Teacher–Student Relationship, Task Persistence, Early Academic Skills and Motivation at Preschool

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ABSTRACT

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The main aim of the current thesis was to examine whether task persistence can act as a mediator in the association between teacher–student relationship and early academic skills and motivation. The present thesis concentrated on preschool students (around six years old) and their teachers who are important figures during the transitional period from the kindergarten to the first grade. Therefore, this thesis suggested one of the possible mechanisms of how teacher–student relationship relates to early academic skills and motivation of preschool students.

For the purposes of the current thesis, quantitative concurrent data from the study *Get involved!* (Lithuania) was used. Teacher–student relationship and task persistence of preschool students were measured by teacher questionnaires, students had individual tests for early academic skills, and motivation of students was assessed by interviews.

Results of the study confirmed the positive connections between close teacher–student relationship and early academic skills and motivation via the task persistence of preschool students. The closer relationship with students teachers perceived, the better task persistence and academic outcomes students had. In contrast, the more conflicting teacher–student relationship was, the lower the task persistence and, in turn, the lower early academic skills and motivation of preschoolers were.

The current thesis presented one of the tools of how teachers can promote early academic skills and motivation among preschoolers. Close teacher–student relationship should be encouraged because it relates to higher task persistence and, in turn, promotes early academic skills and motivation of students.

Keywords: teacher–student relationship, task persistence, academic skills, motivation, preschool, education in Lithuania

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CONTENTS

1 INTRODUCTION

Various social contexts affect the development of children. When they enter educational settings, teachers become one of the most important figures in the development of children. Research suggests that teacher–student relationship plays a crucial role in promoting early academic skills and motivation of preschool students (Caputi, Lecce, & Pagnin, 2016; Lippard, La Paro, Rouse, & Crosby, 2017; Stephanou, 2014). In the present thesis, the teacher–student relationship was understood as a close or conflicting connection between teachers and students (Hamre & Pianta, 2001). Warm and close relationship leads to better academic outcomes and higher motivation while distance and conflict between teachers and students can lead to lower academic achievement and motivation. Therefore, it is crucial for teachers to be aware of the signs that inform them whether their practices are effective and their close relationships with students are maintained.

The current thesis concentrated on task persistence of students as one of the possible outcomes of close teacher–student relationship. Task persistence was understood as the ability of students to concentrate and complete difficult tasks in the classroom (Kikas & Tang, 2018). In the present thesis, both teacher–student relationship and task persistence were measured from the perspective of the teachers, whereas early academic skills and motivation of preschool students were measured by student tests and interviews. One of the main aims of this study was to examine associations between teacher–student relationship and early academic skills and motivation via task persistence. Reaching this goal can provide new insights on how teachers can promote the academic outcomes of students.

One previous study showed the mediation of task-focused behaviour in the association of supportive interpersonal environments and academic skills (Kiuru et al., 2014). However, the current thesis aimed to expand knowledge by including preschool students instead of primary school students. Preschool education is important for the further development of students and supports a smooth transition to primary school. Children, who enter the first grade in primary school,

face a lot of new challenges and changes, therefore preschool education becomes crucial for a better adaptation of students (Malinauskienė, 2006; Küçükturan & Akbaba Altun, 2017). The present study concentrated on one particular developmental stage and educational and cultural background—preschool students in Lithuanian schools. Moreover, the current thesis investigated not only feelings of teachers towards their students (Kiuru et al., 2014), but also perceptions of feelings of students towards the teachers. The present study has also measured task persistence from the teacher point of view to gain a broader perspective as teachers observe the classroom and notice the behaviour of students.

The current thesis complements the previous studies by providing more knowledge about the possible role of teacher–student relationship and task persistence to the motivation, which is a very broad concept and requires more research to be done. The present research also gives more insights about the Lithuanian population as similar studies which would include Lithuanian samples were not detected. Moreover, the current thesis includes preschool education in the context of teacher–student relationships, task persistence and early academic skills and motivation, which is less often analysed than the primary education.

Therefore, the main goals of the current thesis were to investigate whether teacher–student relationship, task persistence and early academic skills and motivation correlate with each other and whether task persistence acts as a mediator in the association of teacher–student relationship and early academic skills and motivation of preschool students.

At the literature review, the importance of preschool education was introduced. Then the role of teacher–student relationship for early academic skills and motivation were discussed through different theoretical viewpoints. After that, task persistence and its associations to teacher–student relationship and early academic skills and motivation, and the preschool education system in Lithuania were introduced. After the literature review, the current thesis includes the implementation of the study, the results, discussion of the findings, limitations of the current study and possible practical implications.

2 THE ROLE OF PRESCHOOL EDUCATION

The current thesis concentrated on students and their teachers in the preschool. Preschool age in the present study was understood as one year of compulsory education before primary school and included children of around six years old. Some of the previous studies refer to the preschool as a kindergarten, but the term of *preschool* is preferred in the European context and, thus, this term was chosen for the purposes of the study to better define one preparatory year before primary school.

Preschool age is a crucial period for the basis of early academic skills, future learning outcomes and school adjustment (Kang, Horn, & Palmer, 2016). During this period, it is important to create a supportive environment for students to make their preparation for and transition to primary school easier and smoother. Preschool education can prepare students for what is expected in formal schooling. Promotion of early academic skills and motivation of preschool students can help them to adapt to the changing environment when they enter the first grade (Malinauskienė, 2006). Preschool-aged students were chosen for the current thesis because of the importance of supporting the learning of students and preventing difficulties in the future schooling from the very early age (Mokrova, O'Brien, Calkins, Leerkes, & Marcovitch, 2012). Early childhood education is important for the development of students and is especially beneficial for students who need support. Preschool education reduces inequalities and gaps before entering formal schooling (Küçükturan & Akbaba Altun, 2017).

Previous research has proved the importance of preschool education by providing evidence of the impact of early academic skills on the future academic achievement of children. For example, Stanley, Petscher and Catts (2017) found relations between vocabulary skills in preschool and vocabulary in third grade and even reading comprehension in tenth grade. Another longitudinal study for the research purposes used a nationally representative sample and showed that early math skills are very important predictors for the later achievement at school

(Claessens & Engel, 2013). Both of these studies confirmed the importance of increasing early academic skills for the better development of students and higher achievement at school.

To conclude, the current thesis emphasized the importance of developing early academic skills and motivation of students at the preschool, right before they enter primary school. To provide one of the possible explanations how learning of students can be supported, the present thesis discussed the role of the teacher–student relationship and task persistence for the development of early academic skills and motivation of preschool students.

3 THE ROLE OF THE TEACHER–STUDENT RELATIONSHIP

At the beginning of this section the definition of teacher–student relationship is described, then the theoretical perspective on teacher–student relationship is presented. At the end of the section research about associations between teacher–student relationship and early academic skills and motivation are discussed to show a broader perspective on the role of the teacher–student relationship. This section provides a background for the first research question.

3.1 Definition of Teacher–Student Relationship

Teacher–student relationship was understood as a close or conflicting relationship between the teacher and the student. According to the *Process-Person-Context-Time model* (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 2007), teacher–student relationship is as a *proximal process* which is important for the development of students. Teacher–student relationship can be also explained through the amount of involvement between the teacher and the student (Pianta, Nimetz, & Bennett, 1997). It is an interpersonal relation of the teacher and the student which develops through time and is shaped by the interactions, emotional context, behaviour, personal qualities and expectations (Lippard et. al., 2017). In the current thesis teacher–student relationship was measured from the teacher perspective and included negative and positive feelings (Pianta & Stuhlman, 2004). Teacher–student relationship involves believes and feelings of teachers towards students and perceptions of teachers about the actions of students towards them. The close relationship includes warmth, trust and absence of conflict between the teacher and the student while conflicting relationship includes tension and negativity towards each other (Hamre & Pianta, 2001; Pakarinen et al., 2017). In other words, this study measured whether teachers perceived

that their relationship with students was warm, close, and full of trust or, in contrast, they felt that students showed distance and negative emotions towards teachers. All these negative or positive interactions in the current thesis were measured through two scales of closeness and conflict (Pianta, 1992; Pianta, 2001).

