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Social Perspective Taking and Metacognition of Children.
A Longitudinal View Across the Fifth Grade of School

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Abstract

Social perspective taking (SPT) is understanding the social situation of another person. SPT helps us to communicate effectively and to foster social bonds, both of which are skill sets that youths need to succeed at school and in life. SPT has been associated with reading experience (RE), but there has been little research on the factors that support SPT at school. SPT involves understanding the fictional characters described in a text. Metacognitive strategies (MCSs) taught in class help students comprehend a text. Our aims were, therefore, to investigate the interrelations between these concepts and to test whether variance in SPT is indirectly explained by RE with books via using MCSs during in-class reading activities. In the current study, $N = 2,105$ fifth-grade students' SPT, RE and MCSs were measured three times over one year of school. The sample consisted of students at all schools with a focus on social learning and reading from a nationally representative study. The results indicate interrelations between these concepts over time and the postulated indirect effect. Variance in SPT was partially explained by the MCSs, variance in that was in turn explained by RE assessed five months before. This suggests that teaching MCSs provides a way to support students' SPT when reading texts with fictional characters and when students have experience in reading.

Keywords: social perspective taking; metacognition; reading experience; relational frame theory

Social Perspective Taking and Metacognition of Children.

A Longitudinal View Across the Fifth Grade of School.

SPT has been described as the cognitive dimension of empathy (Davis, 1980). SPT is also conceptualized within the cognitive-developmental framework of theory of mind (ToM; e.g., Baron-Cohen, Leslie, & Frith, 1985). Further conceptualizations of SPT include theory and simulation (e.g., Epley, Keysar, van Boven, & Gilovich, 2004). Thus, SPT is an attempt to consider and understand the behavior and the situation of another person by putting oneself in the other person's place (e.g., Chambers & Davis, 2012; Epley et al., 2004). The development of social understanding has been examined within humanistic approaches in terms of distinctions among self and non-self, perception, and self-other experiences, largely based on the ideas of Merleau-Ponty (e.g., De Jaegher, Di Paulo & Gallagher, 2010; Gallagher & Metzloff, 1996). Social understanding has also been related to reflective conversation that assists in understanding others' viewpoints (e.g., Halling, Kunz, & Rowe, 1994).

All mental representations of others' viewpoints are a priori anchored in the self, in children, adolescents, and adults (e.g., Epley et al., 2004; Gallagher & Metzloff, 1996). One way to distance oneself from this anchor is to flexibly switch between one's own and another's (or others') social viewpoints (Fizke, Barthel, Peters, & Rakoczy, 2014). This requires coordinating one's own viewpoint with that of another (Foody, Barnes-Holmes, & Barnes-Holmes, 2012; Selman, 1980). Coordination is associated with adequately regulating social perspectives by means of theory, simulation (Epley et al., 2004), or monitoring and controlling knowledge about another person. Monitoring and controlling knowledge is known as metacognition and is framed in models such as theory of mind (e.g., Schneider, 2015). Thus, SPT can be understood as person-related metacognition, and metacognition is linked to reading and language (e.g., Schneider, 2015). For example, SPT is applied when

one tries to understand a historical or fictional character's perspective as described in a text, and MCSs are applied in coordinating perspectives as in arbitrary text. The more children coordinate different perspectives in arbitrary text before, while or after reading the text, the more reading experience they gain with different types of texts.

RE is defined as the context in which a reader has a representation of meaning while reading (Britt, Goldman, & Rouet, 2012; Mullis, Martin, & Sainsbury, 2015). This representation is connected to an existing network of vocabulary, related knowledge, strategies, and skills (e.g., Baker & Beall, 2009; Cunningham & Stanovich, 1997; Schneider, 2015). This definition of RE coheres with the phenomenal tradition of human experiences understood in a self-constructed world as direct experience, in writing, or in reading (e.g., Heidegger, 1962, Merleau-Ponty, 1962, Miller, Nash & Fetty, 2014). Thus, RE is a phenomenon with multiple definitions in diverse traditions (e.g., Habermas, 1984; Heidegger, 1962, Merleau-Ponty, 1962). For example, Heidegger (1962) said that we look to the future to see the past coming at us again. This has intuitive appeal when we consider how reading can inspire the reader to think about the future. The existential-phenomenological angle perspective permits a view on the overlaps and disjoints among theories of human action (e.g., Habermas, 1984; Park, 2010) and/or development (e.g., Baron-Cohen et al., 1985; Gallagher & Metzloff, 1996) theories.

Crossley (2000) discussed Ricoeur's work on human action in terms of the construction of meaning within text material and imagining the social world around us. This formed part of the "meaning-making model" proposed by Park (2010, p. 258), although the focus here was on critical life event adjustment. Nonetheless, the concept of "appraised event meaning" within Park's model (2010, p. 258) appears relevant to the construction of meaning during reading.

