Metaphor Comprehension in Preschoolers: A Pragmatic Skill

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Abstract

While metaphors are an integral part of everyday speech, developmental studies on metaphor comprehension present very mixed findings. Some studies demonstrate successful metaphor comprehension only after age 10, while others show evidence of metaphorical understanding even at age 3. However, given the great variability in the types of metaphors and tasks used to assess children's understanding, the exact age of development of metaphor comprehension remains unclear. Here we introduce a new paradigm for metaphor comprehension tapping into 3- and 4-year-olds' ability to assess a non-literal statement as being either relevant or irrelevant to the discourse. Results demonstrate successful - albeit incomplete - metaphor comprehension in 4-year-olds but persistent limitations in 3-year-olds. Our study provides corroborative evidence to the early development of metaphor comprehension, while raising questions about the methodologies that could best showcase pragmatic skills during metaphor comprehension in early preschool years.

Keywords: metaphor comprehension; language development; experimental pragmatics; discourse relevance

Introduction

Metaphors are an integral part of everyday speech (Pollio et al., 1977; Smith et al., 1981; Glucksberg, 1989). Children, like adults, are exposed to metaphors every day: an older sibling might ask a child to stop being a 'leech', their teacher might tell them to let a painting 'rest', or their parents might insist when the time 'has come' to leave. Metaphor also underlies the understanding of abstract concepts we use frequently. For instance, time is commonly conceptualized as a 'moving object', which can 'pass' fast or sometimes 'fly' (Johnson & Lakoff, 1980; Lakoff, 2008). Despite the widespread use of metaphor in everyday language, the developmental trajectory of children's understanding of metaphorical sentences remains something of a mystery.

Developmental literature on metaphor comprehension appears very mixed, with certain studies finding that children can interpret metaphors correctly around 9 to 12 years of age (e.g. Asch & Nerlove, 1960; Billow, 1975; Smith, 1976; Winner, Rosenstiel & Gardner, 1976; Pollio & Pollio, 1979; Winner et al., 1980), while others showing successful metaphor comprehension even at 3 to 5 years of age (e.g. Vosniadou & Ortony, 1983; Vosniadou et al., 1984; Waggoner & Palermo, 1989; Özçalişkan, 2005; Pouscoulous & Tomasello, 2020; Rubio-Fernández & Grassmann, 2016). How can such discrepancies be explained? One source of contradictory results across studies may have to do with the tasks that were used to assess children's comprehension of metaphor (see Grigoroglou & Papafragou, 2017; Pouscoulous, 2011; Pouscoulous, 2014, for discussion). Studies that show later understanding of metaphor tended to ask children to provide their own metaphorical interpretations or to choose among several interpretations and to provide justifications for their choices. For instance, Winner et al. (1976) presented 6- to 12-year-old children with metaphors (e.g., "The prison guard was a hard rock") and asked them to explain what they thought the metaphorical sentence meant or choose between four interpretations in a multiple-choice task. Results showed that 6- and 7-year-olds tended to give either literal interpretations that involved magic ("The king had a magic rock and he turned the guard into another rock") or interpretations that modified the literal meaning of the sentence ("The guard worked in a prison that had hard rock walls"). Eight-year-olds gave "primitive metaphoric" interpretations by extending the attribute *hard* to another physical domain (e.g., "The guard had hard, tough muscles") instead of the intended abstract domain, and only 10-year-olds were able to derive metaphorical interpretations (e.g., "The guard was mean and did not care about the feelings of the prisoners"). Similarly, a study by Billow (1975) investigated children's comprehension of metaphor through a series of short interviews (e.g. Metaphor: "A butterfly is a flying rainbow." Interview questions: "What does this sentence mean? Are there more colourful things in the world or more butterflies? Why?") Only 9-year-olds in this experiment showed reliable signs of metaphor comprehension. Evidently, such tasks are highly metalinguistic and, thus, may have masked children's true pragmatic abilities.

