Teaching Children to Create Metaphorical Expressions

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Abstract

Metaphorical language is a type of non-literal language with multiple uses in communication. Despite its relevance, most studies about this topic have focused on measuring the performance of a variety of populations on this skill and relating it to biological substrates or other cognitive abilities and there are little or no published studies on procedures for training the creation of metaphorical expressions. The current study evaluated a multiple exemplar training procedure for training simple metaphorical expressions in 4 six-year-old participants. Results demonstrated that all participants acquired the skill and demonstrated generalization, suggesting that multiple exemplar training may be effective for teaching children to create simple metaphorical expressions.
Key words: metaphorical language, non-literal language, multiple exemplar training.

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Novelty and Significance

What is already known about the topic?

- The studies about metaphorical language have focused mainly on knowing the cerebral basis of this skill or its relationship with some hypothetical constructs and they have obviated the intervention directed to the improvement of this skill.
- Although there are some studies that have demonstrated that children who were not fluent comprehending metaphorical expressions could improve this skill, regarding to the ability to create metaphorical expressions, no previous research has tried to establish it.

What this paper adds?

- This study contributes to this field by describing a training applied to some children who did not create metaphorical expressions. This training was effective, since children improved their skill to create metaphorical expressions.

Metaphorical language is a type of figurative language that is very widespread in daily life and it is used in people's discourse with different goals, including to clarify, to add interest, to be eloquent, to provoke thought, to compare similarities (Roberts & Kreuz, 1994), to fill gaps in the lexicon, to express some ideas that are difficult to express in literal language, to add vividness or intensity to a message or a feeling (Fussell & Moss, 1998; Ortony, 1975), to guide another's actions, to show negative emotions or to be humorous (Erfaniyan, Shafiri, & Meshkatod, 2014). Generally speaking, people generate metaphorical expressions to highlight some feature of something or someone and even to express private events, such as emotions or interoceptive sensations (e.g., pain, thirst, hunger, etc.). Because metaphorical language is so common in everyday communication, a procedure for teaching it would be useful educational and therapy (Garner, 2005).

Metaphorical expressions involve a transfer of meaning from a second subject or vehicle to a first subject or target (McCurry & Hayes,1992). For example, considering the metaphorical expression *Jake is a skyscraper*, skyscraper would be the vehicle and Jake the target, and someone might employ this metaphorical expression to highlight that Jake is particularly tall.

Several cognitive studies have analyzed the process of creating metaphorical expressions, but they have focused on knowing the cerebral basis of this skill (Benedek *et alii*, 2014;), measuring the performance of several populations, such as people with a diagnosis of Autism Spectrum Disorder (ASD) or Dyslexia, or they studied correlations between creating metaphors and other cognitive abilities, such as intelligence or creativity (Beaty & Silvia, 2013; Kasirer & Mashal, 2014, 2016, 2017; Pereira de Barros, Primi, Koich Miguel, Almeida, & Oliveira, 2010). Most or all previous research on metaphorical expression in people with disabilities have analyzed their participants' performance, but have not proposed any type of treatment or intervention directed to the improvement of deficits in metaphorical expression. However, some studies described below have demonstrated that it is possible to teach children to comprehend figurative language.

Persicke, Tarbox, Ranick, and St. Clair (2012) taught three children with ASD to understand metaphorical language. The study employed multiple exemplar training across 44 brief stories with relevant contextual clues that included three metaphorical expressions. They used prompts in the form of leading questions, directing participants to engage in the following complex sequence of relating behaviors: 1) identifying the hierarchical relations between the target and its features and the vehicle and its features, 2) discarding the features that were different between target and vehicle (relation of distinction), and 3) identifying the feature that the target and the vehicle had in common (relating in terms of coordination). Two of the three participants required a visual aid that prompted this sequence of relating behaviors. The visual aid instructed the participants to write in two separate columns the target and its features (in one column) and the vehicle and its features (in the other column) and then, participants were asked to draw a connecting line between the features that were the same between the target and vehicle. For example, if a participant was responding to the unknown metaphor "Jake is a skyscraper," the participant might write the word Jake in the left column and then underneath that, write the words boy, tall, brown hair. She might then write the word skyscraper in the right column and underneath that, write the words tall, building, work. She would then compare the words in the left and right column and then draw a line connecting the two words tall and then tell the experimenter that the metaphor means that Jake is really tall. All three participants acquired this skill, the visual aid was successfully faded out, and all participants demonstrated generalization to untrained metaphors.