3.2 Theoretical Background of Teacher–Student Relationship

This section introduces four theories that have brought a broader view on understanding teacher–student relationship and the role of it for the emotional, social and academic outcomes. Different theories are described to explain the importance of teacher–student relationship from various perspectives and theoretical views. In the beginning, *bioecological theory*, then *teaching through interactions theory*, *self–determination theory*, and at the end *attachment theory* are introduced.

3.2.1 Bioecological Theory

The Bronfenbrenner's *bioecological theory* of human development suggested that the *proximal processes* are crucial for the development of people, and children are affected by the interpersonal relationships with others at home or school environment (Bronfenbrenner, 1979; Bronfenbrenner & Ceci, 1994). Bronfenbrenner (1979) suggested that there are a few conditions that are crucial for the effective development of children. One of those conditions is a more competent person who encourages and guides a child to engage in more difficult activities and shares a *positive emotional relationship* with a child. The other following condition is that child should have opportunities to practice those activities that he or she has learned before, without active supervision of more competent person (Bronfenbrenner, 1979). If these conditions are not met, the development of a child cannot be complete. This theory complemented the current thesis by showing the importance of adults in the life of children. It not only leads to a conclusion about the role of a teacher in the life of a student but also emphasizes the positive rela-

tionship between the child and a guiding person or the teacher. This theory included the biological and genetic qualities that influence the *proximal processes* and the outcomes of the development of children. The environment can increase or decrease the possibilities for biological factors to develop. Biological and genetic factors were analysed in this theory together with the different environmental factors from various contexts (Bronfenbrenner & Ceci, 1994). A crucial part of the theory took a *Process-Person-Context-Time model*, which has stated that the development of humans depends on the other persons, objects, stimulus or interpersonal interactions. In order to be able to function effectively, people have to face these interactions in certain periods of time (Bronfenbrenner & Morris, 2007; Tudge, Mokrova, Hatfield, & Karnik, 2009). *Proximal processes* occur in daily life through the process of human development, such as learning or interactions with others. Only by following these processes people begin to understand the world and their purpose in it. *Process-Person-Context-Time model* has also included the personal characteristics which are important for the social interactions, such as appearance, experiences, various skills, motivation, persistence and other related characteristics (Bronfenbrenner & Morris, 2007; Tudge et al., 2009). The theory posited that students might have very different academic skills if one of them has stronger characteristics of motivation or persistence than another. The contextual part of the model describes the different environments that influence the development of children. For example, microsystems, such as home or school, mesosystems, combinations of the microsystems or exosystems, environments that influence the development of children indirectly (Bronfenbrenner & Morris, 2007; Tudge et al., 2009). One of the possible examples of the exosystem that could relate to the current thesis topic would be the exhausted teacher, who starts treating a student more distantly because of the discomfort that the teacher feels. Students are not directly in this environment, but their relationship with the teacher might be affected by this sort of behaviour of the teacher. All of the systems mentioned before are related to the effective functioning and the development of students. Moreover, the *Process-Person-Context-Time model* also emphasized the importance of time, because of the changes in human development over

the different life periods. All these four parts of the model are considered as playing a crucial part in the effectiveness of students and brings a better understanding on how the different environment or interactions, for example with a teacher can influence the possible academic outcomes of students and their development at school (Bronfenbrenner & Morris, 2007; Tudge et al., 2009).

The *bioecological theory* of human development was used in many research studies to better explain the teacher–student relationships, transition to formal schooling, engagement or behaviour of students (Ahtola et al., 2010; Bulotsky-Shearer, Fernandez, Dominguez, & Rouse, 2011; Maynard, Beaver, Vaughn, DeLisi, & Roberts, 2014; Lippard et al., 2017; Heatly & Votruba-Drzal, 2017). Teacher–student relationship is considered as one of the *proximal processes* that play an important role in the development of student academic skills (Lippard et al., 2017). The school environment, teacher–student relationships or practices of teachers shape the environmental contexts which can influence characteristics of students and their academic outcomes.

3.2.2 Teaching Through Interactions Theory

Another theory that can explain the importance of teacher–student relationship is *teaching through interactions theory* (TTI; Pianta, Hamre, & Allen, 2012). The theory distinguishes three main domains of interactions between teachers and students that are important for the academic and social development of students: emotional support, classroom organization and instructional support (Pianta, et al., 2012; Hamre et al., 2013). Emotional support includes the support from the teacher to increase positive interactions with students and help them to interact with their peers. Classroom organization includes the promotion of effective behaviour, attention and effort of students to reach learning goals in the classroom (Hamre et al., 2013). Instructional support consists of general (that can be recognized in various areas) and content-specific support (for the specific skill). All of the domains mentioned before promotes the positive learning outcomes of students in the classroom (Hamre et al., 2013).

In relation to the current thesis, the domain of emotional support can help to explain the importance of teacher–student relationship as positive interactions with students is an important factor for increasing the close relationship between the teacher and the student. Emotional support includes dimensions of positive and negative climate, which leads to different emotional expressions and relation between the teacher and the student (Hamre et al., 2013). These positive and negative dimensions can be related to the closeness or conflict between the teacher and the student. As teacher–student relationship is shaped by emotional context (Lippard et. al., 2017) and consists of positive and negative feelings (Pianta & Stuhlman, 2004), it can be assumed that the positive classroom environment promotes the close relationship between the teacher and the student, and, in contrast, the negative classroom environment increases conflicting teacher–student relationship. Moreover, *teaching through interaction theory* provides evidence about the crucial role of teachers to increase the effective development and academic outcomes of students by providing a positive classroom environment at school.

3.2.3 Self-Determination Theory

Another theory explaining the role of teacher–student relationship is a macro theory of motivation and personality, the *self-determination theory* (SDT; Ryan & Deci, 2000). This theory emphasizes the importance of belongingness and connection with others for the motivation of students and engagement into learning (Ryan & Deci, 2000; Heatly & Votruba-Drzal, 2017). Therefore, *self-determination theory* supported the importance of teacher–student relationship for the well-being of students and, in turn, positive learning and academic outcomes.

SDT includes the conceptualization of three universal and innate basic psychological needs — autonomy, competence and relatedness — which are important for the well-being of people (Deci & Ryan, 2008). *Basic needs theory* takes an important part in *SDT theory* and emphasizes that all three basic psychological needs must be satisfied for a person to flourish and reach psychological growth (Ryan & Deci, 2000; Longo, Gunz, Curtis, & Farsides, 2014). In a school context, the need for *autonomy* can be characterized as the ability to decide, will power of

students and the sense of freely chosen decisions. The need for *competence* includes the experienced success, coping with challenges and sense of effectiveness in the classroom. Finally, the need for *relatedness* comprises feeling of closeness, belongingness, care, involvement and connection between the student, peers and teachers (Vansteenkiste & Ryan, 2013; Longo et al., 2014). When people experience the satisfaction of the needs for *autonomy*, *competence* and *relatedness*, they reach positive outcomes, such as well-being and healthy functioning. In contrast, when people experience the frustration of basic psychological needs, they reach negative outcomes, such as ill-being and malfunction (Vansteenkiste & Ryan, 2013). *SDT* has set three types of environments: *need supportive*, *need depriving* and *need thwarting*, to show that need satisfaction and need frustration are not in the opposite ends of a continuum. It means that basic psychological need frustration cannot be only defined as low need satisfaction. Frustration is an *active* way to disturb healthy development as a person feels the lack of needs, while low need satisfaction is *passive* (Vansteenkiste & Ryan, 2013; Longo et al., 2014). For example, when students are in the environment which deprives the need for *relatedness*, they might feel distant and misunderstood by their teachers and in turn, feel less excitement and motivation to learn. In contrast, if students are neglected and excluded from their peers and do not perceive support from their teachers, they might feel depressive and experience stress at school (Vansteenkiste & Ryan, 2013). This example shows that students feel not only low connection with their peers and teachers but also are rejected, which leads to a not only unsatisfied but also a frustrated need for *relatedness*. Research showed that all three basic psychological needs must be satisfied for the better psychological health of people in all cultures even though there are differences in expressing *autonomy*, *competence* and *relatedness*, as an integration of cultural values plays an important role in basic psychological need satisfaction (Ryan & Deci, 2000; Deci & Ryan, 2008).