Constructed meaning serves as a foundation for a child's subsequent appraisals of text

material. The more positive these appraisals are, the higher the frequency with which the child will read similar texts when given the opportunity. Thus, RE is a growing network of knowledge constructed in tandem with reading habits, such as frequency of reading different types of text material, such as books (see Cunningham & Stanovich 1997, for a brief overview). Taken together, SPT, metacognition, and RE each have strong ties to humanistic psychology.

A relevant question is whether SPT, using MCSs during in-class activities, and reading experience with books, are interrelated. Specifically, SPT and reading might be indirectly associated via in-class use of MCSs. If SPT is associated with teaching MCSs and in turn with reading texts containing different social perspectives, this would suggest one avenue for improving students' communication and fostering the social bonds necessary for an active and engaged life.

Social Perspectives While Reading

Contact with different social perspectives during reading assumes a relational network that excludes non-relational possibilities (e.g., Heidegger, 1962). The relating of oneself to the world and thus the development of relational networks are fundamentally human capabilities. According to Stern (1985), development in the first years of life involves the abstraction of a verbal self from the child's direct observations. As such, the development of the self-concept is a necessary anchor for exploring the verbal world. These views are also in line with Vygotsky's (2004) emphasis on developmental context and DeRobertis' (2006) integration of the core ideas of Rogers and Horney into a humanistic theory of healthy child development. It is interesting, however, that neither SPT or metacognition are mentioned as key developmental phenomena in this account.

Direct links among SPT, language, and reading have been described and investigated in research over the past decade (e.g., Hayes et al., 2001; Hooper, Erdogan, Keen, Lawton, &

McHugh, 2015; McHugh, Y. Barnes-Holmes, & D. Barnes-Holmes, 2004). Much of this evidence has emerged from a behavioral and functional-analytic conceptualization of perspective taking (e.g., Foody et al., 2012) that fits under the rubric of relational frame theory, a behavioral account of human language and cognition. According to relational frame theory (RFT), *arbitrarily applicable relational responding*, as the ability to relate stimuli in arbitrary ways, begins with the simple coordination between words and the objects to which they refer. This skill becomes increasingly complex over the course of childhood and facilitates the emergence of relational networks which form the basis of verbal skills and complex behavioral experience.

For RFT, SPT involves perspective-taking relations (also called deictic relations) that anchor a person's perspective here and now (i.e., *I* is coordinated with here and now), and conversely, anchor the perspectives of others there and then (e.g., *you* is coordinated, from my perspective, there and then). In the various relational networks involving these relations, there are a myriad of possible relationships among *I* and *you/others*, including: coordination relations (e.g., *you* and *I* are similar in that we both like apples); distinction relations (e.g., *I* am different from *you* because *I* am female and *you* are male); opposition relations (e.g., *I* am extroverted but *you* are introverted); and hierarchical relations (e.g., *I* am the parent of *my* children). According to RFT, children develop increasingly complex relational networks that support all emergent and directly trained language, within which the relationships among *I* and *you/others* are central.

Numerous RFT studies have reported developmental age-based and cognitive ability-based differences across samples of children, and have involved comparisons between typically-developing children and those with developmental disabilities (e.g., Gore, Barnes-Holmes, & Murphy, 2010). Some of these studies have shown that perspective taking relations can be targeted directly for educational remediation (Hooper et al., 2015; McHugh

et al., 2004). Therefore, we use this broad framework of RFT and its conceptualization of language as relating (Hayes et al., 2001). We assumed that understanding fictional characters requires both comprehension of text material and experience in reading, through which key relational frames, including perspective taking relations, emerge.

Cognitive Factors, Gender, and Reading Experience

Interestingly, Schonert-Reichl et al. (2015) used Davis' measure (1980) and reported higher SPT levels relative to controls in fourth and fifth graders after mindfulness training. Using Davis' SPT scale (1980), Van der Graaff et al. (2014) found that gender correlated with SPT in both children and adolescents, and that boys' SPT levels were significantly lower than girls' at various measurement times.

However, there have been some mixed findings in terms of correlations with cognitive abilities. On the weak side, the correlation was only $r = .07$ between adults' SPT and passive knowledge of vocabulary on the Wechsler Adult Intelligence Scale (Davis, 1983). On balance, RFT's measure of perspective taking correlated ($r = .45$) with the verbal cognitive performance of adults as assessed by the 34-item Wechsler Abbreviated Scale of Intelligence (Gore et al., 2010). The results from several experimental studies have also shown interpersonal SPT differences based on first- or third-person RE (Brunyé, Ditman, Mahoney, Augustyn, & Taylor, 2009; Sato & Bergen, 2013), which Mason and Macrae (2008) attribute to cognitive abilities. Specifically, sequencing a text requires higher order skills such as MCSs (Schneider, 2015) that help the reader retain some distance from the content of the text and to remain objective whilst adopting the various social perspectives suggested by the text.

