

The role of Theory of Mind, age, and reception of grammar in metaphor and irony comprehension of preschool children*

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The aim of the present study is to investigate whether comprehension of metaphors requires first-order theory of mind ability and whether irony requires second-order theory of mind ability, as well as to investigate the role of the age of children and their reception of grammar in metaphor and irony comprehension.

The participants of the experiment were seventy-one typically developing preschool children. The children were allocated into three groups on the basis of their theory of mind level and their age. The children's comprehension of metaphor and irony was tested with a multiple-choice task. To assess grammar comprehension, the Test for Reception of Grammar was used.

The findings suggest that metaphor understanding can precede first-order ToM ability while second-order ToM ability is not sufficient to ensure better irony comprehension. However, the age of children influences their performance. Furthermore, the correlation between metaphor comprehension and the reception of grammar is found to be statistically significant, but irony comprehension does not correlate with the reception of grammar.

Keywords: *irony, metaphor, comprehension, children, theory of mind, relevance theory*

1 Introduction

The main goal of inferential pragmatics is to explain how the hearer can recognise the speaker's meaning on the basis of the evidence provided. According to the standard pragmatic view (Grice 1975), an essential feature of the human communication is the expression and recognition of intentions. The Relevance Theory (Sperber & Wilson 1995, Wilson–Sperber 2005) shares Grice's claim that utterances raise expectations of relevance, however, their aim is to provide an explanation of the comprehension process in cognitively realistic term. Therefore, Relevance Theory was used both as a pragmatic framework and as the starting point in the present investigations because it has not only got theoretical assumptions regarding nonliteral language comprehension, but it also has psychological value assuming the role of mind-reading in human communication.

According to relevance theoretical approach (Sperber & Wilson 1995), the identification of explicit contents is as inferential and guided by the Communicative Principle of Relevance, as the recovery of implicatures. Comprehension is an on-line process constructing a hypothesis about the speaker's meaning that satisfies the presumption of relevance and involves an inference process embedded within the overall process of constructing a hypothesis about the speaker's intended meaning. This overall task can be broken down into the following subtasks which should not be sequentially

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ordered, but each of them involves a non-demonstrative inference in parallel: a hypothesis about explicatures, a hypothesis about intended contextual assumptions (implicated premisses) and a hypothesis about intended contextual implications (implicated conclusions). In this sense the comprehension process of each utterance (explicatures and nonliteral language forms) is treated in the same way, that is, following a path of least effort in computing the optimal cognitive effect, the hearer should take the decoded meaning and enrich it at the explicit and implicit level until the resulting interpretation meets his/her expectation of relevance (Wilson–Sperber 2005).

On the other hand, Relevance Theory argues against the more general assumption – in rhetorics and Grice’s framework (1975) – that metaphor and irony should be given parallel treatments, that is, irony, like metaphor, is an overt violation of the maxim of truthfulness.

The interpretation of every utterance (explicature or implicature) involves a complex, multi-level mental state attribution (the attribution of mental states to others) which is called the Theory of Mind. Depending on what kind of metarepresentational or theory of mind level is required to be understood, these nonliteral language forms are treated differently.

According to Relevance Theory, metaphor and loose talk are alternative routes to achieving optimal relevance, and the propositional form of a metaphorical utterance is a more or less loose interpretation of the speaker’s thought. The explicit content of metaphors (as loose talk) is indeterminate to some degree, which is linked to the relative strength of implicatures. A proposition may be strongly implicated (its recovery is essential in order to arrive at an interpretation) or weakly implicated (its recovery helps with the construction of an interpretation, but is not itself essential because the utterance suggests a range of similar possible implicatures). Metaphorical utterances convey an array of weak implicatures, e.g. “John has a square mind” weakly implicates that John is rigid in his thinking, does not easily change his mind.

On the other hand, ironic utterances quote or refer to an attributed thought and express the speaker’s attitude towards this thought. Therefore, ironical utterances are echoic and express indirectly dissociative – wry, skeptical, mocking – or humorous attitudes towards the attributed utterance or thought (1).

- (1) What a skinny cat! (said in a funny way about a really fat cat)

To understand an ironical expression, the hearer has to recognise not only the basic proposition expressed, but also the fact that it is being attributively used, as well as the attitude that the speaker intends to convey. Therefore, irony comprehension involves a higher order metarepresentational ability, while metaphor comprehension requires only first-order metarepresentational ability, namely the Theory of Mind (Wilson & Sperber 2005).

The notion of Theory of Mind (ToM) refers to an appreciation of others’ mental states – such as beliefs, thoughts, feelings, knowledge and wishes – that enables us to explain and predict others’ behaviour. Premack and Woodruff (1978) were the first to use the term of Theory of Mind to refer to the child’s ability to attribute thoughts, feelings, ideas and intentions to other people.

