The study aims to answer questions about the developmental trajectories of irony comprehension. The research focuses on the problem of the age at which ironic utterances can first be understood. The link between ironic utterance comprehension and early Theory of Mind (ToM) is examined as well. In order to approach the topic, 46 preschool children were tested with the Irony Comprehension Task (Banasik & Bokus, 2013) and the Reflection on Thinking Test (Białecka-Pikul, 2012) in three age groups: four-year-olds, five-year-olds and six-year-olds. The study showed no age effect in the Irony Comprehension Task and a significant effect in the Reflection on Thinking Test. On some of the measures, irony comprehension correlates with theory of mind. Also, an analysis of children’s narratives was conducted to observe how children explain the intention of the speaker who uttered the ironic statement. The children’s responses fall into four categories, one of which involves a function similar to a white lie being ascribed to the utterance.

*Key words*: verbal irony, non-literal language, pragmatic competence

### Introduction

#### The concept of irony

Verbal irony is a figure of speech through which additional meaning may be expressed with the use of non-literal language. Although there are many various definitions of verbal irony (Ruiz-Gurillo & Alvarado-Ortega, 2013), they share some characteristics, which include: existence of the duality of meaning (1), intentionality (2) and context-dependence (3). The duality of meaning is an obligatory condition for irony. The meanings may be in various relations to one
another. The surface meaning of an ironic statement is prototypically seen as opposite to the actual, implied meaning, thus creating the relation of semantic inversion (Barbe, 1995; Anolli, 2001). However, semantic inversion is not the only possible relation of the two meanings. In fact, the idea of semantic inversion as the defining feature of verbal irony is criticized by some researchers (Sperber, 1994; Sperber & Wilson, 1995). It is not always the opposite of what was said that is communicated. Irony may also be expressed through understatement or hyperbole (Kreuz & Gluecksberg, 1989).

Intention is central both for irony production and comprehension (Dews & Winner, 1997). One of the felicity conditions described by Austin (1962) is, in the case of irony, violated on purpose in order to communicate additional meaning. In Austin’s and Searle’s (1969, 1979) terms, the speaker is intentionally insincere – i.e. declarative assertions are not true (“What a great day” to express disappointment), compliments should not be taken as compliments but as rebukes (“You did a great job!” to criticize somebody), questions are asked even though an answer is not desired, the politeness level may be inappropriate to the situation (“Would you please be so nice and maybe kindly consider cleaning your room some time this year?”) etc. This intentional insincerity must not only be consciously used by the speaker, but interpreted as such by the recipient of the utterance. Otherwise, the speaker’s utterance might be perceived as a lie, hence the irony would not be comprehended. Verbal irony alludes to some prior expectation or convention (the addressee expects their interlocutor to speak the truth) which is violated. The violation is intended by the speaker, the addressee is aware of the intention, and the speaker expects the addressee to know that the violation is intended.

Verbal irony is context-dependent, as the meaning relates to a state of the world of which both the speaker and the addressee need to be aware. Also, both parties of the communicative interaction need to understand that the duality of meaning is intended (ibid.).

Irony in a developmental perspective

Comprehension of verbal irony, as an example of pragmatic competence in understanding non-literal language, has been studied for over 30 years. However, the results are inconsistent as to the age when this competence is acquired. Despite this, it is agreed that comprehension of verbal irony is a skill which develops relatively late in a child’s development (Pexman & Glenwright, 2007). One reason for that may be the fact that the process is composite and involves multiple mental processes. (Recchia et al., 2010, p. 257, Ackerman; 1983; Filippova & Astington, 2008; Winner & Leekam, 1991). Verbal irony is understood much later than metaphor, simile or sarcasm (Andrews et al., 1986; Happé, 1993). The reason for that is the fact that irony comprehension requires prior development of certain cognitive abilities, such as the ability to under-
stand figurative and non-literal language, which, according to some studies, is possible no earlier than at the age of six (Demores et al., 1984). Although the use of sarcasm, often defined as a kind of irony (Littman & Mey, 1991, p. 47), also depends on comprehension of non-literal language, it is believed to be understood prior to irony, as it usually uses the discrepancy between the uttered statement and the intended message in a less subtle way than other kinds of irony.