In a similar study, Persicke, Tarbox, Ranick, and St. Clair (2013) taught three children with a diagnosis of ASD to comprehend and respond to sarcastic language, another type of figurative language widely used in our society. They applied a training package, including rules and in vivo multiple exemplar training. This training was effective and all participants demonstrated generalization across new examples, settings and teachers.

Recently, Melogno, Pinto, and Di Filippo (2017) applied two different trainings focused on improving novel metaphors comprehension in a high-functioning child with ASD. The first training, focused on recognizing and naming emotions and inferring the characters' mental states that appeared in some videoclips, produced no effect at

all. Contrary, the second training produced a significant improvement supported at the follow up. This second training was based on three activities: 1) one activity consisted of exercises where the metaphor structure "X is Y" was transformed in "X is like Y" and a comparative strategy that consisted of visual thinkings maps was used to search similarities between the target (X) and the vehicle (Y); 2) a second activity based on the request for unconventional labels to rename objects or pictures, and 3) a final activity consisted of story-matching exercises where the child had to listen to brief stories and then choose between two metaphorical expressions the one that fit the best in the story. Similarly, Melogno, Pinto, and Orsolini (2017) improved significantly the skill to explain metaphors in four children with ASD employing the first two activities applied in Melogno, Pinto, and Di Filippo (2017).

The majority of research literature on metaphors has been conducted from cognitive perspectives and little attention has been paid to metaphorical language in the behavioral literature. Relational Frame Theory (RFT) (Hayes, Barnes-Holmes, & Roche, 2001; Stewart & Barnes-Holmes, 2001; Stewart, Barnes-Holmes, Hayes, & Lipkens 2001) is a modern behavioral approach to language and cognition that proposes that people learn to relate stimuli in different ways or relational frames, such as coordination, distinction, opposition or hierarchy, among others. As Stewart *et alii* (2001) introduced and Persicke *et alii* (2012) also illustrated, three such relational frames would be particularly relevant to metaphorical language: hierarchy (the behavior of relating one stimulus to another one that belongs to it), distinction (the behavior of relating one stimulus as different or dissimilar to another stimulus) and coordination (the behavior of relating two or more stimuli as similar, equal or the same).

Thus, from a behavioral functional-analytic perspective, composing metaphorical expressions as a speaker involves the discrimination of nonarbitrary relations based on a history of arbitrary relational responding (Stewart & Barnes-Holmes, 2001). Stewart & Barnes-Holmes (2001) suggested that the person that is going to create a metaphor might first notice some formal or nonarbitrary similarity between two different environmental events, and then consequently behave verbally in accordance with a new relational network into which this novel formal similarity has been incorporated. When analyzed in this way, it would be necessary for the speaker to have a prior history of arbitrary relational responding for the initial discrimination of the nonarbitrary relations to operate as the basis for metaphorical expression. Metaphors can also be created on basis of functional similarity, not just formal (Ruiz & Luciano, 2012).

Creating a novel metaphor as a speaker might be analyzed as the following behavioral chain: 1) respond in a hierarchical frame to the target (e.g., Jake) by identifying a salient characteristic of the target (e.g, being very tall), 2) then respond hierarchically to that characteristic as a stimulus by identifying other stimuli that share that feature (e.g., skyscrapers), then combine the target and vehicle in a relation of coordination (e.g., "Jake is a skyscraper"). The variables that determine which particular stimulus that shares a feature with the target is then selected as the vehicle are likely very subtle and difficult to determine precisely. For example, giraffes are also tall but someone might be less likely to call someone else a giraffe, perhaps because the particular aspect of a giraffe that is tall (i.e., neck) is not also tall on the target. Other subtle formal features of the target may control which vehicle is selected as a metaphor, for example, someone who is tall and slender might be more likely to be metaphorically described as a skyscraper, whereas someone who is tall and wide might be more likely to be metaphorically described as a mountain.

