



School engagement, sensitivity to criticism and academic achievement in children: The predictive role of theory of mind

Joanna Smogorzewska^{a,*}, Grzegorz Szumski^a, Sandra Bosacki^b, Paweł Grygiel^c, Maciej Karwowski^d

^a University of Warsaw, Faculty of Education, Mokotowska 16/20, 00-561 Warsaw, Poland

^b Brock University, Faculty of Education, 1812 Sir Isaac Brock Way, St. Catharines, ON, Canada

^c Jagiellonian University, Faculty of Philosophy, Golebia 24, 31-007 Cracow, Poland

^d University of Wrocław, Institute of Psychology, Wl. Dawida 1, 50-527 Wrocław, Poland

ARTICLE INFO

Keywords:

Theory of mind
Sensitivity to criticism
School engagement
Academic achievement

ABSTRACT

The present study tested the longitudinal relations among children's theory of mind (ToM), sensitivity to criticism, school engagement, and academic achievement. One hundred and twenty-one school-age typically developing children completed a ToM task (understanding of faux pas), sensitivity to criticism task (emotional reaction and motivation for improvement after critique, 30 months after ToM), and a language and mathematics achievement test (twice, 40 months apart). Teachers assessed children's school engagement 40 months after ToM. The results show that the scores on the Faux Pas Recognition Test predicted the children's motivation for improvement and language and mathematics scores. In turn, motivation predicted school engagement, and engagement predicted language and mathematics scores, even when the initial level of achievement was controlled. A hypothesized sequential mediation was established among ToM, motivation, engagement, and academic achievement. Overall, the present study emphasizes the importance of ToM development for children's academic achievement and overall functioning in school.

1. Introduction

Theory of mind (ToM) is the ability to understand that all people have mental states; it serves as a basis for making predictions about people's possible behaviours in different situations (Wellman, Cross, & Watson, 2001). Although ToM develops from early childhood (e.g., Baillargeon, 2004) and indeed, most research is devoted to children of preschool age (Wellman et al., 2001), there are a growing number of studies with school-aged participants (e.g., Gönültaş, Selçuk, Slaughter, Hunter, & Ruffman, 2020; Lecce & Bianco, 2018). Since the initial studies of ToM (Premack & Woodruff, 1978), it has been posited that ToM plays a key role in children's development in social and cognitive functioning, interactions with people, and learning. Indeed, several studies have shown that children who understand that others have minds score higher on measures of academic achievement (Blair & Razza, 2007; Lockl, Ebert, & Weinert, 2017; Trentacosta & Izard, 2007). Plausible mediators of the links between ToM and school achievement have been proposed and tested, including social competence (Lecce,

Caputi, Pagnin, & Banerjee, 2017), self-esteem (Bosacki, 2000), sensitivity to criticism (Lecce, Caputi, & Hughes, 2011; Lecce, Caputi, & Pagnin, 2014; Mizokawa, 2014), and patterns of children's reactions and responses to failure and criticism (e.g., Smiley & Dweck, 1994). To build on and extend this body of work, the present study analyses how ToM may predict children's academic achievement directly or indirectly over time. Specifically, in our investigation, we include two hypothetical mediators of the relationship between ToM and academic achievement. The first is children's sensitivity to criticism, and the second is school engagement. Specifically, we predict that a higher level of ToM is associated with higher sensitivity to criticism and school engagement, which, in turn, predicts academic achievement. In what follows, we provide an overview of the literature pertaining to the main variables of interest and—at the end of this introduction—we propose a more general, hypothetical model of their interrelations.

* Corresponding author.

E-mail addresses: j.smogorzewska2@uw.edu.pl (J. Smogorzewska), g.szumski2@uw.edu.pl (G. Szumski), sbosacki@brocku.ca (S. Bosacki), p.grygiel@uniwersytet.rzeszow.pl (P. Grygiel), maciej.karwowski@uwr.edu.pl (M. Karwowski).

<https://doi.org/10.1016/j.lindif.2021.102111>

Received 18 March 2021; Received in revised form 10 December 2021; Accepted 15 December 2021

Available online 23 December 2021

1041-6080/© 2021 Elsevier Inc. All rights reserved.

1.1. ToM and academic achievement

The positive links between children's ToM and academic achievement are quite well established but not very strong (e.g., Blair & Razza, 2007; Ebert, 2020; Guajardo & Cartwright, 2016; Lecce et al., 2011; Lecce, Bianco, & Hughes, 2021). Previous research has explored the relations among false beliefs, emotion understanding or advanced ToM, and academic achievement. Academic achievement has often been explained in terms of language (e.g., test scores to show verbal ability, reading, knowledge of letters, narrative comprehension, and phonemic awareness) or mathematical competence measured by achievement tests or teacher ratings.

Longitudinal studies have shown that from preschool years to middle childhood, ToM proficiency may have consequences for academic and social success (e.g., Astington & Pelletier, 2005; Blair & Razza, 2007; Guajardo & Cartwright, 2016; Lecce et al., 2011; Lecce et al., 2017; Lecce et al., 2021; Lecce, Caputi, & Pagnin, 2014; Lockl et al., 2017). The predictive effect of ToM on children's language and mathematical abilities has also been demonstrated (e.g., Astington & Pelletier, 2005; Dore, Amendum, Golinkoff, & Hirsh-Pasek, 2018; Ebert, 2020; Florit, De Carli, Giunti, & Mason, 2020; Lecce et al., 2021). The relations between ToM and both types of academic achievement have been found to show similar strength (Blair & Razza, 2007; Lockl et al., 2017; Smith, Dutcher, Aksar, Talwar, & Bosacki, 2019; Trentacosta & Izard, 2007). Only in one of the latest studies has it been demonstrated that the relation between ToM and reading comprehension is significant, while the relation between ToM and mathematics skills is not (Lecce et al., 2021).

While the majority of previous studies used false belief tasks rather than understanding of emotions as predictors of academic achievement, there is some evidence that both abilities are similarly predictive for academic achievement (e.g., Astington & Pelletier, 2005; Ebert, 2020; Florit et al., 2020). Notably, controlling for possible confounds and including various mediators and moderators (e.g., socioeconomic status, gender, nonverbal abilities, working memory, or language abilities) usually weakens but does not eliminate the relations between ToM and academic achievement (Astington & Pelletier, 2005; Ebert, 2020; Lockl et al., 2017).

1.2. Why do ToM and academic achievement relate to one another?

The research on the links between ToM and academic achievement originates from two related but different perspectives on social cognition. The first perspective claims that metacognitive skills influence children's social and behavioural conduct in school settings (e.g., Roebbers, Krebs, & Roderer, 2014). Indeed, it has been observed that higher ToM is needed for children to display metacognitive behaviours (Meichenbaum & Biemiller, 1992), which, in turn, inform school achievement (e.g., Dunlosky & Metcalfe, 2009; Schneider & Lockl, 2008). Children with advanced ToM were found to be better aware that the mind has a limited capacity and therefore more eager to learn how to use strategies to promote effective learning (Wellman, 2016).

The second perspective highlights the importance of the social relationship between children and their teachers (Lockl et al., 2017). ToM is considered a sociocognitive ability that helps children to better understand their teachers' intentions and instructions (Astington & Pelletier, 2005). Consequently, ToM allows children to exchange complex ideas, thoughts, and beliefs – a process that may lead to the creation of knowledge rather than a pure transmission of knowledge. Thus, more effective communication and collaboration between children and their teachers may enable the co-construction of knowledge. Moreover, children's better understanding of the mental states of others might be quite critical for establishing fruitful relations with their teachers and might consequently strengthen students' possibilities for learning (Davis, 2003; Garner & Waajid, 2008; Hamre & Pianta, 2001). Importantly, despite the growing interest in the aforementioned links (Lockl et al., 2017), to date, very few investigations have taken a more

developmental approach concerning the relations between children's ToM and later academic achievement. Thus, the current study attempts to examine the second sociocognitive perspective by investigating the relations between ToM development and children's understanding of teachers' intentions, understood as sensitivity to teachers' criticism, over time.