Following Schneider's "taxonomy of metacognition components" (2015, p. 261), MCSs may be seen as ways to control knowledge about the mental world or as strategies for dealing with knowledge about memory (e.g., understanding of mental verbs, mental states,

desires, or emotions), persons, or tasks (Schneider, 2015). Thus, MCSs may be helpful in dealing with knowledge about tasks within or beyond social situations. When teachers teach MCSs, they monitor students' handling of text information in terms of their understanding of, and learning about, what they read (e.g., organizing text information via sub-headings, thinking about text content or discussing text information). Students can recall MCSs (i.e., which information they prioritized when sequencing a text) and can reflect upon and organize information to understand reading content (Bråten et al., 2014; Mason & Macrae, 2008; Schneider, 2015). Students recognize that such strategies aid their reading comprehension and their understanding of text-based social situations. When this is the case, they are likely to use these strategies recurrently and apply metacognitive knowledge (e.g., Flavell, 1979; Schneider, 2015). Indeed, when children remember which strategies they have used previously to understand textual characters, they are recalling MCSs. Thus, students' SPT might be associated with MCSs that help in appreciating the various perspectives in an arbitrary text, and in turn, using MCSs during in-class activities might be associated with RE (e.g., with books).

Aims and Hypotheses

Previous results indicated that variance in perspective taking tasks can be explained by language in general (see the meta-analysis by Milligan, Astington, & Dack, 2007). In the current study, we speculated that SPT would be supported by recalled use of MCSs during in-class reading activities, and in turn, that these MCSs would be supported by RE with books. We tested a mediation hypothesis via two predictions: (1) Interrelations exist among students' SPT, recalled use of MCSs during in-class activities, and RE with books.

Specifically, variance in students' SPT is explained by MCSs during in-class activities up to six months previous. In turn, variance in these MCSs is explained by RE with books at the beginning of fifth grade (see Figure 1). Conversely, variance in MCSs during in-class

activities at the end of the fifth grade is explained by SPT in the previous six months. In turn, variance in this SPT is explained by MCSs during in-class activities at the beginning of fifth grade. (2) Variance in students' SPT at the end of fifth grade is indirectly explained by RE with books at the beginning of the fifth grade when the students recall using MCSs during in-class reading activities. We expected students' SPT to be associated with RE with books when the students recall using MCSs during in-class activities.

Method

Data Source and Procedure

Our sample consisted of $N = 2,105$ fifth-grade students ($n = 973$ female) from $k = 127$ classes at 66 schools. The sample consisted of students at all schools with a focus on social learning and reading from a nationally representative large-scale study. The main idea of the nationally representative study was to examine effects of organizational changes from half-day schools to all-day schools with extended education by a multi-perspective longitudinal design (i.e., linking teaching contents with extracurricular activities; for full data description, see Fischer & Klieme 2013; Study on the Development of All-Day Schools – StEG, 2013). The schools of the current sample provided extracurricular activities that aimed to support social learning (e.g., by role-playing or communication training) and reading (e.g., providing reading time and books which students desired or reading together aloud). The study received institutional research ethics committee approval. In this sample (Study on the Development of All-Day Schools – StEG, 2013), $n = 637$ students attended a *Gymnasium* (the most academically-oriented type of secondary school in Germany), while the other $n = 1,468$ students attended a secondary school with a more vocational curriculum. In general, the type of secondary school students attend is determined predominantly by their performance in elementary school. All students (with a mean of 10 years of age) were assessed at three measurement points: at the beginning (Time 1), middle (Time 2), and end (Time 3) of fifth

grade during the school year 2013/2014. The summer break began after Time 3.

Measures

Social Perspective Taking

Davis (1980) has developed measures to assess the cognitive and affective dimensions of empathy, and the independent and interactive contributions of each within self-reports. Four items on the SPT scale used in this study stemmed from a subscale of this empathy questionnaire (Davis, 1980; for psychometric properties in other studies see Davis, 1983; Schonert-Reichl et al., 2015; Study on the Development of All-day Schools – StEG, 2013; van der Graaff et al., 2014). Students responded to each of the five items using the same scenario “Imagine yourself in your school” to encourage them to think about how they usually act in social situations at school. Students’ SPT was assessed by their responses to the question and various response options:

What do you do? a) I sometimes try to understand my friends better by imagining how things look from their perspective; b) I believe that there are two sides to every question and try to look at them both; c) Before criticizing somebody, I try to imagine how I would feel if I were in their place; d) I try to look at everybody’s side of a disagreement before I make a decision; or e) I pay attention to how other people feel.

Students ranked their responses on a 4-point scale (from 1 = *not true at all* to 4 = *absolutely true*). Thus, high scoring on the cognitive dimension of the SPT measure indicates that the person tends to consider the views of others and “to anticipate the behavior and reaction of others” (Davis, 1983, p. 115), pointing to understanding of the frames of reference of both oneself and others. This SPT measure has been used in several large-scale surveys (Schonert-Reichl et al., 2015; Study on the Development of All-Day Schools – StEG, 2013; Van der Graaff et al., 2014). In this study, Cronbach’s alpha was $\alpha = .84$ at Time 1, $\alpha = .81$ at Time

2, and $\alpha = .86$ at Time 3, thus demonstrating satisfactory internal consistency.

