

Utrecht University  
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**MASTER'S THESIS**

**Reading minds by reading books.**

**The relationship between the reading habits and second order theory of mind performance of school aged children in Romania**

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**Abstract:** The present study looked into the relationship between second order theory of mind abilities and the reading habits of 54 Romanian children between 7-12 years old. Second order theory of mind is a more advanced form of theory of mind, and it is broadly defined as the ability to infer what one person thinks about another person's thoughts and mental states.

**Method:** Children were interviewed individually in sessions of approximately 45 minutes. Theory of mind performance was assessed through shortened versions of two instruments: Strange Stories (Happé, 1994) and Faux Pas (Baron-Cohen, 1999). Fourteen short stories, which children read out loud, were followed by a few questions which assessed their understanding of the situations in the stories. Children also completed a questionnaire composed of a broad range of closed and open-ended questions which looked into their reading habits. Four factors were identified: "time spent reading", "number of books read", "pleasure of reading" and "preference for books with ToM profile". The four factors accounted for 75% of the total variation.

**Results:** As expected, scores for the Strange Stories instrument tend to increase with the age of children, with a faster increase in the case of girls. Contrary to our expectations, there was no statistically significant age effect for the faux-pas stories. Positive correlations were found between the scores for the Strange stories instrument and two factors related to the reading habits of children: "Time spent reading" ( $0.31, p = .024$ ) and "Number of books read" ( $.25, p = .07$ ).

**Conclusion:** The present study found that there is a positive effect of reading on the theory of mind scores of school aged Romanian children.

## INTRODUCTION

Theory-of-mind is the ability to attribute mental states- beliefs, intents, desires, emotions, knowledge- to oneself and to others that have beliefs, desires, intentions, and perspectives that are different from one's own. Theory of mind is crucial for everyday human social interaction and is used when analyzing, judging and inferring other's behaviors. Theory of mind appears to be an innate ability in humans that requires social and other experience over many years for its full development. It has been hypothesized to be of two kinds: cognitive (concerning the mental states, beliefs, thoughts, and intentions of others) and affective (concerning emotions of others). Cognitive theory of mind is further separated into first order and second-order theory of mind. While first order theory of mind (inferring about other people's thoughts, beliefs etc. - "I think that she thinks that") starts developing around the age of 3-4, second order theory of mind (inferring about what other people think of other people's beliefs, thoughts etc. - "he thinks that she thinks that") appears later, typically at the age when children start going to school, and continues developing throughout the school years.

Initially, theory of mind research emphasized universal changes in children's concepts of mind. Development was seen as a maturational process where the social environment played the role of a trigger (Leslie, 1994). Since then, many studies have looked into the associations between TOM performance and both family background and cultural background (Lagattuta et. al, 2015). Some of the individual differences that have been associated with ToM performance are: parent-child interactions (Kerns, Brumariu, 2014), children's attachment to caregivers (De Rosnay, Harris, 2002), maltreatment, siblings (Perner et al., 1994), peer relations (Lagatutta et. al, 2015), and executive functions (Devine, Hughes, 2014). A study by Perner, Ruffman and Leekam (1994) documented a striking effect of family size, equivalent to an acceleration of approximately six months per sibling, in the understanding of false-belief.

Studies of pre-schoolers have documented numerous cognitive and social predictors of variability in ToM performance, but an area of research which has been studied minimally is that of individual differences in ToM during middle childhood (Lagattuta et. al, 2015). It is not clear how important these relations still are in middle childhood, or whether there are other better predictors of ToM variability for this age.

In this study, I will look at two sources of individual differences in ToM in middle childhood. Firstly, I will look at the reading habits (type of literature, frequency, and duration of reading) of 8 to 12

year olds in two different cultural settings, and their performance on second order theory of mind. I expect that the reading habits of children in this age group will be associated with their theory of mind performance.

Secondly, I will look for individual differences in theory of mind which can be explained by the number of siblings, order of birth and sex of siblings, as the literature indicates that children who have one or more older siblings tend to have better theory of mind performances (Hughes, White & Ensor, 2014) and those who have at least one same-sex sibling fare better on ToM performance than those with no same-sex siblings (Kennedy, Lagattuta & Sayfan, 2015).

### **Reading and ToM**

The developmental benefits of reading to one's child from an early age and with great frequency have been widely recognized. One important gain is that of social cognitive development. Children's stories are social in nature, centering on interactions between individuals who often have competing goals and frequently describe situations in which characters hold diverging beliefs (Peskis & Astington, 2004). Cassidy et al. (1998) found that of the books read to preschoolers by a group of parents, over 75% contained some language related to internal states, and a third dealt directly with the concept of false belief. Reading improves one's vocabulary, exposes a child to emotional exchanges and a diverse context of emotions and situations, and comes with the opportunity of exercising cognitive perspective taking.

During joint book reading, parents have the opportunity to expose their children to mental state language that can be incorporated into "book reading routines" (Bruner, 1986). If parents routinely ask young children what storybook characters are thinking and feeling, it may become part of the routine for children to ask and answer similar questions (Symons, et. al, 2005). Joint book reading is a good opportunity for parents to elaborate, ask questions, describe and label pictures, paraphrase and discuss emotions and points of view of characters. (Symons et. al 2005) hypothesised that "the function of story-telling may prompt young children not only to acquire habits of mind-minded discourse, but also to make genuine strides in developing a ToM".

Several studies have related ToM and discourse during parent-child interactions in tasks such as joint reading. Garner, Jones, Gaddy and Rennie (1999) looked at mothers and children discuss a picture storybook and examined mental state references about the emotions of characters. They found that mothers who explained the causes and consequences of emotions had children who did better on standard emotion understanding tasks than children of mothers who did not refer to emo-

tions or did not explain them. Turnbull and Carpendale (1999) used a similar procedure and found that children with poor false belief understanding had relatively limited interchanges with their mothers about the mental states of story characters. Ruffman et al. (2002) gave parents and children photographs without text and asked them to look at them like they would a book at bedtime or pictures in a magazine. They showed that mental state utterances of mothers predicted performance on standard ToM tasks, as well as the children's own mental state utterances. Furthermore, those associations pertained both concurrently and 1 year later.

Symons, Peterson, Slaughter, Roche and Doyle (2005) examined the relationship between theory of mind and mental state discourse in three studies conducted in Canada and Australia. For the first study, they asked parents and children (5-7 years old) to jointly read a storybook, and the mental discourse of the parents (elaborations of the story) was found to be positively related to the children's ToM, confirming the findings of previous studies. For the next two studies, they looked at children's mental discourse during story-telling tasks and found that the mental discourse of children during narrative was also strongly related to their ToM performance. The study showed that apart from the parent's discourse, children's spontaneous use of mental state language is also a strong correlate for ToM performance.