Creating novel metaphors as a speaker is likely a very complex repertoire of behavior and little or no previous research has tried to establish it. The purpose of the current study was to attempt to children to create simple novel metaphorical expressions, who do not already demonstrate this ability. The study used a multiple exemplar training package, consisting of prompting and reinforcement across a variety of metaphorical stories.

Method

Participants

Five typically developing children participated in the study: C, M, J, R, and P, but only four participated in the training. Their ages were six and their native language were Spanish. One of them was a boy (J) and the other three were girls. All possessed the following prerequisites: a) age-appropriate, b) demonstrated relational framing in terms of coordination; and c) demonstrated relational framing in terms of hierarchy. All parents signed an informed consent for the participation of their children in the study and the recording of the sessions in audiotape.

Materials and Setting

Materials included several tests designed specifically for this study by the first and second authors, as described below.

The *Functional Language Assessment Test* was applied to guarantee that children had the necessary skills for this study. It included five sections: *mands, echoics, listener behavior, tacts* and *intraverbals*. The section on mands included three items. Establishing operations or motivations were generated by the experimenter and the children's responses were assessed as correct if they asked about the necessary materials (for example, the experimenter asked the children to draw a house or color a picture but she did not give a pencil or some crayons). The section on echoics comprised of three items and children were asked to repeat words and sentences of different lengths. The listener behavior section consisted of 36 items that asked the children to point to or give the experimenter a picture (e.g., "point to the food", in the presence of a pear, a ring and a kangaroo), asking the children to follow several instructions (e.g., "touch your head" or "close your eyes and then open them") and with several stories of different lengths followed by several questions about each story. The section on tacts included 32 items and they were shown pictures and asked "What's this?" Finally, the section on intraverbals assessed the relational frame of hierarchy and included 62 items. From these 62 items, 50 were questions about things, animals, people or places, in terms of features that would later be relevant during training (40 items) or the situations presented in the Metaphorical Creation Assessment Test (10 items) (e.g., "Tell me things or animals that are really red," or "What animals or objects are really big?"). If a participant did not respond correctly to these intraverbals, a pretraining was administered (see pre-training phase). The Metaphorical Creation Assessment Test assessed metaphorical creation by asking the children to imagine that they knew a familiar person, animal or object that had a very prominent feature and asking them how they could highlight this feature with a metaphorical expression (see samples in Table 1). Correct responses involved those that employed metaphorical expressions, that is, expressions that included the same target presented with a vehicle that stood out for being as the feature proposed. In addition, the other 12 items were descriptive intraverbals about known vehicles

that were going to be employed in the Metaphorical Comprehension Assessment Test (e.g., "Do you know what a hedgehog is? What are the most prominent features of a hedgehog?"). The *Metaphorical Comprehension Assessment Test* contained 10 items and it was comprised of metaphorical expressions with known vehicles within stories without contextual cues that could guide explicitly towards the correct response (e.g., "Jane loves plants. She has a garden with many trees and flowers and she cares for them with so much love. Jane has gone on vacation for two weeks and she has asked her sister to take care of her garden. When Jane has returned she has said: *My garden is a DESERT*. What does Jane mean when she has said: *My garden is a DESERT*?").

The *Coordination Framework Assessment Test* included three sections. The first section consisted of four items in which the experimenter showed the children two equal pictures and then asked them if they were different or equal (e.g., "Are they different or equal?", "Is this thing the same as this other thing or is it different?", "Is this thing like that other thing or is it different?). The second section was comprised of six items and it was based on a matching-to-sample task. That is to say, one picture was presented as a sample stimulus on the table and another two pictures (comparison stimuli) were presented below the sample stimulus. The experimenter asked the children to choose the picture that was equal to the sample stimuli ("Point to the picture that is like this") and the responses were pointed as correct if they chose the card with the same picture. Finally, the third section was composed of six items. The experimenter read two sentences about two people in which appeared the words *same as, like* or *equal* to and then she framed a question about these people (e.g., *Mary's house is big. Anna's house is like Mary's. How's Anna's house?*).

The study was carried out at the participants' school, in a separate room about 3x4 m. The room had a circular table and two chairs and the children were seated next to the experimenter. The sessions were conducted from Monday to Friday in school hours and each session lasted from 10-90 minutes, depending on the phase of the study. For example, the application of the *Functional Language Assessment Test* in the pre-training required approximately 80-90 minutes, taking measures in baseline took only 5-6 minutes and a training session lasted about 20 minutes.