1.3. Teachers' criticism as a type of feedback

As Hattie and Timperley (2007) recognized, teachers' verbal feedback is a powerful predictor of students' learning and achievement. Its impact can either be positive or negative depending on different factors, including the type of feedback and how feedback is given, for instance, with or without the provision of support or advice. Teachers criticize students for their mistakes, insufficient progress, or lack of engagement in learning (Hyland & Hyland, 2001; Ruiz-Primo & Li, 2013). Some children might perceive this criticism as a personal attack on their sense of self, and the criticism may thus be less effective than constructive feedback related to tasks, processes, and regulations (Hattie & Timperley, 2007).

The personal criticism of a child provides less detailed information regarding the quality of the performed tasks and fewer hints regarding how students should correct the tasks or develop their abilities. This type of teacher critique may also jeopardize how a child views himself or herself in terms of confidence and lead to a self-fulfilling prophecy where students ultimately believe their teachers' expectations (Cutting & Dunn, 2002).

Most researchers agree that studies that investigate different types of feedback are insufficient to understand the determinants of its effectiveness (Hattie & Timperley, 2007; Jónsson, Smith, & Geirsdóttir, 2018). For instance, such studies need to be complemented by investigations of students' skills and characteristics within diverse learning contexts because different characteristics of students and learning contexts can influence teachers' critiques (Hattie & Timperley, 2007; Jónsson et al., 2018). To address such gaps in the literature, the present study examines how individual differences in children's ToM skills may predict how students react to teachers' feedback, which, in turn, may relate to their academic skills.

1.4. ToM, sensitivity to criticism, and academic achievement

Within the context of the classroom, children's sensitivity to teachers' criticism is defined as children's awareness of teachers' negative comments about their work and their ability to manage these comments (Lecce, Bianco, Devine, Hughes, & Banerjee, 2014). Young children who better understand people's mental states and emotions may develop a higher sensitivity to teachers' criticism (Cutting & Dunn, 2002; Dunn, 1995). The links among children's ToM, sensitivity to criticism and academic achievement were initially observed in past studies that showed that children who are better mind readers and are more sensitive to criticism are also likely to better understand the intentions of teachers' feedback and to use this feedback in an effective way, which positively influences their academic achievement (Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014). Importantly, the effect was observed when ToM was measured a few years before sensitivity to criticism was measured. This result shows the predictive role of ToM in reacting to a teacher's critique.

Furthermore, Mizokawa (2014) suggested that a child's motivation for improvement – making use of the critique – is an important element of sensitivity to criticism. Thus, although Mizokawa's study did not consider academic achievement, the general idea that underlies the presented relations can be used to hypothesize that an understanding of others and motivation for improvement after being criticized positively impacts children's achievement. This explanation supports past evidence that shows the association between academic achievement and motivation (e.g., Boggiano & Pittman, 2010; Steinmayr & Spinath, 2009;

Taylor et al., 2014) and the positive role of strong and supportive bonds between students and teachers. Taken together, such factors might indeed play important roles in children's learning processes and influence their motivation to learn (e.g., Curby, Rimm-Kaufman, & Ponitz, 2009; Davis, 2003; Mainhard, Oudman, Hornstra, Bosker, & Goetz, 2018). Moreover, ToM skills may have a meaningful impact on how children interpret and react to teachers' (critical and constructive) feedback (e.g., Krijgsman et al., 2019; Shell & Eisenberg, 1996; Tunstall & Gipps, 1996). Therefore, in our study, we decided to analyse the relations between ToM and academic achievement, with the motivation for improvement after critique as one of the hypothesized mediators. The second vital factor that seems to underlie the links between ToM and academic achievement is students' school engagement.

1.5. Role of school engagement in links among ToM, sensitivity to criticism, and academic achievement

Motivation is an intrinsic process that supports the process of learning (Lee & Reeve, 2012). Therefore, the relation between motivational factors and academic achievement is mediated by behavioural factors, e.g., engagement in learning (Green et al., 2012; Skinner, Kindermann, & Furrer, 2009). Behavioural engagement represents students' concentration on tasks, effort, and persistence while initiating and sustaining educational activity (Furrer & Skinner, 2003; Skinner et al., 2009; Skinner & Belmont, 1993). Moreover, while motivation is considered an internal, subjective state, engagement is a set of objective and quite easily observed behaviours that are directly important for academic achievement (Wigfield et al., 2015).

Therefore, we include teachers' assessment of children's school engagement as another factor to explore. School engagement can serve as an indicator of motivation by taking into account the behavioural (e.g., effort, persistence, and following the rules), emotional (e.g., interest and boredom), and cognitive (e.g., going beyond the requirements, a preference for challenge, and effort directed towards learning) components of engagement (Fredricks, Blumenfeld, & Paris, 2004).

Accordingly, by building on past studies (e.g., Pinxten, Marsh, De Fraine, Van Den Noortgate, & Van Damme, 2014), we propose that a higher level of motivation for improvement after critique should be related to a higher level of general school engagement. That is, we predict that children who are more motivated are also more engaged in learning (e.g., Pinxten et al., 2014). Furthermore, school engagement is expected to be positively related to academic achievement. Our assumption is supported by the results of other studies on the relations between engagement and academic achievement and studies on ToM and engagement (Bosacki, Moreira, Sitnik, Andrews, & Talwar, 2019; Ladd & Dinella, 2009; Lecce et al., 2021).

The results of a longitudinal study on school engagement and academic achievement showed that early school engagement predicted long-term scholastic growth. In particular, children who presented higher behavioural and emotional engagement while learning in the primary grades made greater academic progress than children who presented lower levels of these forms of engagement (Ladd & Dinella, 2009). Similarly, Bosacki et al.'s (2019) study of ToM and school engagement in early adolescence showed that high levels of ToM were related to high levels of school engagement, particularly cognitive or academic rather than emotional engagement.

Accordingly, research has shown that children who are proficient mind readers are more sensitive to evaluations from others, including critiques of their performance and behaviours, possibly due to their increased sensitivity to teachers' feedback (Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014). Therefore, to build on and extend past research, we predict that children who have better development of theory of mind are also more likely to understand their teachers' critique and intentions and therefore will be more likely to have increased motivation for improvement and school engagement and, consequently, for academic achievement.

1.6. The current study

The current study investigated the individual differences and longitudinal relations among ToM, sensitivity to criticism, school engagement, and academic achievement. It extended previous research in two ways. First, we predicted that for academic achievement, not only children's emotional state after critique but also their motivation for improvement are important. Therefore, we posited that high levels of theory of mind development, which help children to understand the aim of their teachers' feedback (its role is to help the child), strengthen children's motivation to learn (e.g., Heyder, Weidinger, Cimpian, & Steinmayr, 2020; Rakoczy et al., 2019; Shin, Lee, & Seo, 2017). Importantly, the longitudinal relations among ToM, motivation, and academic achievement have not yet been studied in middle childhood.

The second contribution of the present study was the inclusion of the analysis of children's engagement in learning. We used teachers' ratings of school engagement and students' assessment of motivation for improvement after critique. Such ratings are consistent with knowledge about the intrinsic character of motivation and externally observed engagement of students (Guo et al., 2016). The inclusion of teacher ratings may help to better understand the relations between ToM and academic achievement, especially because past research provides a somewhat inconsistent and incomplete picture (Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014; Mizokawa, 2014).

More specifically, the present study focused on the relations among ToM and language and mathematics achievement, with sensitivity to criticism and school engagement as hypothetical mediators of these links. We included children's academic test scores instead of the teachers' rating of academic achievement, as test scores form a more objective non-biased measure than teachers' ratings of student behaviours and abilities. Although past studies have suggested that teachers' ratings are accurate overall (e.g., Coplan, Bullock, Archbell, & Bosacki, 2015; Jusim, Eccles, & Madon, 1996; Smith et al., 2019), they can be additionally shaped by teachers' personal biases and possible stereotypic perceptions of the characteristics and abilities of their students (Quenneville, Bosacki, & Talwar, 2021, March).