By contrast, studies that have shown earlier metaphor comprehension, have typically used simpler, forced choice paradigms that highlight the difference between a metaphorical and a competitive (e.g., literal or nonsensical) interpretation. For instance, Özçalişkan (2005) presented 3-, 4- and 5-year-old children with stories containing metaphors (e.g., "A lot of ideas wander in Lucy's mind") and a question related to the meaning of the metaphor (e.g., "Why didn't Lucy buy the groceries her mom wanted?"). The question was answered by two speakers (puppets) who either offered an answer compatible with the meaning of the metaphor (i.e., "Because she forgot what her mom told her to buy"), or incompatible with the meaning of the metaphor ("Because

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she bought candies with the money"). Four- and five-year-olds succeeded in the task and chose the answer that was compatible with the meaning of the metaphor. Similarly, Pouscoulous and Tomasello (2020) presented 3-year-olds with metaphorical prompts (e.g. "Give me the bottle with the round belly") and asked them to choose between two toys: one that matched the metaphorical prompt (i.e., a round water bottle) and one that did not match the metaphorical prompt (i.e., a slim water bottle) Three-year-old children successfully picked the appropriate toy, thus suggesting that they understood the intended meaning of the prompt.

A second source of contradictory findings across studies may have to do with the content of the metaphors used (cf. Grigoroglou & Papafragou, 2017; Pouscoulous, 2011; Pouscoulous, 2014). Studies that show later metaphor comprehension tended to use more difficult metaphors that may have not been accessible to young children. For example, the psychological metaphors used in Winner et al. (1976) mentioned above (e.g., that life as a prison guard could lead to insensitivity) require encyclopedic knowledge that children may not yet have. Relatedly, in other work (Cicone, Winner & Gardner, 1981), metaphors used involved highly idiosyncratic comparisons, such as between physical objects ('a flowing fountain') and psychological states ('generosity'), which could have been difficult for young children to grasp. In support of these points, subsequent work has shown that the familiarity of the source and the target of metaphors plays a significant role in enhancing children's comprehension of metaphor (e.g., Keil 1986; Özçalişkan, 2005).

Conversely, studies that show successful metaphor comprehension earlier on tended to use simpler metaphors, more aligned with young children's vocabulary and world knowledge. For instance, a study by Vosniadou et al. (1984) used novel metaphors targeting behaviour traits (e.g., "Jimmy is a squirrel burying his nuts," meaning "Jimmy is a child hiding his cookies"), which involved concepts and vocabulary that were familiar to young children (e.g., 'squirrel' and 'burying'). In an act-out task using toys, 4-year-old children were able to correctly enact the intended meaning of the metaphor. Similarly, Pouscoulous and Tomasello (2020), mentioned previously, used simple novel metaphors relying on visual similarities between concrete and known objects (e.g., a 'round bottle' and a 'belly'). Studies that have used conventional metaphors also yield earlier ages of success with metaphor comprehension. In a study mentioned previously by Özçalişkan (2005), which yielded successful metaphor comprehension at age 4, children were presented with well-established conventional metaphorical mappings, such as 'time' and 'moving object' (e.g., "Time flies and goes away quickly"), or 'mind' and 'container' (e.g., "An idea passed through her mind").

However, several issues concerning children's understanding of metaphor remain open. First, it is unclear whether young children who performed successfully in forced-choice tasks demonstrated genuine metaphor comprehension or simply made a reasonable inference based on the available options. For example, in Pouscoulous & Tomasello (2020), children could have picked the right toy by simply relying on visual similarity between the prompt and the available referents, without necessarily making a sophisticated pragmatic inference (e.g., a slim bottle had no similarity to a 'belly'). Relatedly, in Vosniadou et al.'s (1984) act-out task, children were more successful with the comprehension of metaphors, when these were a predictable (rather than an unpredictable) ending to a story, thus raising the question of whether they actually processed the metaphorical ending or simply guessed how the story most likely ended.

Second, given the great variability in materials used in metaphor comprehension, it is difficult to disentangle metaphor comprehension as a pragmatic ability, where children detect when a statement is used intentionally to convey something beyond its literal meaning (Grice, 1975; Searle, 1979; Sperber & Wilson 2008; Taverniers, 2017), or as a process of accessing already available lexical meanings. For instance, the conceptual metaphors used in Özçalişkan, (2005; e.g., "Time flies and goes away quickly"), concerned highly conventional meanings, which children acquire over the course of development as part of their lexicon. Such meanings are often listed in dictionaries as part of the meaning of a word, e.g., 'flying' in English has a separate entry in the dictionary which corresponds to its metaphorical meaning in "Time flies!" (Merriam Webster, n.d.).

At present, the ability of young children to interpret metaphorical statements as the result of a sophisticated pragmatic calculation of the speaker's intention, as well as the developmental trajectory of metaphor understanding remain open.

Current Study

In the current study we investigate comprehension of novel metaphors in 3- and 4-year-old children. Given that recent studies show evidence for metaphor comprehension in these age groups (e.g., Özçalişkan, 2005; Pouscoulous & Tomasello, 2020; Vosniadou et al., 1984), we were interested in how children's pragmatic abilities with respect to metaphor comprehension develop during these critical ages.