In relation to the current study, the role of teacher–student relationship can be understood through the lens of basic psychological need of *relatedness*. For example, if teacher and student have a close and warm relationship with each other,

the basic psychological need for the *relatedness* of a student would be more satisfied and, in turn, lead to better motivation, engagement and positive academic outcomes. In contrast, if the teacher and the student have a conflicting relationship with each other, the basic psychological need for *relatedness* would be frustrated and the student would feel less motivated or engaged in learning. *SDT* assisted in setting the basis for explaining how important teacher–student relationship is for the well-being and performance of students.

3.2.4 Attachment Theory

Attachment theory (Bowlby, 1982) is another theory that was used in research concerning teacher–student relationship. Attachment with others is a biologically important aspect for the survival of persons. It is a crucial part for humans to reach for the relationship with others to feel safe and close when they feel too weak to take care of themselves (Bowlby, 1982). The first attachment relationship that must be maintained is a parent–child relationship. However, during the lifetime there are many other types of relationships that must be maintained for the healthy development of personalities. Attachment relationships became well known in the 1930s and 1940s when separate clinicians were observing the difficulties in the development of personality and found the importance of attachment with caregivers and consequences of inconsistencies by the mother figure (Bowlby, 1982; Scharfe, 2017). Children express *attachment behaviour*, such as crying, smiling, vocalizing, and attracting attention for seeking comfort, care and closeness from the people that are perceived as more competent handling the world issues. When children receive the help and support that they need, when more competent persons respond to them, children feel more secure and are willing to maintain their relationship with others (Bowlby, 1982; Scharfe, 2017). In relation to the current thesis, this theory showed the importance of maintaining the close relationship between teachers and students to increase the safety and security of children and willingness to continue close relationships at school.

The *attachment theory* was developed in cooperation of Bowlby and Ainsworth (Ainsworth & Bowlby, 1991). According to the theory, infants need attachment figures to feel comfortable while exploring the world and to have someone to turn to when they seek support. This relationship is crucial for forming the self-image of children and feeling loved and cared. It is also important for being able to form a trustful relationship with close figures surrounding them (Bowlby, 1982; Ainsworth & Bowlby, 1991; Scharfe, 2017). Relationship of children with others is based on the cognitive representations which children are developing while interacting with their caregivers. Children are bringing these representations to interactions with others, such as teachers who continue influencing experiences of children at school (Bowlby, 1982; Caputi et al., 2016; Hamre & Pianta, 2001). Parents and teachers are important figures providing a safe environment for students, warmly encouraging them to engage in learning, and increasing their motivation (Bowlby, 1982; Ainsworth & Bowlby, 1991; Heatly & Votruba-Drzal, 2017). Relationships with adults play a crucial role in the development of children and, when they enter school, the main adult figures become teachers. Maintaining a close teacher–student relationship becomes important for increasing adjustment and academic achievement of students (Hamre & Pianta, 2001).

In conclusion, *attachment theory* provided a shred of evidence for the importance of the teacher–student relationship. From a very early age, children develop attachment relationships with their caregivers which show that child-adult relationship is crucial for the healthy development of children. When children start attending schools, teachers become important figures to encourage children to explore and learn while providing a supportive and trustful environment at school.

3.3 Teacher–Student Relationship and Academic Skills and Motivation in Preschool

This section discusses previous research in the field concerning the associations between teacher–student relationship and academic outcomes and motivation of

students. In the beginning, the theoretical background for the importance of the early academic skills at preschool is introduced, then research showing the role of teacher–student relationship in early literacy and numeracy skills is discussed. Further, the theoretical background for the motivation is described and, in the end, research showing the importance of teacher–student relationship for the motivation of students is discussed.

3.3.1 Theories of Emergent Literacy and Emergent Numeracy

The concept of *emergent literacy* refers to the fact that literacy skills are developing gradually, and they start forming at an early age, not only when a child enters grade school. All behaviour that is related to literacy during preschool age plays a crucial part in the development of literacy skills (Whitehurst & Lonigan, 1998). The theoretical model of *emergent literacy*, created by Whitehurst & Lonigan (1998), suggests that reading, writing and speaking are interrelated parts which depend on each other and develop already before the formal schooling, during the social interactions. *Emergent literacy*, according to the theoretical model (Whitehurst & Lonigan, 1998), consists of different components: language (vocabulary, reading, distinguishing sounds), conventions of print (elements on the printed pages that helps to distinguish sequence, separate words or sentences, etc.), knowledge of letters, linguistic awareness (ability to differentiate language units), phoneme-grapheme correspondence (identifying connections between the phonemes and the letters), emergent reading (e.g. ability to read signs in everyday life situations), emergent writing (trying to or practicing writing), phonological memory (ability to remember number or sound sequences), rapid naming (naming rows of symbols, objects, etc.) and print motivation (interest of children in literacy-related activities).

The two main domains of *emergent literacy* are distinguished: outside-in and inside-out (Whitehurst & Lonigan, 1998). Outside-in represents the knowledge of children about the context, semantics or language units when they try to read or write. Inside-out represents the knowledge of children about the rules on how to convert sounds to letters or letters to sounds. These both domains are working

together while a child is trying to read and write. It is not only important to be able to identify sounds and words of a sentence (inside-out processes) but it is also important to take into account the context (outside-in process) in order to understand the meaning of the sentence. Both processes are crucial for learning how to read successfully (Whitehurst & Lonigan, 1998).

In addition to the *emergent literacy*, math-related emerging skills, knowledge about the concept of counting and numbers, ordinality and cardinality, falls into the concept of *emergent numeracy* (Coplan, Barber, & Lagace-Seguin, 1999). *Emergent numeracy* also includes the emerging symbol awareness, such as differentiation of numerics and is related to the *emergent literacy* skills (Neumann, Hood, Ford, & Neumann, 2013). All these early numeracy skills are important for the development of more complex mathematical knowledge and better future academic outcomes. The better numeracy skills students have at the preschool age, the faster development of math skills they demonstrate in primary school (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004).

In relations to the current thesis, the previous theoretical views have shown that early academic skills are important for the future development of students. Literacy or numeracy skills start to develop at a very early age, not only from the beginning of the school, therefore it is important to promote the early literacy and numeracy skills of students already before the primary school. Even though the importance and development of *emergent literacy* or *emergent numeracy* are known for decades, there are still gaps in research that concentrates on promoting early academic skills of students in different cultural settings.

3.3.2 Associations between Teacher–Student Relationship and Early Literacy and Numeracy Skills

Previous research in the field typically found the associations between teacher–student relationship and academic achievement of students (Caputi et al., 2016; Lippard et al., 2017). As research showed the crucial role of teacher–student relationship for the achievement of students, in the current study one of the focuses

was early literacy and numeracy skills at preschool and its associations to teacher–student relationship quality.