Fig. 1 presents a proposed model of the relations among the variables.

2. Methods

2.1. Participants

The sample in this longitudinal study (three waves) initially consisted of 156 typically developing children attending primary schools. During the course of the study, 35 families dropped out; in most cases, the families discontinued participation after the first wave, as the child had moved to another city or school. Therefore, in this study, we analysed the data of 121 typically developing children attending primary schools in Poland. None of the children had special educational needs. Sixty-four girls (53%) and fifty-seven (47%) boys participated. At the time of the first assessment, the children were 7.4 years old on average ($SD = 0.68$, range 6.00–8.11) and were in the first or second grade (children in Poland can start school at the age of 6 or 7 years depending on their cognitive, social and emotional development and their parents' decision).

The sample included children from all regions of Poland who attended a random selection of schools and classes (which were drawn from the Polish Educational Information System database). The parents provided written consent for their children's participation, and the children verbally agreed to take part in the study. All children who participated in the study were ethnically Polish and were thus fluent in the Polish language. None of the children had a diagnosis of special educational needs or disability because developmental difficulties were an exclusion criterion. Nine percent of mothers and 21% of fathers had an education lower than high school. Twenty-seven percent of mothers

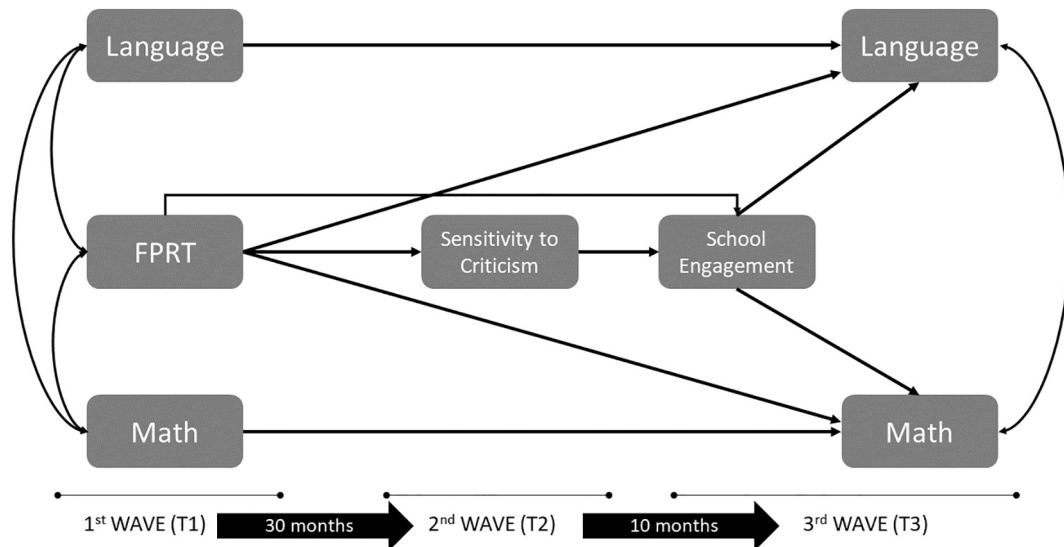


Fig. 1. An assumed model of the relations among the main study variables.

and 32% of fathers had a high school education. More than half of the children had parents with college or higher education levels (mothers: 64%, fathers: 47%). A similar number of the children lived in cities with more than 100,000 inhabitants (34%), 20,000–100,000 inhabitants (36%), or in small towns with up to 20,000 inhabitants (30%). Almost all children who participated in the study were taught by women; there was only one male teacher. The children attended 53 different classrooms, and there were between 19 and 25 students in most classes. Because we were interested in obtaining a diverse population to the greatest degree possible and we did not perform assessments at the class level in this study, individual children from each classroom participated. It was important to invite as many classrooms as possible with teachers using diverse feedback and working with different educational methods to increase results' variance.

2.2. Measures

2.2.1. Theory of mind

ToM was measured with the Faux Pas Recognition Test (FPRT, Baron-Cohen, O'Riordan, Jones, Stone, & Plaisted, 1999), which has previously been used among 7- to 11-year-olds. The FPRT consists of 10 stories with and 10 stories without faux pas, but in the current study, we used 5 stories with faux pas and 5 stories without faux pas. We decided to use half of the originally prepared stories to prevent fatigue among participants and to assess a wide selection of tasks without repeating all of them. The choice of the stories was made based on the results of a pilot study conducted with another group of children in which we determined the level of the stories' readability and difficulty to help to prevent the floor and the ceiling effects in the main study. The stories were presented in a random order. The task measures the ability to understand how two characters commit social transgressions in that they behave in a way that opposes social norms or standards. Moreover, it captures diverse forms of mental-state reasoning and links between them, i.e., understanding of beliefs, emotions, and intentions of characters at the same time. The task is also a good but rare example of a "naturalistic" measure concerning everyday social situations and interpersonal relations, which are important elements of functioning at school (Banerjee, Watling, & Caputi, 2011).

The stories with faux pas involve a character in the story behaving inappropriately, which confuses the other character; however, the character who commits the faux pas does not realize that his or her behavior is confusing. For example, in one story with faux pas, a girl proudly presents a cake that she prepared for a guest; the guest states

that he loves cakes but adds that he does not like apple pies, but the cake turns out to be an apple pie. The stories without faux pas do not contain inappropriate behaviours, but the child still needs to properly assess the situation. Based on past practice in other studies (Söderstrand & Almkvist, 2012; Zalla, Sav, Stopin, Ahade, & Leboyer, 2009), we mixed stories containing faux pas with those that did not contain faux pas to achieve a higher level of variance, with each story followed by 4 questions (see Baron-Cohen et al., 1999). The content of all stories – with and without faux pas – can be found in the article by Baron-Cohen et al. (1999).

The reliability of the FPRT at the first assessment time was Cronbach's $\alpha = 0.75$ for stories with faux pas and $\alpha = 0.67$ for stories without faux pas. This result is similar to the reliability of other ToM measures (Hayward & Homer, 2017; Osterhaus, Koerber, & Sodian, 2016). The children received one point for a story if they answered all the questions in the story correctly; otherwise, they received 0 points. Therefore, the participants could receive 0 to 10 points for the FPRT.

2.3. Sensitivity to criticism

Sensitivity to criticism was measured with four stories prepared in accordance with Heyman, Dweck, and Cain (1992) and Mizokawa (2014); the stories assessed emotional reaction to critique and the level of motivation for improvement after critique using indirect methods (playing with toys and/or listening to a story about some characters) and children's declarations about characters' possible behaviours and feelings. These stories concerned different tasks (one task each related to language, math, science, and art). In each story, the character was attempting to perform the task as well as he or she could but made a mistake; the teacher noticed this mistake and criticized it indirectly (see the Appendix for an example story).

Participants were asked to think about how they would feel and behave in such a situation and to answer the following two questions: 1) How do you think the character felt in this situation? (five possible answers from 5 = he or she was very concerned and started to cry to 1 = he or she was not concerned at all), which concerned emotional sensitivity to critique; 2) After what the teacher said, do you think that the child would correct her or his work to be flawless? (five possible answers from 5 = s/he would definitely correct her or his work to 1 = s/he would definitely not correct her or his work), which concerned the level of motivation to correct mistakes after critique.

The children's responses about their emotional reaction after critique were summarized; the same procedure was followed with responses that

addressed the motivation for improvement. Therefore, the children could score from 4 to 20 points for each dimension of sensitivity to criticism. The reliability estimated on the matrix of the polychoric correlations for the questions concerning emotional sensitivity was $\alpha = 0.74$, and that for the motivation to correct mistakes was $\alpha = 0.83$.