**Relation between irony and theory of mind**

Another important milestone in cognitive development that is crucial for irony comprehension could be the theory of mind, i.e. the ability to infer mental states of other people, such as beliefs, desires, intentions, imagination, emotions etc. (Baron-Cohen, 2001). Theory of mind is used to explain one’s own behavior to others by telling them about one’s thoughts and desires, as well as to interpret other people’s behavior by considering their thoughts (Astington & Edward, 2010). The idea to jointly study theory of mind and verbal irony comprehension comes from the assumption that both are linked to a similar mechanism: ironists provide a false description of a state of the world. Hence, irony requires the listener to comprehend the figurative use of that false description (Massaro et al., 2013). Similarly, success in the false-belief task relies on understanding that one’s belief or representation of the world contrasts with reality.

According to various studies, the ability to make second-order attributions (the ability to predict what X knows that Y knows) is related to irony and sarcasm comprehension both in children and in adults. Sullivan and collaborators (1995) demonstrated that the correct distinguishing of irony from jokes and lies in children was related to results obtained in the theory of mind task. Also Happé (1993) showed that there is a positive correlation between results in the false-belief task and correct interpretation of irony. Berg (1976) stresses that in order to understand verbal irony, one needs the ability to recognize social expectations and certain knowledge about the world.

So far, there are no studies on the use of verbal irony in Polish-speaking children. However, there are studies on other aspects of irony: Milanowicz and Bokus (2011) studied the interpretation of ironic utterances in cases of situational irony in Polish-speaking children. They concluded that children as young as four-year-olds are capable of identifying examples of verbal irony. It is important for this study insofar as ironic utterances often relate to situational irony. Verbal irony is impossible without an appropriate context and it may be situational irony that provides it.

Although situational irony may be appreciated as early as at the age of four, it is older children that start to recognize the intent behind ironic statements — between the age of five and six. The aforementioned research suggests that five-year-old children have substantial competence in recognizing the speaker’s
intent and that some five-year-olds are capable of creating new examples of situational irony in their stories.

Both theory of mind and the ability to comprehend non-literal language may require a process of reasoning based on understanding the discrepancy between information about a certain element of the world provided by salient evidence and the actual state of the world. Whereas in the case of verbal irony the actual meaning of an ironic utterance may be an inversion of its surface semantic meaning, a hyperbole or an understatement, theory of mind enables children to understand that the same object may have different interpretations to different people and that another person may or may not have the same knowledge as the child (e.g. Flavell, Everett, Croft & Flavell, 1981). Theory of mind is also considered as part of social knowledge (Carpendale & Lewis, 2006; Putko, 2008; Białecka-Pikul, 2002); as a pragmatic competence which is crucial for children’s effectiveness in using language in social interactions (Bates, 1976; Ninio & Snow, 1996). From the developmental perspective, researchers agree that the fourth year of life is an important moment for children, as it is then that the false belief test can be solved (Wellman, Cross and Watson, 2002). This seems to be consistent with the results of studies on children’s narratives. Three-year-olds do not ascribe mental states to the characters they are describing, whereas four- and five-year-olds do (Bokus, 1998, 2004)

**Aims**

The study approaches the following questions:
1. What is the developmental dynamics of irony comprehension in Polish-speaking preschool children?
   1a. How old are children when they start comprehending simple ironic utterances?
   1b. Are there significant differences in irony comprehension among the groups of four-year-olds, five-year-olds and six-year-olds?
2. Is there a relation between irony comprehension and the development of Theory of Mind?
3. How do children explain the discrepancy of the meanings (literal meaning and implied meaning) in ironic utterances?

**Method**

**Participants**

Forty-six children in three age groups took part in the study. Among them, 14 were girls and 32 were boys. The age range was 45 to 76 months ($M = 61$ months, $SD = 8$).

The three age groups were as follows:

Four-year-olds: $N = 18$ (45-59 months; $M = 52.5$, $SD = 8.6$)
Five-year-olds: N = 14 (61-64 months; M = 63.2, SD = 1.2)
Six-year-olds: N = 16 (67-76 months; M = 71.4, SD = 2.5)

The children were recruited through three Warsaw preschools which agreed to participate in the study. After receiving the parents’ written consent, the children were asked whether they wanted to take part and those who agreed were included in the group.

**Measures**

For the purpose of the study, two measures were used:

1) To investigate the comprehension of ironic utterances in children, the Irony Comprehension Task (Banasik & Bokus, 2013) was used. The task is a story comprehension task consisting of 12 narratives (see attachment 1), six of them containing an ironic utterance and the other six – a literal one, said by one of the characters in the story. Children were presented with the stories by means of audio and visual stimuli (pre-recorded narrated stories and pictures accompanying the stories displayed on a touchscreen) and then asked to answer a series of questions. The questions checked the children’s understanding of the intended utterance meaning (non-literal vs. literal), evaluation of the degree to which it was funny and evaluation of how nice the speaker was (in each of the questions, the pictorial Likert scale – smiley faces – was used).