Research has shown that teachers tend to rate the academic achievement of students in a first grade higher if they feel that they have a close relationship with students. On the other hand, teachers tend to rate the academic achievement of students lower if they feel that their relationship with students is conflicting (Pianta & Stuhlman, 2004). Caputi and colleagues (2016) showed the importance of preschool academic skills for later school achievement and emphasized the significance of the transitional period from preschool to primary school for the later achievements of students. A study found that verbal abilities in preschool, which was measured by vocabulary test, significantly correlates with verbal abilities and academic achievement (text comprehension and math tasks) in the fourth grade of primary school. Research also shows that teacher–student closeness and conflict in the second year of primary school significantly correlates with academic achievement in fourth grade (Caputi et al., 2016). Supportive interpersonal environments, such as authoritative parenting, peer acceptance and positive teacher affect, increases the academic achievement of students (Kiuru et al., 2014). Moreover, Hamre and Pianta (2001) found that teacher-reported teacher–student relationship in preschool predicted academic achievement and student behaviour in early elementary school. This long-term relationship might appear because the responsiveness of teachers in early age and emotional support, reaction to needs of students and constant feedback encourage academic skills and social competence of preschool children (Hamre & Pianta, 2001). White (2013) has also investigated the associations of teacher–student relationship and early academic skills of preschool students and found that conflict between the teacher and the student negatively affected the writing skills of the student.

Overall, previous research, concerning the associations between teacher–student relationship and academic achievement have shown a crucial role of a close connection between teacher and student. Conflicting teacher–student relationship relates to lower early literacy and numeracy skills which may cause difficulties during the transitional period to primary school.

3.3.3 Theoretical Background of Motivation

The *expectancy-value theory* of motivation by Eccles, Wigfield and other theorists (Eccles, Wigfield, Harold, & Blumenfeld, 1993) suggested that expectancies and values are related to the academic achievement of students, their effort and persistence. Moreover, these expectancies and values are shaped by the perceptions of own abilities, beliefs and goals, which are influenced by the experiences and interactions with others (Wigfield & Eccles, 2000). Parents or teachers have a major influence on the beliefs of students. Different expectations, behaviour, cultural and historical background shapes perceptions of students about their achievement (Wingfield & Eccles, 1992). This theory implies that positive perceptions about the achievement beliefs motivate students towards the positive learning approaches and outcomes (Eccles et al., 1993). When students feel that they are able to complete the task, their expectancy is high and they perceive a task valuable, they have higher intentions to learn and perform better (Wigfield & Eccles, 2000). Therefore, in relations to the current thesis, the *expectancy-value theory* has proven the importance of teachers in increasing motivation of their students. The close relationship between the teacher and the student can help to increase the positive beliefs of a student about her or his achievement and, in turn, foster the motivation to put more effort into learning.

Moreover, in the current study, motivation was measured as an interest by the *Task-Value Scale for Children* (TVS-C; Nurmi & Aunola, 1999), which was based on the ideas of this theory (Eccles et al., 1983). As the motivation itself is a very broad concept, in the present study it was understood according to the conceptualization of Nurmi and Aunola (1999), based on the work of Eccles and colleagues (1983), as an interest in reading, writing and counting. The *task-value theory* compares the intrinsic value with subjective interest or interest value. The theory suggests that the higher interest value of a task students perceive, the better intrinsic motivation they have (Eccles et al., 1983; Wingfield & Eccles, 1992).

In conclusion, the *expectancy-value theory* supported the claims about the importance of teachers in increasing motivation or interest of students. Teachers

influence the beliefs that students have about their abilities towards achievement and, in turn, influence their behaviour towards the school tasks.

3.3.4 Motivation in Literacy and Numeracy Related Activities

Research analysing teacher–student relationship found connections not only with student achievement but also with various other outcomes such as social competence (Pianta & Stuhlman, 2004), behavioural development and behavioural problems (Pianta & Stuhlman, 2004; Lippard et al., 2017; Skalická, Belsky, Stenseng, & Wichstrøm, 2015), and engagement of students (Heatly & Votruba-Drzal, 2017; Papadopoulou and Gregoriadis, 2016). However, associations between close and conflicting teacher–student relationship and motivation of students in reading, writing or math tasks were rarely investigated. Consequently, in the current thesis, not only links between teacher–student relationship and early academic skills of preschool students but also their motivation were studied.

Teachers are important figures for increasing motivation of students. For example, Shen with colleagues (2015) was analysing the relationship between teacher burnout and student autonomous motivation and found a negative correlation between these constructs. Teachers who experience burnout symptoms are less involved in classroom activities and give less individual attention, become more distant. All these changes affect the feelings of students toward the teacher and negatively affects their motivation (Shen et al., 2015). Higher stress of teachers negatively affects the learning motivation, measured as interest, of six-year-old children, teachers show a lack of support and avoid interactions with children (Pakarinen et al., 2010). These studies could be connected to the current study by showing that burnout or stress of the teacher affects the relationship between teacher and student which leads to more distant connection and lower motivation of students. Research also shows that more child-centred practices and less teacher-directed practices increase the interest in reading and mathematics of students in the preschool classroom (Lerkkanen et al., 2012). Previous re-

search has shown that positive interactions of teachers and students are very important for student motivation. Moreover, Stephanou (2014) found connections between the positive rates of children about their relationship with preschool teachers and the learning motivation of students. In addition to previous studies, research also shows the importance of interpersonal relationships for the autonomous motivation of students in the first grade of secondary school (Opdenakker, Maulana, & Brok, 2012).

To sum up, the teacher plays a crucial part in the classroom by affecting the interest of students in learning academic subjects and by helping to better prepare for future studies during the transition from preschool to primary school. Therefore, in the present study associations between teacher–student relationship and student motivation in preschool were analysed.

4 TASK PERSISTENCE AT PRESCHOOL

At the beginning of this section, task persistence is described to better understand the construct, then studies that have shown the associations between teacher–student relationship and task persistence are introduced. Finally, research analysing the role of task persistence in the association between teacher–student relationship and early academic skills and motivation are introduced to support the main research questions of the current thesis.

4.1 Definition of Task Persistence

In the previous literature, task persistence was operationalized as the behaviour of students during academic tasks (Kikas & Silinskas, 2015). The research has defined task persistence as perseverance with tasks at school, effort to complete even the most difficult tasks without giving up when facing challenges (Kikas & Tang, 2018) and amount of attention that student is able to pay for the challenging task (Bulotsky-Shearer et al., 2011). For example, students, who have high task persistence carry on with a task even if it is challenging, while students with low task persistence give up on a difficult task, try to find less challenging ones or turn their attention to something more interesting (Jõgi & Kikas, 2015). Some of the previous studies were analysing task persistence as part of behavioural engagement together with the involvement and effort of students while completing tasks (Roorda, Spilt, & Koomen, 2017). However, in the current study task persistence was analysed not as a part of a broader component, but as a separate construct. Moreover, task persistence was analysed in a preschool sample, considering the fact that persistence in completing the challenging tasks is an important aspect for the school readiness of children and should be noticed at an early age (Mokrova et al., 2012). In the current thesis, task persistence was analysed as an aspect of behaviour and engagement (Jõgi & Kikas, 2015). In conclusion, task persistence in the current thesis was understood as perseverance and

attention to even the most difficult task without easily giving up and ability to resist switching to less challenging or unrelated activities.

4.2 Teacher–Student Relationship and Task Persistence

Previous research has shown the connections between teacher–student relationship and task persistence. Kikas and Tang (2018) study has shown that teachers reported higher task persistence of students when they felt that they show high support and affection. In connection with the current thesis, these findings could highlight the possible associations between the closeness of the teacher–student relationship and task persistence.