2.4. School engagement

School engagement was assessed by the children's teachers because teacher reports have been found to provide the most comprehensive observations of children's school behaviours. Moreover, teacher reports are one of the most common ways of measuring school engagement among students (Fredricks et al., 2004; Smith et al., 2019). Past studies have shown that teachers' ratings are often more valid than students' assessments, as students may be biased in their perceptions of themselves (Fredricks et al., 2004).

The questionnaire has 21 statements concerning the child's engagement in learning, including items such as "He or she likes to go to school", "He or she always does her or his homework", "He or she gives up quickly", "He or she tries to solve a task as long as he or she will achieve a desired effect", and "When he or she makes a mistake, he or she tries to correct it as fast as he or she can". Each statement was assessed on a four-point Likert scale where 4 is yes, 3 is rather yes, 2 is rather no, and 1 is no, with a few reversed items. The overall result was treated as the child's general attitude towards school and learning. The Cronbach's α was 0.95.

2.5. Academic achievement

Achievement in mathematics was assessed with 9 tasks during the first wave ($\alpha = 0.88$; given the dichotomous or 0–1–2 scoring of the items, internal consistency was estimated based on the matrix of polychoric correlations in psych package in R, Revelle, 2020) and 21 tasks during the third wave ($\alpha = 0.93$). During each wave, the tasks were consistent with the Polish curriculum. In the first wave, the test consisted of simple tasks involving counting (addition and subtraction), comparing numbers, classifying, and completing basic geometry (recognizing figures). In the third wave, the tasks included more advanced content, including multiplication, division, fractions, tasks with text, geometry, and scales. For each correctly solved task, the children received one point (for one task in the first wave, the children could receive from 0 to 2 points – there were two questions to answer in one task, for each one child could receive one point).

Achievement in the Polish language during the first wave was assessed with 10 tasks ($\alpha = 0.76$; given the dichotomous scoring of the items, internal consistency was estimated based on the matrix of tetrachoric correlations). The test was prepared according to the Polish curriculum and included simple tasks that consisted of recognizing and writing letters, reading short words, understanding short instructions, and reading comprehension test. For each correctly solved task, the children received one point. This test, which is a test of very basic language abilities and is mostly passive, can be treated as an indicator of general language abilities. During the third wave, language achievement was assessed with 12 tasks ($\alpha = 0.88$). The tasks focused on overall language usage, understanding, grammar tasks, and a reading comprehension test and were prepared according to the Polish curriculum.

2.6. Procedure

The study was approved by the ethics committee of the [blinded] (approval number 130–2016/2017). The parents gave written permission for their children to participate. The children completed the tasks and the questionnaires individually in a quiet room at their schools. An experienced educator or psychologist who had been trained to help with the data collection was present when the children were performing the activities for the study. The study started in November 2015 (T1). At this

point, we measured ToM and language and math achievement. After 30 months, in May 2018, we measured sensitivity to criticism (emotions and motivation after critique, T2), and after 10 more months (40 months after T1), in March 2019, we assessed school engagement and reassessed language and math achievement (T3). Students completed all the measures, except school engagement, which was assessed by students' teachers.

2.7. Statistical analysis and addressing missing data

To examine the potential mediation effects, we proceeded with sequential mediation in lavaan for R (Rosseel, 2012). Language and math at Time 3 were regressed on Time 1 ToM and the relevant controls (language T1 or math T1), Time 2 sensitivity to criticism and Time 3 teacher-assessed school engagement. We were particularly interested in the sequential indirect effect: ToM \rightarrow Sensitivity to criticism \rightarrow School engagement \rightarrow Academic achievement.

Given the longitudinal design of our study, because of attrition, there were some missing data. More specifically, there were 16 missing values (13%) in the T3 language and math results. As the Little (1988) test indicated that these values were missing completely at random (MCAR test $\chi^2 = 53.88$, $df = 69$, $p = .91$), we imputed the missing data using the multiple imputation procedure (Enders, 2010). We also repeated all analyses on a smaller subset of complete data, and the results were almost exactly the same (see Supplementary Online Material – SOM Tables S1 and S2).

3. Results

Table 1 presents the descriptive findings for the study's main variables, including the zero-order correlations.

ToM was unrelated to the initial results for language achievement but positively related to achievement in math ($r = 0.29$) and quite robustly associated with both language ($r = 0.30$) and math ($r = 0.35$) at T3. The stability of language ($r = 0.34$) and math achievement ($r = 0.32$) was mediocre – likely because of the relatively easy tests at T1 (as illustrated by the negative skewness values and large grand mean) and the long gap between measurements. Motivation for improvement was positively related to students' initial ToM ($r = 0.25$) and their math scores ($r = 0.18$) as well as student engagement as assessed by teachers ($r = 0.34$) and math achievement at T3 ($r = 0.19$). Student engagement was positively related to initial language achievement and T3 achievement in language and math. Overall, the correlations were moderate in strength, yet their direction was consistent with our hypotheses. Finally, due to the lack of correlations between emotional reaction to criticism and the other variables, we did not further test these relations in the final model.

To test for the potential mediation effects, we conducted a path analysis with sequential mediation, where the FPRT scores served as a predictor and motivation for improvement after critique (T2, the results obtained 30 months after T1) and school engagement (T3, the results obtained 40 months after T1) served as mediators of language and math achievement at T3. In both cases, we controlled for math and language achievement at T1. Fig. 2 presents the results of the analysis.

The T1 FPRT scores predicted motivation for improvement after 30 months (T2, $\beta = 0.25$) and academic achievement in math ($\beta = 0.24$) and language ($\beta = 0.27$) after 40 months (T3).

The motivation for improvement scores measured at T2 predicted school engagement 10 months later (T3), with a robust effect size ($\beta = 0.31$). In turn, the school engagement scores predicted academic achievement in math ($\beta = 0.21$) and language ($\beta = 0.23$) assessed at T3. Both sequential indirect effects were statistically significant, albeit weak in terms of effect size, $\beta = 0.02$ for language (95% confidence intervals: 0.002, 0.06) and $\beta = 0.03$ for math (95% CI: 0.001, 0.09); thus, the results showed partial mediation among ToM, motivation for improvement, school engagement, and language and math achievement.

Table 1
Descriptive statistics of the results.

Variables	1	2	3	4	5	6	7	8
Theory of Mind (FPRT) (1)	1	0.01	0.29	0.25	−0.11	0.17	0.30	0.35
Language T1 (2)		1	0.35	0.06	−0.04	0.24	0.34	0.32
Math T1 (3)			1	0.18	0.17	0.11	0.13	0.32
Motivation for Improvement (4)				1	−0.10	0.34	0.09	0.19
Emotional Reaction to Criticism (5)					1	−0.08	−0.09	−0.11
Engagement (6)						1	0.33	0.28
Language T3 (7)							1	0.63
Math T3 (8)								1
Minimum	0.00	1.00	2.00	7.00	6.00	42.00	2.00	3.00
Maximum	10.00	7.00	8.00	16.00	19.00	84.00	15.00	25.00
M	4.75	6.04	6.85	14.72	14.32	69.32	9.76	17.44
SD	2.11	1.03	1.33	1.58	2.33	10.73	2.81	5.02
Skewness	0.16	−2.22	−1.22	−1.61	−0.110	−0.55	−0.45	−0.49

Note. $N = 121$. Statistically significant correlations ($p < .05$) are bolded.