To tap into children's pragmatic abilities, we used a variation of the truth value judgment task (TVJT; Crain & Thornton, 1998), a task commonly used in research targeting the acquisition of pragmatics (e.g., for assessing children's understanding of scalar implicature; Katsos & Bishop, 2011; Noveck, 2001; Papafragou & Musolino, 2003; Skordos & Papafragou, 2016, a.o.). In our task, participants were asked to accept or reject a metaphorical statement uttered by a less competent speaker (i.e., a young puppet who is learning new things). Our design probed the *relevance* of the metaphors compared to their linguistic context. A metaphor was uttered by the puppet as a response to a context sentence provided by the experimenter. For half of the trials, the context sentence rendered the metaphor meaningful (e.g., "Sarah is a rocket" as a response to "Sarah runs faster than all my friends"); for the other half, the context made the metaphor irrelevant (e.g.,

"Sarah is a rocket" as a response to "Sarah says 'no' to everything"). We reasoned that, provided that our metaphors were apt, accessible, and age-appropriate, and that the context was sufficiently supportive, children should be able to accept meaningful (i.e., context-congruent) metaphorical statements and reject irrelevant (i.e., context-incongruent) metaphorical statements, uttered by a speaker in a 'conversation-like' setting.

To avoid tapping into children's lexical knowledge as opposed to their metaphor comprehension skills, we investigate nonconventional metaphors, where a novel comparison is established between two noun phrases (e.g., "Sarah is a rocket"). We drew on metaphorical uses of nouns, which are more familiar to children early on (Kuperman et al., 2012), and more in line with their world knowledge. To ensure that children made an inference of relevance based on the linguistic context of the metaphor as opposed to relying on visual similarity alone, we used metaphorical sentences targeting people's abilities or behaviours that would be familiar to young children (e.g., 'running fast').

Unlike prior research that used metaphors that were difficult to children due to a lack of pre-existing encyclopedic knowledge (e.g., Winner et al. 1976; Smith 1976), we familiarized children with the items used as the *source* of our metaphorical stimuli before our main test on metaphors (e.g., we told them that "rockets go fast"). To avoid priming children with a relevant feature alone, we also presented them with a feature that would be irrelevant to the metaphor comprehension task (e.g., "rockets go to space") for each item.

Methods

Participants

Our target sample includes 20 3-year-old and 20 4-year-old children, native speakers of English (with exposure to the language more than 75% of the time) and a control group of 20 adult native speakers. Data collection is ongoing. Here we report on data based on 10 3-year-old children (M = 37.91 months, range = 3;00-3;09, 6 girls),11 4-year-old children (M = 51.17 months, range = 4;00-4;08, 4 girls), and 12 adults (M = 23;5 years, range = 20-28 years, 8 females). Children were recruited from preschools in the Toronto Greater Area. Adults were recruited via the University of Toronto participant pool in exchange for course credit. One additional 3-year-old child was excluded from the analysis because they abstained from giving a response in more than 50% of the test trials.

Materials & Design

Norming A separate group of adults (N=43, self-reported native English speakers, recruited on Prolific) evaluated an initial battery of 44 metaphors. Each metaphor involved a person as the target, e.g. "Sarah", and either an animal, e.g. "mouse", an object, e.g. "rocket", or a natural element, e.g. "waterfall", as the metaphorical source. The source items were selected using age-of-acquisition ratings for English words (Kuperman et al. 2012) to ensure that they would be familiar to young children. The concepts targeted by the metaphors (e.g. 'running fast') were also chosen by proxy from children's vocabulary using the same age-of-acquisition ratings.

Participants in the norming task were asked to explain freely what they thought the meaning of each metaphor was, and to evaluate its creativity, ease of interpretation, and the appropriacy of the metaphor's intended meaning (e.g. "Sarah runs fast" to describe "Sarah is a rocket") on a 7-point Likert scale. On the basis of participants' responses, we chose 12 metaphors, which scored >3 for creativity, >4 for ease of interpretation, and >4 for appropriacy of intended meaning. Six of these 12 selected items involved animals as their metaphorical source, 3, objects, and 3, elements of nature. Eight metaphors were chosen as test items; four were chosen for practice items.

