

Assessing Sarcasm Understanding in South African Children

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Abstract

Objective: Understanding non-literal language, like sarcasm, requires inference of speakers' intentions, which implicates Theory of Mind. Previously, a standard western lie-joke measure of sarcasm proved problematic for South African children. Assessing sarcasm understanding is an integral part of understanding ToM development in middle childhood. We thus developed a new lie-joke task for this non-western context, implementing best-practice methods indicated by literature, and evaluated its psychometric properties.

Methods: A cross-sectional study examined internal consistency and inter-rater reliability. Convergent validity was assessed using four measures associated with Theory of Mind. We assessed efficacy by asking whether the new task could differentiate sarcasm understanding between younger and older children, where older children should perform better. We also assessed whether the entire group, and those children 10 years and older (i.e., where sarcasm understanding should be present) did better than on the old task. Sixty-three children, five- fifteen years (43 males, 20 females) were recruited via snowball sampling in June - August 2020. Due to COVID-19 contact restrictions, data was collected via online platforms.

Results: Results indicated the new task was reliable, with good internal consistency and inter-rater reliability. It demonstrated convergent validity, having significant associations with three related measures. It detected the expected difference in sarcasm understanding between younger (< 10 years) and older children ($d = 1.28$). Importantly, all children did better on the new than the old task ($d = 1.08$), and the new task was better at discerning age-appropriate sarcasm understanding in older children than the original task ($d = 0.98$).

Conclusion: The new lie-joke task is appropriate for assessing sarcasm understanding and Theory of Mind development in English-speaking South African children. Future research should assess its performance in other non-western, LMIC contexts.

Keywords: Theory of mind development; Non-literal language; LMIC, South Africa

Introduction

Theory of Mind (ToM) plays a critical role in our ability to navigate complex social relationships. ToM is an umbrella construct, referring to the ability to infer mental states, including intentions, emotions, and beliefs. ToM develops across childhood, with major milestones in the preschool period and significant increases in complexity across school age [1, 2]. Most ToM research has focused on early-childhood, emphasizing the age at which children pass the 'gold standard' of ToM acquisition, the false-belief test [3]. False belief reasoning requires an understanding that people's beliefs may not match reality – this necessitates a mental representation of another's mental state. False belief tasks are usually passed at around age 4 in western children, although in other populations this may vary [4]. Important progress occurs in middle childhood, as children develop more advanced ToM abilities necessary to understand complex social interactions. ToM in middle childhood is an expanding area of research [5-7]. However, most research remains limited to a western context [8-10]. This literature indicates that around 8 – 9 years, children show some appreciation of the humour present in sarcasm [11]. At around 10 years, they have developed sufficient ToM skills to correctly infer the teasing or mocking intent underlying a sarcastic comment [12].

Children find sarcasm particularly challenging because it violates three conversational maxims of literal communication, namely truth, belief and literalness [13]. A sarcastic comment is false, violating the truth maxim; the speaker does not believe what they are saying, violating the belief maxim; and the utterance contradicts what is meant, violating the literalness maxim. Research indicates that children struggle most with the literalness violation because it contradicts reality [11]. Thus

children interpret sarcastic utterances only in terms of the truth and belief violations, misinterpreting sarcasm as deception [14].

The western literature frames younger children's failure to comprehend sarcastic intent as due to developmental ToM immaturity. However, some cross-cultural research argues that development of sarcasm understanding is influenced by sociocultural factors [8, 9, 15]. Cultural differences in pedagogical experiences, family size and interactions play a role in children's comprehension and use of sarcasm [15, 16]. Research in western and non-western countries generally assesses sarcasm understanding via lie-joke vignettes that determine whether children can correctly differentiate a character's intent depending on context – are they lying or joking sarcastically? [8-11]. The child needs to identify various cues to detect the literalness maxim violation which enables them to grasp the humour or criticism in a sarcastic utterance [14]. Speech prosody provides an important cue as demonstrated in several studies [17-19]. Non-verbal cues delivered via facial expressions are also key in aiding understanding [20].