Part of the previous research demonstrated the associations between teacher–student relationship and task persistence by analysing constructs that involve or relate to task persistence. For example, Papadopoulou and Gregoriadis (2016) included task persistence into the construct of engagement and analysed the associations between teacher–student relationship and engagement of students. Results showed that warm relationship between the teacher and the student positively correlates with the engagement of kindergarten students in preschool classrooms (mean age 5.3), and conflicting relationship between teacher and student negatively correlates with the engagement of students. Based on Papadopoulou and Gregoriadis (2016) results, it is predictable that teacher–student relationship also relates to task persistence, as it was considered as a part of student engagement. Lippard and colleagues (2017) analysed associations between teacher–student relationship and classroom behaviour of four to five-year-old children. Research has shown that the closer teacher–student relationship, the more positive behaviour students expressed and, in contrast, the more conflicting the teacher–student relationship, the less positive behaviour students demonstrated in the classroom. Moreover, attention and behaviour take part in the operationalization of task persistence of students. Task persistence is a behaviour of students during the academic tasks and involves the concentration of attention towards the task (Bulotsky-Shearer et al., 2011; Kikas & Silinskas, 2015).

Therefore, it is possible to predict the correlations between teacher–student relationship and task persistence.

In conclusion, all the discussed studies in this chapter contributed to explaining associations between teacher–student relationship and task persistence. Previous research has supported the claims that the closer teacher–student relationship was, the higher task persistence preschool students had, and the more conflicting teacher–student relationship was, the lower task persistence preschool students demonstrated.

4.3 Task Persistence as a Mediator

Research has shown that task persistence is an important factor that can act as a mediator in the association of various constructs, such as between literacy skills of children and academic help from the mothers (Kikas & Silinskas, 2015) or between supportive interpersonal environments and academic performance of students (Kiuru et al., 2014). This section described the possible mediating role of task persistence in the association between the quality of teacher–student relationship and early academic skills of students and in the association between teacher–student relationship and motivation of preschoolers.

4.3.1 Mediation in the Association of Teacher–Student Relationship and Early Academic Skills

Research has shown the connections between teacher–student relationship and task persistence (Kikas & Tang, 2018) and connections between teacher–student relationship and early academic skills (Caputi et al., 2016; Lippard et al., 2017). Previous research also found connections between task persistence and literacy (Kikas & Silinskas, 2015), problem-solving skills (Jogi & Kikas, 2015), reading, spelling and math skills (Kiuru et al., 2014). These findings set the basis for interconnectedness between all three constructs of teacher–student relationship, task persistence and early academic skills. The current study examined one of the possible ways how these constructs can be related: Task persistence was analysed as

a mediator in the association between teacher–student relationship and early academic skills and motivation.

For the support of the main expectations of the current thesis, one similar study among Finnish students should be acknowledged (Kiuru et al., 2014). Kiuru and colleagues (2014) analysed task-focused behaviour as a mediator in the association between interpersonal environments (parents, teacher and peers) and academic achievement of students in Finnish primary schools (Grades one to four). To expand the knowledge in the field of education, the current study concentrated only on preschoolers and their preschool teachers among the students in another cultural context — Lithuania. Thus, these samples of students differ in the developmental stage, cultural and educational background. Moreover, preschool age is crucial for the transition to primary school and sets the basis for future learning, therefore more research is needed that concentrates on the last year of education before primary school. In addition, in previous research authors were analysing only positive teacher affect which is a one-sided factor that shows only how teachers feel about their students (Kiuru et al., 2014). Thus, in the current study, both sides of teacher–student relationship — close and conflicting relations between the teacher and the student — was analysed to better understand the nature of the relationship between teachers and students. Teacher–student relationship, which was measured in the current thesis, included perceptions of teachers not only about their feelings towards students but also feelings of students towards the teachers. One more difference between the previous study and the current thesis that is worth mentioning is that in Kiuru and colleagues (2014) research task-focused behaviour was analysed from the perspective of students and in the present study, task persistence from the perspective of teachers was analysed as a mediator between the association of teacher–student relationship and early academic skills. Even though students are capable to express their opinion and they have a right to be heard, it is interesting to look at task persistence of students from the perspectives of teachers as well. At the preschool age, teachers might be more objective towards the perseverance of students to complete even the most difficult tasks than students themselves.

Therefore, the current study concentrated on task persistence and teacher–student relationship from the perspective of preschool teachers. Early academic skills were measured by the tests of students and motivation was measured by the interviews of students. The main research question asked whether task persistence mediates the association between teacher–student relationship and early academic skills.

The other research that has supported the claim about the mediation of task persistence in the association of teacher–student relationship and early academic skills is a Hughes and Kwok (2007) study. Results of this research showed that teacher–student relationship in the first grade correlated with student achievement the next year through the engagement of students. A similar study by Hughes and colleagues (2012) showed that close and conflicting teacher–student relationship related to reading and math achievement via engagement of students. Moreover, Hughes and Kwok (2007) and Hughes with colleagues (2012) included persistence as one of the measured factors of engagement. Therefore, previous studies support the research question of the current thesis about the mediation of task persistence in the association of teacher–student relationship and early literacy skills.

In conclusion, the previous research has shown that task persistence of preschool students could mediate the association between teacher–student relationship and early academic skills. In the current thesis, it was expected to find that a closer teacher–student relationship relates with better early academic skills of preschool students via higher task persistence. In contrast, it was expected to find that more conflicting teacher–student relationship relates to lower early academic skills via lower task persistence.

4.3.2 Mediation in the Association of Teacher–Student Relationship and Motivation

Research has shown the connections between teacher–student relationship and task persistence (Papadopoulou & Gregoriadis, 2016; Kikas & Tang, 2018),

teacher–student relationship and academic or learning motivation, such as interest and learning goals (Opdenakker et al., 2012; Stephanou, 2014) and task persistence and competence motivation (Bulotsky-Shearer et al., 2011). Furthermore, research has shown that problematic interactions of four-year-old children with teachers relate to negative approaches toward learning, such as low persistence and competence motivation of children (Bulotsky-Shearer et al., 2011). Problematic interactions with teachers are connected to a teacher–student relationship and could cause conflicting relationship between the teacher and the student. Therefore, this study supported the possible correlations between teacher–student relationship, task persistence and motivation of preschool students.

One of the main aims of the current research was to find whether task persistence can act as a mediator in the association between teacher–student relationship and motivation. The main requirement for mediation analysis is that all the constructs would correlate with each other. As the previous research showed that teacher–student relationship, task persistence and motivation of students relate with each other (Kikas & Tang, 2018; Stephanou, 2014; Bulotsky-Shearer et al., 2011), it is interesting to investigate whether task persistence could act as a mediator in the relation between teacher–student relationship and motivation of preschool students. During the literature review, there were no studies spotted that would investigate the mediation of task persistence as a separate construct between teacher–student relationship and motivation (or interest) of students. The present thesis will add to the current literature by providing evidence on associations of the relationship between teachers and students and the motivation of students via the task persistence at preschool.

In conclusion, previous research sets the basis for one of the research questions about task persistence as a mediator in the association of teacher–student relationship and motivation of preschool students. It was expected to find that closer teacher–student relationship correlates with the higher motivation of students via higher task persistence. On the other hand, it was expected to find that more conflicting teacher–student relationship correlates with the lower motivation of preschool students via lower task persistence.

5 EDUCATION IN LITHUANIA

5.1 Lithuanian Educational System

The educational system in Lithuania consists of kindergarten, preschool (age six to seven), primary education (1st to 4th grade), lower-secondary education (consists of two parts: from 5th to 8th grade and from 9th to 10th grade), upper secondary education (11th to 12th grade), vocational education and training, tertiary and non-formal education. Compulsory education in Lithuania is for students until the age of 16, and preschool education (one year before the first grade) became compulsory from the year 2016 (LR Ministry of Education, Science and Sports, 2019).