Intercorrelations between the items and the mean of the items ranged from .56 to .62. SPT at Time 3 served as the dependent variable for analyzing interrelations and testing the mediation hypothesis.

Metacognitive Strategies

To measure students' MCSs, we asked them, "*What do you do when you are reading a text very thoroughly in class?*" The six response choices were as follows: *a) I mark passages (e.g., with a highlighter); b) I take notes (e.g., at the border of the text or on a separate sheet of paper); c) I speak to others about what I've read; d) I take time to think about what I've read; e) I divide the text into sections; f) I pay attention to headings.*

Students indicated the frequency of each of these six options on a 4-point scale (from 1 = *never* to 4 = *almost always*). This MCSs measure was previously used in large-scale surveys (for psychometric properties see, for example, Mokhtari & Reichard, 2002; Wagner, Helmke, & Rösner, 2009). In this study, Cronbach's alpha was $\alpha = .79$ at Time 1, $\alpha = .73$ at Time 2, and $\alpha = .79$ at Time 3, thus demonstrating acceptable internal consistency.

Intercorrelations between the items and the mean of the items ranged from .55 to .67. The intraclass correlation was low, and the low intraclass correlation shows that values for students in the same class did not tend to be similar (intraclass correlation ICC = .03). The MCSs during in-class activities at Time 3 served as the dependent variable for analyzing interrelations with SPT and RE with books. For testing the mediation hypothesis, we used MCSs at Time 2 as the mediator variable.

Reading Experience with Books

RE was conceptualized in previous research (e.g., Britt et al., 2012; Mullis et al., 2015). To generate the independent variable RE with books, students responded to the following question at Time 1, Time 2, and Time 3: "*How often did you read books the last*

half year?” Students indicated on a 4-point scale (from 1 = *never* to 4 = *almost always*) how often they had read books. Students used the full range from *never* to *almost always* for their responses (see Table 1), with 11% at Time 1 and 21% at Time 3 of the $n = 1,132$ boys indicating they did not read books in the last six months. Reading no books in the last six months was indicated by 2% at Time 1 and up to 10% at Time 3 of the $n = 973$ girls.

Someone would read *almost always*, if s/he reads at every opportunity. We measured data skewness via adjusted Fisher-Pearson standardized moment coefficients and kurtosis via properties of symmetric distributions, and both were within -2 and 2 at Time 1, Time 2, and Time 3, thereby supporting the assumption of normally distributed data (Revelle, 2015). Despite that, RE with books was considered as a categorical dependent variable at Time 3 for analyzing interrelations using the weighted least squares mean and variance adjusted (WLSMV) estimation based on logistic regression (Rosseel, 2012; 2016). The same estimator was applied with RE with books as an independent variable at Time 1 for testing the mediation hypothesis.

[Please insert Table 1 about here]

Missing Values

Overall, missing values for SPT and MCSs across the three measurement points ranged from 0% to 10%. Table 1 shows the number of missing values. Missing values for RE were below 6%. Because of the missing values, we entered structural equations such as the CFA by the full information maximum likelihood (FIML) procedure provided in the R package lavaan (Rosseel, 2012).

Control Variables

Previous research suggested correlations between SPT and verbal abilities (e.g., Gore et al., 2010) as well as general cognitive abilities (e.g., Schonert-Reichl et al., 2015), as

mentioned above. Therefore, we considered verbal and nonverbal cognitive abilities and reading speed as covariates in the current study. Verbal and nonverbal abilities were assessed using cognitive performance tasks (Weiß, 2006), which measured comprehension of general and advanced German vocabulary, as well as verbal and nonverbal (fluid reasoning by matrices) processing capacity. Reading speed was tested with the standardized Salzburger Lese-Screening 5–8 (Auer et al., 2011). Students read syntactically and grammatically simple sentences as quickly as possible and responded to questions pertaining to the sentences. Table 2 contains product-moment-correlation coefficients at Time 1, and shows a correlation between knowledge of vocabulary and reading speed.

[Please insert Table 2 about here]

Statistical Analyses

A confirmatory two-factor analysis (CFA) using *lavaan* (Rosseel, 2012) indicated that the postulated structure fit the data. Therein, we included the SPT and MCSs items at Time 1, Time 2, and Time 3, considering the cluster *classes at school*; $\chi^2 = 1102.029$, $df = 480$, fit indices: root mean square error of approximation (RMSEA) = .031, C.I. [.029, .033], comparative fit index (CFI) = .983, standardized root mean square residual (SRMR) = .040. Furthermore, boys and girls comprehended the items adequately over time, indicating scalar invariance across sex and over time in multi-group analyses specified simultaneously with the CFA, Models 1 to 4: DELTA.CFI .004–.006 by WLSMV (Pornprasertmanit, Miller, Schoemann, & Rosseel, 2014).