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Studies on sarcasm understanding in middle childhood have been described as methodologically inconsistent [21,22], with existing lie-joke tasks varying in complexity, vocabulary, syntax, length, number of characters, and relationship between characters. This variability imposes inconsistent demands on memory and comprehension skills, contributing to contradictory findings regarding children's understanding of sarcasm [8, 22]. Furthermore, research indicates that lie-joke vignettes specific to western contexts are inappropriate cross culturally [16, 22]. The above critiques highlight the need for systematic investigation of sarcasm understanding development across various contexts. The limited extant research in low-to-middle-income countries (LMICs) highlights the importance of orienting task cues within appropriate social contexts [23,24]. A particularly important consideration is the influence of cultural norms regarding respectful behavior on individuals' use of sarcasm [16, 23]. It is likely that a child will only understand sarcasm if it is consistent with these norms [21, 22]. It is thus critical to consider how specific cultural complexities impact communication in order to construct a lie-joke task that reflects familiar scenarios and thus promotes understanding [11].

In 2019, a lie-joke task from the UCT ToM Battery [25]. Based on tasks used by established authors in the field [26, 27]. Proved ineffective in detecting sarcasm understanding in English-speaking South African children. This raised questions regarding the structure and cultural content of the vignettes and indicated the need for an adapted task. Thus, we aimed to develop a contextually appropriate lie-joke task to assess sarcasm understanding in English-speaking South African children. We assessed the internal consistency, inter-rater reliability and convergent validity of the newly developed measure. We assessed its efficacy by examining its performance in older versus younger children, and by comparing its performance with the original task both in the total sample, and in older children where sarcasm understanding should be intact (i.e., 10 years and older).

Method

Design

We created a new lie-joke measure using simple short narratives and appropriate characters employing sarcasm. A cross-sectional study examined the reliability, convergent validity, and efficacy of the newly developed task. Reliability was estimated via internal consistency and inter-rater reliability. Convergent validity was assessed via correlation with four associated measures: empathy, vocabulary, and ToM Strange Stories and Faux Pas tasks. Efficacy was assessed by comparing the performance of younger (<10 years) children with older children on the new task; and by comparing the performance of the full group, as well as that of older children on the old versus the new task.

Participants

Sixty-three mid-high SES children aged 5 – 15yrs were recruited via snowball sampling. Due to the COVID-19 pandemic, non-essential contact was prohibited, thus recruitment was limited to children with online streaming access. This unfortunately excluded low-SES participants. The sample was divided into two groups according to the age at which sarcasm understanding is generally evident (i.e., 10 years). Due to the convenience sampling method, we could not match precisely across demographic factors.

Inclusion and exclusion criteria

All participants were English speaking South African children. Because verbal and social skills are strongly associated with ToM [28].

Exclusion criteria included learning delays, a vocabulary subtest scaled score below 6, diagnosis of language impairment, autism spectrum disorder, conduct or oppositional defiant disorder. No participants met any exclusion criteria.

Estimated required sample size

A priori power analysis [G*Power;29] for power of [29].80 was conducted. For correlations (convergent validity) N = 36 was required; N = 60 was required for independent t-tests, with N=43 needed for repeated measures t-tests. The final sample size (N=63) was sufficient.

Measures

Demographic questionnaire

Parents provided information about child age, sex and home language, as well as clinical or medical information pertaining to exclusion criteria.

Parent-report measure

Questionnaire of Cognitive and Affective Empathy [30]. This 31-item questionnaire constituted one of four measures of convergent validity. Empathy and ToM are related constructs: by enabling inference of others' emotional states, ToM plays an essential role in empathy [31]. The QCAE examines dispositional empathy via cognitive and affective empathy subscales and yields a total empathy score.