Pre-test A picture book created in a PowerPoint file was used during the pre-test phase to familiarize children with the items that would appear in the experiment as sources of the metaphor. Each item (e.g., *rocket*) was introduced to the child in a picture book format, together with two features: one that would be later relevant to the test phase (e.g., "Rockets are very fast") and one irrelevant feature (e.g., "Rockets go to space"). The source items introduced in the pre-test were 'lion', 'skunk', 'mouse', 'bat', 'turtle', 'elephant', 'rocket', 'stove', 'cushion', 'cloud', 'waterfall', and 'shadow'.

Test Test stimuli involved 8 metaphorical statements, which appeared after a context statement (see Table 1). For each metaphorical statement (e.g., "Sarah is a rocket"), we created two context statements (a total of 16): one that was compatible with the metaphor (i.e., "Sarah runs faster than all my other friends") and one that was incompatible with the metaphor (i.e., "Sarah says 'no' to everything"). Test stimuli were arranged in two lists. Each list contained all 8 test metaphors and a single version of a context statement: 4 context statements were compatible with the metaphor and 4 context statements were incompatible with the metaphor. This led to metaphorical statements appearing as *context-congruent* (when preceded by a context statement compatible with the metaphor) or *context-incongruent* (when preceded by a context statement incompatible with the metaphor). Whether each of the 8 metaphorical statements appeared as context-congruent or incongruent was counterbalanced across lists.

Test trials were preceded by 4 practice trials, which were similar to test trials, except that they expressed similes and not metaphors (with the addition of the simile marker 'like', e.g., "Clara is like a bat"). Similarly to test trials, practice trials followed a context statement that was either compatible or incompatible with the simile (see Table 2).

Procedure

Pre-test Children were introduced to Lala, a 'young' and inexperienced puppet, on a computer screen, and were told that Lala wanted to play a game. However, before Lala could play, children were told that she needed to learn some things

about animals, objects, and nature, and they were asked to help Lala learn. Children sat with the experimenter, and were prompted to participate in Lala's learning experience, by naming some of the items on the screen and describing some of their features, through picture elicitation. Lala displayed some recorded reactions during the pre-test, to help the child remain engaged (e.g., nodding, shaking her head, and clapping).

Table 1: Test materials

Metaphor	Congruent Context	Incongruent Context
Erik is a lion.	*Erik is never afraid of danger.*	*Erik is very good at hiding.*
Simon is a skunk.	*Simon never takes a bath.*	*Simon takes very long naps.*
Sam is a mouse.	*Sam makes no noise when he walks.*	*Sam is very good at swimming.*
Attica is a turtle.	*Attica is always the last to finish drawing.*	*Attica can see very far.*
Lucas is a waterfall.	*Lucas cries every morning.*	*Lucas loves playing in the sunshine.*
Anna is a shadow.	*Anna follows me everywhere.*	*Anna always makes a mess.*
Fiona is a cushion.	*Everyone likes hugging Fiona.*	*Fiona is always singing.*
Sarah is a rocket.	*Sarah runs faster than all my friends.*	*Sarah says 'no' to everything.*

Table 2: Practice materials

Simile	Context
Clara is like a bat.	*Clara stays awake at night.* (congruent)
Pedro is like an elephant.	*Pedro can jump very high.* (incongruent)
Amir is like a stove.	*Amir always feels hot.* (congruent)
Yigu is like a cloud.	*Yigu gets hurt very easily.* (incongruent)

Test During the test, the experimenter told children that Lala was now ready to play and explained the rules of the game: "I am going to show Lala a photo album of my friends! Lala will use what she learned about animals, objects and nature to say something smart about my friends. If she says it well, she should get a prize!" In each trial, the experimenter introduced their friend (e.g., "This is my friend Sarah") and used a context statement to describe a characteristic of the friend (e.g., "Sarah runs faster than all my other friends"). For visual support, context statements were accompanied by pictures of the 'friend' on the screen, designed in Lexica, a publicly available artificial intelligence stable diffusion model (Lexica, *n.d.*). Then, the puppet, Lala, used a metaphorical sentence as a response (e.g., "Sarah is a rocket!") and the child was asked to decide if the puppet should get a prize or not ("Did she say it well? Should she get a prize?"). The correct response for context-congruent metaphors was always "yes" (4 responses), whereas the correct response for context-incongruent metaphors was always "no" (4 responses). At the end of the test trials, children saw a video of Lala receiving a prize and clapping, and the experimenter thanked them for their participation.