Design

A multiple baseline, consisting of pre-training, training, and post-training phases, across participants, was used to determine the effects of the training on the creation of metaphorical language. Generalization was assessed with the presentation of new exemplars that had not been presented before.

Response Measurement and Interobserver Agreement

Accuracy of participant metaphorical expression was recorded across pre-training, training, and post-training phases. A response was scored as correct if the child created a non-literal expression but with the same meaning than the situation presented by the experimenter. That is, they spoke a word that highlighted the same feature as the target stood, without using any word with the same root than the main word given or a synonym. If the child used a synonym, experimenter asked him or her for a different way to express the same meaning. A response was scored as incorrect if the child gave a response using the same root word as the main word given in the sentence proposed, if he or she did not give a response or if she or he said "I don't know."

25% of sessions were scored from audiotapes by a second independent observer. Trial-by-trial interobserver agreement (IOA) was calculated by dividing the number of agreements by the sum of agreements and disagreements and multiplying by 100. Mean IOA was 100% for pre-training tests sessions, 87.5% for training sessions and 100% for post-training sessions.

Procedure

Pre-training. During this phase, they were applied the *Functional Language Assessment Test* (including the hierarchical framework assessment through descriptive intraverbals about the vehicles used in metaphorical comprehension assessment and intraverbals about animals, objects, people or places featured for certain features), the *Coordination Framework Assessment Test*, the *Metaphorical Comprehension Assessment Test* and the *Metaphorical Creation Assessment Test*. During the pre-training phase, sessions of the *Metaphorical Creation Assessment Test* included five examples of stories that required the creation of metaphors. On these probes, no differential consequences were provided for correct or incorrect responding. However, some social reinforcement was administered for attention behavior in order to avoid the loss of motivation. Besides, the experimenter played board games with the children to give a break and reinforce their attention during the task. Children who performed poorly on the intraverbal test were given training on basic prerequisite skills. Training consisted of a combination of listener behavior, tacts and intraverbals. In the first part, the experimenter put six pictures on the table; three of them contained the target feature (e.g., if the target was *red*, one picture was a *tomato*, another one was a *cherry* and the third picture was a *strawberry*) and the other three pictures were distractors. The experimenter then asked the child "Point to the red ones". If the child pointed correctly, he or she was provided with social praise (e.g., "Perfect, those are the red ones!"). If the child pointed incorrectly, he or she was shown the correct responses and then the child was asked again. In the second part, the experimenter removed the distractor pictures and she requested the names of each of the three pictures selected. If the responses were correct, the child was provided some social praise (e.g., "Excellent! This is a tomato!") and if his or her responses were incorrect, they were supplied the correct names of the pictures. The child was asked again and when he or she responded correctly, the final trial was presented. In the third and final part, the child was asked: "Tell me things or animals that stand out for being red". If the child gave a minimum of two correct responses, he or she was praised and given descriptive feedback (e.g., "Great! A strawberry stands out for being red!"). If children did not say a minimum of two things, they were showed the pictures as prompts and then the pictures were removed and they were asked the question again. Training finished when the children said a minimum of two things without prompts. Monica was trained on intraverbals for nine concepts (round, black, small, short, blue, ancient, salty, white and dangerous), Joey was trained on intraverbals for four concepts (round, black, soft and smelly) Rachel was trained on intraverbals for 16 concepts (full of water, fast, jumping, strong, soft, light, thin, hairy, dirty, orange, smelly, black, many plants, dangerous, go out at night and crawl on the ground), and Phoebe was trained on intraverbals for 16 concepts (ancient, funny, dark, blue, salty, short, hard, white, strong, soft, light, cold, orange, dirty, round and black).