Child task measures

Vocabulary: The Wechsler Abbreviated Scale of Intelligence, Second Edition [32]. Vocabulary subtest was used as the second measure of convergent validity. Research consistently demonstrates a strong association between ToM and verbal intelligence [21, 28]. Furthermore, any participant who obtained a scaled score below 6 would have been excluded.

Theory of mind: The UCT Theory of Mind Battery [25] measures a wide developmental range of ToM abilities. We used four tasks: The Location Change False-Belief task was used to confirm whether children in our sample demonstrated false-belief reasoning. As the last two measures of convergent validity, we used the Strange Stories [33,34]. And Faux Pas [advanced module; 34] tasks. Strange Stories assesses children's understanding of various kinds of non-literal language, while the Faux Pas task examines understanding of social errors and misunderstandings. Lastly, we administered the original Lie-joke task (advanced module) to compare its performance with the newly developed measure.

Original lie-joke task: Previously, our research team found that South African children aged 10 years and older had unexpected difficulty correctly identifying sarcasm in the original task. These children generally incorrectly stated that the sarcastic character was lying. This original task was based on tasks from the literature [26, 27]. It is scored out of 16 and features four vignettes, each with two main characters and a third background character. In the 'joking' stories, a child directs a sarcastic utterance at an adult (i.e., their parent or teacher). We identified various factors that may have negatively affected the children's ability to identify sarcasm. Firstly, informal questioning by our research team indicated that the children answered incorrectly because the scenarios were culturally inappropriate. They perceived a child directing sarcasm at an adult as extremely disrespectful and not permitted in the cultural context of the Western Cape. These children indicated that any such behavior would elicit a very negative reaction

and would certainly not be viewed as a joke. The literature suggests that sarcastic statements are more likely to be understood when uttered by an adult, as adults use non-literal language more frequently [8]. Furthermore, some of the vocabulary was not appropriate for the South African context. Having a third character created unnecessary complexity and added length to the measure. Where children have difficulty following items, this may incorrectly create the impression that they do not understand sarcasm. Therefore, when designing a lie-joke task, items should feature contextually appropriate vocabulary and both length and complexity should be controlled [8].

New lie-joke task: These factors were carefully considered in developing the new task. The length of each vignette was limited to 65 words (vs the original task's 165 words), the number of characters was reduced from three to two, and we used appropriate vocabulary and story settings for a South African context. When read aloud, researchers used sarcastic intonation for the joke stories (i.e., lengthened phrases and lowered pitch); and the characters' facial expressions were explicitly illustrated to emphasise the non-literal meaning of sarcastic statements. To control for the effects of normative role dynamics on sarcasm comprehension, half of the items featured an adult speaking to a child, and the other half featured two children conversing. The new lie-joke task consisted of eight vignettes, scored out of 32. To enable direct comparison with scores from the original task (scored out of 16), these scores were proportionally adjusted (doubled) and hence also scored out of 32.

Procedure

Ethical approval was granted by the University of Cape Town's Psychology Department Ethics committee (ref: PSY-2020032). Thereafter, individuals known to the researchers were sent a recruitment WhatsApp message and asked to distribute this to other parents. Parents whose children were interested then emailed the researchers and were provided with an informative invitation letter. No child participated unless a parent provided written informed consent. Children provided written assent after a parent explained what participation entailed. Participating parents completed the demographic questionnaire and the QCAE and scheduled their child's sessions via online platforms. Child tasks were administered individually over two 30-minute Zoom video calls. The first session began with a brief introductory conversation, where participants were reminded that they could stop answering questions at any point. Thereafter, the researcher used the screen share option and began the WASI-II vocabulary test. Each child then completed a practice story item before starting the Location-Change False-Belief and Strange Story tasks. During the second session, the original and new Lie-joke tasks, and the Faux Pas task were administered. To control for order effects, items from the original and new Lie-joke tasks were counterbalanced. All responses were recorded verbatim, and participants were provided with non-evaluative positive feedback at the end of this session.

