Assessing Pragmatic Abilities in School-Age Children

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Abstract

This study aims at developing a measure for assessing pragmatic language abilities related to Theory of Mind (ToM) in Greek, typically developing, school-age children. We developed tories, based on previous work by Sodian and Frith (1992), Baron-Cohen and colleagues (1999), and Giannakou (2008), in order to assess the reception of deception, faux pas and irony by school-age children. The story presentation was supported by pictures presented with video. We performed a validation study with adult Greek speakers and included the most comprehensible stories in our materials (32 stories in total). We tested 120 school-age children (64 females, Mean=10;2, SD=1.74). The results indicated high correctness scores (> 90%) for the deception and the faux pas tasks. Irony comprehension caused difficulties for the younger children and seemed to be significantly improved only at the age of 9. Furthermore, we performed an error analysis which showed that pragmatic errors were more frequent than semantic ones in the comprehension of these stories. Finally, we discuss these findings in the light of previous studies on the reception of deception, faux pas and irony (e.g., Baron-Cohen et al., 1999) and address the issue of age of acquisition in typically developing children.

Keywords: Pragmatic Abilities, Theory of Mind, School-Age Children

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Introduction

The study of language as a social act and appropriate behavior with communicative intention belongs to the domain of pragmatics (Mc Tear & Conti Ramsen, 1992). Pragmatic skills are often studied in close relation to socio-cognitive skills, such as Theory of Mind (ToM). ToM is the ability to attribute independent mental states to ourselves and to others in order to interpret and predict behaviors. It is considered to be an inherent cognitive mechanism that allows the representation of mental states. These mental states must be independent of the real world of events and independent of other people's mental states, because people may believe things that may not exist (Baron-Cohen, Leslie & Frith, 1985).

Studying pragmatic skills is an indeed a difficult enterprise due to the great variation in the manifestation of the expression and reception of these skills. Up to now, assessment of pragmatics and ToM is being performed directly or indirectly (Almehmadi, Tenbrink & Sanoudaki, 2020; Volden, & Phillips, 2010). For example, direct assessment of pragmatic skills is performed via psychometric tests, such as the Test of Pragmatic Language - TOPL-2 (Phelps-Terasaki & Phelps-Gunn, 2007) and the faux pas test (Baron-Cohen et al., 1999). By contrast, indirect assessment is performed through questionnaires or assessment lists (completed by children's parents or educators), such as the Children's Communication Checklist-2 (Bishop, 2003) and the Assessment of Pragmatic Language and Social Communication (Hyter & Applegate, 2012).

There are limitations of the assessment tasks above as there may be subjectivity of the answers in the questionnaires or assessment lists and high cognitive requirements of the immediate tasks (Bishop & Baird, 2001; Blain-Brière, Bouchard, & Bigras, 2014). In addition, the performance of the children depends on their language skills, attention and working memory (Bock et al., 2015; Brandt et al., 2016). For example, in some of the tools mentioned above, participants read or listen to a social scenario, which in most cases is complex and may contain complex language forms, such as passive syntax and sub-sentences. Moreover, stories are often long. All these features are likely to deplete the children's cognitive resources, making it difficult for them to understand the stories. For these reasons, we have created a tool for immediate assessment of pragmatic and socio-cognitive skills, which limits the above cognitive and language requirements.

As far as Greek-speaking population is concerned, pragmatics is only assessed as part of general tests of language (for example Mouzaki, Antoniou, Ralli, Diamanti & Papaioannou, 2017 for preschool children, 4-7 years old). In addition, some materials in English have been translated into Greek but without adaptation (for example TOPL-2, faux pas). To deal with these limitations, we developed a tool for immediate assessment of school-age Greek speaking individuals. The ultimate aim of this study is to develop an assessment tool that could be employed in clinical settings for the evaluation of individuals with neurodevelopmental disabilities. For the purposes of the present paper, we report the process of developing these materials and their initial employment for assessing typically developing population.

1. Methodology

1.1. Materials and Procedure

Taking into account previous work by Sodian and Frith (1992), Baron-Cohen and colleagues (1999) and Giannakou and colleagues (2007), we initially developed 50 stories (23 control stories) for Greek speaking children, which were visualized through video presentation. Specifically, to minimize the linguistic and cognitive effect on the children's performance, we adapted everyday social stories with simple syntax and vocabulary. In all stories, everyday vocabulary was used and subordinate clauses, passive voice or other complex syntactic structures were avoided. We visualized all stories and then created videos for the participants.