Perner and Wimmer (1985) have described two types of beliefs that play a crucial role in children’s understanding of social interactions: first-order beliefs that refer to what children think about real events (2) and second-order beliefs that pertain to what children think about other people’s thoughts (3).

- (2) Peti thinks that Mari is angry.
- (3) Peti thinks that Mari thinks that he is angry with her.

The predictions about the degree of Theory of Mind necessary for understanding metaphor and irony are confirmed in adolescents with autism and in normally developing children by Happé (1993). These findings show that autistic subjects who pass first-order false belief tests comprehend metaphor, but fail to understand ironic utterances. However, children who pass second-order false belief tests tend to comprehend irony as well. Moreover, the performance of a small sample of normally developing young children shows that only second-order ToM passers (who pass both of first-order and second-order false belief tests) understand irony while both groups (first-order ToM passers and second-order ToM passers) are at the ceiling on metaphor comprehension. The conclusions are that Theory of Mind performance is a very good predictor of metaphor and irony comprehension.

Concerning these findings, some facts and recent evidence may question this simplified picture about the role of Theory of Mind in metaphor and irony comprehension in typically developing children.

The sample size of normally developing children in Happé's study (1993) was not really demonstrative, because the sample size was relatively small: in the second-order group there were only 5 children.

On the other hand, Tager-Flusberg (2000) shows there is a different developmental relationship between ToM and pragmatic competence among individuals with autism, more specifically, the connection between ToM and pragmatic skills is not so close in children developing typically as in individuals with autism.

Third, Nippold (1998) mentions that the age factor could also play a role in these findings. Children typically pass first-order false belief tasks at around the age of 4 but metaphor understanding increases throughout adolescence, that is why the age of the autistic adolescent participants might have influenced, more precisely, positively distorted the results.

In the developmental literature Winner (1997) states that metaphor and irony differ not only in their primary functions and structures, but the competences that are used to understand them are different. Understanding metaphor is primarily a logical-analytic task, in which the hearer should recognise the linguistic elements being linked. However, understanding irony is essentially a social-analytic task, in which the hearer tries to recognise the speaker's beliefs and attitudes.

According to Vosniadou (1986, 1987), metaphor comprehension is conceptualised as a continuous process which starts at early ages and develops gradually, constrained primarily by limitations in children's conceptual knowledge, linguistic skill, and information processing ability. She identifies some of the critical variables that might have effects on metaphor comprehension, supported by some empirical evidence. (1) The linguistic form of the metaphorical statement affects metaphor understanding, for instance, the riddles ("What is like a scar but marks the sky?") were found the easiest of all the forms to explicate (Winner, Engel, and Gardner 1980). (2) The content of the metaphorical statement is another important determiner of comprehension, as Billow's findings (1975) show, young children find metaphors based on perceptual similarity ("The cloud is a sponge") easier to understand than metaphors based on abstract and complex relations ("My head is an apple without any core"). (3) The appropriate and more

predictable linguistic and pragmatic context, in which the metaphorical statement occurs, can facilitate the comprehension of metaphor (Vosniadou et al. 1984). (4) The difficulty of the comprehension task is a factor which can influence the outcome, therefore our perception of children's metaphoric comprehension level. Paraphrase and explication are more difficult than the multiple-choice tasks, children who failed on the paraphrase measure often succeeded on the multiple-choice test, as Winner (1997: 46) demonstrated. To sum up, however, it is not exactly clear how these factors interact with each other and with the age of the children (Vosniadou 1987).

Norbury's (2005) study investigated the role of both Theory of Mind and language ability in metaphor understanding in children with communication impairments. Her results provide evidence that the possession of first-order Theory of Mind skills is not sufficient to ensure adequate metaphor comprehension, but language ability in general and semantic skills specifically are more important for metaphor comprehension.

In connection with irony, Sullivan et al. (1995) examined the relationship between the ability to attribute second-order mental states and the ability to discriminate lies from ironic jokes in typically developing children. The results provide evidence that second-order mental state attribution (Person 1 does not know what Person 2 knows) precedes the ability to distinguish lies from jokes. Furthermore, Sullivan et al. (2003) compared adolescents with Williams syndrome to age-matched individuals with Prader-Willi syndrome, using the task designed by Sullivan et al. (1995). Their results showed that almost none of the participants in any of the groups, even those who were able to conceptualise second-order knowledge states, were able to correctly classify the ironic jokes, and judged them to be lies instead. Their conclusion was that the ability to conceptualise the second-order knowledge state of the speaker is necessary but not sufficient to distinguish ironic jokes from lies. The participants in both studies made the same kind of error, that is, they systematically called all the ironic jokes lies.

Similar results are shown in Szücs's (2011) data, according to which typically developing schoolchildren are able to understand the intended meaning of ironic utterances, however, they can often not recognise the speaker's ironic attitude or they misunderstand it; in fact in most cases they think that the speaker intends to deceive them. On the other hand, these results raised the issue whether preschool children are able to recognise the ironic meaning and attitude of the ironic utterances, and if they can, at what age.