Interrelations and indirect relations were specified as follows: First, a latent auto-regression model with cross-lags was specified with SPT, using MCSs during in-class activities and RE with books at Time 1, Time 2, and Time 3 for boys and girls simultaneously. Control variables were included in that model (passive knowledge of vocabulary; Weiß, 2006), reading speed (Auer et al., 2011), and fluid reasoning measured by

matrices (Weiß). Subsequently, a latent mediation model was specified, again including these control variables. Both models are drawn in Figure 1 with control variables, (i.e., the auto-regression model with cross-lags above and the mediation model below). The models were specified with the R package *lavaan* and WLSMV estimation (Rosseel, 2012; 2016). The cluster structure *classes at school* was considered in these analyses (Rosseel, 2012).

[Please insert Figure 1 about here]

Results

The Relationship between Social Perspectives and Metacognition over Time

Results from product-moment correlations are depicted in Table 2. The variables SPT, RE with books, and using MCSs during in-class-activities at Time 1 correlated significantly with each other (see Table 2). The results from the latent auto-regressive model with cross-lags indicated a good fit between assumed and real data structure ($\chi^2 = 2,816.810$; $df = 1,332$; CFI = .960, RMSEA = .042, C.I. [.039, .043], SRMR = .053). Figure 2 and Table 3 show the results of the auto-regressive modeling with cross-lags.

By the end of fifth grade, SPT at Time 3 was only significantly associated with girls' MCSs during in-class-activities at Time 2, but not by RE with books at Time 2. Neither boys' nor girls' RE with books was associated with either SPT at Time 2 or MCSs at Time 2. However, girls' MCSs during in-class activities at Time 3 were significantly associated with SPT at Time 2 and RE with books at Time 2, but boys' MCSs were not (see Figure 2 and Table 3).

The interrelations within the fifth grade were as follows: boys' and girls' SPT at Time 2 was significantly associated with RE with books at Time 1 and the MCSs at Time 1. RE with books at Time 2 was only significantly associated with boys' and girls' MCSs at Time 1, not with SPT at Time 1. The MCSs at Time 2 were significantly associated with boys' and girls' SPT at Time 1 and with RE with books at Time 1 (see Figure 2 and Table 3). This

latent auto-regression model with cross-lags explained significantly 35% of variance in boys' SPT and 41% of variance in girls' SPT.

[Please insert Table 3 about here]

We tested the mediation hypothesis with the model including SPT, using MCSs during in-class activities, RE with books, and the control variables mentioned above simultaneously for boys and girls (see the model below in Figure 1). Fit indices indicated that the model structure was acceptable identified in the data (bootstrap, WLSMV-estimator, $\chi^2 = 655.605$, $df = 164$, CFI = .92, RMSEA = .053, C.I. [.049, .058], SRMR = .046). Results from the mediation analysis are depicted in the model in Figure 2 and in Table 4. Boys' SPT at Time 3 was significantly associated with RE with books at Time 1, whereas girls' SPT at Time 3 was not associated with RE at Time 1 (direct path a). However, boys' and girls' SPT at Time 3 were significantly associated with using MCSs during in-class activities at Time 2 (path b), and these MCSs at Time 2 were, in turn, significantly associated with RE with books at Time 1 (path c). The results indicated indirectly explained variance of boys' and girls' SPT (indirect effect), $\text{path b} \times \text{path c} = .06$, $p = .001$, and a significant total effect, $(\text{path a} + \text{path b}) \times \text{path c} = .15$, $p = .000$.

[Please insert Figure 2 about here]

The mediation model explained amounts of the variance in SPT at Time 3 (i.e., 8% in boys' and 14% in girls' SPT) through RE with books via MCSs over one year of school (specified for boys and girls simultaneously). Thus, boys' and girls' SPT at Time 3 was associated indirectly with RE with books one year prior via the use of MCSs during in-class activities within the fifth grade several months previously (see Table 4).

[Please insert Table 4 about here]

Discussion

The aim of this study was to investigate whether high levels of SPT are associated

with RE with books and by employing MCSs while reading in class. We argued that SPT involves the coordination of one's own and others' perspectives (e.g., Foody et al., 2012). SPT is facilitated when students engage more often in reading, organizing, and reflecting upon textual information using metacognition. Davis' SPT measure (1980) activates internal and external frames of reference using different pronouns (e.g., *I* or *their*); thus, changes in that measure represent SPT levels and the relevant patterns of relational coordination. While Davis' SPT measure (1980) activates internal and external frames of reference mostly with regard to other persons, the MCSs measure activates internal frames of reference via the most frequently used pronoun *I* and different mental representations of views on textual material.