Multiple exemplar training. The experimenter asked the children to imagine an object or a person with a prominent feature and asked them for other ways to say that this object or this person stood out for this characteristic but without using that key words (e.g., *red, fast, tall* or *hairy*). If the children did not respond or responded incorrectly, the experimenter provided prompts, consisting of questions directed to

the searching of vehicles for the metaphorical expression. That is to say, questions about things, places, people or animals that stood out for the prominent feature like the person or the thing presented in the previous situation, namely, the target of the metaphorical expression (e.g., "What things or animals do you know that stand out for being red?"). If the children still responded incorrectly, the experimenter provided examples (e.g., "A strawberry is red") and asked again about things or animals with the prominent feature. Later, the experimenter said to the children that if they wanted to highlight that the person or the thing presented in the situation stood out for that specific feature, they could say that this person or that thing was one of the things or animals the children had said (e.g., "If we want to point out that his t-shirt is red, we could say that his t-shirt is one of these things we just said, right?") and encouraged the child to say it (e.g., "Come on, say it!"). If they still responded incorrectly, they were provided with a correct response (see Table 1). Eight trials were presented in each training session and the training concluded when the children's responses were correct above or equal to 75% (6 of 8 trials) in three consecutive sessions or up to a maximum to 5 sessions (with a total of 40 trials). During this phase, the correct responses were reinforced with descriptive social praise (e.g., "Excellent! We can say this man's t-shirt is a tomato if we want to point out that his t-shirt is red!") and with some play time with board games.

Post-training assessment. This phase consisted of the *Metaphorical Creation Assessment Test*. In addition to the same five items presented in the pre-test, generalization was assessed with five new items that had never been presented, for a total of 10 items. During this phase, no differential consequences were provided for correct or incorrect responses. However, some social praise and play time were given to the children for their attention during the task, regardless of correct or incorrect responding.

Table 1. Sample trials for the creation of simple metaphorical expressions.

Examples in pre-training	- Imagine you see a baby with very white skin and you want to point out that he has very white skin but you cannot use the word "white." How would you say this baby has very white skin without using the word "white"? (Examples of correct responses: "This baby is a snowflake", "his skin is like milk" or "he looks like cotton"). - Imagine there are many books in a friend's room and you want to point out that there are many books in that room but you cannot use the words "many books." How would you say that this room has many books without using the words "many books"? (Examples of correct responses: "His room is a library" or "his room is like a school"). - Imagine you know a woman who works with a very dangerous machine and you want to point out that the machine is very dangerous but you cannot use the words "dangerous or danger." How would you say this machine is very dangerous without using the words "dangerous or danger"? (Examples of correct responses: "That machine is a shark", "that machine is like a bomb" or "that machine looks like a cobra").
Example during training with prompts	- Imagine you see a man with a red t-shirt and you want to point out that his t-shirt is red but you cannot use the word "red." How would you say that his t-shirt is red without using the word "red"? (Examples of correct responses: "That t-shirt is a tomato", "that t-shirt is like a strawberry" or "he looks like a raspberry"). *First prompt*: "What things or animals do you know that stand out for being red?" *Second prompt*: "Then, if we want to point out that his t-shirt is red, we could say that his t-shirt is one of these things we just said, right? Come on, say it!"
Examples presented in post-training (generalization)	- Imagine you have a friend who has many animals in their house and you want to point out that there are many animals in their house but you cannot use the words "many animals." How would you say there are many animals in his house without using the words "many animals"? (Examples of correct responses: "His house is a zoo", "his house is a farm" or "his house looks like a jungle"). - Imagine you know a woman who just goes out into the street at night and you want to point out that she just goes out at night but you cannot use the words "goes out at night". How would you say this woman just goes out at night without using the words "goes out at night"? (Examples of correct responses: "This woman is an owl", "this woman is a bat" or "this woman is like the moon"). - Imagine you have a ruler, you have cut with this ruler and you want to point out that this ruler cuts but you cannot use the word "cut." How would you say this rule cuts without using the word "cuts"? (Examples of correct responses: "That ruler is a knife", "that ruler is like a blade" or "that ruler looks like a razor").

Results

  Table 2 depicts the results during pre-training, regarding prerequisite skills. Overall, participants responded correctly above 80% in most of the skills assessed. Regarding the intraverbals about things, places or animals featured for certain features that children did not know, they were trained as it has been explained above. The data displayed in the table about intraverbals represent the initial results, previous to this training. Training data about this prerequisite are not included for reasons of space but are available from the first author, upon request.

