

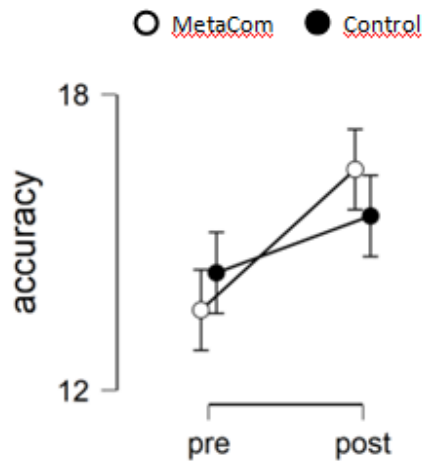
PROMOTING METAPHOR COMPREHENSION IN TYPICAL DEVELOPMENT: THE METACOM TRAINING

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Introduction. Metaphor comprehension represents a challenge in the process of language acquisition for both typically and atypically developing children. In typical development, a full-fledged metaphorical understanding is not reached until the age of ten/eleven years [1;2], although there is evidence that simpler tasks might reveal earlier metaphorical skills [3]. For atypical development, a large amount of evidence confirms that children with autism spectrum disorders (ASD) have difficulties in figurative language understanding [4]. On the one hand metaphor understanding represents a challenge in the processing of learning to communicate, on the other hand its achievement is key in a number of communicative, social, and school situations [5], with difficulties in figurative language being related for instance to literacy [6]. Given the importance of metaphor, it is striking that the literature on training programs to promote metaphorical skills is very scant. There have been a few intervention studies involving children with ASD and reporting successful results [7-9], but the field is still in its infancy, and no studies have targeted typical development. The aim of this study was to develop a novel training program to promote children's Metaphor Comprehension (MetaCom) and to test its effectiveness in a randomized controlled trial involving typically developing children. The rationale of MetaCom is grounded in the relevance-theoretic lexical-pragmatic account of metaphor [10]. Specifically, we capitalized on the idea that metaphor comprehension involves a process of conceptual adjustment of the lexically encoded concept, based on the narrowing of its denotation (by dropping logical properties) as well as on the broadening (by promoting contextually relevant encyclopedic properties).

Methods. The study involved 53 children (28F, age range=8;8-9;8, *Mage*=9;3) after excluding children who were not native speakers or were diagnosed with learning disabilities. Children were randomly divided into 2 groups: one received the MetaCom and the other received a control training targeting reading comprehension. Both training programs consisted of two sessions per week, for two consecutive weeks, for a total of four sessions of 50 minutes each. In MetaCom, each session included either one or two items. Each item focused on one single metaphor (e.g., *This jumper is an oven*) and included four types of exercises. First, a short story containing the metaphor was presented, and the meaning of metaphorical sentence was discussed by the trainer together with the children. The discussion started from identifying the logical properties of the metaphor's vehicle (for *oven*, *being a cooking item*) and then focused on the context-relevant encyclopedic features that could be used to broaden its denotation (*being warm*). Second, in a picture-matching task, children were required to match the metaphor with the correct figure, with the purpose of consolidating the knowledge acquired about the meaning of the metaphor in the specific context of the story. Third, children were presented with an association task (adapted from [11]) in which a list of four words was provided offering different pairing possibilities, one of which based on the trained metaphor (e.g., *room-oven*) and the other literal (e.g., *cake-oven*): children were asked to create metaphorical pairs and to explain them. Finally, to promote generalization and use, they were asked to write a short story using the metaphor learned in the previous exercises. The reading comprehension training was based on existing tools [12; 13] and included a number of exercises promoting the comprehension of written text. For instance, children were trained to extract information that was explicitly presented in the text in order to answer to comprehension questions or to identify and correct inappropriate words in the text. Metaphor comprehension abilities were assessed pre-training (T1) and post-

training (T2) in all children through the Physical and Mental Metaphors task (PMM) [2], comprising 12 metaphors (not included in the training) and measuring accuracy on a 0-1-2 scale in a verbal explanation task. Additionally, children were administered a working memory test (Digit Span Backward from WISC-III) and a vocabulary test (Peabody picture vocabulary test) as control variables.