Results from previous research (e.g., a meta-analysis by Milligan et al., 2007) indicate that students' understanding of perspective taking tasks is supported by previous language use. The positive correlation between SPT and RE with books is consistent with results from other studies (Gore et al., 2010; Mori & Cigala, 2015; Sato & Bergen, 2013). If students think about the feelings, intentions, and interests of fictional characters in various situations, and if they discuss these with others in class, they may be better able to relate to real people.

Coordinating Perspectives on Social and Metacognitive Situations

We analyzed interrelations among students' SPT, RE with books, and recalled use of MCSs during in-class activities. Furthermore, we tested the mediation hypothesis that SPT is associated with RE with books via the MCSs. We specified two statistical models and included the available control variables passive knowledge of vocabulary, reading speed, and fluid reasoning in both models. Previous research showed differences between boys' and girls' SPT levels (e.g., Van der Graaff et al., 2014). Considering this previous research, we analyzed the data on boys and girls separately and simultaneously using these models.

The new findings are interrelations and an indirect association across a year of school. That is, students' SPT, using MCSs during in-class activities, and RE with books were linked to each other over the three measurement times. The SEM moderately supported the idea of associations among students' RE with books, MCSs, and SPT over time. Indeed, the autoregressive paths positively affected the amount of explained variance. The results from our mediation analysis suggest indirect effects when SPT at Time 3 was regressed on MCSs at Time 2 and RE with books at Time 1, while MCSs were regressed on RE with books at Time 1. Variance in students' SPT was explained indirectly by RE with books when the students recalled using MCSs during in-class activities. Thus, our results reasonably support the assumed model (see Figure 2). That is, the more students reported RE with books, the more they agreed with using these MCSs, and in turn, with applying SPT.

SPT is a skill essential for effective communication and fostering social bonds (Mori & Cigala, 2015; Selman, 1980). We conclude from the results that students' understanding of diverse points of view and coordination of perspectives on text material can be supported through the use of MCSs taught in class when students have reading experience with books. The new-found interrelations and the indirect effect among SPT, MCSs, and RE with books support even more than our hypotheses the humanistic psychological approaches (e.g., DeRobertis, 2006; Miller et al., 2014; Stern, 1985), and diverse further directions (e.g., Mullis et al., 2015; Park, 2010) mentioned in the first sections above.

Limitations of the Study and Implications for Future Research

Our statistical analyses were based on data from a longitudinal study in which children's self-reports were used. Self-reported information provided by students on their SPT and RE might differ from that observed by other researchers. A confounding variable is social desirability, the tendency of students to answer in a manner that is viewed favorably by their teachers. Social desirability was relevant for the self-report measures used in this paper (SPT,

MCSs, RE with books). Self-reports were controlled by assessing reading and cognitive abilities.

Additional items could be included for assessing MCSs that might impact subjective and objective SPT measures (e.g., reading the first and last three sentences before the body of the text; thinking aloud about a possible continuation of a text in peer learning; or comparing the text with a similar text; Bråten et al., 2014). If available in large-scale data, a robust reading comprehension measure was a possible thread connecting social perspective taking, metacognitive strategy use, and reading experience.

Boys' and girls' SPT improves with the application of metacognitive knowledge in classes when they have RE with books. In future research, this might be investigated directly using an experimental design in which students read texts and then complete SPT tasks. Randomized independent variables (texts read) and mediation variables (MCSs) also allow for the testing of mediation effects, not only indirect effects.

We propose a broader conceptualization of SPT as *perspective coordination*, in line with existing literature (e.g., Fiske et al., 2014; Selman, 1980) and the current findings. This serves to highlight the skill of coordinating different perspectives with different degrees of similarity to one's own, thus reflecting greater flexibility in behavior than the narrower concept of *taking another's social perspective*. Indeed, no person can *fully and only* take the social perspective of another, because the person remains developmentally anchored to his/her own perspective. For example, a person can empathize with another and understand what this person is feeling, but all of this is experienced from the person's own perspective, which has not changed (Chambers & Davis, 2012; Davis, 1980).

Conclusion

Our main findings suggest interrelations among students' SPT, recalled use of MCSs during in-class activities, and RE with books. Furthermore, SPT was indirectly associated with

RE with books via the MCSs during in-class activities. Time frames at school are constrained and teachers cannot apply role-playing or other direct SPT training with students in class every day. Our findings are easily applicable to daily classroom instruction. For example, MCSs might be taught by reading texts in which fictional characters are described. This would allow students to practice SPT, which may have social implications as well as educational ones. Furthermore, the current research contributes to existing knowledge in the fields of social behavior, metacognition, and reading experience. Our empirical evidence supports links among these fields.