Guajardo and Watson (2002) tested the hypothesis that mental state concepts in storytelling could enhance children's ToM understanding. They found that performance in false-belief and deception tasks improved significantly for preschoolers who were exposed to a school-based storytelling intervention, but not for children in a control group. In a similar study, Peskin and Astington (2004) investigated whether exposing four to five-year-old children to picture books rich in explicit metacognitive terms over a four-week intervention period improved production and comprehension of metacognitive vocabulary, as well as false-belief understanding. Children in both the control and experimental groups performed significantly better on the false-belief tasks after the intervention period, but children in the control group who were exposed to the same picture books stripped of metacognitive language improved significantly more than children in the experimental group. According to the authors, having to interpret implicit mental states from illustrations and text seemed to be more important than hearing numerous metacognitive terms. Taken together, these experimental studies, along with the longitudinal studies on family discourse described earlier, suggest that even if mental state concepts are not made explicit verbally, children's participation in social discourse improves their narrative skills and promotes ToM understanding (Adrián et al., 2007; Guajardo & Watson, 2002; Howard et al., 2008; Peskin & Astington, 2004; Ruffman et al., 2002).

While almost all studies have been focused on preschool children's joint reading habits and first order theory of mind, there is no literature (to my knowledge) on school-aged children, and the effects of their reading habits on more advanced theory of mind abilities. Many parents read to their children during the preschool years, but in middle childhood children have the opportunity to take more decisions for themselves, especially when it comes to their free time. Although parents generally have rules concerning the time spent on the computer or tablets and they encourage certain activities such as reading, individual differences in children's preferences of spending their free time are important. Cross-cultural analyses reveal differences in the time children spend on work, school, and leisure activities, but by some estimates, children in middle school spend up to 50% of their waking hours on leisure activities and free time (Larson & Richards, 1989).

McHale, Crouter, and Tucker, (2001) argue that middle childhood is an especially important developmental period in which to study what children do with their free time. One reason is that time use varies less in early childhood, and by adolescence, social class differences in time use are pronounced, suggesting that important individual differences may emerge in middle childhood (Larson & Verma, 1999). Middle childhood is a time of relative freedom for children to discover what they like and to take some personal decisions regarding their free time, and by adolescence, the pressure to follow a certain path and prepare for becoming an adult takes away part of this freedom, of not having to worry about academic performance and future prospects.

Research indicates that children's activities are associated with social class (SES) indices, with parents' education being the most consistent correlate. Although the habit of reading and the number of books that a family has is undoubtedly associated with the SES of families, it is interesting to study the effect of reading on ToM performance in the context of families with a similar SES background. The sample of children which are included in this study come from families with a good or very good SES, therefore, the population is homogenous in terms of financial status and education. It is interesting to study the effects that reading might have on children with similar opportunities to engage in this activity.

Using these studies (Bruner, 1986; Garner et al., 1999; Ruffman et al., 2002; Symons, et. al, 2005) as proof of the wide array of benefits that reading and storytelling have on the ToM development of children, I predict that reading and storytelling continue to play a role in children's ToM development past the preschool years, and well into middle childhood. In order to assess the reading habits of children, I will use a questionnaire with multiple questions that refer to: how often children are engaging in reading, the duration of reading, the content of the books that children read, the type of

characters that children enjoy reading about, the number of books that children have read during the summer and throughout the school year, as well as how much children actually enjoy reading.

### **Sibling- ToM relations**

In addition to learning about psychological states from parents, children also acquire knowledge about desires, intentions, emotions, and beliefs from day-to-day interactions with siblings. Numerous studies have shown that preschoolers with more siblings, particularly older siblings, **perform** better on ToM tasks than children without siblings or children with only younger siblings (Farhadian, Gazanizad, & Shakerian, 2011; Jenkins & Astington, 1996; McAlister & Peterson, 2006, 2007, 2013; Perner, Ruffman, & Leekam, 1994; Ruffman, Perner, Naito, Parkin, & Clements, 1998).

These studies provide evidence for a model in which younger children learn from their older siblings via opportunities to participate in or overhear mental state conversations (e.g., Brown, Donelan-McCall, & Dunn, 1996; Hughes et al., 2014), as well as through opportunities to engage in pretend play (Harris, 2005) and conflict (e.g., Ross et al., 2005) with more socially and cognitively advanced social partners.

Interactions with older siblings may provide children with the benefits of a skilled partner who can operate within the child's 'zone of proximal development' (Vygotsky, 1978). Also, it may be that children benefit from observing older siblings interacting with others, and especially caregivers.

Witnessing emotional interactions between other family members may facilitate children's developing theories of mind (Dunn & Brown, 1991; Lagattuta, Wellman & Flavell, 1997).

Dunn and colleagues' detailed longitudinal studies (e.g., Dunn et al., 1991) provide some evidence for both of these interactional and observational explanations, since their findings suggest that false-belief comprehension at 40 months is significantly and independently predicted not only by co-operative interactions between siblings at 33 months but also by observations of mother-sibling conflict interactions. In addition, the 'observational learning' account is also supported by results from Lewis et al.'s (1996) Mediterranean-based study in which false-belief comprehension was associated with overall family size (including adult relatives living at home) rather than with number of siblings per se. On the basis of their findings, Lewis et al. (1996) proposed a 'general apprenticeship' model in which theory-of-mind development is improved through contact with a variety of family members (rather than through interactions with siblings in particular).

This prior research on sibling-ToM relations has focused on children 6 years of age and younger, a time period when ToM is first developing and children spend most of their waking hours with fami-

ly members. Once children have reached a certain threshold of mental state understanding, connections between siblings and ToM may disappear.

There are several reasons to suspect that associations between siblings and ToM may differ in older children as opposed to younger children. A reduced time with siblings and family, and growing importance of peers—may reduce or extinguish family-based factors that predicted ToM earlier in development. When children enter school at 5 or 6 years of age, socialization practices shift such that children begin to spend significantly more time outside of the home with nonfamilial peers, with the number of peer contact hours increasing over childhood into adolescence (Larson & Verma, 1999). The frequency of mental state talk with peers—talk about emotions, desires, beliefs, thoughts, and intentions—predicts individual differences in ToM (see Symons, 2004), with studies indicating that school-age children engage in more mental state talk with friends than with siblings (e.g., Brown, Donelan-McCall, & Dunn, 1996).