Because of the arising questions and uncertainties regarding these nonliteral language forms, the specific aims of the present study were three-fold.

One goal of the present study was to test the original prediction (Happé 1993) that the comprehension of metaphors requires first-order ToM ability and irony requires second-order theory of mind ability in typically developing children. The sample size of the typically developing participants in her study, the different developmental patterns of typically and atypically developing children's comprehension, the inconsistent results of the recent studies (Norbury 2005, Sullivan et al. 1995, 2003), and the lack of Hungarian data (except Schnell's (2007) findings, where the connection between ToM and comprehension of similes and metaphorical expressions was investigated, but the latter ones were idiomatic expressions in reality) indicated the first developmental investigation to examine systematically whether typically developing children who pass first- and second-order ToM tasks would have better understanding of metaphor and irony.

The second goal of the study was to investigate the role of the age of the children in their metaphor and irony comprehension. As Vosniadou (1987) demonstrated that metaphor comprehension starts during the preschool years and develops gradually to

encompass more complex metaphorical inputs, which can be influenced among other factors by the syntactic-semantic type of the metaphorical expression (Nippold et al. 1984). As she concluded that children (aged 7 and 9) had greater difficulty in comprehension of proportional metaphors than in predicative ones, but the psychological metaphors were not more difficult to understand in comparison to the perceptual ones. Therefore, this developmental investigation aimed to determine the comprehension level of certain predicative metaphors during preschool years. In the case of irony, earlier studies provided counterfactual evidence of the approximate age when children begin to understand irony. As Cresure (2007) shows, the estimated range is from the ages of 6 year (Winner-Leekam 1991) to 12 years (Capelli et al. 1990). Some recent findings indicate that 5 or 6 year-old children are able to recognise at least some of the components of ironic speech acts (Creusere 1997, Dews et al. 1996), but others show that even schoolchildren have difficulties with distinguishing irony from lies (Sullivan et al. 1995, 2003, Szücs 2011). Therefore, the present study was designed to investigate whether preschool children can comprehend ironic meaning and detect ironic attitude beyond the ironic utterances compared their performance with those of the control adult group.

The third goal of the study was to investigate how close the connection between the reception of grammar and the comprehension of metaphor and irony is. As discussed previously, Norbury (2005) provided evidence that semantic skills are important for metaphor comprehension. However, the correlation between the grammar reception level of children either in their metaphor or in their irony comprehension has not been shed light on so far.

2 Method

2.1 Participants

Seventy-one typically developing Hungarian preschool children (aged between 4 and 7) participated in the experiment.

To test the role of theory of mind ability in metaphor and irony comprehension, children were tested on two first-order and two second-order false belief tests. On the basis of their test results, they were allocated into three different groups as follows (Table 1):

ToM group	noToM	1stToM	2ndToM
Number	29	22	20
Age (mean)	5;2	5;11	5;11
Age (range)	4;2-6;11	4;0-7;2	4;10-6;11

Table 1: Number and age (mean and range) of children in each ToM group

The noToM group included children, who failed both 1st order tasks, the 1stToM group included children, who passed both of the first-order tasks but failed whatever second-order tasks, and finally, the 2ndToM group included children, who passed both first-order and second-order ToM tasks.

To investigate the role of age, children were allocated also into three groups based on their ages and, additionally, there was a control group of adults (Table 2).

	4-year-olds	5-year-olds	6 and 7-year-olds	Control
Number	17	27	27	14
Age (mean)	4;7	5;6	6;6	21
Age (range)	4;0 – 4;11	5;0 – 5;11	6;0 – 7;2	15–25

Table 2: Number and age (mean and range; /years;month/) of the children and the control group

2.2 Materials

2.2.1 The metaphor and irony comprehension test (Szücs 2014)

The metaphor and irony comprehension test material of the present study was similar to Happé’s test (1993), in which children were read five stories, and after listening to the stories and the metaphorical and ironic utterances they were provided only two choices embedded in question forms:

David is helping his mother make a cake. She leaves him to add the eggs to the flour and sugar. But silly David doesn’t break eggs first – he just puts them in the bowl, shells and all! What a silly thing to do! When mother comes back and sees what David has done, she says:

Metaphorical expression: *Your head is made out of wood!*

Question: *What does David’s mother mean? Does she mean David is clever or silly?*

Just then father comes in. He sees what David has done and he says:

Ironic expression: *What a clever boy you are, David!*

Question: *What does David’s father mean? Does he mean David is clever or silly?* (Happé 1993: 119)

As it can be seen, the word ‘silly’, which is the correct answer in both cases, appears twice in the story explicitly. In addition, there are only two possible answers, and the metaphorical answer possibilities are not the literal and the metaphorical ones, but the metaphorical one and its opposite. These factors, namely a less explicit story content as well as the number and type of possible answers, motivated the modification in the test material of the present study in order to reduce the effortlessness of the test and the possibility of providing correct answers by chance.