With respect to the procedure, an example video was presented before each task. The experimenter explains how the answer is given. A short video is presented with instead of watches, which simply describes an everyday social situation. The experimenter asks a question, which assesses: understanding of deception (8 videos: 5 experimental and 3 control stories), faux pas (12 videos: 8 experimental and 4 control stories) and comprehension of irony (12 videos: 8 experimental and 4 control stories). We performed a validation study including 20 typical adults. In addition, we conducted a pilot study with 10 children to ascertain that the stories are understandable. Based on the results of these studies, we used only the most comprehensible stories (32 stories, 11 of them are control stories). In the main phase of the experiment, the tool was administered to 120 TD school-age children.

1.1.1. Deception Materials

Our first task assesses deception. Deception involves creating false beliefs in someone else's mind. Therefore, understanding and managing beliefs is essential to deception (Sodian, & Frith, 1992), so deception is considered as a 2nd order ToM task.

Our deception task is based on previous work by Sodian and Frith (1992). The children were asked not to let the puppet-thief find the candies and if they would tell the puppet that the candy box was locked (i.e. lies) or open (i.e. the truth). There was also a control task, which is called sabotage. The experimenter puts a dessert in a box. The child was then told that he should always help his friend and never help the thief. When the thief comes, the experimenter asks the child if he would lock the box or leave it open. We developed 5 scenarios of deception, and 3 scenarios of sabotage. Objects, such as toys, chocolate and sweets, which are used daily by children at this age were used. These stories were then visualized and 8 videos were created. Each correct answer was scored with one point (so the maximum score for deception is 5 points, and for control stories is 3) (For an example see Appendix A).

1.1.2. Faux Pas Materials

The 2nd tasks assesses faux pas, which means what should not be said. The task is based on previous work by Baron-Cohen and his colleagues (1999) and it includes 10 faux pas stories. In each story there are two or three characters and at least two different statements. After listening to the story, the children answered 4 questions: a faux pas detection question, a faux pas verification question, an understanding question, and a misconception question. There are also 10 control stories (similar scenarios), in which there was no faux pas.

Most TD children succeed in ToM tasks at the age of 6. In this study we used more naturalistic tests to assess social cognition. Faux pas task attributes everyday social situations and measures different cognitive elements of social function, such as: empathy, assuming other's perspective, reasoning about mental states, and the performance of false beliefs in everyday situations.

For our faux pas task we selected only 12 stories the most comprehensible and appropriate ones for school-age children, from the Baron-Cohen's task. We simplified them syntactically and lexically, visualized them and created 12 videos, (8 faux pas stories, 4 control stories). To make the task shorter and easier to use, we omitted the last question. Each correct answer was scored with one point (so the maximum score for faux pas is 8, and for control stories is 4) (For an example see Appendix B).

1.1.3. Irony Comprehension

Finally, the 3rd task assesses irony comprehension. Verbal irony is a figure of speech that communicates the opposite of what is said (Filik, Țurcan, Ralph-Nearman, & Pitiot, 2019). So, understanding an ironic speaker implies making assumptions about his beliefs, but also the representation of his inner situations (Bryant, 2012). The task is based on previous work by Giannakou and colleagues (2007) and evaluates the comprehension of irony, metaphor, literal and inappropriate speech (irrelevant speech). As Giannakou and colleagues (2007) assessed adults, we created our own stories, which are shorter and more appropriate for the age of the research participants. We developed 8 stories evaluating ironic speech, and 4 control stories, 2 literal stories and 2 inappropriate speech stories (irrelevant speech).

In total, there are twenty-four short stories, at the end of which someone says or thinks something. The examinee must first judge whether what is said at the end makes sense. If it does make sense, the examinee must explain what the main character actually means.

After the video presentation, we ask if what is said at the end makes sense. Then we ask what the main character of the story really means. It is not necessary for the child to say the term irony, but to explain the meaning of each statement. For an example, "the character means the opposite of what is said". Each correct answer is scored with one point (the maximum score is 8 points for experimental stories and 4 points for control stories) (For an example see Appendix C).

1.2. Participants

One-hundred and twenty monolingual Greek speaking children with typical development (TD), 56 boys and 64 girls, participated in our study. These children were recruited from speech therapy and special education centers.