To complicate the discussion even further, research remains mixed regarding which combination is most ideal—having more siblings (Jenkins & Astington, 1996; McAlister & Peterson, 2007, 2013; Perner et al., 1994) or having more siblings who are older in age (Farhadian et al., 2011; Lewis et al., 1996; Ruffman et al., 1998). Furthermore, a subset of studies have found that preschoolers with siblings who are diverse in gender or age demonstrate the most advanced ToM; however, researchers disagree whether it is most beneficial to have siblings who are both older and younger than oneself (Lewis et al., 1996; Peterson, 2000) or to have siblings who are of the opposite sex (Carlson & Moses, 2001; Cassidy, Fineberg, Brown, & Perkins, 2005; Ruffman et al., 1998).

Exposure to a greater variety of sibling perspectives may benefit children's social-cognitive development by providing more frequent opportunities to interact with children whose views differ from their own (Ross, Recchia, & Carpendale, 2005) such as exposure to differences in preferences and play styles that often follow gender lines (Martin & Ruble, 2010). Because these studies focused on children 6 years of age and younger, it is unknown whether the same sibling patterns hold in older age groups, particularly given that sibling relationships also undergo significant changes as children grow older.

Kennedy, Lagattuta and Sayfan (2015) tested the relations between 4- to 11-year-olds' ToM (192 children) and (a) number of siblings, (b) sibling chronological ages, and (c) sibling gender. Within each of these categories, they also separated the number of older versus younger siblings and examined diversity in sibling age (both older and younger siblings) or gender (both male and female sib-

lings). First of all, they found significant associations between sibling composition and advanced ToM in 4 to 11 year-olds, which suggests that the associations between ToM and siblings still exists in middle childhood. Secondly, they found that children who had a greater number of older siblings more frequently suggested different interpretations for different people (e.g., one person may think “snake,” whereas the other person may think “snail,” when viewing an ambiguous curve), and they also more frequently explained this mental diversity in relation to differences in past experiences (e.g., “Because she saw a snake before, but this girl saw a snail picture”).

The benefit of having older siblings was not specific to children of a certain age range and having both older and younger siblings did not add unique variance to the ToM prediction.

Thirdly, they found that neither the number of female siblings nor number of male siblings predicted ToM performance, but, regardless of age, children with more same-sex siblings outperformed those with fewer or no same-sex siblings. Having both male and female siblings did not show any significant improvement. This suggests that the closeness or quality of sibling relationships also shapes mental state learning.

This study provides support for a model of social-cognitive learning in the family (Keneddy et al., 2015) and strongly suggests that family-based variables shape knowledge and ToM skills during middle childhood.

Although Keneddy and colleagues’s study (2015) seems to provide a lot of insights into the ToM-siblings relationship in middle childhood, the results are mixed and other studies have found null relationships in this age period (Calero, Salles, Semelman, & Sigman, 2013; Miller, 2013) when children were measured through first- and second-order false-belief tasks. The question of siblings and ToM performance is worth further investigating, especially in a cross-cultural study.

The participants in our study will be asked about: the number of siblings they have, the order of birth, and the gender of their siblings. I expect to find that 1) children with at least an older sibling have a better ToM performance than children with no older siblings, 2) children with same-sex siblings have a better ToM performance than children with no same-sex siblings, 3) children with more siblings have better performances than children with fewer siblings.

The main goal of this research paper is to look into the relationship between reading habits (frequency, duration, type of literature and perceived gains) and second-order ToM performance in

middle childhood (8-12 years old). There are three research questions which are derived from this goal and are investigated in this paper.

- 1) What is the reliability of the second order ToM instruments in the Romanian context?
- 2) How do second order ToM abilities continue to improve in the first school years (8-12 years old)?
- 3) What is the relationship between the reading habits of children aged 8-12 and their second order ToM performance?

Additionally, there is a fourth research question which looks at the family structure of the child and his/her second-order ToM performance.

- 4) Is there a relationship between family structure (number of siblings, order of birth) and second-order ToM?

Based on the four research questions, the analyses are structured by the following hypotheses:

**H1.** The shortened versions of the instruments that measure second-order theory of mind have a good reliability in the context of the Romanian population.

**1a.** The shortened version of The Strange Stories instrument has a good reliability.

**1b.** The shortened version of the Faux Pas has a good reliability.

**H2.** The scores that measure second-order theory of mind development are positively correlated with the age of the children.

**2a.** The scores for the Faux Pas instrument are positively correlated with the age of the children.

**2b.** The scores for the Strange Stories instrument are positively correlated with the age of the children.

**2c.** The improvement in second-order ToM tasks is faster among girls than among boys at this age (7-12 years old).

**H3.** Children who read more tend to have higher scores on the second-order Theory of Mind instruments.

**3a.** Children who read more tend to have higher scores for the Faux Pas instrument.

**3b.** Children who read more tend to have higher scores for the Strange Stories instrument.

**H4.** The family structure (number of siblings, order of birth) will be related to second-order TOM performance.

**4a.** I expect to find a better theory of mind performance in children who have siblings, as compared to those who have no siblings.

**4b.** It might also be that children who have (at least one) older sibling(s) will have a better theory of mind compared to those who only have younger siblings.

## **METHODS**

### **Subjects**

54 children (28 boys and 26 girls) from two private schools in the city of Cluj-Napoca (the second largest city in Romania) and one public school from the town of Gherla, participated in the testing. The youngest child was 7 years and 10 months, and the oldest was 12.0 years old, with the mean age of 9.24 years for boys and 9.82 years for girls. Children were recruited from two schools of comparable socio-demographic composition in the city of Cluj-Napoca (the second largest city in Romania) and one school from the adjacent urban district (Gherla) with a lower SES. The schools in which the study was performed approved the research and all children's parents or legal guardians gave signed voluntary consent. Consent letters were sent to the parents of children from 6 classes (grade 1, 2, 3, 4 and 5) and the main teacher from each class asked the parents to write down the name of their child on a form if they wanted their child to participate. Approximately 150 parents were asked to have their child participate in the research, of which 55 agreed. Inclusion criteria for the study were that children attend grades one to five, that their native language is Romanian and that they do not have any known linguistic or cognitive disabilities.

One subject (age=12.5 years) was eliminated from the testing because of severe social anxiety.