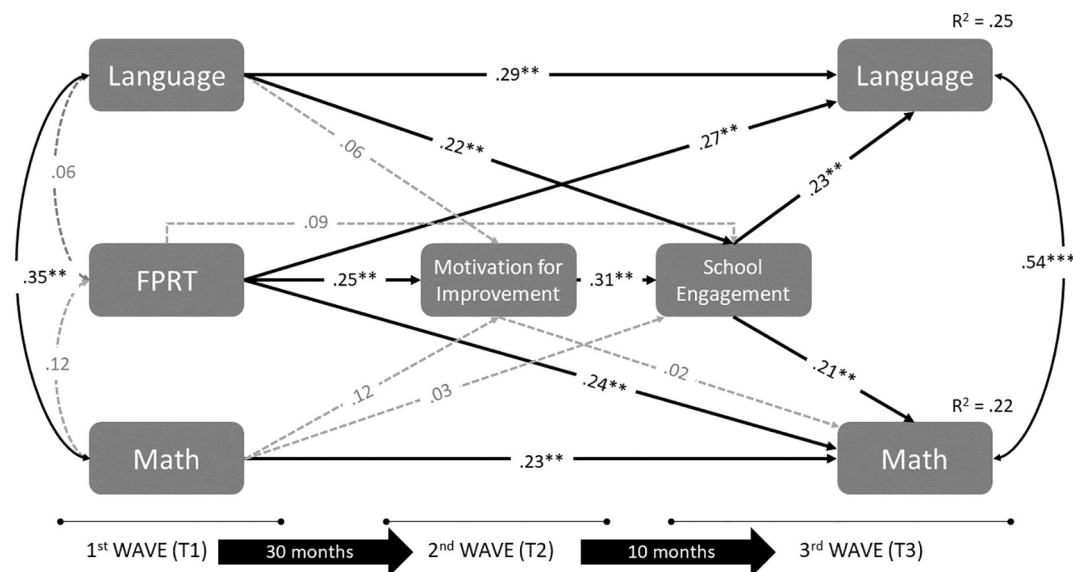


Fig. 2. A model of the longitudinal relations among the main study variables.

4. Discussion

This study determined whether ToM, as measured by responses on the FPRT (Baron-Cohen et al., 1999), predicted children's functioning at school. Consistent with our predictions, we found that higher levels of faux pas understanding predicted the children's motivation for improvement after receiving the teacher's critiques and achievement in math and language after 30 and 40 months, respectively.

Overall, the present study provides two meaningful contributions to the literature on children's sociocognitive abilities and school functioning. First, the present study supports previous results that showed that ToM is an important ability not only for social relationships with others (e.g., Kuhnert, Begeer, Fink, & de Rosnay, 2017; Ronchi, Banerjee, & Lecce, 2020; Vonk, Jett, Tomeny, Mercer, & Cwikla, 2020) but also for cognitive and academic development (Atkinson, Slade, Powell, & Levy, 2017; Devine & Hughes, 2014; Lockl et al., 2017; Smith et al., 2019). Although the social benefits of ToM have been demonstrated in the past (e.g., Banerjee et al., 2011; Bosacki, 2000; Quenneville et al., 2021, March), to date, only a few studies have explored the cognitive advantages of ToM proficiency. Therefore, it seems reasonable to analyse ToM development within the school context. Schools are places where children spend much of their time, communicating, interacting and building relationships with others—with both peers and teachers. These diverse experiences are important for their understanding of others' minds and different aspects of the world.

The second main contribution of our study is that the results show that positive relations exist among ToM, motivation for improvement after a teacher's critique, and academic achievement. Therefore, while our findings reaffirm previous results (Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014; Mizokawa, 2014), at the same time, they differ from previous results in several elements.

First, building on past studies (Atkinson et al., 2017; Lockl et al., 2017), we examined whether ToM predicted language and mathematics academic achievement. Our results show a robust relation between understanding ToM and academic achievement 40 months later. This result indicates that it would be reasonable to examine the relations between ToM and both logical reasoning and intelligence in more depth as they underlie such achievement. To date, there are few studies on this issue, but these existing studies show a relation between ToM and student intelligence (e.g., Coyle, Elpers, Gonzalez, Freeman, & Baggio, 2018; Estes & Bartsch, 2017; Ibanez et al., 2013). Moreover, the correlation between academic achievement and intelligence is also strong (Kriegbaum, Becker, & Spinath, 2018).

Second, we analysed the relations between ToM and sensitivity to criticism. Similar types of studies have shown that children who are more sensitive to teachers' criticism also achieve higher academic scores (Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014; Mizokawa, 2014). In our model, we presented the level of motivation for improvement after criticism without reporting the results of the children's emotional state after criticism because these latter results were not correlated with the

other variables.

Overall, our results indicate that children who better understand their teachers' feedback as constructive and are motivated to improve their mistakes, are also more likely to achieve higher academic scores. However, this result may be in part due to the supportive relationship and understanding children share with their teacher (e.g., Gasser, Grütter, Buholzer, & Wettstein, 2018; Lazarides, Gaspard, & Dicke, 2019). In contrast, children's reactions to teachers' criticisms may also be due to possibly conflictual, nonsupportive relationships with their teachers and thus may damage a child's confidence and overall well-being (e.g., Ruiz-Primo & Li, 2013). Although it is important to note that our study did not test the strength of the emotional attachment between children and their teachers, our results support previous findings that show the importance of the relationship between a teacher and a student for student achievement (Roorda, Koomen, Spilt, & Oort, 2011; Urache et al., 2020). Therefore, this study demonstrates the important role of ToM in the teacher-student relationship, and sheds new light on its multidimensionality and versatility within the school context.

Third, our study adds a new element to the existing models. We proposed that school engagement mediates the link between sensitivity to criticism and academic achievement. We hypothesized that having better development of theory of mind, and thus showing a better understanding of the real aim of critique, allows deeper school engagement and different aspects of school attendance, which in turn have a positive impact on academic achievement. Overall, we found that more developed ToM positively translates into an understanding of further prospects and of higher and more complex aims of learning. Therefore, our results show that understanding the intentions, hints and suggestions of teachers may be important for children's engagement and motivation to put more effort into learning.

Based on previous studies, it is clear that children can be motivated by a variety of different factors, such as the value of the task (Pekrun & Perry, 2014), teachers' feedback (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014), academic self-concept and self-efficacy (Guay, Marsh, & Boivin, 2003; Guo, Parker, Marsh, & Morin, 2015; Klassen & Usher, 2010), and school-related emotions (Pekrun, Lichtenfeld, Marsh, Murayama, & Goetz, 2017; Umarji et al., 2021). However, the role of ToM in these relations should be further analysed, which could broaden the understanding of the cognitive and emotional consequences of ToM.

4.1. Limitations

Although our research adds to the current discourse on the longitudinal relations between ToM development and school functioning, some limitations must be noted. One limitation is the modest reliability of the FPRT instrument. Indeed, different analyses of other ToM measures show rather questionable reliability, and it is difficult to identify the most prominent reason for this effect (e.g., Osterhaus et al., 2016). We emphasize that the modest reliability makes our estimates conservative,

and future studies with larger samples might benefit from structural equation modelling techniques that will eliminate measurement error.

Given the lack of well-developed, reliable, valid measures of children's sensitivity to criticism (Heyman et al., 1992; Lecce et al., 2011; Lecce, Caputi, & Pagnin, 2014), the measure used in the present study requires further validation. The current measure was based on the children's declarations about possible behaviours of a character in the story and did not measure the children's direct behaviours and reactions. However, the current measure assessed the young children's thinking about others based on their own experiences and emotions (Howard, 2002; Wellman, Philips, & Rodriguez, 2000). Unfortunately, motivation for improvement was assessed with only one question in each story. Yet, the question was easy to understand and clear, and it has already been used in a similar version in previous research with satisfactory effects (Heyman et al., 1992; Mizokawa, 2014). In general, future studies would benefit from a direct assessment of children's understanding of the reasons for teachers' criticism.

Our sample size was relatively small, which made it impossible to use more sophisticated analytical approaches (e.g., structural equation modelling) or provide additional, exploratory analyses (e.g., on gender differences). Moreover, our study did not include possible confounding factors that may have influenced the results (e.g., IQ, working memory, sociocultural factors such as family SES). Therefore, future studies should include a higher number of participants and use more variables in the model.