Data analysis

Statistical analyses were conducted using SPSS (IBM SPSS version 28), with α set at convention (.05), except for the multiple t-tests, where it was Bonferroni corrected. Inter-rater reliability of the new lie-joke task was assessed using Cohen's kappa coefficient (κ), and, as Cronbach's alpha is increasingly considered problematic [35]. Split-half reliability (internal consistency) was established using the Spearman-Brown prophecy formula. Convergent validity was assessed via bivariate Pearson's correlations establishing the magnitude of association between performance on the new Lie-joke task and four related measures. We

examined group differences between the younger (5 – 9yrs) and older children (10 yrs. up) on the new task using an independent samples t-test, with the prediction that older children should do significantly better. We also examined within group differences using paired samples t-tests on the old vs new lie-jokes tasks in the total group, and in the older children, to assess whether they scored better on the new task (we did not use a split plot ANOVA as we were not interested in omnibus findings, but only in these 3 specific contrasts). To account for increased risk of Type 1 error when using multiple t-tests we applied the Bonferroni correction, yielding a more conservative alpha of 0.016.

Results

Demographics

The sample comprised two groups of older and younger children (Table 1). Ethnicity and sex were not matched – although we were able to recruit some participants of colour, the sample was predominantly white.

Table 1: Sample demographics.

		Younger n=34	Older n=29
Age	Range	5y 11m – 9y 11m	10y 0m – 15y 2m
	M (SD)	8.10 (1.17)	11.83 (1.24)
Sex	M: F	22:12	23:6
Ethnicity	W:C	23:11	20:9

Note: W = White; C = Coloured (Mixed ancestry)

Task performance

Vocabulary T-score is given in Table 2 – it is within the normative average range. Participants performed at ceiling on the Location Change False Belief task, confirming that this early developing ToM capacity was established (Table 2). All participants adequately understood the ToM measures, with performance on control questions at ceiling.

Table 2: Task Scores.

	Control M(SD)	ToM M(SD)
WASI-II Vocabulary T-score	61.84 (8.01)	
Parent-report QCAE	84.5 (13.15)	
Location Change False-Belief	12 (0)	12 (0)
Strange Stories	23.67 (0.91)	22.49 (1.68)
Original Lie-Joke	31.94 (0.25)	24.46 (2.08)
New Lie-Joke	31.71 (1.36)	28.74 (3.61)
Faux Pas	37.5 (2.5)	29.98 (6.24)

Reliability

The Spearman-Brown prophecy formula estimated internal consistency for participants between 10 and 15 years old, as these children should be able to understand sarcasm [12]. The resultant correlation coefficient ($r = .94, p = .032$), indicated good internal consistency. Cohen's kappa ($\kappa = .76$) indicated good agreement between raters [36].

Validity

Scores on the new lie-joke task correlated significantly with vocabulary skills (WASI-II Vocabulary; $r = .45, p = .043$), and with scores on two measures of advanced ToM abilities (Strange Stories, $r = .51, p = .038$; Faux Pas, $r = .52, p = .04$). However, the correlation with empathy was small and non-significant (QCAE, $r = .18, p = .053$). The correlation between the new task and the cognitive empathy subscale (the aspect of empathy closely related to ToM) indicated that a small

effect seemed present ($r = .23, p = .057$) but was not significant.

Efficacy of the new lie-joke task

An independent samples t-test showed that older children performed significantly better ($M = 30.42; SD = 2.18$) than younger children ($M = 26.53; SD = 3.71$) on the new lie-joke task, $t(48.25) = 5.05, p < .001, d = 1.28$. A repeated measures t-test comparing the original vs. the new lie-joke task for the entire sample indicated better performance on the new task; $t(62) = 8.57, p < .001, d = 1.08$.

A repeated measures t-test comparing the original ($M = 26.75, SD = 4.09$) vs. the new lie-joke task ($M = 30.42, SD = 2.18$) for the older children, in whom sarcasm understanding should be present, also indicated a better performance, close to ceiling, on the new task; $t(31) = 5.54, p < .001, d = 0.98$.