  Figure 1 depicts the children's percentages of correct responses in metaphorical creation pre-training, during training, post-training, and on generalization probes. C reached 80% of correct answers in the pre-test, so he was not exposed to the training phase and he was omitted from the Tables and the Figures. M's baseline showed a total lack of the skill. She required four sessions to reach criterion during training, thereby,

Table 2. Percentage of correct responses in the functional language assessment and metaphorical comprehension assessment.

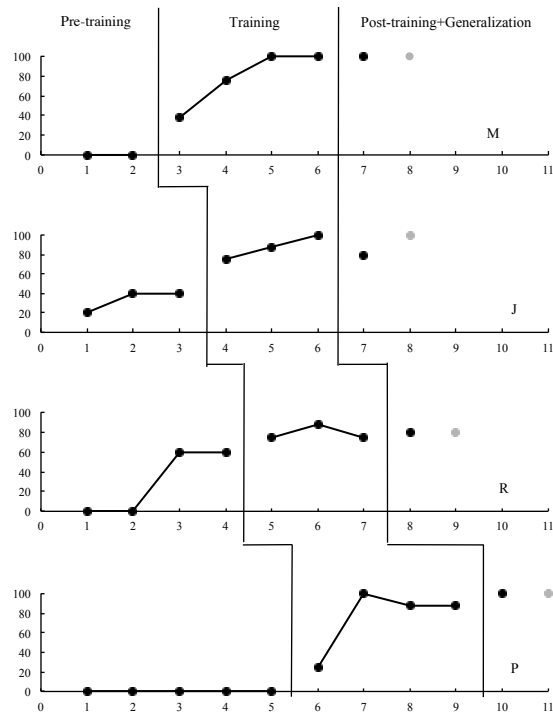| Participants	Mands	Ech	Listener behavior	Tacts	Intraverbals (hierarchy)	Coordination	Metaphorical comprehension
M	100	66.67	97.29	96.88	83.33	100	80
J	100	100	97.29	93.75	89.13	100	100
R	100	66.67	94.59	90.63	63.04	100	100
P	100	100	86.49	93.75	66.67	100	80

Figure 1. Percentage of correct responses during the phases of the study.

she was exposed to a total of 32 training trials. She demonstrated accurate performance post-training and on generalization probes.

J's maximum performance in baseline was around 40% and he reached the training criterion after only three sessions of training, resulting in a total of 24 trials during the training. Post-training, he demonstrated 80% correct responding, followed by 100% correct during generalization.

R demonstrated between 0 and 60% correct during baseline and required only three training sessions, for a total of 24 training trials. Her performance during post-training and generalization was 80% correct.

During her five sessions of baseline, P demonstrated a total lack of metaphorical creation skill. She required a total of four sessions (32 trials) to reach the criterion during training. She demonstrated 100% correct responding both with the pre-training examples and the new examples in generalization trials.

DISCUSSION

The results of the current study suggest that multiple exemplar training was effective in establishing the skills of metaphorical expression in children. All participants demonstrated equal or above 80% correct responses in both the post-training and generalization assessment. Two of four children required only three training sessions to reach the criterion. This is the first study of which we are aware that teaches how to create metaphorical expressions in children.

Similar to the findings of Persicke and colleagues (2012, 2013), the current study suggests that multiple exemplar training may be effective for teaching complex language skills to children, including the creation of metaphorical language. In those studies, children were taught on one hand, to comprehend metaphorical language and, on the other hand, to detect and respond to sarcastic language. In the present case, children were taught how to create their own metaphorical expressions, advancing research one more step on the teaching of figurative language.

The current study also supports the RFT analysis of metaphors suggested by Persicke and colleagues. In the current study, the experimenters prompted the participants to talk through frames of coordination and hierarchy to create their own metaphors. The results suggest that if children have the prerequisite skills of identifying objects with certain prominent features (that is, they respond in a framework of hierarchy) and they also have the skill to respond in a framework of coordination between similar features, then they will likely be able to learn how to create simple metaphorical expressions through multiple exemplar training.

The prompts used in the current study warrant brief discussion. The first prompt, focused on the search of words that stand out for having a particular feature, (e.g., things that stands out because they are red) seemed to be effective and necessary. On the other hand, the second prompt, directed to put these words in a framework of coordination with the target presented in the situation, was not necessary in almost any trial. That is, after the first prompt, in almost all the cases, when children found a possible vehicle, they put it in a frame of coordination with the target, without any difficulty. It is possible, therefore, that the second prompt was unnecessary to produce the training effects observed in this study.