5. Conclusion

The current study reaffirms the important role that ToM plays in grade school children's adaptive functioning. The results of our study build on and extend past findings on the relations between ToM development and children's mechanisms of learning in the school context. These results also have practical implications. Theoretically, our study supports past studies that have shown that actions aimed at ToM proficiency within the classroom, such as an increased use of psychological or mentalizing language, are worth attention and implementation (e.g., Kloo & Perner, 2008; Lecce, Bianco, et al., 2014), even if ToM is only a one of many potential elements of better functioning at school. Such inclusion of mental state talk in the classroom may thus strengthen children's development of ToM and may have a positive influence on their social and cognitive functioning in school, which are important not only for childhood but also for adolescence and, ultimately, adulthood.

Acknowledgements

The study has been financed by National Centre for Science (no. 2016/23/B/HS6/00271), Poland School Engagement, Sensitivity to Criticism and Academic Achievement in Children: The Predictive Role of Theory of Mind.

Appendix A. Appendix

Sensitivity to criticism – art story

“During art class, children were preparing calendars for a new year. Marta liked this task very much and she did a beautiful illustration for every month by giving many attention to each of them. After she finished her work, she wanted very much to show her calendar to her teacher, but while she was walking towards the teacher, she noticed that she prepared only 11 months – she forgot about April! The teacher noticed that one month was missing and said, “Marta, look at your work, you made a mistake. Obviously, the calendar cannot have 11 months! Such beautiful illustrations should not be wasted!”

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.lindif.2021.102111>.

References

- Astington, J. W., & Pelletier, J. (2005). Theory of mind, language, and learning in the early years: Developmental origins of school readiness. In B. D. Homer, & C. Tamis-LeMonda (Eds.), *The development of social cognition and communication* (pp. 205–230). Erlbaum.
- Atkinson, L., Slade, L., Powell, D., & Levy, J. P. (2017). Theory of mind in emerging reading comprehension: A longitudinal study of early indirect and direct effects. *Journal of Experimental Child Psychology*, 164, 225–238. <https://doi.org/10.1016/j.jecp.2017.04.007>
- Baillargeon, R. (2004). Infants' reasoning about hidden objects: Evidence for event-general and event-specific expectations. *Developmental Science*, 7, 391–424. <https://doi.org/10.1111/j.1467-7687.2004.00357.x>
- Banerjee, R., Watling, D., & Caputi, M. (2011). Peer relations and the understanding of faux pas: Longitudinal evidence for bidirectional associations. *Child Development*, 82, 1887–1905. <https://doi.org/10.1111/j.1467-8624.2011.01669.x>
- Baron-Cohen, S., O'Riordan, M., Jones, R., Stone, V., & Plaisted, K. (1999). A new test of social sensitivity: Detection of faux pas in normal children and children with Asperger syndrome. *Journal of Autism and Developmental Disorders*, 29, 407–418. <https://doi.org/10.1023/A:1023035012436>
- Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development*, 78, 647–663. <https://doi.org/10.1111/j.1467-8624.2007.01019.x>
- Boggiano, A. K., & Pittman, T. S. (2010). *Achievement and motivation. A social developmental perspective*. Cambridge University Press.
- Bosacki, S. (2000). Theory of mind and self-concept in preadolescents: Links with gender and language. *Journal of Educational Psychology*, 92, 709–717.
- Bosacki, S., Moreira, F., Sitnik, V., Andrews, K., & Talwar, V. (2019). Theory of mind, emotion knowledge, and school engagement in emerging adolescents. *International Electronic Journal of Elementary Education*, 11, 529–538. [10.26822/iejee.2019553349](https://doi.org/10.26822/iejee.2019553349)
- Coplan, R. J., Bullock, A., Archbell, K. A., & Bosacki, S. (2015). Preschool teachers' attitudes, beliefs, and emotional reactions to young children's peer group behaviors. *Early Childhood Research Quarterly*, 30, 117–127. <https://doi.org/10.1016/j.ecresq.2014.09.005>
- Coyle, T. R., Elpers, K. E., Gonzalez, M. C., Freeman, J., & Baggio, J. A. (2018). General intelligence (g), ACT scores, and theory of mind: (ACT)g predicts limited variance among theory of mind tests. *Intelligence*, 71, 85–91. <https://doi.org/10.1016/j.intell.2018.10.006>
- Curby, T. W., Rimm-Kaufman, S. E., & Ponitz, C. C. (2009). Teacher-child interactions and children's achievement trajectories across kindergarten and first grade. *Journal of Educational Psychology*, 101, 912–925. <https://doi.org/10.1037/a0016647>
- Cutting, A. L., & Dunn, J. (2002). The cost of understanding other people: Social cognition predicts young children's sensitivity to criticism. *Journal of Child Psychology and Psychiatry*, 43, 849–860. <https://doi.org/10.1111/1469-7610.t01-1-00047>
- Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist*, 38, 207–234. https://doi.org/10.1207/S15326985EP3804_2
- Devine, R. T., & Hughes, C. (2014). Relations between false belief understanding and executive function in early childhood: A meta-analysis. *Child Development*, 85, 1777–1794. <https://doi.org/10.1111/cdev.12237>
- Dore, R. A., Amend, S. J., Golinkoff, R. M., & Hirsh-Pasek, K. (2018). Theory of mind: A hidden factor in reading comprehension? *Educational Psychology Review*, 30, 1067–1089. <https://doi.org/10.1007/s10648-018-9443-9>
- Dunlosky, J., & Metcalfe, J. (2009). *Metacognition*. Beverly Hills, CA: SAGE.
- Dunn, J. (1995). Children as psychologists: The later correlates of individual differences in understanding of emotions and other minds. *Cognition and Emotion*, 9, 187–201. <https://doi.org/10.1080/02699939508409008>
- Ebert, S. (2020). Theory of mind, language, and reading: Developmental relations from early childhood to early adolescence. *Journal of Experimental Child Psychology*, 191, Article 104739. <https://doi.org/10.1016/j.jecp.2019.104739>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.
- Estes, D., & Bartsch, K. (2017). Theory of mind: A foundational component of human general intelligence. *Behavioral and Brain Sciences*, 40, Article e201. <https://doi.org/10.1017/S0140525X16001618>