### **Materials**

14 short stories were chosen in order to test the second-order theory of mind abilities of the children. The 14 stories are a combination of two types of stories: Faux-Pas stories (6 stories and two controls), and Strange Stories. The Faux Pas story test (Baron-Cohen, O'Riordan, Stone, Jones & Plaisted, 1999) and the Strange Story test (Happe, 1994) are two of the few existing instruments that look at more advanced theory of mind development. The stories were selected in terms of content, bearing in mind the age of the children (8-12 years old), relevance of the stories' topics for this age group, as well as cultural sensitivity.

The 14 stories were translated to Romanian by two independent translators, and the translations were compared and discussed in order to reduce the risk of linguistic biases and subjectivity. The

names of the characters in the original stories were replaced with common Romanian names in order to facilitate the memorization of names from the stories.

### **Strange Stories**

The Strange Stories tests is a theory of mind test created by Francesca Happé (1994). Happé recruited adolescents and adults with autism (with varying intellectual disabilities) and presented them with a set of 24 short stories which contained social situations that involve ambiguities or misconceptions about people's mental states (e.g., lie, joke, persuade, sarcasm). Participants were then asked to describe why they think that event took place, and their responses were coded for the correctness and quality of the explanations. This test outlined great differences in the performance of children and adolescents with autism and normally developing children, but the performance on this task has also been found to greatly improve in the middle childhood for typically developing children (Happé, 1994; Peterson, Wellman, & Slaughter, 2012).

The test consists of different story-types, such as: Lie, White Lie, Joke, Misunderstanding, Persuade, Appearance/Reality, Figure of Speech, Sarcasm, Double Bluff, and Contrary Emotions. In the original test there are three or four stories from each category. For our instrument, we chose to use 6 strange stories. The decision of which stories to include was made based on three criteria: the stories should be of different kinds (one sarcasm story, one white lie story, one joke story, one figure of speech story, one contrary emotions story), the stories should have topics that are relevant and common for children of 8-12 years old and they should be culturally appropriate for both India and Romania.

Each story is followed by the comprehension question "Was it true, what X said?," and the justification question "Why did X say that?". For example, in one of the stories, two children go for a picnic. One of them says the weather is going to be lovely, but when they get there and start unpacking the food, it starts raining and they are soaked wet. The other child then says "Oh yes, It's a lovely day for a picnic indeed". In this story, the children must identify the sarcasm/irony in order to be rated with a correct answer.

The justifications given in response to the "Why" question were rated with either 0, 1 or 2 points, depending on the complexity of the answer. 2 points were given if the answer was full and complete, 1 point if the answer was partially complete and 0 if the answer was incorrect or irrelevant. A justification could be incorrect because it involved errors about the facts given in the story, or because it involved an inference that was inappropriate as a reason for the story character's utterance. Many of the story characters' utterances could be justified correctly either in terms of mental states

or physical states. For example, in the joke story where a boy calls a dog an elephant, this can be correctly explained by the physical justification, "the dog is big like an elephant," or the mental state justification, "He's just joking." Mental state answers included all those that referred to thoughts, feelings, desires, traits, and dispositions. Mental state justifications included terms such as "like", "want", "happy", "cross", "afraid", "know", "think", "joke", "pretend". Subjects with autism were found to give more physical state justifications (than mental state justifications) compared to the normal population (Happe, 1994). In our research we did not additionally score the type of justification (mental or physical) because we did not look at participants with autism, so the answers were only scored in terms of the complexity of the answer.

### **Faux Pas**

The Faux Pas test (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999) is an advanced ToM task designed for children aged between 7 and 11 years old. It consists of short stories where a person's statement may be perceived as negative, offensive, or insulting, but is unintentional and made out of ignorance (e.g., a man says "I don't think I've met this little boy" to a little girl with short hair). Studies using the Faux Pas test have found age-related improvements between the ages of 5 and 11 years in being able to detect a faux pas and to identify accurately the "person's" ignorance and intention (Banerjee & Watling, 2005; Baron-Cohen et al., 1999). Comparative studies have shown that children and adults with autism spectrum disorder have significant difficulties with this task, even those with high language proficiency and who have passed first- and second-order false-belief tasks (e.g., Zalla, Sav, Stopin, Ahade, & Leboyer, 2009).

It is not easy to give a definition for a faux pas, but it might be seen as something that happens when a speaker says something without considering if it might have a negative or unpleasant consequence for the listener, and it happens when the speaker did not intend to say such a thing (Baron-Cohen et al., 1999). Socially normal individuals can usually recognize when someone has committed a faux pas, but the exact context and criteria for this is difficult to define. A faux pas usually implies a mix of regret, embarrassment, or feeling bad for the listener, which can often be summed up by the phrase "I wish I hadn't said that!" (Baron-Cohen et al., 1999).

In the original instrument, there are 10 stories containing a faux pas and 10 stories without a faux-pas which are read in a random order. For our research, we chose 6 out of the 10 stories containing a faux pas and 2 additional control stories. The 6 stories were chosen in order to be culturally sensitive. For example, in one of the stories from the original test, a girl asks "Have you heard my new joke about sick people?". Apparently, in the Netherlands there is a category of jokes about sick peo-

ple, but such category does not exist in Romania, so we decided to eliminate this story because the remark in the story would sound strange for children who are not Dutch.

In the original study (Baron-Cohen et al., 1999), the improvement in task performance was greater for girls between 7 and 9 years than for the boys, and boys showed a more dramatic improvement in performance than girls between 9 and 11 years.

The experimenter introduces the child to the set of stories by saying “Now I’m going to read you some stories. I want you to listen very carefully because afterwards I am going to ask you some questions to see what you think of them.”. After the experimenter reads the story, there are four questions that follow: a faux pas detection question (“In the story did someone say something that they should not have said?”), an identification question (“What did they say that they should not have said?”), a comprehension question and a false-belief question (these differ from story to story). For example, in one of the faux-pas stories, Jane’s mum is preparing a surprise party for Jane and asks Anna, who is Jane’s best friend, not to say anything about the party. The next day, the two girls are playing when Anna accidentally tears her dress and says “Oh, I was going to wear this dress at your party”. Jane asks “What party?” and Anna replies “Oh, let’s go get an ice-cream”. The child is then asked four questions: “In the story did someone say something that they should not have said?”, “What did they say that they should not have said?”, “Who was the surprise party for?” and “Did Nicky remember the party was a surprise?”. If the child answers all questions correctly, he/she receives 1 point. If any of the questions is answered incorrectly, the child receives 0 points. The child is also given 1 point for each control question that he/she answered correctly, thus identifying that no faux-pas occurred.