The present study concentrated on students in preschool education, the last year of early childhood education, to emphasize the importance of smooth transition and preparation for the primary school. Therefore, this section discusses the preschool education in Lithuania in-depth.

5.2 Preschool Education

The aim of preschool education in Lithuania is to ensure the optimal development of a child considering individual qualities and prepare to learn according to the curriculum of primary education (Lithuanian Republic Ministry of Education and Science, 2014a). The group in preschool should not exceed the 20 children limit and a minimal number of hours is 640 per year (LR Ministry of Education, Science and Sports, 2019). Preschool education strategies in Lithuania are child-oriented and seek to develop *social*, *health*, *cognitive*, *communication* and *art* competencies of a child. *Social competency* includes self-awareness and self-efficacy, relationships with peers and adults and relation to nature, social and cultural environment (LR Ministry of Education and Science, 2014a). *Health competency* includes psychological, physical and social health education, such as general knowledge about a healthy lifestyle, be able to express and be aware of emotions, be able to differentiate proper and undesirable behaviour, to be careful

with strangers, take care of physical health and other related skills. *Health competency* also comprises an attempt of children to prevent themselves from impulsive behaviour and ability to concentrate attention to activities for a certain period of time, which is being supported by exercises that develop concentration and strengthen volition of children (LR Ministry of Education and Science, 2014a). *Cognitive competence* includes curiosity of a child, willingness to seek information and actively explore the environment, ability to predict consequences, critical thinking and creativity. This competency also includes the differentiation and classification of objects, ability to count, measure, group, compare, which is an important aspect for early numeracy skills described in the present study. *Cognitive competence* includes the knowledge of basic geometrical figures, ability to count until 20 and from 10 backwards, ability to do subtraction and addition calculations using different objects, recognize some numbers and mathematical signs. Preschool children in Lithuania use numbers for defining quantity, sequences, comparing sets, and use illustrations to define what do they see and are encouraged to use new vocabulary (LR Ministry of Education and Science, 2014a). *Communication competency* includes language perception, speaking and early reading and writing skills. Students are expected to be attentive and be able to concentrate, to know various concepts and words to express themselves. Children are also expected to understand the basic word structures and their changes, basic rules of sentence structure and be able to pronounce the majority of native language sounds. *Communication competency* comprises understanding and ability to explain the advantages of reading and writing, ability to recognize similarities and differences of sounds, connecting sounds and letters, ability to recognize and write the majority of letters and to read individual words, and few or more sentence texts, differentiate upper and lower case letters (LR Ministry of Education and Science, 2014a). *Art competency* includes the perception of beauty, creativity as a tool of expression, freedom and ability to create and relive the joy of creativity. Learning to learn, creativity and entrepreneurial learning is also integrated into all five competencies (LR Ministry of Education and Science, 2014a). All of these main competencies are described in the *Preschool national curriculum*

of Lithuania (LR Ministry of Education and Science, 2014a). The curriculum sets the guidelines for the educational process in preschools. Teachers are expected to organize the preschool activities by following the programme, by applying the individual model confirmed by the school, and by taking into consideration the individual needs of children (LR Ministry of Education and Science, 2014b).

In conclusion, preschool education in Lithuania is compulsory and concentrates on the development of children and preparation for the primary school. All the teaching practices are provided according to the preschool education curriculum and include the main five competencies: *social*, *health*, *cognitive*, *communication* and *art*. The measured early academic skills in the present study were chosen according to the main expectations of preschool education in Lithuania.

6 RESEARCH AIMS

For the main aims of the current thesis, quantitative data of Lithuanian sample was used. Teacher–student relationship and task persistence were measured from the teacher perspective through the teacher questionnaires. Early academic skills and motivation were measured through the tests and interviews of preschoolers. The study provides one of the possible explanations of how relationships with teachers can relate to early academic skills and motivation of students by answering the four research questions:

1. To what extent the teacher–student relationship (closeness and conflict) is associated with early academic skills and motivation of students?
2. To what extent task persistence is associated with early academic skills and motivation of students?
3. To what extent the teacher–student relationship is associated with task persistence of students?
4. Does task persistence mediate the association between teacher–student relationship and preschool student early academic skills and motivation?

7 IMPLEMENTATION OF THE STUDY

This chapter describes the methodology and the process of the research (data collection, sample description). In the beginning, participants and data collection process are introduced, then short descriptions about each method that is being used in this research are presented.

7.1 The Participants and the Data Gathering Process

This research was a part of the longitudinal data collection *Get involved!* (Šilinskas & Raižienė, 2017-2018), which was implemented in cooperation between two universities: The University of Jyväskylä in Finland and Mykolas Romeris University in Lithuania. The data gathering was carried out conveniently in six Lithuanian schools. To make sure that there is a representative distribution of rural and urban areas in Lithuania, three schools were selected from the rural areas (around 35 %) and another three were selected from the urban areas (capital area, 65 %). Data were collected from students, their parents and teachers to identify how instructional support from teachers and parents can maintain the motivation, self-regulation, self-efficacy and academic achievement of the children during the transitional period from preschool to the first grade of school. School psychologists tested and interviewed the children, and parents and teachers filled in the questionnaires at three-time points: preschool (T1), the beginning of the first grade (T2), and the end of the first grade (T3). All the gathered data were anonymized, and codes were assigned for each participant of the study. There were no interventional tests and no sensitive questions asked.

The longitudinal data collection *Get involved!* was presented to the *Ministry of Education and Science* in Lithuania to get permission for the research implementation at Lithuanian schools. After that, research permits from the administration of schools were collected. Research members met the school teachers to present the data collection and teachers were asked to hand envelopes with research description and permission form for the parents. Student tests and interviews were

prepared to collect data concerning reading- and math-related skills (e.g. vocabulary, reading, writing, counting) and motivation (e.g., interest in reading and math). Protocols and instructions were handed to the psychologists from the participating schools, concerning the tests and interviews of children. Every student completed identical tasks individually in the separate room, usually the room of psychologist, to provide an environment without additional distractions. Results of the tests have been scored by the members of the research group. Questionnaires about individual students and class, in general, were filled by the teachers. Parents filled questionnaires about their children and handed the papers to the class teacher together with the signed permissions for their own and their children's participation.

In the current thesis data from 231 preschool students (50.6% girls, n = 117; 49.4% boys, n = 114) and their teachers (n = 18) were analysed. Students, whose data on at least two of the main constructs (teacher–student relationship, task persistence and academic skills or motivation) were missing, were excluded from this research sample. The average age of students, in general, was 6.73 years (SD = .30), girls 6.73 (SD = .27), boys 6.74 (SD = .33). Boys and girls did not differ in terms of their age ($t(226) = -.25$, p = .81).

Table 1 shows the distribution of mothers' and fathers' education. Majority of parents had a university degree or had studied at college or vocational school. Only a few parents had less than eight years of education.

TABLE 1 Parent Education

Education	Mother	Father
0–8 years	1 (0.4%)	4 (1.7%)
9–10 years	8 (3.5%)	8 (3.5%)
11–12 years	22 (9.5%)	27 (11.7%)
College or Vocational school	55 (23.8%)	64 (27.7%)
University	139 (60.2%)	110 (47.6%)
Did not provide information	6 (2.6%)	18 (7.8%)

Concerning family structure, majority (n = 178) of parents answered that their children live with both father and mother (77.1%); 26 children (11.3%) lived only with a mother; 11 (4.8%) children lived with mother and stepfather; remaining 16 (6.8%) children lived only with father, foster family or parents chose option *other* or have not provided information about their family structure.