As a result, the present test consisted of five short stories, each one illustrated with four pictures to reduce overloading the memory capacity. Each story had both a metaphorical and an ironic ending. The metaphorical utterances were various regarding their frequency: three of them were quasi perceptual-predicative metaphors in non-existing word forms in Hungarian, and further two were psychological-predicative familiar, but rarely used, metaphorical expressions. The ironic utterances were not frozen phrases and were also never or rarely used. The frequency and occurrence of these metaphorical and ironic utterances was checked in the Hungarian National Corpus (Váradi 2002).

After listening to a story, the participating children were asked what the story characters meant by their metaphorical and ironic utterances. They were not required to

answer own their own but they had to choose an answer from a multiple-choice task which contained the correct metaphorical/ironic answer, as well as a literal one, and an irrelevant but plausible one.

The children were tested individually in a quiet room.

An example of the test:

Story: Katie was helping her mother make cookies. After kneading the dough they put it in the oven, and went out to the garden to play. Unfortunately, the cookies stayed in the oven for too long, and were burnt.

The mother said:

- Metaphorical utterance: *These became stone cookies.*
- Test question: *Why did the mother say that? What were the cookies like?*
- Possible answers:
 - the cookies were made of stone (literal answer)
 - the cookies were hard (metaphorical answer)
 - the cookies were sweet (irrelevant answer)

Story (continued): Later the father came home, saw the cookies and said:

- Ironic utterance: *What soft cookies!*
- Test question: *Why did the father say that?*
- Possible answers:
 - He thinks that the cookies are soft (literal answer)
 - He wants to deceive the mother (irrelevant answer)
 - He expresses in a funny way that the cookies are hard (ironic answer)

2.2.2 False belief tests

The most established method of assessing the Theory of Mind is the false belief test.

First-order false belief tests

The first-order false belief tests establish whether a child can attribute a false belief to a story character or to another person. To make the correct prediction, the child must be able to look beyond or inhibit his/her own knowledge of reality and appreciate the false belief of the other person instead.

In this experiment two well-known tests were used:

- the Sally and Anne test (Baron-Cohen et al.1985, 1986), which is based on the transference paradigm, and
- the Smarties test (Hogrefe, Wimmer & Perner, 1986), which is based on the false content paradigm.

Performing both first-order false belief tests successfully was required to be allocated into 1stToM group.

Second-order false belief tests

The second-order false belief tests are more complex and require a child to attribute a story character a false belief about another person's belief.

To reduce the effects of test complexity, two simpler, shorter and more comprehensible tests were used, such as: the Birthday test (Herold 2005) and the Robot test (Coull, Leekam and Bennett, 2006), which are based on the transference paradigm. Both of them were illustrated with pictures to support the understanding of the story

content. Performing both first-order and both second-order false belief tests successfully was required to be allocated into 2ndToM group.

2.2.3 The Test for Reception of Grammar

The standardised TROG test (Bishop 1983, adapted by Lukács–Rózsa 2012) is an individually administered, multiple-choice test designed to assess grammar comprehension of Hungarian grammatical contrasts marked by inflection, function words, word order etc.

It is appropriate for children aged 4 to 13 years and a very good tool, because no expressive speech is required, thus the participants' performance is not influenced by their verbal skills.

The original English test consists of 80 items (in 20 blocks of 4 items), but the standardised Hungarian version includes only 18 blocks (with 72 items), because structures measured reception of passive and gender are irrelevant in Hungarian. Each block assesses the child's comprehension of a specific type of grammatical contrast (e.g. nouns, verbs, negative, singular/plural, and relative clause, etc.). In each item the subject is required to select from an array of pictures and point to the one that corresponds to a word order or grammatical construction spoken by the tester. A block is passed only if the child responds correctly to all 4 items. The scores were counted according to the number of blocks successfully processed.

2.3 Results

2.3.1 Results: The role of ToM in metaphor comprehension

Our initial hypothesis, based on Happé's (1993) prediction was that the percentage of the 1stToM group's correct answers would be significantly higher than those of the noToM group.