### **Reading habits questionnaire**

The questionnaire that I used in the study was created specifically for this purpose and it comprises 11 questions related to reading. I created the questionnaire because I could not find in the literature a questionnaire that is both suitable for the age group of 7-12 years old and inquires about all the different aspects of reading that I was interested in. The first two questions of the questionnaire refer to how much the child enjoys reading (in general and during holidays) and the child must choose an answer from 1 to 5 that best fits with his experience of reading. The next three questions concern the number of books that: a child has at home (just his/her personal books), that a child has read during the summer holidays, and that a child has read since the beginning of the school year (here the child is also asked to provide the titles of the books that he/she remembers having read). The

next two questions are investigating how often the child reads for school and for pleasure in a given week (in how many days per week). Questions 8 and 9 are asking for the amount of time (specified in minutes) that the child has spent reading during the previous school day and during the previous weekend. Lastly, there are two multiple choice questions where the child can choose the types of characters and books that he/she particularly enjoys reading about/from.

The reading questionnaire was composed in such a way that questions are asked in varied ways. Many questions are asked in an open-ended manner, which is aimed at reducing the social desirability of certain answer options (children have the tendency to think that “more is better “). The child has to write down the number of books that he/she has at home, that he/she remembers having read, the amount of minutes that he/she spends reading. Also, the child is asked to write down the titles of books that he/she remembers having read. The questionnaire covers many aspects related to reading, referring to the frequency of reading, time spent reading, number of books, preferences of books and characters etc.

The questionnaire takes about 5 minutes to complete and the children received guidance and additional instructions throughout its completion.

### **Procedure**

Each child was interviewed separately in a quiet room in the school for about 35-45 minutes. The testing conditions were very similar in both schools. All children were native speakers of Romanian and all the instructions, stories and questionnaires were translated in Romanian. All children received the same instructions, with slightly different terms used for younger children. Before the testing, each child was told that “These activities that we are about to do together have nothing to do with the school. You will not receive any mark and no one will see your answers apart from me. Everything will be confidential and your parents and teachers will not be able to see what you answered” The child was also briefly told about what the testing will consist of: “There will be 4 activities that we will do together today. We will start with some fun stories that I will ask you to read and then I will ask you some questions about the stories; then I will ask you some questions about your reading habits; there will also be some questions about you, and lastly, I will ask you to rate your classmates that are also participating in this research ”. All the children were tested in this exact order: stories and questions, reading questionnaire, self-concept questionnaire and rating of classmates.

The set of stories was introduced as follows for the younger children (grades 1 and 2): "Here are some stories, and some questions. I'm going to read out the stories and I'd like you to listen careful-

ly, and help me with the questions at the end of each story." The older children were asked to read the stories themselves: "I have 14 short stories here and I would like you to read them out loud. After each story, I will ask you one, two or three questions about the story". With the younger children, reading the stories and answering the questions took approximately 25- 30 minutes, and an additional 15 minutes for the rest of the questionnaires. For the older children, reading the stories and answering the questions took about 15 minutes and an additional 10 minutes for the questionnaires. Almost all subjects (42) finished the stories in one testing session, with short breaks given as needed. The stories remained in front of the children throughout the ToM testing in order to minimize memory difficulties.

At the end of each story the subjects was asked the two (or sometimes three or four) test questions and the answers were recorded in full on scoring sheets, for later analysis. Positive comments were made throughout the testing session to encourage the subject, but no feedback was given about the correctness of the answers.

For each subject, the stories were presented in random order.

## **RESULTS**

Results are organized into three sections. The first section presents the descriptives for the second-order theory of mind instruments in relationship with the age and gender of children and for the reading questionnaire. The second section presents the results for the relationship between the second-order theory of mind score and the reading habits questionnaire. The third section presents the results for the association between siblings and second-order theory of mind performance.

### **Descriptives**

#### *Second-order theory of mind instruments, age and gender*

Two shortened versions of instruments were used for assessing second-order theory of mind performance. The original version of the Strange Stories (Happe, 1994) contains 24 short stories, while our shortened version contained 8 short stories. The internal consistency for the shortened version of Strange stories was good (Alpha Cronbach=.559). The mean score for the Strange stories instrument was 9.29 (std.=2.15, Mdn=9.0) out of a possible score of 14.

As expected, the scores for the Strange Stories correlated with the ages of the children ( $r = .412, p = .002$ ) and girls fared slightly better than boys. The scores of the boys tended to be more constant

( $b=0.45$ ), while girls had a higher increase in scores over time ( $b=0.89$ ). With each year, girls' scores improved by almost one point, while boys' scores improved by just half a point.

The original version of the Faux Pas instrument for children contained 10 stories, while our instrument contained 5 short stories and two control stories. Contrary to our expectations, the internal consistency of this instrument was quite low (Alpha Cronbach=.22), and the ages of the children did not correlate with the aggregate score for the Faux Pas. The mean score for this instrument was 3.45 (std=1.1, Mdn= 4.0) out of a possible score of 14. Possible reasons for this result will be addressed in the Discussion part.

Table 1

*Descriptives for the Strange Stories and Faux Pas instruments*

	FP	SS
N	55	55
M	3.454	9.290
Mdn	4.0	9.0
SD	1.10	2.157

#### *Reading questionnaire*

After performing an exploratory factor analysis for the reading habits questionnaire, four factors were identified: “time spent reading”, “number of books read”, “pleasure of reading” and “preference for books with ToM profile”. The four factors accounted for 75% of the total variation. The first factor is composed of three questions which look into the amount of time that children spend reading: how much time they read during the weekend, how much time they read during a week day and how often they read for school and pleasure during a given week. The second factor is composed of two questions, which look into the number of books that children read: how many books they read

Table 2

*Item-Total Statistics for Faux Pas Instrument*

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
V5	3.073	.846	.143	.223
V10	2.618	1.018	.077	.278
V15	2.800	.756	.275	.071
V20	2.691	.958	.087	.274
V25	2.636	1.013	.064	.289