In the process of their construction the stories were controlled for:
1. Length (number of words in each story)
2. Morphosyntactic complexity (simple or compound sentences, but not complex ones)
3. Difficulty of words (words already acquired)
4. Dyads of characters in the story – who says the ironic utterance to whom (child to child vs. adult to child)

2) To investigate how children explain the discrepancy between the literal and implied meaning of the ironic utterances presented to them in the Irony Comprehension Task, each child was asked an open-ended question directly following the story presentation.

Thematic analysis was used to categorize the children’s answers. This method is generally used in order to identify, analyze and report patterns within data (Boyatzis 1998). These patterns – topics – are to be identified by the researcher as relevant and important for the research question, as representing a certain level of patterned response or meaning in the data (Braun & Clarke 2006), with a certain prevalence and size. The data are then organized into semantic groups, after which description and interpretation follows.

3) To study the development of Theory of Mind, the Reflection on Thinking Test (TRM) (Białecka-Pikul, 2012) was used. TRM, which is an original task
constructed on the basis of an exhaustive literature review (Białecka-Pikul, 2012), uses a set of stories, as it has been stated that this form proves reliable for testing Theory of Mind (Bosacki & Astington, 1999). The stories are constructed so that they include various aspects of theory of mind, i.e. visual perspective understanding, emotion and intention understanding, pretense and imagination, understanding states of knowledge and degrees of knowledge certainty, remembering and forgetting, recognition of appearance versus reality, understanding of verbal ambiguity and understanding of deception. The task enables an analysis which is twofold: a basic, quantitative one, including the accuracy of the children’s responses to the questions about the character’s behaviors, and a qualitative one that provides children’s interpretations of the character’s actions through their answers to the open-ended question ‘Why?’.

The Reflection on Thinking Test consists of nine tasks measuring the following aspects of knowledge about the mind: understanding unexpected identity (Appearance-reality task), understanding a first-order belief (Unexpected transfer test), understanding unexpected identity (Deceptive box test), understanding interpretation (Droodle test), understanding social situations (Deceptive task), understanding ambiguity (Duck-rabbit task), understanding emotions resulting from false belief, understanding a seeing-knowing relationship and the second-order belief resulting from it and understanding a second-order false belief.

**Procedure**

The study was conducted in two sessions on the preschool premises. The Reflection on Thinking Test was introduced during one session, and the Irony Comprehension Test during the other. The sequence of tests was counterbalanced. The stories were presented in a fixed order in both tasks, in accordance with the assumptions of the construction of the tasks. Children were tested individually. The experimenter first tried to get to know the child and acquainted him or her with the procedure and the equipment used (computer, touchscreen, sound recording device). After that, the test proceeded. For the Irony Comprehension Task, the stories were prerecorded and displayed to the children during the session together with the picture stimuli on a large (21.5-inch) touchscreen. After doing a trial test, the children responded to the questions by touching the screen and answering the questions aloud, which was recorded by the sound recording device. For the Reflection on Thinking Test, the experimenter read the stories and the questions to the child and showed slides with pictures on the computer screen, and the child responded. The answers were coded by a second experimenter and recorded. Both the coding of TRM and ZRI was done independently by two coders and the inter-rater reliability was above 90%. In case of doubt, a third coder assessed the children’s replies.
Results

One-way ANOVA was conducted in order to compare the groups: four-year-olds, five-year-olds and six-year-olds on the recognition of irony and theory of mind tasks. Post-hoc comparisons were conducted with the Scheffe test (see Table 1).

For irony recognition, the analysis did not show any significant difference among the three age groups. The difference proved to be significant for the measures of theory of mind, both in the quantitative ($F(2,43) = 7.67, p = 0.01$) and in the qualitative indicators ($F(2,43) = 18.12; p = 0.00$).

The effect sizes are $\eta^2 = 0.26$ for the quantitative indicator and $\eta^2 = 0.45$ for the qualitative one. For the qualitative analysis, the means differ significantly for all the age groups. The largest difference in means is between four-year-olds and six-year-olds, where four-year-olds scored the lowest and six-year-olds the highest. In the quantitative measure, only the difference between four-year-olds and five-year-olds turned out to be significant. The youngest children in the study obtained results that were on average 28% lower than those obtained by the five-year-olds.