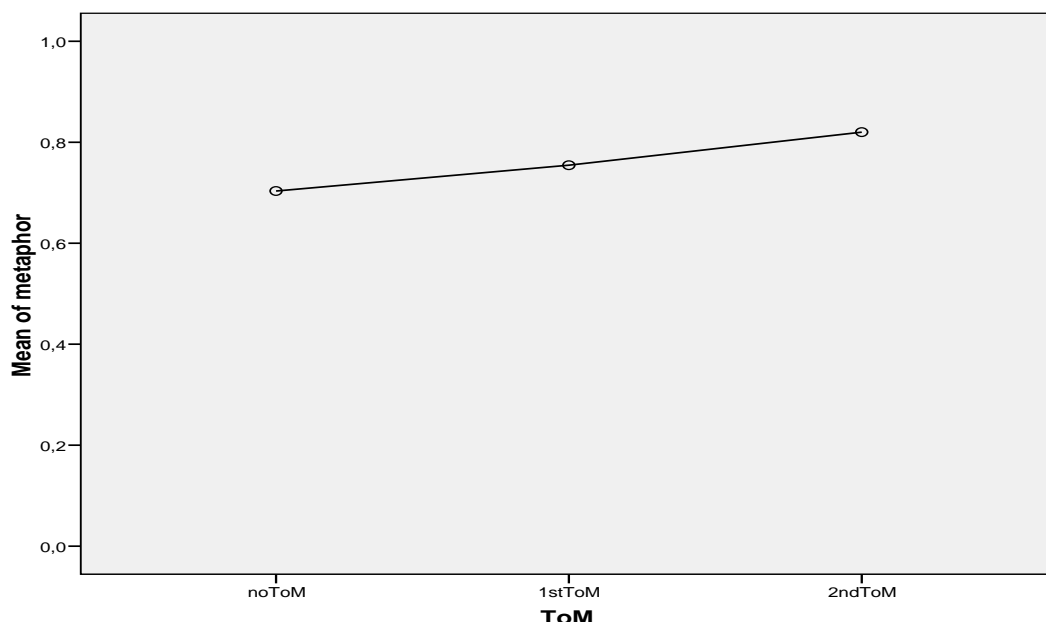


Figure 1: The proportion of correct answers of metaphor in each ToM group

The results can be seen graphically depicted in Figure 1. The percentage of the correct responses was relatively high in both ToM groups. In addition, the noToM (70%) and the

1st ToM (75%) groups were close to each other. A bit higher percentage is found only in the 2ndToM group (82%).

As data was not normally distributed, the non-parametric Kruskal-Wallis Test was used to compare the difference among the groups. The analysis showed no difference among the metaphor results of the ToM groups ($X^2=3.562$; $p=0.168$).

2.3.2 Results: The role of ToM in irony comprehension

The original hypothesis was that the proportion of the 2ndToM group' answers would be significantly higher than those of the 1stToM group.

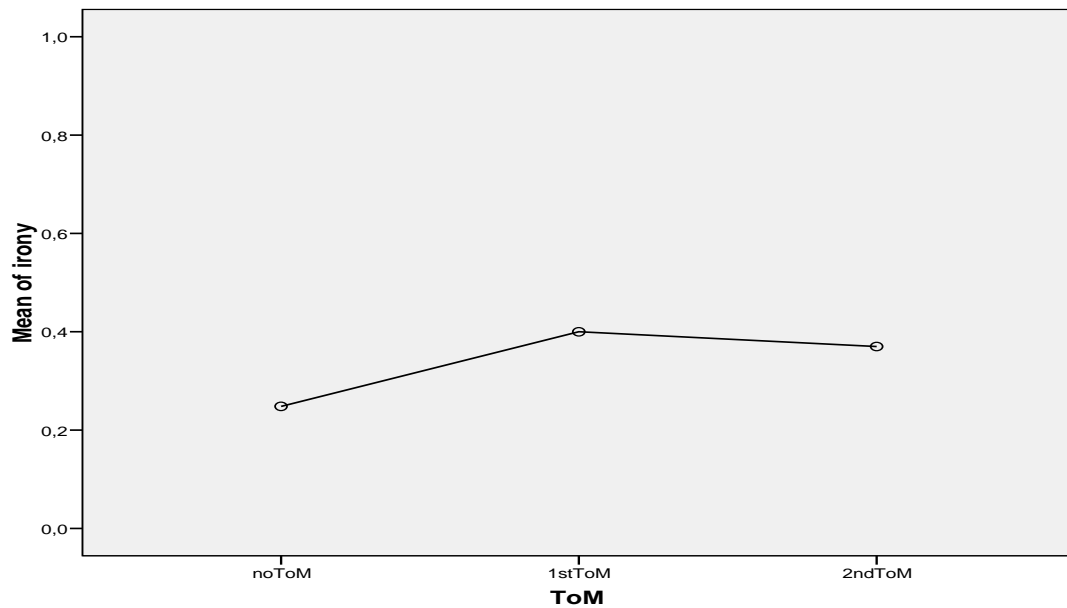


Figure 2: The proportion of correct answers of irony in each ToM group

The results can be seen graphically depicted in Figure 2. The percentage of the correct responses was much lower in each ToM group than in the case of metaphor comprehension (and in Happé's study). The scores were similar in the 1stToM (40%) and the 2ndToM (37%) groups.

As in the case of metaphors, the non-parametric Kruskal-Wallis Test was used to compare the difference among the groups. The analysis showed no difference among the irony results of the ToM groups ($X^2=2.21$; $p=0.331$).