One interesting pattern of errors was when participants employed vehicles accordingly to their own learning history but they did not consider the listener's

perspective. For example, one girl said that "a room was a t-shirt" when she was asked to say that a room was really dirty in a different way. Probably, this girl had a strong relation between *t-shirt* and *dirty* according to her learning history (for example, some nearby episodes in which she has stained her t-shirt); so, she employed a *t-shirt* as a vehicle that stands out because is dirty. Errors such as these point out the possibility that effective metaphorical expressions require some amount of *perspective-taking*. This concept is understood as the core component of such a representational understanding of our own minds and the minds of others (McHugh *et alii*, 2009). It is thought that if someone wants to communicate some ideas or some private events using metaphorical expressions and he or she wants to be understood when uses a metaphorical expression, he or she should consider the knowledge of the listener. If the listener does not know the vehicle involved in the metaphorical expression or he or she does not consider that the vehicle highlights for the prominent feature that the speaker considers, the communication will not be effective. Although the ability of perspective-taking was not assessed in this study, we suppose that these children had some ability in perspective-taking because of their typical developmental status and age. Concerning to this, in one training trial involving a woman who was very tall, a participant said that the woman looked like one basketball player unknown to the experimenter. Then, he quickly self-correct and he said:"probably you do not know who he is, but he was a basketball player and he was about 3 meters," and provided another example (i.e., "That woman is like a little skyscraper").

Some studies have examined the relation between *Theory of Mind* (ToM) and metaphorical comprehension. For example, Happé (1993) assessed first-order and second-order ToM in children with and without ASD and found that ToM ability predicted understanding metaphors. On the other hand, Norbury (2005) analyzed this relation in children with and without language impairments and with ASD. Norbury's study (2005) suggested that ToM was not sufficient for metaphor understanding and, instead, the findings indicated that semantic ability was a stronger predictor of performance on the metaphor task. Later, Białecka-Pikul (2010) found that teaching metaphorical comprehension in 4-5-year-old children was not an effective technique for influencing the development of ToM. It seems likely that, although metaphors and perspective taking are closely related, the relation is not necessarily causal.

It should be noted that the *echoics* assessment during pre-training had the lowest percentages of correct responding. This is likely because only three items were assessed and one of them had a considerable length ("John lives in Madrid and Anna lives in Almería"). Several children omitted one word, resulting in an incorrect response and an overall echoic percentage correct of only 66%.

Perhaps the largest limitation of the current study is that it would have been interesting to assess the impact of the training in the natural interactions in these children's life. Although it would be difficult to measure that impact, the participants' teachers or parents could have been interviewed to identify whether participants used metaphorical expressions in their daily lives. Furthermore, considering the lack of research on this topic with children with disabilities, it could have been fruitful to use this training with children with autism and other disabilities.

From an RFT perspective, in so far as the creation of metaphorical expressions involves relating relations, it could be considered an important component measure of intelligence (Lipkens & Hayes, 2009). If this is the case, then the training evaluated in this study may represent a small step in this direction.

One possible limitation is the fact that, during post-training, only one measure with the same items presented in the pre-training and one generalization measure was conducted, instead of the same number of measures taken in the pre-training (post-training coincided with summer holidays, so it was not possible to conduct more trials). However, the first final measure is likely the most relevant, in so far as it would be the first time after the training in which conditions would change (for example, no differential consequences). That is, considering both measures, those with the same items employed in the pre-training (where the children's performances were low), and those measures with new items that had never been presented (generalization items), high percentages of correct responses in the post-training would be attributed to the training. In other words, the first set of post-training and generalization trials are likely the purest tests of generalization.

In conclusion, future researchers should evaluate a similar training procedure with children with challenges in their development, as well as the applications of multiple exemplar trainings to the creation of other figurative forms, such as ironies. To date, multiple exemplar training approaches based on RFT appear to have provided a fruitful starting point for developing complex language training programs for children. Future researchers should further advance this line of research by more thoroughly evaluating the extent to which such trainings improve functioning in daily life.

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