In Table 1 information on the participants of the study is presented.

Table 1. The Sample of the Study

Participants	Male (N)	Age Mean (SD)
120	56 (46,7%)	10.2 (1.74)

2. Results

In Table 2 the overall child performance on the tasks is presented below.

Table 2. Children's Performance on Experimental Stories (Correct Answers %)

Participants	Deception Mean (SD)	Faux pas Mean (SD)	Irony Mean (SD)
120	95.6	93.4	85.3

As it can be seen in Table 2, 95.6% of the children answered correctly to the deception task, 93.4% answered correctly to the faux pas task while the percentage for the correct answers drops to 85.3% for the irony comprehension task.

In Table 3, the correct children's performance on the control stories is presented.

Table 3. Children's Performance on Control Stories (Correct Answers %)

Participants	Deception Mean (SD)	Faux pas Mean (SD)	Irony Mean (SD)
120	97.5%	94%	98%

As it can be seen in Table 3, participants performed almost at ceiling on all tasks. The table describes the performance of children in control stories, which were very high in all control tasks. More specifically, 97.5% of the children answered correctly to the deception task, 94% answered correctly to faux pas task and 98% answered correctly to the irony comprehension task.

2.1. Correlation Analysis

Graph 1. Correlations between Children's Performance on the Experimental Tasks and Their Age
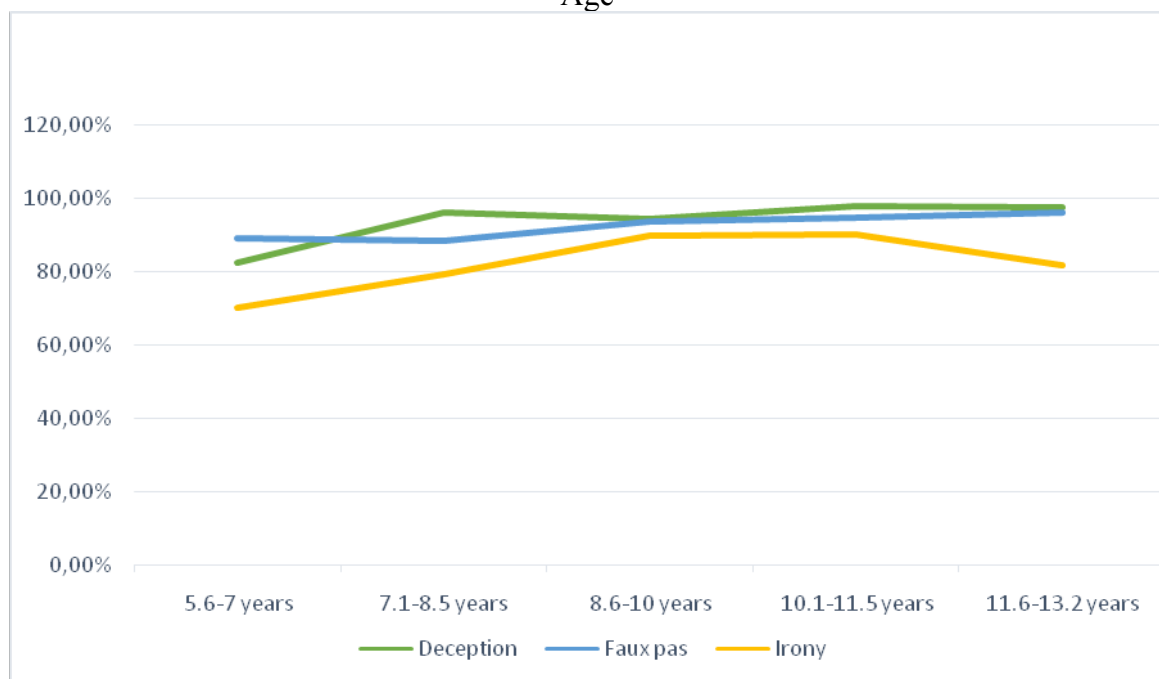
In the deception task the participants show high levels even in the first age group (82.5%). Understanding of deception improves significantly in the second age group (96%) and remains at high levels beyond this age (up to 97.8 %).

In the faux pas task performance is already high in the first age group (89%). It remains stable and grows slowly reaching close to one hundred per cent in the last age group (96.2%).