Because of the low level of the performances, One-Sample Test was run to compare whether the results of each group are below chance level. The analysis showed that the mean percentages are significantly below chance level in each group (noToM: $t(28)=-1.96$; $p=0.06$; 1stToM: $t(21)=0.899$; $p=0.379$; 2ndToM: $t(19)=0.51$; $p=0.616$).

The analysis of the incorrect answers in the case of irony

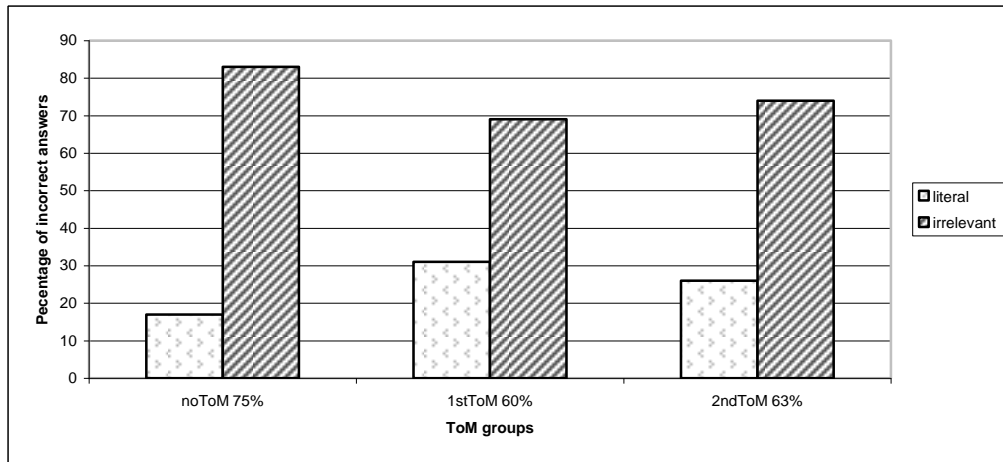


Figure 3: Percentage of the literal and the irrelevant answers in each ToM group (with the total number of incorrect answers)

The incorrect answers are more frequent in the case of irony than in the case of metaphor (noToM: 75%, 1stToM: 60%, 2ndToM: 63%).

As shown in Figure 3., the irrelevant (deceiving) answers are the most dominant error types: if the total number of incorrect answers is 100%, the percentages of irrelevant answers are 83% in the noToM group, 69% in the 1stToM group and 74% in the 2ndToM group.

To analyse the difference among the groups regarding their irrelevant answers, the non-parametric Kruskal-Wallis Test was used. The analysis showed no difference among the deceiving answers of the ToM groups ($X^2=1.294$; $p=0.524$).

2.3.3 Results: The role of age in metaphor and irony comprehension

The descriptive statistical results can be seen in Table 3.

	4-year-olds	5-year-olds	6 and 7-year-olds	Control
Metaphor (%)	61	76	83	100
Irony (%)	33	25	41	100

Table 3: The percentage of correct answers in the case of metaphor and irony in each age group

There is an increasing tendency in the case of metaphor comprehension. However, the irony performance of the children in each group is really close to each other and there is a large gap between the performance of the control group and all three children groups.

To analyse data statistically, the non-parametric Kruskal-Wallis Test was used to compare the difference among the age-groups. The analysis showed significant difference among either the metaphor ($X^2=28.723$; $p<0.001$) or the irony results ($X^2=35.549$; $p<0.001$) of all age-groups.

Because of the low level of the irony performances (except of the control group), One-Sample Test was run to compare whether the results of each group are under chance level. The analysis showed that the mean percentages are significantly under chance level

in each age-group (4-year-olds: $t(16)=-0.009$; $p=0.993$; 5-year-olds: $t(26)=-1.324$; $p=0.197$; 6-7-year-olds: $t(26)=1.184$; $p=0.247$).

A more detailed comparison of age-groups designed with the post hoc test of the Oneway ANOVA (Table 4) shows which groups are significantly different from the others regarding metaphor and irony. To control the developmental process, only the contrast between neighbour groups was taken into account (e.g. 4-year-olds' performance was compared only with that of the 5-year-olds').

Age-groups	Metaphor			Irony		
	5	6-7	Control	5	6-7	Control
4-year-olds	*	-	-	ns	-	-
5-year-olds		ns	-		*	-
6 and 7-year-olds			**			**

Table 4: Metaphor and irony comprehension according to age groups (ns: no significance, *: $p<0.05$, **: $p<0.01$ significance, -: not relevant)

Regarding metaphor comprehension, there is a step by step development. The five-year-olds' performance is significantly better than that of the four-year-olds. However, the six- and seven-year-old children's performance does not differ significantly from the performance of the 5-year-olds, but it differs from the adult control group's performance.

These findings suggest that there can be once a great leap in metaphor comprehension between the ages of four and five, and also further major ones later during the school years.