To ensure that children understood the task (i.e., make the necessary comparison between target and source domains) and could respond both "yes" and "no", they received four practice trials before the test (see materials for details). Similarly to test trials, practice trials also involved a character (one of the experimenter's friend; e.g., "This is my friend Pedro") and a context sentence (e.g., "Pedro can jump very high"). Unlike test trials, where the puppet used a metaphor, in practice trials the puppet used similes (e.g., "Pedro is like an elephant"). After each practice trial, the experimenter gave feedback to help children understand the comparative nature of the task (e.g., "No, Pedro is not like an elephant, because elephants cannot jump very high").

Results

To analyze children's comprehension of metaphor, we measured participants' accuracy for each trial ("correct"= 1, "incorrect" = 0) for all trials (including context-congruent metaphors, to which the answer was "yes," and context-incongruent metaphors, to which the answer was "no"). Child Data were analyzed using multi-level mixed-effects modeling (Baayen, 2008; Baayen, Davidson, & Bates, 2008) and were fit using the *glmer* function of the *lme4* package (version: 1.1.35.1; Bates, Maechler, Bolker, & Walker, 2015). Adult data were excluded from this preliminary analysis, due to model convergence failure (as a result of limited variability/ceiling effect). The model included fixed effects of Metaphor Type (context-congruent, context-incongruent) as a first-level predictor, fixed effect of Age (3-year-olds, 4-year-olds) as a second-level predictor, and their interaction. The model also included a random by-trial intercept (a random by-participant intercept was removed from the model as it presented no variance and resulted in model convergence failure). The fixed effects of Metaphor Type and Age were coded with centered contrasts (-1/2, 1/2). Figure 1 summarizes the data. Table 3 presents fixed effect parameter estimates for the multi-level model of accuracy in children's metaphor comprehension. Results showed a significant effect of Metaphor Type, with children being more accurate for context-congruent metaphors than context-incongruent metaphors ($M_{congruent}$ = 0.74 vs. $M_{incongruent}$ = 0.47). The model also returned a significant effect of Age,

with 4-year-olds being, overall, more accurate than 3-year-olds (M_3 = 0.51 vs. M_4 = 0.69). The interaction between Age and Metaphor Type was not significant.

To test for the robustness of participants' metaphor comprehension, we also compared their performance in each Metaphor Type to chance (.50), using one-sample two- tailed t-tests. These comparisons showed that adults performed above chance for both context-congruent and context-incogruent metaphors (p's < 0.001, $M_{congruent}$ = 0.88, $M_{incongruent}$ = 0.96). Four-year-olds performed above chance for context-congruent metaphors, ($t(10) = 2.63$, $p = 0.025$; M = 0.77) but at chance for content-incongruent metaphors ($t(10) = 0.89$, $p = 0.39$, M = 0.61). Three-year-olds were at chance for both context-congruent metaphors ($t(10) = 1.69$, $p = 0.121$, M = 0.70) and context-incongruent metaphors ($t(10) = –1.44$, $p = 0.18$; M = 0.33).

Table 3: Parameter estimates for proportion of acc. resp.

Effects	Estimate	*SE*	*z*
Intercept	0.46	0.19	2.47*
Metaphor type	–1.21	0.38	–3.19**
Age	0.80	0.34	2.38*
Metaphor type: Age	0.82	0.67	1.22

* $p < 0.05$ ** $p < 0.01$

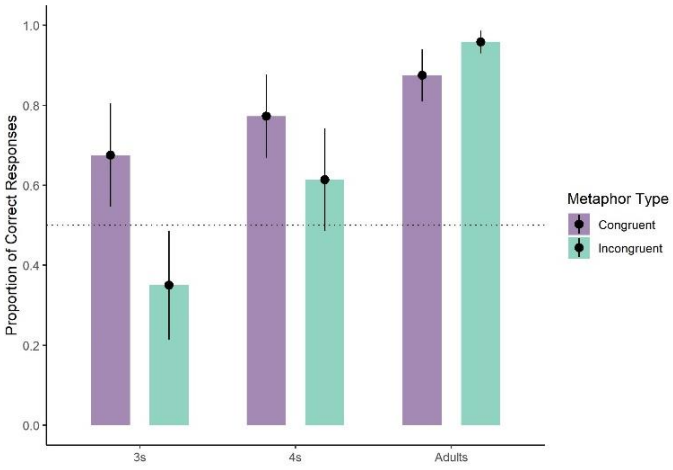

Figure 1. Proportion of accurate responses per Age group and Metaphor Type.