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Table 1

SPT, MCSs during in-class activities and reading experience in fifth grade students across a year at school: Means, standard deviations and missing values

Variable	Boys						Girls					
	Time 1		Time 2		Time 3		Time 1		Time 2		Time 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
SPT	3.87	1.59	3.67	1.61	3.70	1.71	3.96	1.47	3.81	1.48	3.86	1.55
MCSs	2.26	0.67	2.27	0.72	2.13	0.78	2.36	0.63	2.29	0.68	2.23	0.72
RE-Books	2.80	1.01	2.70	1.08	2.55	1.13	3.15	.95	3.05	1.00	2.96	1.04
Range	1	4	1	4	1	4	1	4	1	4	1	4
SPT	25	177	14	123	37	130	8	149	3	141	11	145
MCSs	34	25	44	47	113	50	16	16	26	18	43	31
RE-Books	127	348	174	314	236	282	61	455	78	401	97	369
Missing	<i>Mis</i>		<i>Mis</i>		<i>Mis</i>		<i>Mis</i>		<i>Mis</i>		<i>Mis</i>	
SPT	161		139		200		115		89		109	
MCSs	49		130		164		30		87		104	
RE-Books	27		98		122		6		68		70	

Note. Number of missing values (*Mis*), September/October 2013 (Time 1), January/February 2014 (Time 2), June/July 2014 (Time 3). The summer break began after the survey.

Table 2

Correlations among independent and control variables at Time 1

Variable	1	2	3	4	5	6
SPT ¹	-					
RE with books ²	.18***	-				
MCSs ³	.35***	.29***	-			
Vocabulary ⁴	.10***	.18***	-.05*	-		
Reading speed ⁵	.12***	.21***	.08**	.54***	-	
Matrices ⁶	.02 ^{ns}	.09***	-.02 ^{ns}	.29***	.22***	-

Note. ^{ns} $p > .10$, ** $p < .01$, *** $p < .001$.

Table 3

Interrelations between SPT, using MCSs during in-class activities, and RE with books

	Boys			Girls		
	β	<i>SE</i>	<i>p</i>	β	<i>SE</i>	<i>p</i>
<hr/> SPT, Time 3, regressed on						
SPT, Time 1	.199	.069	.004	.207	.064	.001
SPT, Time 2	.636	.096	.000	.592	.103	.000
MCSs, Time 2	.047	.060	.435	.110	.049	.026
RE-Books, Time 2	.027	.028	.327	-.004	.026	.862
<hr/> RE-Books, Time 3, regressed on						
RE-Books, Time 1	.313	.053	.000	.242	.054	.000
RE-Books, Time 2	.528	.049	.000	.517	.059	.000
MCSs, Time 2	-.027	.066	.683	.073	.081	.367
SPT, Time 2	-.017	.080	.835	.025	.112	.824
<hr/> MCSs, Time 3, regressed on						
MCSs, Time 1	.328	.106	.002	.212	.148	.151
MCSs, Time 2	.220	.082	.008	.618	.112	.000
SPT, Time 2	.258	.073	.000	.101	.089	.257

RE-Books, Time 2	.072	.028	.010	.000	.035	.995
<hr/>						
SPT at, Time 2, regressed on						
SPT, Time 1	.328	.052	.000	.183	.059	.002
MCSs, Time 1	.259	.058	.000	.395	.079	.000
RE-Books, Time 1	.072	.022	.001	.099	.024	.000

Note. September/October 2013 (Time 1), January/February 2014 (Time 2), June/July 2014 (Time 3). Boys (code 1), girls (code 0). The data cluster structure (students per class at school) was considered at individual level.

(continued)

Table 3 (continued)

Interrelations between SPT, using MCSs during in-class activities, and RE with books

	Boys			Girls		
	β	<i>SE</i>	<i>p</i>	B	<i>SE</i>	<i>p</i>
<hr/>						
RE-Books, Time 2, regressed on						
RE-Books, Time 1	.690	.035	.000	.640	.038	.000
MCSs, Time 1	.231	.104	.027	.478	.137	.000
SPT, Time 1	.138	.087	.114	.106	.114	.355
<hr/>						
MCSs, Time 2, regressed on						
MCSs, Time 1	.702	.097	.000	.737	.157	.000
SPT, Time 1	.155	.054	.004	-.244	.101	.015
RE-Books, Time 1	.135	.028	.000	.178	.031	.000

 RE-Books, Time 1, regressed on

Fluid Reasoning	.036	.024	.137	.024	.024	.315
Vocabulary	.008	.013	.540	.018	.013	.180
Reading Speed	.192	.048	.000	.168	.051	.001
R^2 of latent SPT, Time 3	.349			.409		
R^2 of latent MCSs, Time 3	.338			.532		

Note. September/October 2013 (Time 1), January/February 2014 (Time 2), June/July 2014 (Time 3). Boys (code 1), girls (code 0). The data cluster structure (students per class at school) was considered at individual level.