In the case of irony comprehension, there is an unexpected result, namely the percentage of four-year-olds is higher than those of five year-olds, but this difference is not statistically significant. On the other hand, the difference between the performance of five-year-olds and 6–7 year-olds seems to be significant, but the comprehension of all groups is also under chance level in reality. In contrast, there is a sharp rise between the chance levelled performance of 6 and 7 years old children (41%) and that of the control group (100%), which is significantly better than the former one. These results indicate that irony comprehension begin to improve after the preschool years.

2.3.4 Results: The role of grammar reception

In order to examine the connection between the reception of grammar and the comprehension of metaphor and irony, the correlation between the right blocks of TROG test and the percentage of the correct answers of metaphor and irony was calculated with Pearson Correlation statistic probe.

The correlation between metaphor comprehension and the reception of grammar was found statistically significant ($r_{\text{metaphor}}=0.350$; $p=0.003$). However, irony comprehension did not correlate with the reception of grammar ($r_{\text{irony}}=-0.131$; $p=0.277$). These finding suggest that the relation to grammar reception is different in the case of the two nonliteral forms.

3 Discussion

Concerning the role of the Theory of Mind, we predicted that the comprehension of metaphors requires first-order ToM ability and irony requires second-order theory of mind ability in typically developing children.

However, these predictions were not confirmed. In the case of metaphor, the 1stToM group was not more successful in metaphor comprehension than the noToM group, as the difference between the two groups was not significant. In addition, both groups had a relatively high performance in metaphor understanding.

The results of the present study are only partially consistent with Norbury's (2005) findings. Both results showed that the noToM and the 1st ToM groups do not differ significantly from each other at all. The difference between the two results is that children with communication impairments had deficits with metaphor comprehension regardless of their theory of mind level in Norbury's (2005) study. Therefore, she concluded that the first-order ToM is not sufficient for understanding metaphors in the case of atypically developing children. In contrast, in the present study the children developing typically did not have difficulties with metaphor comprehension, because the noToM group already had nearly as high scores as the 1stToM group in the metaphor test. Therefore, the present study suggests that metaphor comprehension can precede 1st order ToM in children developing typically. The different types of inconsistency led to the conclusion that the relationship between metaphor comprehension and the first-order Theory of Mind level is at least less robust (as Wilson concluded 2013: 44) or might not be seen (in line Langdon et al. 2002).

In the case of irony, the 2ndToM group had similar scores to the 1stToM group on the irony comprehension test, the difference between the two groups was not significant. It should be noted, that the ironic scores in the present study were much lower than those in the case of metaphor comprehension or those in Happé's (1993) irony test.

One possible explanation for this result can be that children had to understand not only the ironic meaning but the ironic attitude as a whole in the present study. As discussed by Szücs (2011), schoolchildren are able to understand that the intended meaning is not relevant in the context or in the situation but they cannot recognise the speaker's ironic attitude behind the utterance, and mostly they do not understand or misunderstand the ironic utterances. That is why they could have difficulties with recognising the ironic meaning and attitude as a whole; their responses were nearly at a chance level. The percentage of incorrect answers is much higher in the case of irony as in the case of metaphor in each ToM group.

The present findings are consistent with other earlier findings (Sullivan et al. 1995, 2003, Winner 1997) concerning the error pattern. The findings reported here also suggest that typically developing children, who are able to detect that the sentence meaning of the ironic utterance is not relevant in the context, tend to misunderstand the intention of the speaker and to choose systematically deceiving answers instead of ironic answers. Children confront a discrepancy between the reality and the recognition of the falsehood when they hear an ironic expression. Resolving this discrepancy, they try to attribute an intention to the speaker, which can be plausible and familiar for them. As they do not have any experience about the ironic use of language at these ages, they judge the ironic utterances as ones containing some kind of falsehood, such as a lie. Therefore, our conclusion is that the main problem of preschool children is the absence of metapragmatic awareness about ironic use of language (Szücs & Babarczy 2014), which may improve at the beginning of the school years.

Regarding the theory of mind necessary to irony comprehension, our findings are in keeping with Sullivan and her colleagues' results (1995). They concluded that the second-order mental state knowledge precedes the ability to distinguish between lies and ironic jokes by some years in children developing normally. Present findings also suggest that the second-order ToM ability alone is not sufficient to ensure better irony comprehension.

In summary, contrary to the expectations, the relationship between the theory of mind level and the comprehension of the two nonliteral language forms may not be so close in typically developing children.

In the second analysis, the role of the age was reported, which was motivated by the question whether the role of age would be more or less important than the role of Theory of Mind.

Although the four-year-olds' performance was relatively high, the five-year-olds were significantly better in metaphor comprehension. However, their performance was similar to 6 and 7 years olds', whose understanding was significantly lower than the control group's. These findings showed a constant, step by step increase in metaphor comprehension in these ages.

On the other hand, the irony comprehension of the children in each group was much lower than the control group's. Although there was a significant difference between the five-year-olds and the six- and seven-year-olds, the percentage of the latter ones' correct answers was only around 40%, also below chance level.