Table 3

*Item-Total Statistics for the Strange Stories Instrument*

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
V38	8.182	4.485	-.103	.594
V41	8.127	2.780	.378	.352
V44	8.127	3.632	.289	.416
V47	8.091	3.269	.532	.311
V50	7.545	4.067	.104	.494
V53	7.545	3.438	.404	.365
V56	8.127	4.335	.116	.482

during the summer holidays, how many books they have read since the beginning of the school year. The third factor refers to the pleasure of reading and is composed of three questions: how much children generally enjoy reading, how much they enjoy reading during holidays and how often they read for pleasure during a given week. Finally, the fourth factor refers to the type of books and characters that children enjoy reading about and looks at whether children prefer books and characters which have a theory of mind profile (e.g. “I like books that help me imagine and understand other people’s lives”, “I like characters that help me understand people that are unlike

myself”). When asked how much they generally enjoy reading from 1 (not at all) to 5 (I love reading), Romanian children reported an average of 4.2. When they were asked how much they enjoy reading during holidays, the average was 3.85 out of a possible 5 on the same scale. Children reported that they read an average of 3.22 books during the school year, and 6.17 books during the summer holidays. The average number of books that children

Table 4

*Correlations between the Faux Pas total score, Strange Stories total score and the variables from the Reading Habits Questionnaire*

		b1	b2	b3	b4	b5	b6	b7	b8	b9
FP	r	.072	.118	.215	.106	-.085	.026	.189	.075	.147
	p	.606	.394	.118	.446	.540	.850	.171	.591	.287
	N	54	54	54	54	54	54	54	54	54
SS	r	.004	.071	.272*	.128	.192	-.021	-.058	.428**	.428**
	p	.976	.611	.046	.355	.165	.882	.679	.001	.007
	N	54	54	54	54	54	54	54	54	54

Note: b1=likes reading; b2=likes reading during holidays; b3=number of books read during school year; b4=number of books read during holidays; b5=number of books owned at home; b6=reads for school and pleasure/ week; b7= reads for pleasure/ week; b8= time spent reading during weekend; b9=time spend reading during weekday.

reported to own at home was 86.87. When asked how often they read during the school week, children reported that they read on average in 3.2 days of the week for school and pleasure and in 2.69 days of the week for pleasure reading. The average time that children reported to spend reading during the weekend was 65 minutes and the average time that they reported to spend reading during a normal weekday was 36 minutes.

Table 5

*Descriptive statistics of the variables from the Reading Questionnaire*

	b1	b2	b3	b4	b5	b6	b7	b8	b9
N	54	54	54	54	54	54	54	54	54
M	4.22	3.85	3.22	6.17	86.87	3.20	2.69	65.09	36.04
Mdn	4.00	4.00	3.00	3.00	50.00	3.00	3.00	52.50	30.00

Note: b1=likes reading; b2=likes reading during holidays; b3= number of books read during school year; b4=number of books read during holidays; b5=number of books owned at home; b6=reads for school and pleasure/ week; b7= reads for pleasure/ week; b8= time spent reading during weekend; b9=time spend reading during weekday.

Table 6

*Rotated component matrix of the exploratory factor analysis for the Reading Habits Questionnaire*

	Component			
	1	2	3	4
like reading	-0.094	0.152	0.846	0.047
like reading during holidays	0.206	0.118	0.677	-0.114
# books during school year	0.124	0.909	0.175	0.027
# books during summer holiday	-0.007	0.908	0.165	0.215
# own books at home	-0.045	0.2	-0.128	0.628
read for school and pleasure / week	0.703	0.011	0.331	-0.131
read for pleasure / week	0.487	0.079	0.734	0.108
time spent during weekend	0.847	-0.088	0.056	-0.003
time spent / week day	0.739	0.443	-0.003	0.004
likes books for TOM characters	0.076	-0.167	0.169	0.799
likes TOM books	-0.103	0.168	-0.032	0.74

---

Extraction Method:principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 6

*Estimates of the categorical regression model*

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	$\beta$	Std. Error	p
Age	.178	0.194	.362
#books read	.633	0.37	.020

---

a. Dependent Variable: Strange Stories Score

### **Second order theory of mind and reading habits**

The scores for the Strange Stories Instrument had the strongest correlations with the first factor, time spent reading ( $r=.308$ ,  $p=.024$ ), followed by “number of books read” ( $r=.25$ ,  $p=.07$ ). Thus, from the aspects related to reading habits, the time that children spent reading (measured by the number of minutes and by how often they read weekly) and the number of books that children read during the summer holidays and during the school year, were positively related to the second-order theory of mind scores assessed through the Strange Stories instrument. When controlling for age, the number of books read remained positively and significantly correlated with the scores for the Strange Stories instrument ( $r=0.307$ ,  $p=0.20$ ), while the other factors did not maintain their significance.

### **Second order theory of mind and siblings**

32.7% (18) of the children in this study had no siblings, 50.9% (28) of the children had one sibling, 14.5% (8) had two siblings and 1.8% (1) had 3 siblings.

However, there was no significant correlation between the number of siblings and the second-order theory of mind scores ( $r=-.02$ ,  $p=.88$ ). Furthermore, there was no relationship between the theory of mind scores and having older or younger siblings ( $r=-.162$ ,  $p=.237$ ;  $r=.148$ ,  $p=.230$ ).

## DISCUSSION

The present study was motivated by a lack of research on older children in the field of theory of mind and by the desire of looking at the relationship between more advanced ToM performance and certain individual characteristics that had not been studied in this age group.

Most studies on ToM have not addressed issues of gender. One hypothesis known as the gender intensification hypothesis (Hill and Lynch, 1983) predicts that gender differences increase in time because of increased pressure to conform to traditional gender-role stereotypes. This hypothesis has been confirmed by studies done on older children (Calero, Salles, Semelman, & Sigman, 2013), which found that gender differences appear later but there is a strong effect indicating that girls perform significantly better than boys for ToM tasks. Our results are in line with this hypotheses and previous studies, confirming gender differences in the 7-12 years age group.

The results from the literature concerning the relationship between siblings and second-order theory of mind scores have been mixed, with some reporting null relationships (Cole and Mitchell, 2000; Hughes and Ensor, 2005; Calero, Salles, Semelman, & Sigman, 2013; Miller, 2013;), while others reported advantages for children with older siblings and same-sex siblings (Kennedy, Lagattuta and Sayfan, 2015). One of the reasons for looking into this possible factor of individual variation is the lack of studies done on this particular age group (7-12). Almost all studies have been done on preschool children, with few exceptions (Calero, Salles, Semelman, Sigman, 2013; Kennedy, Lagattuta and Sayfan, 2015). Although contrary to our expectations, our results are in line with other studies that report no significant relationship between siblings, order of birth, gender of siblings and performance on ToM tasks.