Although all recruited schools taught children in Lithuanian language, a total of 1.7% of participants (n = 4) spoke Russian, 0.9% (n = 2) Polish, 4.3% (n = 10) Lithuanian and Russian, 1.3% (n = 3) Lithuanian and Polish, and 1.3% (n = 3) a combination of Lithuanian, Russian and Polish at home.

7.2 Research Methods

In the current study, data of student's early academic skills (i.e., vocabulary, phonological awareness, letter knowledge, reading, writing, number sequences, and arithmetic) and their motivation was analysed. Moreover, the teacher reports about the task persistence of each child and the quality of teacher–student relationship with each child were used. The tests were taken from the longitudinal study *First Steps* (Lerkkanen et al., 2006-2016), *ARMI* test battery (Lerkkanen, Poikkeus, & Ketonen, 2006) and the doctoral dissertation of Gedutienė (2008) and were modified for the purposes of the current study. Noteworthy, psychometric properties of all the constructs (sample size, means, standard deviations, ranges, and skewness) are presented in the *Results* part (Table 6).

7.3 Teacher Questionnaire

7.3.1 Teacher–Student Relationship

The quality of the teacher–student relationship was measured using a short form of the *Student–Teacher Relationship Scale* (STRS; Pianta, 1992; Pianta, 2001). Teachers answered questions about their perceptions of the degree to which they experience close and conflicting relationships with each individual student. The

scale includes 15 items and two different subscales: Closeness (7 items) and Conflict (8 items). The *Student–Teacher Relationship Scale* was adapted and translated to Lithuanian language by two independent translators and then the most suitable translations were chosen for the purposes of the current study. Teachers had to rate the items using 5-point Likert scale (1 - Completely disagree; 2 - Disagree; 3 - Neither agree nor disagree; 4 - Agree; 5 - Completely agree).

TABLE 2 Factor Loadings of Items of the Student-Teacher Relationship Scale – Short Form (STRS-R; Pianta, 1992; Pianta, 2001)

Closeness		Factor Loadings	
		1	2
1.	I share an affectionate, warm relationship with this child	-.63	.24
3.	If upset, this child will seek comfort from me	-.20	**.59**
5.	This child values his/her relationship with me	-.43	**.48**
6.	When I praise this child, he/she beams with pride	-.40	.33
7.	This child spontaneously shares information about himself/herself	.17	**.94**
9.	It is easy to be in tune with what this child is feeling	-.17	**.68**
15.	This child openly shares his/her feelings and experiences with me.	.10	**.92**
Conflict			
2.	This child and I always seem to be struggling with each other	**.78**	.05
4.	This child is uncomfortable with physical affection or touch from me	**.45**	-.24
8.	This child easily becomes angry with me	**.90**	.07
10.	This child remains angry or is resistant after being disciplined	**.88**	.08
11.	Dealing with this child drains my energy	**.84**	.07
12.	When this child is in a bad mood, I know we‘re in for a long and difficult day	**.87**	.03

13.	This child's feelings toward me can be unpredictable or can change suddenly	**.78**	-.08
14.	This child is sneaky or manipulative with me	**.82**	.02

Student-Teacher Relationship Scale is widely used by many authors in different countries. For example, Gregoriadis and Tsigilis (2007) used *exploratory factor analysis* and showed that the *Student-Teacher Relationship Scale* is a valid scale to apply it in the Greek educational context. Koomen and colleagues (2012) used *confirmatory factor analysis* and showed that adapted *Student-Teacher Relationship Scale* for Dutch sample is valid to use for measuring teacher–student relationship. The *exploratory factor analysis* using the principal components method with direct oblimin rotation was performed to investigate whether the *Student-Teacher Relationship Scale* is valid to apply in the current sample. The analysis extracted two factors from the scale with eigenvalues greater than one, which has explained 57% of the variance. *Exploratory factor analysis* shows that all the conflict items fall into one of the factors. However, not all the closeness items fall to the second factor, which shows that there might have been some inconsistencies in the distinction of two dimensions of teacher–student relationship in this particular sample. All in all, as this scale was proven to be valid and reliable in many different contexts, it was decided to continue analysis using all of the items, to keep the whole scale as was suggested by the original author (STRS-R; Pianta, 1992; Pianta, 2001). Moreover, the reliability of this scale was also proven to be high in the current sample (Table 5).

7.3.2 Task Persistence

Task persistence was measured using the *Behavioural Strategy Rating Scale* (BSRS; Aunola, Nurmi, Parrila, & Onatsu-Arvilommi, 2000; Nurmi & Aunola, 2000). Teachers were asked about the behaviour of each individual preschool student in the classroom. The scale included 5 items on a 5-point Likert scale (1 - Completely disagree; 2 - Disagree; 3 - Neither agree nor disagree; 4 - Agree; 5 - Completely agree). Table 3 shows all the items that were used in the research to measure task persistence.

TABLE 3 Items of the Behavioural Strategy Rating Scale (BSRS; Aunola et al., 2000; Nurmi & Aunola, 2000)

	Items	Factor Loading
1.	If difficulties arise in the activity or assignment, does the child easily start doing something else?	**.82**
2.	Does the child actively try to manage even the difficult situations or assignments?	**.87**
3.	Does the child easily give up trying?	**.52**
4.	Does the child show activity or endurance in her/his actions or assignments?	**.87**
5.	If the assignment or activity does not go well, does the child begin to busy her/himself with this and that?	**.82**

The scale was adapted and translated to Lithuanian language by two individual translators and then the most suitable translations were chosen for the purposes of the current study. Values of the negative statements (1, 3 and 5) were reversed (1 to 5; 2 to 4; 3 to 3; 4 to 2; 5 to 1). To show that the psychometrical properties of the study are good, *Spearman correlation* was calculated to analyse whether the teacher reported task persistence correlates with the task persistence that was reported by school psychologists (testers). *Spearman correlation* was used because the data of task persistence did not fit to the normal distribution. Results show that the task persistence, reported by teachers and psychologists statistically significantly correlates with each other ($r = .554$, $p < .01$). Moreover, the *exploratory factor analysis* using the principal components method with direct oblimin rotation was used to investigate the validity of the questionnaire. The analysis extracted one factor from the scale with eigenvalues greater than one, which has explained 55% of the variance. Therefore, the *Behavioural Strategy Rating Scale* is valid to use for the current sample.

7.4 Children Tests

Early literacy (e.g., reading, writing, letter knowledge) and early numeracy skills of children (e.g., counting, number sequences) were measured by individual tests

and motivation was measured by interviews. Test batteries and instructions were translated into Lithuanian language from the study *First Steps* (Nurmi et al., 2006-2016), *ARMI* test battery (Lerkkanen et al., 2006) and the doctoral dissertation of Gedutienė (2008). All the measures were used for the purposes of the study and were adapted to be culture- and age-appropriate.

7.4.1 Early Literacy Skills

Vocabulary was assessed using a short version of *Peabody Picture Vocabulary Test-Revised* (PPVT-R, Form L; Dunn & Dunn, 1981) adapted in the *First Steps* study (Lerkkanen et al., 2006-2016). During the test, students were asked to show which picture out of four represents the meaning of the word pronounced by the school psychologist. Children were presented with 30 words, and one point was awarded for the correctly pointed word (0 – wrong; 1 – correct). Words and instructions from the original scale were translated into the Lithuanian language. Vocabulary test measures the number of words that students can recognize in the presented pictures. During the test, the time was not measured, and all 30 words were presented to all of the children. None of the students that have participated in the current study scored at the ceiling.