In the irony task, children show relatively lower levels in the first age group (70.3%). Then irony comprehension improves significantly, by about 10 percentage points from the first to the second age group, and 10 percentage points from the second to the third age group. The highest performance is observed in the fourth age group (90.2%). In the last age group there is a significant decline in the performance of children (81.8%).

Table 4. Correlations between Children's Performance and Age

Tasks	Deception	Faux pas	Irony
Age	rho=0.232, *p*=0.011	rho=0.213, *p*=0.019	No correlation

There is a moderate correlation between deception and the age of children (Spearman's rho = 0.232), which is statistically significant ($p= 0.011$), and between faux pas and the age of children, which is also statistically significant (Spearman's rho = 0.213, $p = 0.019$). It seems that there is no correlation between irony and age ($p = 0.338$).

Table 5. Correlations between Tasks

Tasks	Faux pas	Irony
Deception	rho=0.124, *p*>0.05	rho=0.076, *p*>0.05
Faux pas	X	rho=0.258, *p*=0.005

There is a small non-statistically significant correlation between deception and faux pas there is a small non-statistically significant correlation (Spearman's rho = 0.124, $p> 0.05$), between irony and faux pas there is a moderate statistically significant correlation (Spearman's rho = 0.258, $p = 0.005$). There is no correlation between irony and deception there is no correlation (Spearman's rho = 0.076, $p> 0.05$). Finally, gender was not a significant performance factor as shown by non-parametric statistics (Mann-Whitney test $p> 0.05$).

2.2. Qualitative Error Analysis

In addition to quantitative analysis, qualitative error analysis was performed to investigate the error types the children produced. We point out that such analysis was not performed for the deception task as children were asked to simply choose between two answers.

This analysis was performed for all the remaining tasks and indicated the following points:

Faux Pas Task

In the faux pas task semantic errors are related to the literal understanding of the story, while pragmatic errors are related to the understanding of faux pas. For example: the aunt did not answer the neighbor (faux pas story, see Appendix B). The highest percentage of errors are pragmatic, while a small percentage are semantic (see Table 6). For example: they didn't understand that Nancy is a girl (faux pas story, see Appendix B).

Irony Task

In the irony task semantic errors are related to the literal understanding of the story, whereas pragmatic errors are related to the understanding of the ironic statement. For example: he said that to make her feel better (irony story, see Appendix C). The largest percentage of errors are pragmatic (please see table 7). For example: they didn't understand that Helen was late (irony story, see Appendix C).

Table 6. Qualitative Error Analysis for the Faux Pas Task

No answer	Semantic errors	Pragmatic errors	Total
10 (16.4%)	2 (3.3%)	49 (80.3%)	61 (100%)

According to Table 6, the total number of errors in the faux pas task was 61. 16.4% of the errors were actually tasks without any response (the children gave no answer), only 3.3% of the errors were semantic and 80.3% were pragmatic errors.

Table 7. Qualitative Error Analysis for the Irony Task

No answer	Semantic errors	Pragmatic errors	Total
16 (11.5%)	8 (6%)	115 (82.5%)	139 (100%)

According to table 5, the total number of errors in the irony task was 139. 11.5% of the errors were actually tasks without any response (the children gave no answer) only 6% of the errors were semantic and 82.53% were pragmatic errors.

3.   Discussion

The aim of the study is to develop a measure for assessing pragmatic language abilities related to Theory of Mind (ToM) in Greek, typically developing, school-age children. We developed stories, based on previous works to assess deception, faux pas and comprehension of irony. The results indicated high performance for the deception and the faux pas tasks, while irony comprehension seemed to cause difficulties to the children.

In the deception task even the participants of the first age group show high levels of performance, which increase constantly after this age. These results are consistent with previous research. For example, children have been found to respond successfully to 1st order ToM tasks at the age of 4 and to 2nd order tasks at the age of 6 (e.g., Perner & Wimmer, 1985; Wimmer & Perner, 1983). In addition, Polak and Harris (2011) show that children demonstrate clear signs of intentions to deceive others by the age of 4. Finally, the ability of children to deceive improves significantly after the age of 4 to 5 years and reaches very high levels by the age of 6 (Lee, 2013). Therefore, it is expected that children of the second group, i.e. at the age of 7, will have very high performance.