- Florit, E., De Carli, P., Giunti, G., & Mason, L. (2020). Advanced theory of mind uniquely contributes to children's multiple-text comprehension. *Journal of Experimental Child Psychology*, 189, Article 104708. <https://doi.org/10.1016/j.jecp.2019.104708>
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109. <https://doi.org/10.3102/00346543074001059>
- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95, 148–162. <https://doi.org/10.1037/0022-0663.95.1.148>
- Garner, P. W., & Waajid, B. (2008). The associations of emotion knowledge and teacher-child relationships to preschool children's school related developmental competence. *Journal of Applied Developmental Psychology*, 29, 89–100. <https://doi.org/10.1016/j.appdev.2007.12.001>
- Gasser, L., Grütter, J., Buholzer, A., & Wettstein, A. (2018). Emotionally supportive classroom interactions and students' perceptions of their teachers as caring and just. *Learning and Instruction*, 54, 82–92. <https://doi.org/10.1016/j.learninstruc.2017.08.003>
- Gönültaş, S., Selçuk, B., Slaughter, V., Hunter, J. A., & Ruffman, T. (2020). The capricious nature of theory of mind: Does mental state understanding depend on the characteristics of the target? *Child Development*, 91, e280–e298. <https://doi.org/10.1111/cdev.13223>
- Green, J., Liem, G. A. D., Martin, A. J., Colmar, S., Marsh, H. W., & McInerney, D. (2012). Academic motivation, self-concept, engagement, and performance high school: Key processes from a longitudinal perspective. *Journal of Adolescence*, 35, 1111–1122. <https://doi.org/10.1016/j.adolescence.2012.02.016>
- Guajardo, N. R., & Cartwright, K. B. (2016). The contribution of theory of mind, counterfactual reasoning, and executive function to pre-readers' language comprehension and later reading awareness and comprehension in elementary school. *Journal of Experimental Child Psychology*, 144, 27–45. <https://doi.org/10.1016/j.jecp.2015.11.004>
- Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology*, 95, 124–136. <https://doi.org/10.1037/0022-0663.95.1.124>
- Guo, J., Nagengast, B., Marsh, H. W., Kelava, A., Gaspard, H., Brandt, H., Cambria, J., Flunger, B., Dicke, A.-L., Häfner, I., Brissos, B., & Trautwein, U. (2016). Probing the unique contributions of self-concept, task values, and their interactions using multiple value facets and multiple academic outcomes. *AERA Open*, 2, 1–20. <https://doi.org/10.1177/2332858415626884>
- Guo, J., Parker, P. D., Marsh, H. W., & Morin, A. J. S. (2015). Achievement, motivation, and educational choices: A longitudinal study of expectancy and value using a multiplicative perspective. *Developmental Psychology*, 51, 1163–1176. <https://doi.org/10.1037/a0039440>
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72, 625–638. <https://doi.org/10.1111/1467-8624.00301>
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77, 81–112. <https://doi.org/10.3102/003465430298487>
- Hayward, E. O., & Homer, B. D. (2017). Reliability and validity of advanced theory-of-mind measures in middle childhood and adolescence. *British Journal of Developmental Psychology*, 35, 454–462. <https://doi.org/10.1111/bjdp.12186>
- Heyder, A., Weidinger, A. F., Cimpian, A., & Steinmayr, R. (2020). Teachers' belief that math requires innate ability predicts lower intrinsic motivation among low-achieving students. *Learning and Instruction*, 65, Article 101220. <https://doi.org/10.1016/j.learninstruc.2019.101220>
- Heyman, G. D., Dweck, C. S., & Cain, K. M. (1992). Young children's vulnerability to self-blame and helplessness: Relationship to beliefs about goodness. *Child Development*, 63, 401–415. <https://doi.org/10.1111/j.1467-8624.1992.tb01636.x>
- Howard, J. (2002). Eliciting young children's perception of play, work and learning using the activity apperception story procedure. *Early Child Development and Care*, 172, 489–502.
- Hyland, F., & Hyland, K. (2001). Sugaring the pill: Praise and criticism in written feedback. *Journal of Second Language Writing*, 10, 185–212. [https://doi.org/10.1016/S1060-3743\(01\)00038-8](https://doi.org/10.1016/S1060-3743(01)00038-8)
- Ibanez, A., Huepe, D., Gempp, R., Gutierrez, V., Riviera-Rei, A., & Toledo, M. I. (2013). Empathy, sex and fluid intelligence as predictors of theory of mind. *Personality and Individual Differences*, 54, 616–621. <https://doi.org/10.1016/j.paid.2012.11.022>
- Jónsson, Í. R., Smith, K., & Geirsdóttir, G. (2018). Shared language feedback and assessment: Perception of teachers and students in three Icelandic secondary schools. *Studies in Educational Evaluation*, 56, 52–58. <https://doi.org/10.1016/j.stueduc.2017.11.003>
- Jussim, L., Eccles, J., & Madon, S. J. (1996). Social perception, social stereotypes, and teacher expectations: Accuracy and the quest for the powerful self-fulfilling prophecy. *Advances in Experimental Social Psychology*, 29, 281–388. [https://doi.org/10.1016/S0065-2601\(08\)60240-3](https://doi.org/10.1016/S0065-2601(08)60240-3)
- Klassen, R., & Usher, E. (2010). Self-efficacy in educational settings: Recent research and emerging directions. *Advances in Motivation and Achievement*, 16, 1–33. [https://doi.org/10.1108/S0749-7423\(2010\)000016A004](https://doi.org/10.1108/S0749-7423(2010)000016A004)
- Kloo, D., & Perner, J. (2008). Training theory of mind and executive control: A tool for improving school achievement? *Mind, Brain, and Education*, 2, 122–127. <https://doi.org/10.1111/j.1751-228X.2008.00042.x>
- Kriegbaum, K., Becker, N., & Spinath, B. (2018). The relative importance of intelligence and motivation as predictors of school achievement: A meta-analysis. *Educational Research Review*, 25, 120–148. <https://doi.org/10.1016/j.edurev.2018.10.001>
- Krijgsman, C., Mainhard, T., van Tartwijk, J., Borghouts, L., Vansteenkiste, M., Aelterman, N., & Haerens, L. (2019). Where to go and how to get there: Goal clarification, process feedback and students' need satisfaction and frustration from lesson to lesson. *Learning and Instruction*, 61, 1–11.
- Kuhnert, R.-L., Beeger, S., Fink, E., & de Rosnay, M. (2017). Gender-differentiated effects of theory of mind, emotion understanding, and social preference on prosocial behavior development: A longitudinal study. *Journal of Experimental Child Psychology*, 154, 13–27. <https://doi.org/10.1016/j.jecp.2016.10.001>