In summary, findings from this study suggest a positive relationship between reading and second-order theory of mind performance and contribute to an existing literature on second order ToM development in three important ways. Firstly, this study looked at a source of individual variation for ToM which was not previously studied in the literature and found that the amount of time that children spend reading and the number of books that children read are positively related to their ToM development. Secondly, it examined an important developmental period after age six, characterized by the significant increase in social demands children experience upon entering formal schooling. Thirdly, while most studies of ToM have included English-speaking children from the US, Canada

and Great Britain, this study included a sample of children from a different cultural and linguistic background.

The findings of this study point to the fact that exposure to mental state concepts and language, which are integral parts of books and stories, enhance children's second order ToM understanding. It has been established in the literature that joint book reading has a highly important contribution to the social cognitive development of children, and it is interesting to see that this effect is still important in the following years. In an age when children are spending more and more time on their computers, tablets and smartphones, this result can come as an additional argument for parents to prioritize their children's free time in a way that will help them develop useful social skills and abilities.

One limitation of this study is the small variation in the socio-economic background of the participants. 45 of the total of 55 children were recruited from private schools in Cluj-Napoca, and thus had above average socio-economic status. More than 90% of children in Romania go to public schools, and private schools are considered to be expensive. The children also reported the professions of their parents as part of the Reading Questionnaire, and the vast majority of parents had professions such as business managers, doctors, IT programmers or lawyers. The other 10 participants were recruited from a public school from a nearby town, but the variation was reduced in this sample also as the children who participated had parents who were teachers in the school.

It is plausible that the effects of reading on ToM are stronger when children come from different socio-economic backgrounds and have a bigger variation in terms of opportunities to read.

Another limitation of this study is constituted by the shortened versions of instruments, which allowed us to use more testing instruments instead of focusing on just one measure. However, the downside of this approach is that the reliability is decreased.

Finally, the correlational design of this study constitutes another limitation, as it is difficult to establish the causality of the results. A next step could be to have an experimental design that would allow the space for more firm conclusions.

I believe that the relationship between reading and second order theory of mind deserves to be further studied and should be investigated in the future with more diverse instruments that measure second-order ToM, as well as on more diverse populations of children.

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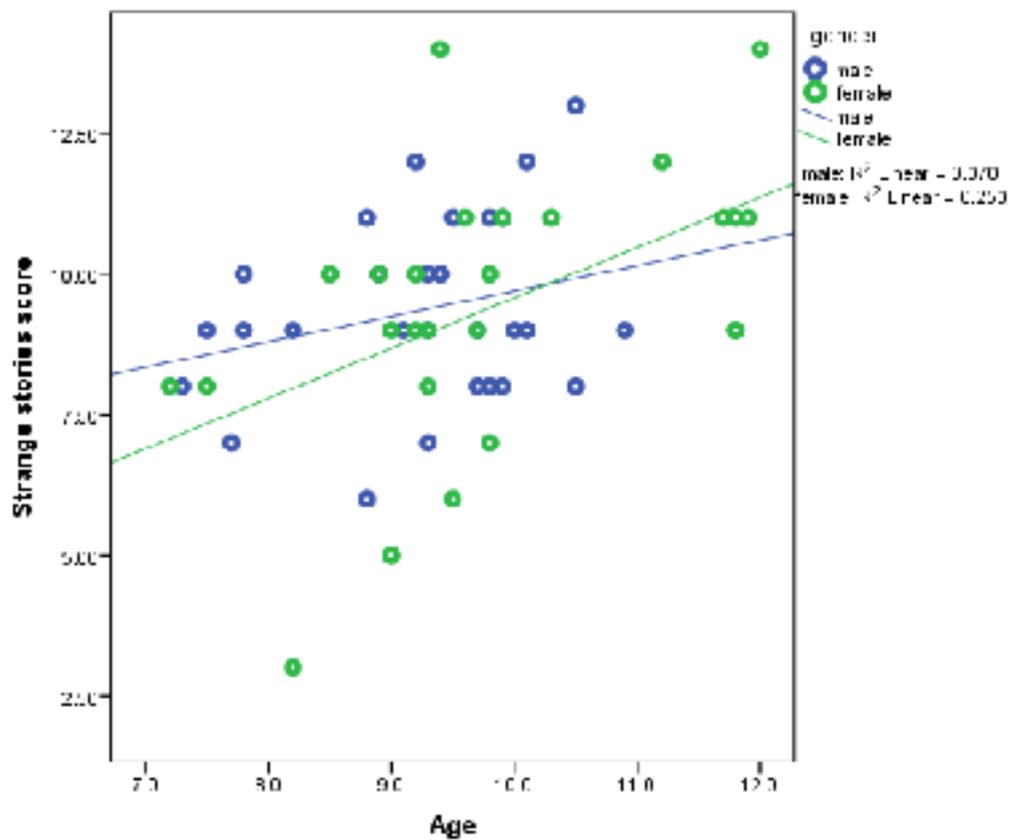
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## APPENDIX



### Faux Pas stories

1. All of the class took part in a story competition. Emma really wanted to win. Whilst she was away from school, the results of the competition were announced: Alice was the winner. The next day, Alice saw Emma and said “I’m sorry about your story”. “What do you mean?” said Emma. “Oh nothing,” said Alice.

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?”

Comprehension Question: Who won the story competition?

False Belief Question: Did Alice realize that Emma hadn’t heard the results of the competition?

2. Mike was in one of the cubicles in the toilets at school. Joe and Peter were at the sinks nearby. Joe said “You know that new boy in the class, his name is Mike. Doesn’t he look really weird!” Mike then came out of the cubicles. Peter said “Oh hello Mike, are you going to play football now?”.

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?” Comprehension Question: Where were Joe and Peter when they were talking?

False Belief Question: Did Joe know that Mike was in the cubicles?

3. Kim helped her Mum make an apple pie for her uncle when he came to visit. She carried it out of the kitchen. “I made it just for you”, said Kim. “Mmm”, replied Uncle Tom, “That looks lovely. I love pies, except for apple, of course!”

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?” Comprehension Question: What kind of pie had Kim made?

False Belief Question: Did Uncle Tom know that the pie was an apple pie?

4. Jill had just moved into a new house. She went shopping with her Mum and bought some new curtains. When Jill had just put them up, her best friend Lisa came round and said, “Oh, those curtains are horrible, I hope you’re going to get some new ones.” Jill asked, “Do you like the rest of my bedroom?”.

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?” Comprehension Question: What had Jill just bought?

False Belief Question: Did Lisa know the curtains were new?

