, whose relevance has been perceived by various sectors of psychology (cognitive psychology, psycholinguistics, developmental psychology, psychoanalysis and other theoretical currents of clinical psychology, social psychology, sport psychology, etc.), generating, for more than forty years, a vast scientific literature.

As educational psychologists, to promote these skills, evaluating and intervening, we consider it necessary to have valid resources. And it is under these assumptions that we find ourselves validating an assessment instrument for understanding metaphors, originally Italian, called the Metaphor Comprehension Test (TCM) (Figueira et al. in press), which is intended for children/young people, between 9 and 14 years of age.

We assume that language is essential and indispensable in the life of the Human Being, allowing communication and interaction with the other to occur (Figueira and Ferreira 2019). As important as the act of communicating, in the sense of using language, whatever it may be, to express ideas, feelings or emotions, is the act of understanding this form of communication, being one of the relevant areas of study in the context of the psychology of education and development.

After all the linguistic adaptation procedures, we present the first results resulting from the use with 95 students. Although very exploratory, these are promising data.

Method

Sample

95 subjects of both sexes participated in this study, aged between 9 (4th grade) and 15 (9th grade), from a school in the region of Aveiro, central Portugal (see Table 1). The criterion assumed is accessibility vs. convenience, having complied with all ethical and informed consent requirements.

Table 1. *Sample Distribution by Age and Sex*

Age	Male	Female
9	7	12
10	10	9
11	19	8
12	5	4
13	8	2
14	6	3
15	2	0
Total	57	38

Resource(s)/Instrument(s)

Although, for reasons of validation, we also used a reduced version of Raven's progressive matrices (Amaral 1966) and treated the data, in its version with raw data, for reasons of context, we do not present them in this space.

Thus, the TCM, Metaphor Comprehension Test (Figueira et al. in press) is an originally Italian instrument (Pinto et al. 2006), which aims to assess the ability to understand metaphors in children/young people, between 9 and 14 years of age (Figueira et al. in press).

This Italian test, in its initial version, consisted of two sets of six metaphors each (evenly distributed in physical-psychological and conceptual), however, the final protocol was changed, resulting in the maintenance of two sets, but one with five metaphors (physical-psychological) and another with seven (conceptual) metaphors (Pinto et al. 2006).

From a structural point of view, the TCM is composed of two parts, corresponding to two different types of metaphors, called "physical-psychological" and "conceptual", which, according to the international literature, and to what has already been mentioned in a (Pinto et al. 2006), seem to express a partially different semantic elaboration, which results in a less linear evolutionary profile in the case of conceptual metaphors. The distinction is based on certain semantic features of the two main components of the metaphor, the "tenor" or content/theme and the "vehicle", T and V, and on the different relationships that are established between them.

In physical-psychological metaphors, the two terms belong to different semantic-conceptual domains: one is taken from the universe of human beings, while the other derives from the inanimate universe of physical objects, or from the animal universe ("my sister is a butterfly"); "that child is a puppy without a leash"). An example is the metaphorical phrase "The prison guard is a rock" which, in order to convey information about a psychological quality, establishes a link between the physical domain (hard rocks) and the domain of psychological traits (obstinate, lack of feeling) (Pinto et al. 2006).

In conceptual metaphors, however, certain concepts or ideas are linked to a concrete object, such as in the example "Memory is a sieve/sieve", through which we want to express some functional (in this case, filter) aspects of the memory process. However, the limits of these categorizations are not always very or so clear, so it can be difficult to decide when a metaphor is unequivocally physical-psychological or conceptual (Winner 1988, in Pinto et al. 2006).

It is important to mention that in this test, despite the attempt to differentiate between physical-psychological and conceptual metaphors presented below, there is, however, a clear understanding that it appears to be difficult to limit in terms of categorization, given that it is not always easy to assign an unambiguous category to them (Winner 1988, in Figueira et al. in press).

However, physical-psychological metaphors are understood to be those that try, in a certain way, to relate, for example, a living being with an inanimate object (ex. "That gentleman is a volcano"), while conceptual metaphors are characterized by presenting , in the final part of the sentence, a concrete object, which relates to

the idea/concept referred to in the initial part (ex. "The family is an umbrella") (Pinto et al. 2003, in Figueira et al. in press).

However, in this exploratory study, eight physical-psychological and six conceptual metaphors were considered (cf. Table 2). There was a need to create two more physical-psychological metaphors in this study, as we intend to explore the difference in the level of response given by the subjects in relation to the following pairs of metaphors: 2 and 4; 5 and 8. This situation is due to the care that an intercultural translation requires and it is taken into account that this is an initial exploratory study, and there may be a need to use more or less items, as well as to make changes in the categorization, after possible factorial analysis and internal consistency of the items.

The items are presented to the subjects, asking themselves if they know what it means, giving these their narrative.