- Ladd, G. W., & Dinella, L. M. (2009). Continuity and change in early school engagement: Predictive children's achievement trajectories from first to eight grade? *Journal of Educational Psychology*, 101, 190–206. <https://doi.org/10.1037/a0013153>
- Lazarides, R., Gaspard, H., & Dicke, A.-L. (2019). Dynamics of classroom motivation: Teacher enthusiasm and the development of math interest and teacher support. *Learning and Instruction*, 60, 126–137. <https://doi.org/10.1016/j.learninstruc.2018.01.012>
- Lecce, S., & Bianco, F. (2018). Working memory predicts changes in children's theory of mind during middle childhood: A training study. *Cognitive Development*, 47, 71–81. <https://doi.org/10.1016/j.cogdev.2018.04.002>
- Lecce, S., Bianco, F., Devine, R. T., Hughes, C., & Banerjee, R. (2014). Promoting theory of mind during middle childhood: A training program. *Journal of Experimental Child Psychology*, 126, 52–67. <https://doi.org/10.1016/j.jecp.2014.03.002>
- Lecce, S., Bianco, F., & Hughes, C. (2021). Reading minds and reading texts: Evidence for independent and specific associations. *Cognitive Development*, 57, Article 101010. <https://doi.org/10.1016/j.cogdev.2021.101010>
- Lecce, S., Caputi, M., & Hughes, C. (2011). Does sensitivity to criticism mediate the relationship between theory of mind and academic achievement? *Journal of Experimental Child Psychology*, 110, 313–331. <https://doi.org/10.1016/j.jecp.2011.04.011>
- Lecce, S., Caputi, M., & Pagnin, A. (2014). Long-term effect of theory of mind on school achievement: The role of sensitivity to criticism. *European Journal of Developmental Psychology*, 11, 305–318. <https://doi.org/10.1080/17405629.2013.821944>
- Lecce, S., Caputi, M., Pagnin, A., & Banerjee, R. (2017). Theory of mind and school achievement: The mediating role of social competence. *Cognitive Development*, 44, 85–97. <https://doi.org/10.1016/j.cogdev.2017.08.010>
- Lee, W., & Reeve, J. (2012). Teachers' estimates of their students' motivation and engagement: Being in synch with students. *Educational Psychology*, 32, 727–747. <https://doi.org/10.1080/01443410.2012.732385>
- Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202.
- Lockl, K., Ebert, S., & Weinert, S. (2017). Predicting school achievement from early theory of mind: Differential effects on achievement tests and teacher ratings. *Learning and Individual Differences*, 53, 9–102. <https://doi.org/10.1016/j.lindif.2016.11.007>
- Mainhard, T., Oudman, S., Hornstra, L., Bosker, R. J., & Goetz, T. (2018). Student emotions in class: The relative importance of teachers and their interpersonal relations with students. *Learning and Instruction*, 53, 109–119. <https://doi.org/10.1016/j.learninstruc.2017.07.011>
- Meichenbaum, D., & Biemiller, A. (1992). In search of student expertise in the classroom: A metacognitive analysis. In M. Pressley, K. Harris, & J. Guthrie (Eds.), *Promoting academic competence and literacy: Cognitive research and instructional innovation* (pp. 3–53). Academic Press.
- Mizokawa, A. (2014). Theory of mind and sensitivity to teacher and peer criticism among Japanese children. *Infant and Child Development*, 24, 189–205. <https://doi.org/10.1002/icd.1877>
- Osterhaus, C., Koerber, S., & Sodian, B. (2016). Scaling of advanced theory-of-mind tasks. *Child Development*, 87, 1971–1991. <https://doi.org/10.1111/cdev.12566>
- Pekrun, R., Cusack, A., Murayama, K., Elliot, A. J., & Thomas, K. (2014). The power of anticipated feedback: Effects on students' achievement goals and achievement emotions. *Learning and Instruction*, 29, 115–124. <https://doi.org/10.1016/j.learninstruc.2013.09.002>
- Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: Longitudinal models of reciprocal effects. *Child Development*, 88, 1653–1670. <https://doi.org/10.1111/cdev.12704>
- Pekrun, R., & Perry, R. P. (2014). Control-value theory of achievement emotions. In R. Pekrun, & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 120–141). Taylor & Francis.
- Pinxten, M., Marsh, H. W., De Fraine, B., Van Den Noortgate, W., & Van Damme, J. (2014). Enjoying mathematics or feeling competent in mathematics? Reciprocal effects on mathematics achievement and perceived math effort expenditure. *British Journal of Educational Psychology*, 84, 152–174. <https://doi.org/10.1111/bjep.12028>
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have theory of mind? *Behavioral and Brain Sciences*, 1, 515–526. <https://doi.org/10.1017/S0140525X00076512>
- Quenneville, S., Bosacki, S., & Talwar, V. (2021, March). Teacher and peer reports on adolescents' social behaviours: Role of gender. In *Virtual poster presented at virtual biennial meeting of the Society for Research in Child Development*, April, 2021, Minneapolis, MN.
- Rakoczy, K., Pinger, P., Hochweber, J., Klieme, E., Schütze, B., & Besser, M. (2019). Formative assessment in mathematics: Mediated by feedback's perceived usefulness and students' self-efficacy. *Learning and Instruction*, 60, 154–165. <https://doi.org/10.1016/j.learninstruc.2018.01.004>
- Revelle, W. (2020). psych: Procedures for Personality and Psychological Research, Northwestern University, Evanston, Illinois, USA. <https://CRAN.R-project.org/package=psychVersion=2.0.8>
- Roebers, C. M., Krebs, S. S., & Roderer, T. (2014). Metacognitive monitoring and control in elementary school children: Their interrelations and their role for test performance. *Learning and Individual Differences*, 29, 141–149. <https://doi.org/10.1016/j.lindif.2012.12.003>
- Ronchi, L., Banerjee, R., & Lecce, S. (2020). Theory of mind and peer relationships: The role of social anxiety. *Social Development*, 2, 478–493. <https://doi.org/10.1111/sode.12417>
- Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research*, 81, 493–529. <https://doi.org/10.3102/0034654311421793>
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36. <http://www.jstatsoft.org/v48/i02/>
- Ruiz-Primo, M. A., & Li, M. (2013). Analyzing teachers' feedback practices in response to students' work in science classrooms. *Applied Measurement in Education*, 26, 163–175. <https://doi.org/10.1080/08957347.2013.793188>
- Schneider, W., & Lockl, K. (2008). Procedural metacognition in children: Evidence for developmental trends. In J. Dunlosky, & B. Bjork (Eds.), *A handbook of memory and metamemory* (pp. 391–409). Erlbaum.
- Shell, R. M., & Eisenberg, N. (1996). Children's reactions to the receipt of direct and indirect help. *Child Development*, 67, 1391–1405.
- Shin, J., Lee, Y., & Seo, E. (2017). The effects of feedback on students' achievement goals: Interaction between reference of comparison and regulatory focus. *Learning and Instruction*, 49, 21–31. <https://doi.org/10.1016/j.learninstruc.2016.11.008>
- Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, 85, 571–581. <https://doi.org/10.1037/0022-0663.85.4.571>
- Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection. Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, 69, 493–525. <https://doi.org/10.1177/0013164408323233>
- Smiley, P. A., & Dweck, C. S. (1994). Individual differences in achievement goals among young children. *Child Development*, 65, 1723–1743. <https://doi.org/10.1111/j.1467-8624.1994.tb00845.x>
- Smith, S., Dutcher, K., Aksar, M., Talwar, V., & Bosacki, S. (2019). Emotional competencies in emerging adolescence: Relations between teacher ratings and student self-reports. *International Journal of Adolescence and Youth*, 24, 19–28. <https://doi.org/10.1080/02673843.2018.1455059>
- Söderstrand, P., & Almqvist, O. (2012). Psychometric data on the Eyes Test, the Faux Pas Test, and the Dewey Social Stories Test in population-based Swedish adult sample. *Nordic Psychology*, 64, 30–43. <https://doi.org/10.1080/19012276.2012.693729>
- Steinmayr, R., & Spinath, B. (2009). The importance of motivation as a predictor of school achievement. *Learning and Individual Differences*, 19, 80–90. <https://doi.org/10.1016/j.lindif.2008.05.004>
- Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology*, 39, 342–358. <https://doi.org/10.1016/j.cedpsych.2014.08.002>
- Trentacosta, C., & Izard, C. E. (2007). Kindergarten children's emotion competence as a predictor of their academic competence in first grade. *Emotion*, 7, 77–88. <https://doi.org/10.1037/1528-3542.7.1.77>
- Tunstall, P., & Gipps, C. (1996). 'How does your teacher help you to make your work better?' Children's understanding of formative assessment. *The Curriculum Journal*, 7, 185–203. <https://doi.org/10.1080/0958517960070205>
- Umarji, O., McPartlan, P., Qiujie, L., Shafer, J., & Eccles, J. (2021). The motivational system of task values and anticipated emotions in daily academic behavior (in press) *Motivation and Emotion*. <https://doi.org/10.1007/s11031-021-09898-y>
- Urache, A., et al. (2020). Early emotion knowledge and later academic achievement among children of color in historically disinvested neighbourhoods. *Child Development*, 91, e1249–e1266. <https://doi.org/10.1111/cdev.1343>
- Vonk, J., Jett, S. E., Tomeny, T. S., Mercer, S. H., & Cwikla, J. (2020). Young children's theory of mind predicts more sharing with friends over time. *Child Development*, 1, 63–77. <https://doi.org/10.1111/cdev.13112>
- Wellman, H. (2016). Social cognition and education: Theory of mind. In 53. *Pensamiento Educativo. Revista de Investigación Educativa Latinoamericana* (pp. 1–23).
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, 72, 655–684. <https://doi.org/10.1111/1467-8624.00304>
- Wellman, H. M., Phillips, A. T., & Rodriguez, T. (2000). Young children's understanding of perception, desire, and emotion. *Child Development*, 71, 895–912.
- Wigfield, A., Eccles, J. S., Friedrichs, J. A., Simpkins, S., Roeser, R., & Schiefele, U. (2015). Development of achievement motivation and engagement. In M. E. Lamb, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Socioemotional processes* (vol. 3, pp. 657–700). Hoboken, NJ: Wiley.
- Zalla, T., Sav, A.-M., Stopin, A., Ahade, S., & Leboyer, (2009). Faux pas detection and intentional action in Asperger syndrome. A replication on a French sample. *Journal of Autism and Developmental Disorders*, 39, 373–382. <https://doi.org/10.1007/s10803-008-0634-y>