Discussion

The new lie-joke task evidenced good reliability, as well as convergent validity with three of four related measures. The expected age difference between younger and older children on sarcasm understanding was apparent. The entire sample did better on the new than on the old task, as did children older than 10 years, whose scores, as expected, were close to ceiling. In this sample, development of sarcasm understanding seems to match that documented in western literature. Multiple factors were considered in designing this task. The story vignettes were embedded within culturally familiar scenarios [11]. The effect of the relationship between interlocutors on sarcasm understanding was carefully considered to ensure that dialogue did not involve children being sarcastic towards adults [8]. Finally, narrative length, vocabulary, syntactic complexity, and the number of characters were reduced so no unnecessary demands were placed on the participants' memory and comprehension skills [22].

Psychometrics

The new lie-joke task demonstrated good internal consistency, evidenced by the strong correlation coefficient found for split-half reliability. Furthermore, the obtained kappa statistic indicates good inter-rater reliability. Reasonable indications of convergent validity were found for the new lie-joke task. Results showed a moderate, positive correlation between vocabulary scores and scores on the new task. These findings align with the literature, which consistently indicates an association between vocabulary skills and ToM abilities [11]. Moderate, positive correlations between the new task and the Strange Stories and Faux Pas tasks were also found. Importantly, these correlations indicate that, like the Strange Stories and Faux Pas tasks, the new Lie-joke task assesses the advancing ToM skills seen in older children [25].

However, only a small, non-significant correlation was found between participants' scores on the new Lie-joke task and their parent-reported empathy scores. This was unexpected because empathy is reportedly associated with ToM abilities [31]. Cognitive empathy in particular has conceptual overlaps with the ToM construct – we note that a small association between the cognitive empathy subscale and the new task was present but fell just above the significance threshold.

Parent report may be influenced by biases, which may account for the weak correlations we found [37]. Perceptual bias means parents may perceive their child more or less empathetic than they actually are, while social desirability bias results in parents giving socially acceptable responses. Another point to consider is that the QCAE provided an indirect measure of the children's dispositional empathy, whereas the other three convergent measures, and the Lie-joke task itself, featured

direct assessments of their abilities. Scores from direct versus indirect measures may not demonstrate strong associations [38]. For our study, parent reports of child empathy were necessary, as children younger than eight cannot reliably report on their internal mental states whereas older children are highly susceptible to demand characteristics [39]. Overall, the results point to good psychometric properties for the new task.

Efficacy of the new lie-joke task

Older children performed significantly better than younger children on the new Lie-joke task, with a robust effect. Our results align with current largely western research, which suggests that sarcasm understanding develops across middle childhood; with children 10 years and older demonstrating better sarcasm comprehension than younger children [11, 12].

Many younger participants demonstrated a developing sense of sarcasm in their identification of sarcastic utterances as teasing; however, they consistently incorrectly identified this 'teasing' as deception. When asked the closed question, "Was x lying, joking, or telling the truth?," the younger participants all chose "lying" because, as research suggests, young children do not possess the second-order reasoning necessary to infer the speaker's beliefs about the listener's thinking [11, 21].

The efficacy of the new task was also demonstrated by significantly better scores on the new vs old tasks, for both the entire sample, and the subset of children 10 and older, who are expected to understand sarcasm [12]. In the latter group, scores approached ceiling, as should be the case in this age group.

Our results indicate that the new task was relevant to the sample assessed and the adjustments made to the length, complexity and participant structure of the stories were effective. The new lie-joke task is an effective task for assessing sarcasm understanding in mid-high-SES English speaking children in a South African context.

The development of a reliable, valid and effective lie-joke task for this context is a necessary contribution to ToM research in middle childhood. The ability to understand non-literal language is key to successful social interactions [17, 40] and relies heavily on ToM abilities. Misinterpretation of intention in non-literal speech can lead to harmful misunderstandings and tensions in social interactions and relationships [40]. ToM permits accurate inference of others' mental states, and hence the ability to discern the nuances of intention that underlie deception versus sarcasm [1, 21, 28].