Table 2. *TCM Items: Physical-Psychological and Conceptual Metaphors*

Physico-psychological metaphors (MPP)	Conceptual Metaphors (C)
1.The prison guard is a rock.	1. The family is an umbrella.
2. My sister is a butterfly.	2. Flowers are the garden calendar.
3. That child is a train without a locomotive.	3. Friendship is a cloak/cover.
4. My sister is an airplane.	4. Autumn leaves are old/old photographs.
5. That child is a puppy without a chain/leash.	5. Intelligence is a skyscraper.
6. That gentleman is a volcano.	6. Memory is a sieve/sieve.
7. Beli is a soap bubble/ball.	
8. That child is a spinning top/wheel.	

In the light of these general criteria of semantic elaboration, four levels of response were equated or established, valid for each item, two of which are pre-metaphorical and two of which are metaphorical. The narrative is then analyzed, its content, using four (4) levels of analysis, that is, four levels of semantic conflict resolution:

> - At level 0 (L0) (score 0), pre-metaphorical level: the subject seems to distance himself from the essence of the task, that is, the search for common ground between T and V.
> These are answers that elude/avoid the confrontation between the elements that define T and the elements that define V. The answer can take the following forms: a) no answer or answers like, "I don't know"; b) metonymy: when the two terms are considered only in a relationship of physical contiguity. partial centering: when the analysis develops either in T or in V, but not in both; c) responses without specificity or non-specific in relation to T or V or exclusively centered on V or T: when the analysis is centered on non-specific characteristics of T and or V; d) answers not relevant to the common ground between T and V.
> - At level 1 (L1) (score 1), pre-metaphorical level: the subject identifies a common ground, but supported only on physical bases, therefore, it is still below the metaphor.

A specification of common ground between T and V arises, but only for physical reasons.

- At level 2 (L2) (score 2), metaphorical level, instead of level 1, the common ground between T and V is discriminated or specified thanks to the ability to abstract relevant traits in the respective domains and identify similarities between the two, without, however, find the psychological or conceptual plane, reducing it to the physical plane. What is still lacking in this level of conduct/response is the depth and precision of common ground. The answers reveal the identification of common ground between T and V centered on specifically human traits at a generic level or halfway between the psychological and the behavioral.

- At level 3 (L3) (score 3), metaphorical level, finally: the subject combines several elements of the T and V, which justify the identification of a common ground, reaching, in this way, the deepening and refinement of the analysis that was not found in the Level 2. Responses reveal identification of common ground between T and V, but based on elaborate human traits.

In this sense, the potential raw data (range of potential points and potential averages) achievable are presented in Table 3.

Table 3. *Potential Raw Data (Range of Potential Points and Potential Averages)*

Age	Range physical-psychological metaphors 8 items	Potential average	Range conceptual metaphors 6 items	Potential average	Total range 14 items	Potential average
9 years	0-24	12	0-18	9	0-42	21
10 years	0-24	12	0-18	9	0-42	21
11 years	0-24	12	0-18	9	0-42	21
12 years	0-24	12	0-18	9	0-42	21
13 years	0-24	12	0-18	9	0-42	21
14 years	0-24	12	0-18		0-42	21
15 years	0-24	12	0-18	9	0-42	21

Procedures

After the necessary authorizations, by the ethics committees, guardians of education and management of the establishments, the instruments were used (it should be noted that, in a logic of exploring other types of validity, namely, concurrent, of the TCM, the IA (Amaral 1966), a reduced version of Raven's Progressive Matrices, which, for reasons of space, we do not present in this context.

Although, preferably, for individual use or application, in this study, for various reasons, it was done in a group, occupying a class time considered not harmful to learning and not interfering with the programmatic contents of the teachers. Initially designed for individual application, as such a procedure becomes unfeasible, since it could invasively interfere with learning times or after-school hours, not being possible to reconcile this situation, we opted for an application in group, class by class.

In the analysis of responses to metaphors, we followed the protocol taking into account 4 levels of analysis.

Results

In this study, with these data, several types of analysis were carried out, however, by space, we present only some descriptive and very general analyzes (cf. Table 4 and Graphs 1 & 2).

Overall, the results revealed that as age increases, the total MCT score also increases, which means a potential improvement or a more complete understanding of metaphors, regardless of their type, with age, which seems to us very predictable. Still, the results suggest some discriminative and differential capacity, depending on the age, being a good prognosis.