5. Helen’s mum was having a surprise party for Helen’s birthday. She invited Nicky and said, “Don’t tell anyone, especially Helen!”. The day before the party Nicky and Helen were playing together and Nicky ripped her new dress. “Oh!” said Nicky, “I was going to wear this to your party.” “What party?” said Helen. “Come on,” said Nicky “Let’s go and see if my mum can mend the tear.”

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?” Comprehension Question: Who was the surprise party for?

False Belief Question: Did Nicky remember the party was a surprise?

### **Control stories**

1. Michelle had just moved into a new house. Michelle went shopping with her Mum and bought a new rug for her bedroom. When Michelle had just put it down, her best friend, Samantha, came round and said, “Oh, your new rug is just like my new one.” Michelle asked,

“Do you like the house?”

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If “no”, proceed to the comprehension question.

Identification Question: What did they say that they should not have said?” Comprehension Question: What had Michelle just bought?

False Belief Question: Did Samantha know the rug was new?

2. Kate helped her Mum make a fruit pie for her neighbour when he came to visit. She carried it out of the kitchen. "I made it just for you", said Kate. "Mmm", replied her neighbour, "That looks lovely - I love pies, especially fruit ones!"

Faux Pas Detection Question: In the story did someone say something that they should not have said?

If "no", proceed to the comprehension question.

Identification Question: What did they say that they should not have said?" Comprehension Question: What kind of pie had Kate made?

False Belief Question: Did the neighbour know that the pie was a fruit pie?

### **Strange Stories**

1.

Jane and Sarah are best friends. They both entered the same painting competition. Now Jane wanted to win this competition very much indeed, but when the results were announced it was her best friend Sarah who won, not her. Jane was very sad she had not won, but she was happy for her friend, who got the prize. Jane said to Sarah, "Well done, I'm so happy you won!" Jane said to her mother, "I'm sad I didn't win that competition!"

Q. Is it true what Jane said to Sarah?

Q. Is it true what Jane said to her mother?

Q. Why does Jane say she is happy and sad at the same time?

2.

Sarah and Tom are going on a picnic. It is Tom's idea, he says it is going to be a lovely day for a picnic. But just as they are unpacking the food, it starts to rain, and soon they are both soaked to the skin. Sarah is cross. She says, "Oh yes, a lovely day for a picnic all right!"

Q. Is it true, what Sarah says?

Q. Why does she say that?

3.

Today James is going to Claire's house for the first time. He is going over for tea, and he is looking forward to seeing Claire's dog, which she talks about all the time. James likes dogs very much. When James arrives at Claire's house, Claire runs to open the door, and her dog jumps up to greet James. Claire's dog is huge, it's almost as big as James! When James sees Claire's huge dog he says, "Claire, you haven't got a dog at all. You've got an elephant!"

Q. Is it true, what James says? Q. Why does James say this?

4.

Brian is always hungry. Today at school it is his favourite meal - sausages and beans. He is a very greedy boy, and he would like to have more sausages than anybody else, even though his mother will have made him a lovely meal when he gets home! But everyone is allowed two sausages and no more. When it is Brian's turn to be served, he says, "Oh, please can I have four sausages, because I won't be having any dinner when I get home!"

Q. Is it true, what Brian says? Q: Why does he say that?

5.

One day Aunt Jane came to visit Peter. Now Peter loves his aunt very much, but today she is wearing a new hat; a new hat which Peter thinks is very ugly indeed. Peter thinks his aunt looks silly in it, and much nicer in her old hat. But when Aunt Jane asks Peter, "How do you like my new hat?", Peter says, "Oh, its very nice".

Q. Was it true what Peter said? Q: Why does he say that?

6.

Helen waited all year for Christmas, because she knew at Christmas she could ask her parents for a rabbit. Helen wanted a rabbit more than anything in the world. At last Christmas Day arrived, and Helen ran to unwrap the big box her parents had given

her. She felt sure it would contain a little rabbit in a cage. But when she opened it, with all the family standing round, she found her present was just a boring old set of encyclopaedias, which Helen did not want at all! Still, when Helen's parents asked her how she liked her Christmas present, she said, "It's lovely, thank you. It's just what I wanted".

Q: Is it true, what Helen said? Q: Why did she say this?

7.

William is a very untidy boy. One day his mother comes into his bedroom, and it is even more messy than usual! There are clothes, toys, and comics, everywhere. William's mother says to William, "This room is a pig sty!"

Q: Is it true that William keeps pigs in his room? Q: Why does William's mother say this?

### **Reading questionnaire**

1. How much do you enjoy reading books for pleasure?

1= I don't like it at all

2= I don't like it very much

3= I like it a little

4= I like it

5= I love it

2. Do you enjoy reading books during the holidays?

1= I don't like it at all

2= I don't like it very much

3= I like it a little

4= I like it

5= I love it

3. What books have you read for your own pleasure since the school year started? Name at least a few that you remember.

4. About how many books have you read during the summer holidays for your own pleasure? (open question)

5. About how many books of your own do you have at home? (just your books, not the entire family's books)

6. How often do you usually read during a given week (books that you read for school, but also books that you read for your own pleasure)?

a) not at all b) once a week c) twice a week d) 3-4 times a week e) almost every day or every day

7. How often do you read books for your own pleasure during a given week?

a) not at all b) once a week c) 2-3 times a week d) 4-5 times a week e) almost every day or every day

8. How much time did you spend reading during the past weekend?

a) 0 minutes b) 10-15 minutes c) 20-30 minutes d) 45 minutes- one hour e) more than one hour f) more than two hours

9. How much time did you spend reading daily in the past week?

a) 0 minutes b) 10-15 minutes c) 20-30 minutes d) 45 minutes- one hour e) more than one hour

10. What types of characters do you especially like in a book? (multiple choice)

- a) No kinds of characters in particular, it just has to be a good story
- b) Characters that I want to be like because they are smart, brave or strong c)
- c) Characters that face a challenge and overcome it
- d) Characters that are similar to me
- e) Characters that help me understand people who aren't like me

11. What kinds of books are you looking for when you want to read a book for pleasure? (multiple choice)

- a) No kinds of books in particular, it just has to be a good story
- b) Books that make me laugh
- c) Books that explore places and worlds that I've never been to
- d) Books that make me think and feel
- e) Books that help me imagine and understand other people's lives
- f) Books that help me forget about real life for a while
- g) Books that are about a topic I want to become familiar with
- h) Books that are about things that I am experiencing

12. Do you have any brothers and sisters?

Are they older or younger than you? How old are they?

Older siblings:

Younger siblings:

13. What is the profession of your parents?