These findings suggest that the development of irony comprehension just begins at around the age of 6 and 7, but generally the children at this age have difficulty distinguishing ironic utterances from deception yet, so their performances are at a chance level. Therefore, we can conclude that the sensitivity to irony may increase in school years.

To sum up, the most important finding here might be that the role of the age seems to be more important than the role of the Theory of Mind, because the difference among groups was significant only in the former condition. That means, that the ages of typically developing children can predict their metaphor and irony comprehension level rather than their Theory of Mind level.

In the third part of the study, the correlation between reception of grammar and comprehension of the two nonliteral forms was investigated. Our hypothesis was that the reception of grammar, which is involved in general language abilities of children, would influence their metaphor and irony comprehension as well.

The present findings partially confirmed our hypothesis. Metaphor comprehension significantly and moderately correlated with the grammar understanding. Therefore, the level of children's grammar reception seems to have a role in metaphor understanding, that means, better grammar knowledge can be followed by better metaphor skills. This result is in line with Norbury's (2005) findings which provided evidence that semantic skills particularly and also the language ability in general are important factors for metaphor comprehension. Moreover, these findings are consistent indirectly with Vosniadou's (1987) approach, which takes into account the linguistic form of the metaphoric expression as a variable affecting children's metaphor comprehension. Her approach was supported by Nippold and her colleagues' findings (1984), which showed that the syntactic complexity of the metaphor influenced the comprehension level of the children; the proportional metaphors were more demanding than the predicative ones for children. These findings also implied that the greater complexity of any kind of structure can be a difficulty for children, whose language knowledge is not completely developed

yet at these ages, that is to say, their better syntactic and also general grammar skills can evoke their metaphor understanding.

However, the present findings can show only the correlation between the two phenomena, the role of any inter-participant variables, namely mental age, IQ or other social-cognitive factors, which might have affected this correlation beyond grammar reception, was not taken into account.

On the other hand, the relatively strong connection outlined between metaphor understanding and grammar reception might be the case only the investigated (predicative) subset of metaphors, not taken into consideration either other syntactic groups (proportional) or other aspects (familiarity) of the metaphors, which might be a limitation of the present results.

In contrast with metaphors, irony comprehension did not correlate with reception of grammar, which suggests that grammar understanding cannot be a determining factor in irony comprehension, that is, better grammar knowledge cannot predict a better comprehension level of irony in these ages. As developmental studies on irony comprehension explored its other aspects, such as the role of contextual information, memory, theory of mind, intonation and facial expression (Creusere 2007), while at the same time the role of children's language abilities have not been observed, this result neither contradicts nor supports earlier empirical findings. However, it can support Winner's (1997) theoretical statement that irony comprehension is a social-analytic task, in which the recognition of the speaker's belief is essential to the correct interpretation, because children have difficulties not with the understanding of the sentence meaning, which depends on language comprehension, but with the recognition of ironic attitude.

4 Conclusion

The present findings reported here have shown a loose connection between theory of mind level and metaphor and irony comprehension in typically developing children. Metaphor understanding can precede first-order ToM ability and second-order ToM ability is not sufficient to ensure better irony comprehension. Therefore, these results have not provided evidence in support of Happé's original claims.

However, the age of children can be a better predictor of their performance in metaphor and irony comprehension. There is a sharp rise at the age of five in metaphor comprehension, but irony comprehension begins only approximately one or two years later.

The reception of grammar has been found closely related to metaphor comprehension, but irony comprehension has not correlated with it, either.

These findings suggest that the comprehension of the two phenomena may require different cognitive and language abilities: metaphor comprehension may rather be connected to language abilities, whereas irony comprehension, as it is a more difficult task to interpret in a correct way, may require other pragmatic or metapragmatic skills. However, it would be interesting and fruitful to explore the implications of the present findings for a greater subset of metaphorical and ironic expressions.

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Appendix

Metaphorical expressions

- (1) Hun. kőszütemény Eng. stone cookies
- (2) Hun. jégcsap az orrod Eng. your nose is an icicle
- (3) Hun. hordóhasú macska Eng. barrel-bellied cat
- (4) Hun. Peti, te egy igazi oroszlán vagy! Eng. Peti, you are a real lion!
- (5) Hun. Te jó ég, ez a szoba egy disznóól! Eng. Oh dear, this room is a pigsty!

Ironic expressions

- (1) Hun. Nahát, ez aztán a puha sütemény! Eng. Vow, what soft cookies!
- (2) Hun. Na, biztosan nem fázik ez a gyerek! Eng. This child surely does not feel cold! (he seems to be cold)
- (3) Hun. Na, ez aztán a sovány macska! Eng. What a skinny cat!
- (4) Hun. Te aztán nagyon aranyos vagy! Eng. You are really nice!
- (5) Hun. Na, ez aztán a rendes szoba! Eng. What a tidy room!