Table 4

SPT indirectly supported by RE with books via MCSs

	Boys			Girls		
	β	<i>SE</i>	<i>p</i>	β	<i>SE</i>	<i>p</i>
SPT (DV), Time 3, regressed on						
RE-Books, Time 1	.063	.028	.027	.024	.027	.376
Fluid Reasoning	.002	.013	.863	-.009	.010	.393
Vocabulary	.010	.006	.092	.002	.005	.735
Reading Speed	-.001	.025	.983	.001	.024	.960
MCSs (MV), Time 2, regressed on						
RE-Books, Time 1	.154	.022	.000	.200	.020	.000
SPT (DV), Time 3, regressed on						
MCSs (MV), Time 2	.244	.067	.000	.456	.079	.000
Indirect effect	.038	.012	.001	.040	.011	.001
Total effect	.101	.027	.000	.100	.030	.000
R^2 of latent SPT, Time 3	.076			.141		
R^2 of latent MCSs, Time 2	.066			.181		

Note. Dependent variable (DV). Mediator variable (MV). September/October 2013 (Time 1), January/February 2014 (Time 2), June/July 2014 (Time 3). Boys (code 1), girls (code 0). The data cluster structure (students per class at school) was considered at individual level.

Figure 1. The latent autoregressive model with cross-lags over three measurement waves across fifth grade of school specified (above) and the mediation model specified (below). Reasoning = Fluid reasoning (Weiß, 2006). Vocabulary = Passive vocabulary (Weiß, 2006). See Table 3 for the path-coefficients from the autoregressive modeling with cross-lags and Table 4 for results from the mediation modeling.

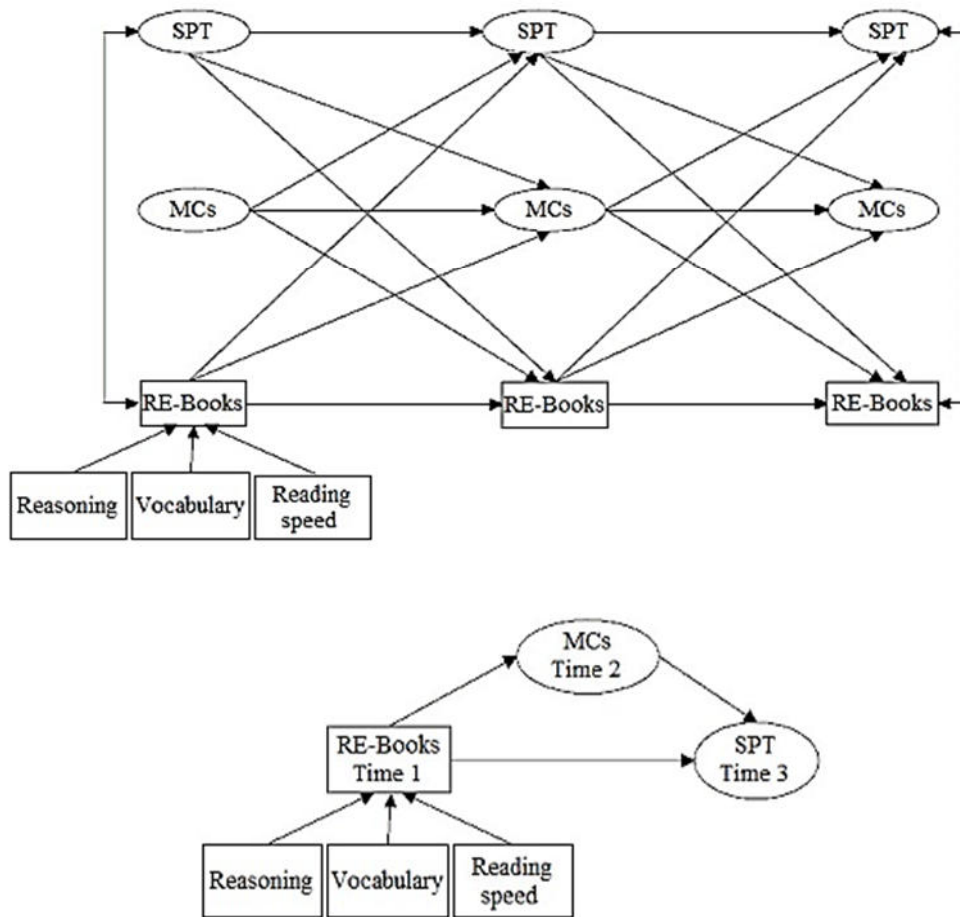


Figure 2. Interrelations (above) with path-coefficients of boys' (before the slash)/girls' (after the slash) SPT, using MCSs during in-class activities, RE with books and control variables across the fifth grade of school (* $p < .05$). Results from the latent autoregression model with cross-lags. See Table 3 for path-coefficients, standard errors, and exact probability values. Indirect associations (below) with path-coefficients of boys' (before the slash)/girls' (after the slash) SPT, using MCSs during in-class activities, RE with books and control variables across the fifth grade of school (* $p < .05$). Results from the latent mediation model. See Table 4 for path-coefficients, standard errors, and exact probability values.