**Table 4.** *Average Quotation by Type of Metaphor, According to Age*

Age	MPP 1	MPP 2	MPP3	MPP 4	MPP 5	MPP 6	MPP 7	MPP8	C1	C2	C3	C4	C5	C6	total
9	1,32	0,58	0,84	0,68	1,00	0,79	0,21	0,63	1,05	0,74	1,00	0,89	0,63	0,47	0,77
10	1,42	0,95	1,16	0,74	0,89	0,84	0,53	0,89	0,95	0,63	1,11	0,74	0,63	0,58	0,86
11	1,63	0,81	1,04	0,89	0,89	1,07	0,59	0,59	0,74	0,89	0,85	0,74	0,74	0,52	0,86
12	1,44	1,33	1,22	1,44	1,67	1,67	0,44	0,56	0,67	0,67	1,00	1,00	1,00	0,56	1,05
13	1,50	0,90	1,20	1,10	1,00	1,30	0,60	0,90	1,20	1,00	1,50	1,10	1,20	0,90	1,10
14	2,33	1,56	1,67	1,11	1,44	1,67	0,78	0,78	1,44	1,22	1,78	1,33	0,89	0,89	1,35
15	0,50	1,50	1,50	0,00	1,50	2,50	0,00	1,00	1,50	0,50	2,50	1,50	1,50	1,50	1,25
Total	1,54	0,94	1,13	0,89	1,06	1,14	0,49	0,72	0,97	0,82	1,14	0,91	0,80	0,62	0,94

We would also like to present the results (percentages) for the 14 items, according to age, and by response levels (L0, L1, L2 and L3) (Graphs 1 & 2).

Graph 1. *Average Scores Obtained by the Present Sample, According to Age*
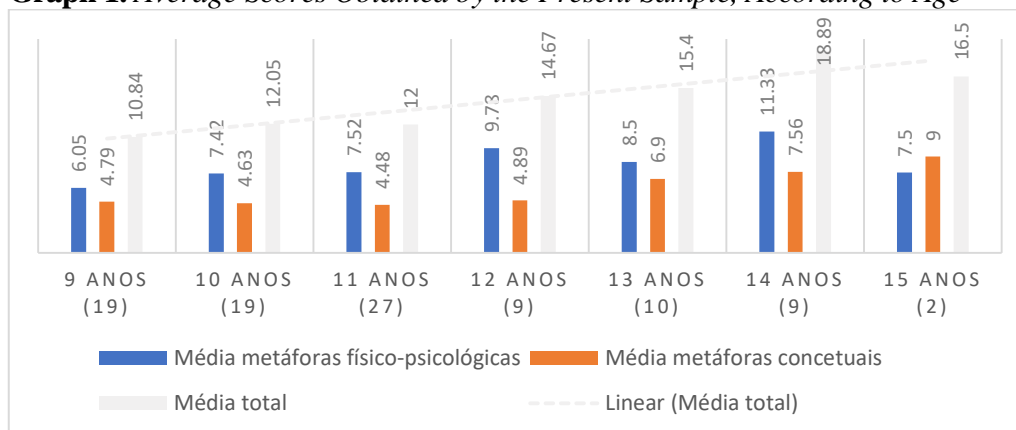
Graph 2. *Average Scores Obtained by the Present Sample, Depending on the Type of Metaphor/Age*
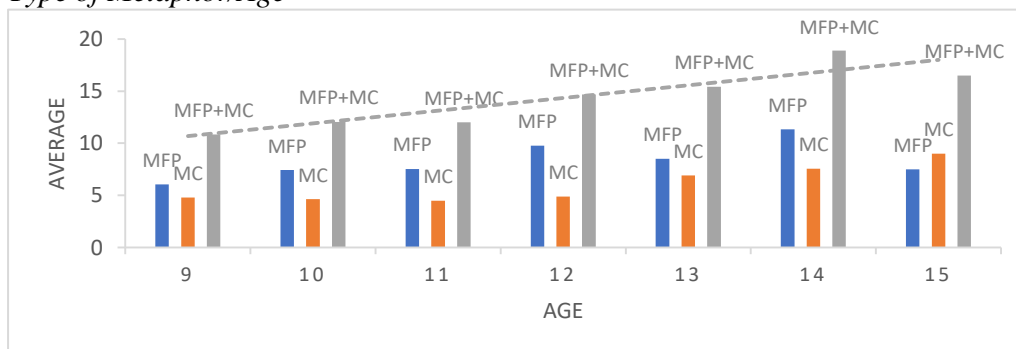
Trying to compare the data obtained with the Italian data, the only ones available, roughly speaking, we can say that they are very close (cf. Pinto et al. 2006).

Conclusions

In this exploratory study, it appears that the average of the sum of the scores at each age tends to increase with age. The results of level 3 responses indicate the difficulty of differentiating the quotation between levels 2 and 3, given the similarity between the correction criteria for the same. This sample is not representative, but should not be underestimated, as all results are important in these exploratory studies.

In general, students were interested and motivated to take the TCM (Figueira et al. in press). It was found, informally, that preferences in certain scientific areas, namely Exact Sciences and Social Sciences, are not determinant for the motivation factor.

This study made it possible to assess the need and relevance of validating the TCM for the Portuguese population, due to the need to create more instruments that can help both in the evaluation and in the intervention process in subjects of different age groups, in the specific case of the metalanguage area, using metaphors.

As this is just an exploratory study, the data are not representative of the Portuguese population, so more studies should continue to be carried out to rigorously validate the TCM, proceeding to collect more protocols that allow the performance of more robust analyses, namely, internal consistency, factorial and correlation analyses.

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