In the faux pas task performance is already high in the first age group and grows slowly reaching close to one hundred per cent in the last age group. This can be interpreted on the basis of previous research. Banerjee & Watling (2005) proved that even children aged 5 to 6 years are usually able to understand faux pas and perceive the negative effect on the feelings of the offended character. Their performance though was much higher at the age of 8 to 9. Therefore, they concluded that understanding of faux pas increases progressively with age. Regarding the sex of the children, girls perform better in the detection of faux pas at the age of 7, while boys at the age of 9 (Baron-Cohen, et al., 1999). In addition, while girls and boys aged 7 and 9 had different performance in the faux pas task there was no significant difference in performance levels between boys and girls at 11 years of age.

In the irony task, children show relatively lower levels in the first age group. Then irony comprehension improves significantly. But in the last age group there is a significant decline in the performance of children. According to Happé (1994), understanding of irony is only achieved after the age of 8. Most studies claim that children's understanding of irony begins between the ages of 5 and 6 (e.g., Dews & Winner, 1997) and continues to develop over time. Loukusa and Leinonen (2008) showed that the majority of children could interpret verbal irony correctly starting at 6 or 7 years of age. Therefore, in the research of Angeleri & Airenti (2014) even children aged 3 and 4 years old can understand the real intention of an ironic communication act.

Regarding the second and third age groups (ie. from 7 to 10 years old),on the one hand, according to Filippova and Astington (2008) even the 9-year-old study participants did not reach the levels of adult comprehension skills. On the other hand, Nilsen, Glenwright & Huyder (2011) claimed that children aged 8 to 10 years were able to take into account the listener's state of knowledge when they had to interpret verbal irony. Finally, an older research showed that even 13-year-olds often fail to distinguish irony from deception (Demorest, et al., 1984).

In our study no safe conclusions can be drawn for the last group due to the small sample size (only 8 participants). The decline in irony performance cannot be interpreted on the basis of the literature. Therefore, low performance may imply task related limitations.

Conclusion

Limitations

The experimental tasks of the study are part of my doctoral dissertation and they will be administered to children with neurodevelopmental disorders. For this reason, the tool was designed on the particular characteristics of these clinical groups, such as deficits in complex syntax (e.g. Terzi, Marinis, Francis, & Kotsopoulou, 2014; Mervis & Beccera, 2007;

Stavrakaki, 2001), in verbal working memory and attention (e.g. Gilotty, Kenworthy, Wagner et al., 2002; Greer, Brown, Pai et al., 2013; Schuchardt, Bockmann, Bornemann, & Maehler, 2013).

One limitation of the study is that no clinical tests were administered. Research has shown that there is a significant correlation between executive functions and cognitive theory of mind (Yeh, Tsai, Tsai, Lo, & Wang, 2016). In addition, working memory has been associated with understanding irony in TD children aged 5 to 9 years in TD children (Filippova & Astington, 2008). Finally, performance on ToM has been found to be related to both syntax and vocabulary (e.g. Milligan, Astington & Dack, 2007; Slade & Ruffman, 2005). Nevertheless, there are no correlations between language- cognitive skills and performance in our task.

In addition, the sample is simple random and it is not homogeneous as the age groups are not represented equally.

Suggestions

The results of this study indicate that development of new, easy and children-friendly tests, with the aid of technology and games is crucial in order to assess accurately pragmatic skills. Moreover, more specialized tasks are required for specific areas of pragmatics or ToM. Finally, we would propose that the task should be assigned to a larger randomized sample.

References

Almehmadi, W., Tenbrink, T., & Sanoudaki, E. (2020). Pragmatic and Conversational Features of Arabic-Speaking Adolescents With Autism Spectrum Disorder: Examining Performance and Caregivers' Perceptions. *J Speech Lang Hear Res.*, *63*(7), 2308-2321.

Angeleri, R., & Airenti, G. (2014). The development of joke and irony understanding: a study with 3- to 6-year-old children. *Can J Exp Psychol., 68*(2), 133-46.

Banerjee, R., & Watling, D. (2005). Children's understanding of faux pas: Associations with peer relations. *Hellenic Journal of Psychology, 2*(1), 27–45.

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition, 21*, 37–46.

Baron-Cohen, S., O'Riordan, M., Stone, V., Jones, R., & Plaisted, K. (1999). Recognition of faux pas by normally developing children and children with Asperger syndrome or high-functioning autism. *J Autism Dev Disord., 29*(5), 407-18.