Discussion

The goal of this study was to assess children's metaphor comprehension as their ability to make an inference about a non-literal statement's relevance to discourse. We tested this using an age-appropriate paradigm that targeted their pragmatic reasoning via overt acceptability judgements, and simple metaphors about familiar abilities and behaviours. To do well on this task, children had to *accept* metaphors when they were congruent with the context and *reject* them when they were incongruent, assuming that the metaphors' meaning was accessible to them.

Our results demonstrate successful – albeit incomplete – metaphor comprehension in 4-year-olds but persistent limitations in 3-year-olds. More specifically, when metaphorical statements were compatible with the context, 4-year-old children tended to accept them, while 3-year-olds were equally likely to accept or reject them. However, when metaphorical statements were incompatible with the context, and should, thus, be rejected, 4-year-olds were equivocal, while 3-year-olds tended to accept them. These findings were complemented by an omnibus analysis which showed that 4-year-olds demonstrated overall better metaphor comprehension than 3-year-olds, while both age groups performed better in the task when the metaphors were compatible with the context (and should be accepted) rather than when the metaphors were incompatible with the context (and, thus, should be rejected).

Several aspects of our data are worth discussing. First, our study contributes additional, necessary evidence to a small (but growing) body of research demonstrating successful metaphor comprehension in 4-year-olds but limitations in 3-year-olds (e.g., Rubio-Fernández & Grassmann, 2016; cf. Vosniadou et al., 1984; Özçalışkan, 2005). Such findings point to a clear developmental leap in children's pragmatic development between the ages of 3 and 4. Given that prior work has demonstrated evidence for metaphorical abilities even at age 3 (Pouscoulous & Tomasello, 2020), it remains to be seen whether certain modifications to our experimental paradigm could lead to successful comprehension of the same metaphorical statements by children younger than 4.

A second important finding was that both 3- and 4-year-old children in our task were more successful at providing accurate responses when the metaphor was congruent with the context (i.e. when the correct answer was "Yes") as opposed to when the metaphor was incongruent with the context (i.e. when the correct answer was "No"). One possible explanation of this finding may have to do with the nature of our task, which, in the case of context-incongruent metaphors, would require children to overcome a potential "yes" bias (Peterson & Grant, 2001; Rocha, 2003; Fritzley & Lee, 2003; Fritzley et al. 2013). However, this explanation is less likely, given that even 3-year-olds were not at ceiling for context-congruent metaphors and extremely low for context-incongruent metaphors (i.e. which is what we would expect if they responded 'yes' to everything). A more plausible explanation is that children in our task (especially 3-year-olds) may have detected the incongruence of the metaphor and the context, but may have been more pragmatically tolerant and tried to 'repair' nonsensical metaphorical meanings by making up a possible interpretation (**cf.** Katsos & Bishop, 2011). While children's pragmatic tolerance has mostly been assessed with respect to violations of *informativity*, it could be that these observations would extend to violations of *relevance*, like those found in our paradigm.

As such, research on early metaphor comprehension has yet to put forth an account of the pragmatic computation involved in the genuine comprehension of non-literal

statements. Research on early simile comprehension has suggested that similes require a pragmatic inference of quantity, or informativity, to be properly understood (i.e., to understand that "Lucy is like a parrot", the listener needs to infer that Lucy is not a parrot; Long, Shukla & Rubio-Fernández, 2021). Here, we suggest that understanding a metaphor involves making a pragmatic inference of relevance, where a statement that cannot be interpreted literally in its context (e.g. "Sarah is a rocket", where Sarah is shown to be a person) only becomes interpretable if it is otherwise relevant to the discourse (i.e., if "rockets" are particularly relevant for describing Sarah, given they share some salient similarity). Future research could further explore the pragmatic inferences that may underlie metaphor comprehension, in an effort to provide a more comprehensive account of the pragmatic mechanisms involved in early metaphor comprehension.

Conclusion

We conducted a variation of the truth-value judgement task (Crain & Thornton, 1998), where 3- and 4-year-old participants had to accept or reject metaphorical statements based on their congruence with a short context sentence. This study sought to explicitly assess young children's ability to process metaphors as relevant contributions to the discourse. Our results show a significant effect of age on this task, lending corroborative evidence to previous research suggesting the emergence of metaphor skills around the age of 4 (e.g., Vosniadou & Ortony, 1983; Vosniadou et al., 1984; Özçalişkan, 2005; Rubio-Fernández & Grassmann 2016). As such, our paradigm contributes to a more direct assessment of children's pragmatic inferences during metaphor comprehension. It is important, however, for future research to extend these efforts to a paradigm that might shed more light on the pragmatic abilities of 3-year-old children during metaphor comprehension.

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