In order to investigate a possible relation between the results on the Irony Comprehension Task and scores in the Reflection on Thinking Test, correlations

![Figure 1. Results for the Irony Comprehension Task and the Reflection on Thinking Test (irony recognition, ToM attributions, ToM explanations)](image-url)
were conducted for the two measures. Also, the variable of age was included in the analysis. The results are presented in Table 1.

Recognition of irony correlates with the qualitative measure of the theory of mind task ($r = 0.32 p = 0.028$). Both of the measures of Theory of Mind correlate with age. However, the Irony Comprehension Task does not.

As the next step of the analysis, the children’s open-ended questions were studied and thematic analysis was used in order to recognize patterns in their responses. Four main categories of addressing the questions were noticed:

1) Lack of comprehension expressed through explicit surprise
   E: Why did X say so?
   CH: Yeah...why?

2) Confirming the factual events, not referring to the implied ones
   E: Why did X say so?
   CH: Because they did

3) Justifying; rationalizing the explicit (surface, apparent) meaning
   E: Why did X say it was a lucky day for them today?
   CH: They did not want to get into the bus really...

4) Making reference to a function – talking about emotions and intentions
   E: Why did X say so?
   CH: He did not want to make him feel bad

The study suggests that children as young as four years old seem to comprehend the real meaning in ironic utterances. Most of the preschoolers tested, however, failed at explaining the reasons for intentional use of the ironic utterance. Explanations of the speaker’s intent (answering the “why” question) seemed to be the most challenging task. Only a few children managed to make a reference to mental states. The correlations showed that the better children are able to talk about the mental states of people, the better they distinguish real from hidden meaning in irony (see Table 1; $r = 0.324, p = 0.028$).

Table 1. Correlations: Theory of mind with the use of the Reflection on Thinking Test (TRM), irony recognition with the use of the Irony Comprehension Task and age

<table>
<thead>
<tr>
<th></th>
<th>TRM Explanations</th>
<th>Irony Recognition</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irony Recognition</td>
<td>0.324*</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Age</td>
<td>0.608**</td>
<td>0.246</td>
<td>–</td>
</tr>
<tr>
<td>ToM Quantitative</td>
<td>0.790**</td>
<td>0.186</td>
<td>0.337*</td>
</tr>
</tbody>
</table>

* The correlation is significant at the 0.05 level (2-tailed).
** The correlation is significant at the 0.01 level (2-tailed).
Discussion

Contrary to the researchers’ expectations, the study did not show a main effect of age in irony comprehension. No statistically significant difference was found when comparing the groups of three-year-olds, four-year-olds and five-year-olds. This result is as surprising as it is interesting. No age-related improvement was shown, but the mean in all the age groups was above 70%. In contrast, adults scored above 90% on the same task (Banasik, in preparation). High accuracy on the Irony Comprehension Task obtained by children in all the age groups may suggest that, if we control for grammatical and lexical complexity and for the length of the presented materials, which might potentially influence the working memory load, four-year-olds are able to understand certain forms of utterances containing verbal irony just as well as five- or six-year-olds. Hence, the results may offer confirmation of the hypothesized ability of children as young as four years old to comprehend simple irony. On the other hand, they could suggest that there might be factors other than the complexity of figurative language itself that makes it difficult for young children to understand ironic utterances. Further studies that meticulously partial out factors such as lexical or grammatical complexity should be conducted.

The differences in means in the test that measures Theory of Mind in the three age groups were compatible with the expectations: six-year-olds perform better than five-year-olds and five-year-olds perform better than four-year-olds. The fact that the differences proved to be significant only for the qualitative analysis may be interpreted in terms of the verbal abilities of children. The qualitative indicator of the Reflection on Thinking Test focuses on children’s explanations of perceived and processed incongruences. Hence, the indicator not only provides more information but is also more complex and difficult for children, as it requires explicit verbalization of observed relations. When it comes to irony, younger children might comprehend the actual intention of the speaker, which may often be in opposition to its semantic expression, drawing from cues such as intonation, mimic expression, context and others. This might mean that the communicative meaning of an utterance is understood prior to the semantic meaning of a sentence. However, being aware of the limitations of the study one should be careful about the conclusions; a continuation and extension of the study is needed.

Acknowledgment

The studies presented here are part of research financed by the Ministry of Science and Higher Education of Poland under the Diamond Grant program.