Limitations

The sample included only mid-high-SES English-speaking children. This was unfortunately unavoidable given the strict COVID 19 lockdown restrictions in place during 2020 – 2021. Researchers were not able to work with a diverse range of participants in schools. Remote online interaction was the only option, limiting recruitment to children who had unlimited internet access. Snowball sampling also limited the size and composition of the sample, although it was large enough to be sufficiently statistically powered. Future work should examine the new Lie-joke task's appropriateness in more diverse groups. The limitations resulting from conducting the study online are not inherent to the task – all materials can be presented in hard-copy and administered in person. Thus, the new Lie-joke measure is accessible to child populations who lack internet access – it will be possible to include more sociodemographic ally diverse LMIC samples in future research. Finally, participants answered questions based on vignettes – these

cannot capture the complexity of real-life interactions. This problem is common to ToM research generally, which faces the critique that although it has made important contributions to understanding the development of mental state reasoning, the artificiality of ToM measures undermines its ecological validity [41, 42]. There is thus a move to shift research methods to situations where one-to-one interactions occur, and social cognitive skills are measured in a more online, dynamic context that more closely mirrors actual social interactions – this of course presents its own challenges.

Conclusion

The new lie-joke task demonstrates good psychometric properties in this sample of English-speaking South African children. All children did better on this task than the original, with children 10 years and older scoring close to ceiling. Importantly, the task is able to discriminate between younger and older children's understanding of sarcasm. We thus have preliminary evidence that the task is suitable for this LMIC; future work will examine the task's performance in more diverse samples.