Results. The two groups did not differ for the control variables, which were therefore not considered in further analyses. A 2(time) x 2(training type) repeated measure ANOVA analysis showed a significant effect of time [$F(1,51)=25.28;p<0.001$] and a significant interaction between time and training type [$F(1,51)=4.54;p=0.038$] on the accuracy of children in the PMM task (see Figure). The relevant post-hoc contrasts between accuracy at T2 and T1 showed a significant effect in the MetaCom group [$t(26)=5.08;p<0.001$] and a marginal effect in the control group [$t(25)=2.04;p=0.052$]. A t-test comparing gain in accuracy scores over time in the two groups showed that improvement was larger in the MetaCom group [$t(51)=2.13;p=0.038$].

Discussion. Results show that the MetaCom is effective in boosting metaphor comprehension and that this effect is stronger compared to the reading comprehension training. These findings are interesting from several points of view. First, they show that metaphorical skills can be trained in typical development, thus extending previous findings on atypical development. Second, they show that the benefits of a theory-based training are genuine and extend to non-practiced tasks. Previous intervention programs focused on conceptual aspects (e.g., thinking maps) but neglected the contextual aspects. Training children in the search for the context-relevant encyclopedic properties is likely to be a key ingredient to promote metaphor understanding; we believe that a similar approach could be beneficial also in atypical development. It is important to note, however, that also the control group showed a trend towards improvement. This might reflect developmental processes and/or might be the effect of the reading comprehension training, which might indeed increase the sensitivity to context and, thus, produce some benefits for metaphorical skills.

References. [1]E. Winner, et al., “The development of metaphoric understanding,” *Dev.Psychol.*2:289–297, 1976. [2]S. Lecce, et al., “Interpreting physical and mental metaphors: Is Theory of Mind associated with pragmatics in middle childhood?,” *J.ChildLang.*1–15, 2018. [3]N. Pouscoulous, “‘The elevator buttocks’. Metaphorical abilities in children,” in *Pragmatic development in first language acquisition*, John Benjamins, 2014, 239–259. [4]T. Kalandadze, et al., “Figurative language comprehension in individuals with autism spectrum disorder: A meta-analytic review,” *Autism*22:99-117. [5]L. Cameron, “Metaphors in the Learning of Science: a discourse focus,” *Br.Educ.Res.J.* 28:673–688, 2002. [6] M.A. Nippold, “Figurative language,” in *Later language development: Ages nine through nineteen*, Little-Brown, 1988, 179–210. [7]N. Mashal, A. Kasirer, “Thinking maps enhance metaphoric competence in children with autism and learning disabilities,” *Res.Dev.Disabil.*32:2045–2054, 2011. [8]A. Persicke, et al., “Establishing metaphorical reasoning in children with autism,” *Res.AutismSpectr.Disord.*6:913–920, 2012. [9]S. Melogno, et al., “Sensory and physico-psychological metaphor comprehension in children with ASD: A preliminary study on the outcomes of a treatment,” *BrainSci.*7, 2017. [10]D. Wilson, R. Carston, “A Unitary Approach to Lexical Pragmatics: Relevance, Inference and Ad Hoc Concepts,” in *Pragmatics*, Palgrave, 2007, 230–259. [11]U. Willinger, et al., “Developmental Steps in Metaphorical Language Abilities: The Influence of Age, Gender,

Cognitive Flexibility, Information Processing Speed, and Analogical Reasoning,”
Lang.Speech, 2017. [12]R. De Beni, et al., *Nuova guida alla comprensione del testo*.
Erickson, 2003. [13]A. Zoccali, *Leggere, ascoltare, comprendere*. Erickson, 2016.