Bishop, D.V., &Baird, G. (2001). Parent and teacher report of pragmatic aspects of communication: use of the children's communication checklist in a clinical setting. *Dev Med Child Neurol., 43*(12), 809-18.

Bishop, D. (2003). *The Children's Communication Checklist* (2nd ed., U.S. ed.), San Antonio, TX: Harcourt Assessment.

Blain-Brière, B., Bouchard, C., & Bigras, N. (2014). The role of executive functions in the pragmatic skills of children age 4-5. *Frontiers in psychology, 5*, 240.

Bock, A.M., Gallaway, K.C., & Hund, A.M. (2015). Specifying links between executive functioning and Theory of Mind during middle childhood: cognitive flexibility predicts social understanding. *Journal of Cognition and Development, 16*(3), 509-521.

Brandt, S., Buttelmann, D., Lieven, E., & Tomasello, M. (2016). Children's understanding of first- and third-person perspectives in complement clauses and false-belief tasks. *Journal of Experimental Child Psychology, 151,* 131-43.

Bryant, G. A. (2012). Is verbal irony special? *Language and Linguistics Compass, 6*, 673–685.

Demorest, A., Meyer, C., Phelps, E., Gardner, H., & Winner, E. (1984). Words speak louder than actions: Understanding deliberately false remarks. *Child Development, 55*(4), 1527–1534.

Dews, S., & Winner, E. (1995). Muting the meaning: A social function of irony. *Metaphor and Symbolic Activity, 10*, 3–19.

Filik, R., Țurcan, A., Ralph-Nearman, C., & Pitiot, A. (2019). What is the difference between irony and sarcasm? An fMRI study. *Cortex, 115,* 112-122.

Filippova E., &Astington, J.W. (2008). Further development in social reasoning revealed in discourse irony understanding. *Child Dev., 79,* 126–138

Filippova, E., & Astington, J. W. (2010). Children's understanding of social-cognitive and social-communicative aspects of discourse irony. *Child Development, 81*, 913–928.

Giannakou, M., Kosmidis, M., Bozikas, P.V., Garyfallos, G., & Fokas, K. (2007). *Comprehension of sarcasm, metaphor and hinting in schizophrenia.*18th Conference of the Hellenic Society for Neuroscience, Thessaloniki, Greece, 30/11/2007-01/12/2007.

Gilotty, L., Kenworthy, L., Wagner, A. E., Sirian, L., & Black, D. O. (2002). Adaptive Skills and Executive Function in Autism Spectrum Disorders. *Child Neuropsychology (Neuropsychology, Development and Cognition: Section C), 8*(4), 241–248.

Greer, M.K., Brown, F.R., Pai, G.S., Choudry, S.H., & Klein, A.J. (1997). Cognitive, adaptive, and behavioral characteristics of Williams syndrome. *American Journal of Medical Genetics, 74*, 521–525.

Happé, F. G. E. (1994). An Advanced Test of Theory of Mind: Understanding of Story Characters' Thoughts and Feelings by Able Autistic, Mentally Handicapped and Normal Children and Adults. *Journal of Autism and Developmental Disorders, 24*, 129-154.

Hyter, Y. (2007). Pragmatic Language Assessment: A Pragmatics-As-Social Practice Model. *Topics in Language Disorders, 27,* 128-145.

Hyter Y. D., & Applegate, E.B. (2012). *Assessment of Pragmatic Language and Social Communication* (APLSC, 2012). Beta research version. Western Michigan University, Kalamazoo.

Lee, K. (2013). Little Liars: Development of Verbal Deception in Children. *Child development perspectives, 7*(2), 91–96.

Loukusa, S., & Leinonen, E. (2008). Development of comprehension of ironic utterances in 3- to 9-year-old Finnish-speaking children. *Psychology of Language and Communication, 12,* 55– 69.

McTear, M.F. & Conti Ramsden, G. (1992). *Pragmatics Disability in Children*. London: Whurr Publishers LTD.

Mervis, C. B., & Becerra, A. M. (2007). Language and communicative development in Williams syndrome. *Mental Retardation and Developmental Disabilities Research Reviews, 13*(1), 3–15.