References

- Lagattuta KH, Sayfan L, Blattman AJ (2010) Forgetting common ground: six- to seven-year-olds have an overinterpretive theory of mind. *Dev Psychol* 46: 1417-32.
- Wellman HM (2017) The Development of Theory of Mind: Historical Reflections. *Child Dev Perspect* 11: 207-214.
- 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.
- Liu D (2008) Theory of mind development in Chinese children: a meta-analysis of false-belief understanding across cultures and languages. *Dev Psychol* 44: 523-31.
- Bosacki SL (2014) A longitudinal study of children's Theory of Mind, self-concept, and gender-role orientation. *Int Electron J Elem Educ* 6: 213-228.
- Devine RT, Apperly IA (2022) Willing and able? Theory of mind, social motivation, and social competence in middle childhood and early adolescence. *Dev Sci* 25: e13137.
- Osterhaus C, Koerber S (2021) The Development of Advanced Theory of Mind in Middle Childhood: A Longitudinal Study From Age 5 to 10 Years. *Child Dev* 92: 1872-1888.
- Banasik-Jemieliak N, Bokus B (2019) Children's Comprehension of Irony: Studies on Polish-Speaking Preschoolers. *J Psycholinguist Res* 48: 1217-1240.
- Shahaean A (2015) Sibling Family and Social Influences on Children's Theory of Mind Understanding. *J Cross-Cult* 46: 805-820.
- Wang Z (2016) Theory of mind and executive function during middle childhood across cultures. *J Exp Child Psychol* 149: 6-22.
- 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: 133-46.
- Recchia HE (2010) Children's understanding and production of verbal irony in family conversations. *Br J Dev Psychol* 28: 255-74.
- Grice HP (1975) Logic and conversation. *Speech acts* 41-58.
- Winner E (1987) Making sense of literal and non literal falsehood. *Metaphor Symb* 2: 13-32.
- Hughes C (2014) Lost in Translation? Comparing British, Japanese, and Italian Children's Theory-of-Mind Performance. *Child Development Research* 2014: 1-10.
- Shahaean A (2013) Cultural and Family Influences on Children's Theory of Mind Development. *J Cross-Cult* 45: 555-568.
- Capelli CA, Nakagawa N, Madden CM (1990) How children understand sarcasm: The role of context and intonation. *Child Dev* 61: 1824-1841.
- Glenwright, M (2014) Intonation influences how children and adults interpret sarcasm. *J Child Lang* 41: 472-84.
- Deliens G (2017) Perspective-taking and frugal strategies: Evidence from sarcasm detection. *J Pragmat* 119: 33-45.
- Rockwell P (2001) Facial expression and sarcasm. *Percept Mot Skills* 93: 47-50.
- Filippova E, Astington JW (2008) Further Development in Social Reasoning Revealed in Discourse Irony Understanding. *Child Dev* 79: 126-138.
- Creusere MA (1999) Theories of adults' understanding and use of irony and sarcasm: Applications to and evidence from research with children. *Dev Rev* 19: 213-262.
- Blasko DG, Kazmerski VA, Dawood SS (2021) Saying what you don't mean: A cross-cultural study of perceptions of sarcasm. *Can J Exp Psychol* 75: 114-119.
- Hou XH (2020) A Reciprocal and Dynamic Development Model for the Effects of Siblings on Children's Theory of Mind. *Front Psychol* 11: 554023.
- Hoogenhout M, Malcolm-Smith S (2014) Theory of mind in autism spectrum disorder: Does DSM classification predict development? *Res Autism Spectr Disord* 8: 597-607.
- Winner E, Brownell H, Happe F (1998) Distinguishing Lies from Jokes: Theory of Mind deficits and discourse interpretation in right hemisphere brain-damaged patients. *Brain Lang* 62: 89-106.
- Steele S, Joseph M, Tager-Flusberg H (2003) Developmental Change in Theory of Mind Abilities in Children with Autism. *J Autism Dev Disord* 33: 461-467.
- Happe F (1995) The role of age and verbal ability in the Theory of Mind task performance of subjects with Autism. *Child Dev* 66: 843-855.
- Faul F (2009) Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods* 41: 1149-60.
- Reniers RL (2011) The QCAE: a Questionnaire of Cognitive and Affective Empathy. *J Pers Assess* 93: 84-95.
- Bird G, Viding E (2014) The self to other model of empathy: providing a new framework for understanding empathy impairments in psychopathy, autism, and alexithymia. *Neurosci Biobehav Rev* 47: 520-32.
- Wechsler D (2011) Wechsler Abbreviated Scale of Intelligence-Second Edition (WASI-II) 2011: APA PsycTests.
- Happe F (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. *J Aut Dev Disord* 24: 129-154.
- Baron Cohen S (1999) Recognition of Faux Pas by normally developing children and children with Asperger Syndrome or High-Functioning Autism. *J Aut Dev Disord* 29: 407-418.
- Peters GJY (2014) The alpha and the omega of scale reliability and validity. *The European Health Psychologist* 16: 56-69.
- McHugh ML (2012) Interrater reliability: the kappa statistic. *Biochem med* 22: 276-282.
- Van de Mortel TF (2008) Faking it: social desirability response bias in self report research. *Aust J Adv Nurs* 25: 40-48.
- Longobardi E, Spataro P, Rossi-Arnaud C (2019) Direct and Indirect Associations of Empathy, Theory of Mind, and Language with Prosocial Behavior: Gender Differences in Primary School Children. *J Genet Psychol* 180: 266-279.
- Dadds MR (2008) A measure of cognitive and affective empathy in children using parent ratings. *Child Psychiatry Hum Dev* 39: 111-22.
- Happe F, Cook JL, Bird G (2017) The Structure of Social Cognition: In(ter)dependence of Sociocognitive Processes. *Annu Rev Psychol* 68: 243-267.
- Gallotti M, Frith CD (2013) Social cognition in the we-mode. *Trends Cogn Sci* 17: 160-165.
- Quesque F, Rossetti Y (2020) What Do Theory-of-Mind Tasks Actually Measure? Theory and Practice. *Perspect Psychol Sci* 15: 384-396.