The paper is based on studies conducted for the author’s doctoral dissertation under the supervision of Barbara Bokus (in preparation).
References


Appendix 1.
Stories used in the Irony Comprehension Task and questions asked

Story 1
Staszek i Piotrek bawią się na podwórku. Na ziemi są kałuże i błoto. Staszek się przewraca. Wstaje, a jego spodnie są mokre i całe w błocie. „Ale jesteś czysty!” – mówi Piotrek
[Staszek and Piotrek are playing in the backyard. There are puddles and there is mud on the ground. Staszek falls down. He stands up and his trousers are wet and muddy. ‘How clean you are!', says Piotrek.]

Questions¹
Q1 Jak myślisz, dlaczego Piotrek tak powiedział?
[Q1 Why, in your opinion, did Piotrek say so?]  
Q2 Czy kiedy Piotrek powiedział „Ale jesteś czysty!” to miał na myśli że:
   – Staszek nie pobrudził się i jest czysty
   – Staszek się pobrudził i nie jest czysty
[Q2 What did Piotrek mean when he said, ‘How clean you are!’?
   – Staszek has not got dirty and is clean.
   – Staszek has got dirty and isn’t clean.]

¹ The same types of questions are used analogically in the following stories.
Q3 Czy kiedy Piotrek powiedział „Ale jesteś czysty!”, to było śmieszne?
- bardzo śmieszne
- trochę śmieszne
- wcale nie śmieszne

[Q3 Was it funny when Piotrek said, ‘How clean you are!’?  
- very funny  
- a bit funny  
- not funny at all]

Q4 Czy kiedy Piotrek powiedział „Ale jesteś czysty!”, to był miły?
- bardzo miły
- trochę miły
- wcale niemiły

[Q4 Was Piotrek nice when he said,’How clean you are!’?  
- very nice  
- a bit nice  
- not nice at all]

Story 2
Marta i Lidka bawiły się razem klockami. Skończyły zabawę i Marta sprząta klocki do pudełka. A Lidka zaczęła się bawić innymi zabawkami.
„Wcale mi nie pomagasz” – powiedziała Marta

[Story 2  
Marta and Lidka were playing with bricks. They have finished and Marta is putting the bricks into the box. Lidka at the same time starts to play with other toys.  
‘You are not helping me at all!’, says Marta.]

Story 3
„Świetnie się spisałeś!” powiedział brat do Krzysia.

[Story 3  
Krzyś wanted to have some juice. He asked his brother for the juice. Krzyś’s brother poured him a glass of juice. Krzyś knocked down the glass and spilt the juice over the clean tablecloth. There was a big, wet stain on the tablecloth.  
‘Well done!’, said Krzyś’s brother to Krzyś.]

Story 4
„O, jak szybko wróciles do domu!” powiedziała babcia

[Story 4  
Julek was to come straight home after school. His grandma has been waiting for Julek. It is already dark outside. Julek comes back home. ‘You’ve come home early!’ , says Julek’s grandma.]
Story 5


[Ania has got a green, warm jumper. Ania does not like this jumper. Ania’s green jumper is heavy and itchy. It is cold today. Ania has put on her jumper. 'How awful this jumper is!', says Ania to her friend.]

Story 6


[Łukasz was playing with his toys in the room. He finished and put all the toys into the box. There was nothing left on the carpet. Łukasz’s dad came in to the room. He said to Łukasz, ‘How tidy!’.]

Story 7


[Zuzia’s uncle always brings her a present. Today he has brought a hair-pin. Zuzia’s uncle remembers Zuzia’s long hair. He does not know that Zuzia’s mum cut Zuzia’s hair yesterday. Now the girl has got short hair. Zuzia’s uncle sees Zuzia and says, ‘How your hair has grown!’].

Story 8


[Krzyś is coming back from kindergarten with his mum. They want to get back home quickly. It starts raining. Krzyś and his mum are running to catch a bus. But the bus door has closed. The bus has left without them. 'How lucky we are today', says Krzyś’s mum.]

Story 9

Gosia dislikes spinach very much. She never eats it at kindergarten. There is spinach for dinner today. Gosia does not want to eat spinach. She says to her friend, ‘Well, my favorite food!’.

Story 10
Adaś and Tomek were painting. Adaś knocked down a cup of paint and spilt the paint over his clothes. There is a big, wet stain on his T-shirt now. ‘How dirty you are!’, says Tomek to Adaś.

Story 11
Piotruś likes reading books about dinosaurs. Dinosaurs are animals which have become extinct. Piotruś’s friend has brought a book about dinosaurs to kindergarten. ‘I like such books very much!’, says Piotruś.

Story 12
Beata and her mum wanted to go for a walk to the forest. The sun was shining and it was very warm and nice. Beata and her mum like walking on such days. ‘What a wonderful day for a walk in the forest!’, says Beata’s mum.