Milligan, K., Astington, J. W., & Dack, L.A. (2007). Language and Theory of Mind: Meta-Analysis of the Relation Between Language Ability and False-belief Understanding. *Child Development, 78*(2), 622 – 646.

Nilsen, E. S., Glenwright, M., & Huyder, V. (2011). Children and adults understand that verbal irony interpretation depends on listener knowledge. *Journal of Cognition and Development, 12,* 374 – 409.

Perner, J., & Wimmer, H. (1985). "John thinks that Mary thinks that…": Attribution of second-order beliefs by 5- to 10-year-old children. *Journal of Experimental Child Psychology, 39*(3), 437–471.

Phelps-Terasaki, D., & Phelps-Gunn, T. (2007). *TOPL-2 Test of Pragmatic Language: Examiner's Manual* (2 ed.). Shoal Creek Boulevard, Austin, Texas: Pro-ed Inc.

Polak, A., & Harris, P.L. (1999). Deception by young children following noncompliance. *Dev Psychol., 35*(2), 561-8.

Schuchardt, K., Bockmann, A-K., Bornemann, G., & Maehler, C. (2013). Working memory functioning in children with learning disorders and specific language impairment. *Topics in Language Disorders, 33*(4), 298–312.

Slade, L., & Ruffman, T. (2005). How language does (and does not) relate to theory of mind: A longitudinal study of syntax, semantics, working memory and false belief. British *Journal of Developmental Psychology, 23,* 117–141.

Sodian, B., & Frith, U. (1992). Deception and sabotage in autistic, retarded and normal children. *Journal of Child Psychology and Psychiatry, 33*, 591–605.

Stavrakaki, S. (2001). Comprehension of reversible relative clauses in specifically language impaired and normally developing Greek children. *Brain and Language, 77,* 419-431.

Terzi, A., Marinis, T., Francis, K. & Kotsopoulou, A. (2014). Grammatical abilities of Greek-speaking children with autism. *Language Acquisition, 21*, 4-44.

Yule, G. (2006). *The Study of Language (*3rd edition). Cambridge University Press.

Volden, J. & Phillips, L. (2010). Measuring pragmatic language in speakers with autism spectrum disorders: Comparing the children's communication checklist--2 and the test of pragmatic language. *Am J Speech Lang Pathol., 19*(3), 204-12.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13,* 103-128.

Yeh, Z.-T., Tsai, M.-C., Tsai, M.-D., Lo, C.-Y., & Wang, K.-C. (2016). The relationship between theory of mind and the executive functions: Evidence from patients with frontal lobe damage. *Applied Neuropsychology: Adult, 24*(4), 342–349.

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Apendix

Appendix A

Deception Task- Examples

1.   Experimental Story

Maria has a chocolate. She puts the chocolate in the top drawer. After a while, Bill comes in the room and asks her: "Which drawer is your chocolate in, in the top or in the bottom one?" Maria does not want Bill to find her chocolate. Which drawer will Maria say that her chocolate is in, in the top or in the bottom one?

2.   Control Story- Sabotage

Jenny has a donut. She puts the donut in the top closet. After a while Peter comes in the room. Jenny does not want Peter to find her donut. Which closet will Jenny lock? The top or the bottom one?

Appendix B

Faux Pas Task- Examples

1.   Experimental Story

Nancy has short brown hair. She is at her aunt's house. The bell is ringing. It's Kate, the neighbor. Kate says: "Hello! I don't think I have met this little boy. What's your name;" The aunt said: "Hey, who wants to drink tea?"

2.   Control Story

Mary helped her sister make a spinach pie for their new neighbor. When the neighbor came, Mary said, "I made this pie for you." The neighbor replied: "It looks very tasty! I love pies, especially spinach pies! "

Appendix C

Irony Comprehension Task- Examples

1.   Experimental Story

Helen had an appointment with Alex outside the school at 2 o' clock. Alex waited for an hour. Helen came to the appointment after an hour. When Helen arrived, Alex said: "Thank you for not being late!"

2.   Control Story I: Irrelevant Speech Story

Nick and Carol have gone to the market for Christmas presents, all the shops are decorated and Christmas songs are played on the street. Carol thinks: "What a wonderful summer!"

3.   Control Story II: Literal Story

The teacher gives back to the students the language tests. George answered correctly to all the questions of the test. The teacher says: "Congratulations! You should always do well at tests! "