Phonological awareness was measured by two tests: phoneme identification and phoneme deletion (Gedutienė, 2008). During the phoneme identification test, students were asked to identify the first phoneme of 12 words (pronounced by the school psychologist). During the phoneme deletion test, children had to delete the first phoneme from another set of 12 words (pronounced by the school psychologist) and say the word without the first phoneme. Answers were rated as incorrect or correct (0 – incorrect; 1 – correct). Words and instructions from the original scale were translated into the Lithuanian language. In the phonological identification subtest, 33.2% (76) of students scored at the ceiling. In the phonological deletion subtest, 6.6% (15) of students scored at the ceiling.

Letter knowledge was measured by asking children to name all the letters of the Lithuanian alphabet (32 letters). Uppercase letters were randomly written and presented on a piece of paper. Letters had to be named one at a time in the

correct order from left to right. While children were naming letters from the particular line, the lower lines were covered with paper. The letter knowledge test of the Lithuanian alphabet was adapted from Gedutienė (2008) and *ARMI* (Lerkkanen et al., 2006). Answers were rated as incorrect or correct (0 – incorrect; 1 – correct), the total sum of mistakes and correct answers was calculated. In the current study, 25.3% (58) of students scored at the ceiling.

Reading skills were tested using a list of 16 words, ranging from easy to difficult (ARMI; Lerkkanen et al., 2006; Gedutienė, 2008). During the test, 16 words were presented, and students were asked to read as many words as possible in 45 seconds. At the beginning words with three letters were presented and at the end - ten letter word was presented. One point was given for a correctly read word (0 – incorrect; 1 – correct), the total sum of correctly read words in 45 seconds was calculated, and the sum of correctly read words was used for the analysis. In the current study, 11.4% (26) of students scored at the ceiling.

Writing was tested by the test developed in accordance with the *ARMI* test battery (Lerkkanen et al., 2006) and the dissertation of Gedutienė (2008). During the test, students were asked to write their names and eight words, pronounced by the school psychologist. The words were organized in an order of difficulty: the first word had four letters, and each following word had one letter more than the previous one. All written words were scored from 0 to 4 (0 – incorrectly spelled word; 0,5 – one correctly spelled letter, but not the first letter; 1 – correctly spelled the first letter of the word; 2 – two or more correctly spelled letters; 3 – the whole word that is spelled incorrectly, but contains correct phonetic structure, switched letters; 4 – correctly spelled word). Words and instructions from the original scale were adapted to Lithuanian language. In the current study, 0.9% (2) of students scored at the ceiling.

7.4.2 Early Numeracy Skills

Number sequence skills were evaluated by the test which includes four tasks that measure the ability of students to count forwards and backwards (Hannula,

Räsänen, & Lehtinen, 2007). During the test, students were asked to name numbers starting from 1 (task 1), name numbers backwards starting from 12 (task 2), name numbers backwards starting from 23 (task 3) and name numbers from 6 to 13 (task 4). Answers were rated from 0 to 2 (0 – More than two mistakes; 1 – One or two mistakes; 2 – Correct answer). The total sum of correct answers was calculated. Instructions from the original test were translated into the Lithuanian language. In the current study, 33.2% (76) of students scored at the ceiling on the number sequences test.

Arithmetic skills were measured using two types of tests – **addition** (nine tasks) and **subtraction** (nine tasks). The tests were adapted from Aunola and Räsänen (2007) and modified for the current research purposes. During the tests, students were asked to complete as many addition and subtraction tasks as possible, in 60 seconds for each test. Each student was presented with a stimulus sheet of paper with the equations and was asked to tell the answers aloud. Answers were rated as incorrect or correct (0 – incorrect; 1 – correct), the total sum of and correct answers were calculated. For the addition test, 6.1% (14) of students scored at the ceiling; and for the subtraction test, 6.6% (15) of students scored at the ceiling.

7.4.3 Motivation

Motivation was measured using *Task-Value Scale* during the interview with children (TVS-C; Nurmi & Aunola, 1999; based on Eccles et al., 1983). This scale examined the degree of the interest for the reading, writing and mathematics tasks. In the beginning, psychologists showed students five faces with different emotions ranging from the very sad to very happy as shown in *Appendix* and asked to point the face which represents most how they feel about reading, writing and counting activities at school and home. The table below shows the items of the motivation subscales that were used in the current study.

Table 4 Task-Value Scale Items (TVS-C; Nurmi & Aunola, 1999; based on Eccles et al., 1983)

	Factor Loadings		
Motivation to Read	1	2	3
1 How much do you like doing reading-related tasks at preschool?	**.65**	.00	-.14
2 How much do you like doing reading-related tasks at home?	**.77**	-.07	.03
3 How much do you like reading at preschool?	**.75**	.09	-.06
Motivation to Write			
1 How much do you like doing writing-related tasks at preschool?	.00	-.03	**-.80**
2 How much do you like doing writing-related tasks at home?	.12	-.01	**-.65**
3 How much do you like writing at preschool?	.06	.14	**-.65**
Motivation to Count			
1 How much do you like doing math-related tasks at preschool?	-.07	**.74**	-.14
2 How much do you like doing math-related tasks at home?	.21	**.77**	.27
3 How much do you like math at preschool?	-.10	**.73**	-.20

Answers of students were measured from 1 to 5 (1 – Very boring; 5 – Very fun). Sentences and instructions from the original scale were translated into the Lithuanian language. The *exploratory factor analysis* using the principal components method with direct oblimin rotation was performed to investigate the validity of *Task-Value Scale* for the current sample. The analysis extracted three factors from the scale with eigenvalues greater than one, which has explained 37% of the variance. Table 4 shows that all motivational items loaded on their respected scales: motivation to read (Factor 1), motivation to write (Factor 3), and motivation to count (Factor 2). As the expected amount and pattern of factors were extracted from the scale, the *factor analysis* confirms that the scale is valid in the current sample.

7.5 Reliability

Cronbach's alpha was used to measure the reliability of the tests and scales. The internal consistency (*Cronbach's alpha*) of all the scales that were used in the study are shown in the table below.

TABLE 5 Reliability

Scale	Cronbach's alpha
Teacher–Student Relationship	
Closeness	.857
Conflict	.914
Task Persistence	
Task Persistence	.843
Early Literacy Skills	
Vocabulary	.683
Phoneme Identification	.914
Phoneme Deletion	.967
Letter Knowledge	.955
Reading	.961
Writing	.971
Early Numeracy Skills	
Number Sequences	.824
Addition	.834
Subtraction	.877
Motivation	
Motivation to Read	.601
Motivation to Write	.593
Motivation to Count	.622

Table 5 shows the internal consistencies of all the measures that were used in the current thesis. *Cronbach's alpha* has shown very high reliability of conflict subscale, phoneme identification, phoneme deletion, letter knowledge, reading and writing tests. It has also shown good reliability of closeness subscale, task persistence scale, number sequences, addition and subtraction tests. A bit lower reliability had a vocabulary test and all three motivation subscales.

7.6 Data Analysis Strategy

All the data were entered into the *IBM SPSS Statistics 26* program file. A variety of statistical methods were used. *Descriptive statistics* were calculated to investigate the distributions of the variables. To answer the first three research questions about the associations between the variables of teacher–student relationship, task persistence and student early academic skills and motivation at preschool *Spearman's* correlations were calculated. To answer the fourth main research question, *PROCESS* analysis modelling tool for *SPSS* was used to evaluate whether task-persistence can act as a mediator (Figure 1) between teacher–student relationship and early academic skills and motivation. The figure below demonstrates the basic theoretical mediation model (Field, 2013). *Path c* represents all the associations between the predictor and the outcome (total effect), *path a* shows that teacher–student relationship (predictor) predicts task persistence (mediator), and *path b* shows that the task persistence (mediator) predicts early academic skill and motivation (outcome). When task persistence (mediator) is taken into account, the direct association between teacher–student relationship and early academic skills and motivation is *path c'*.

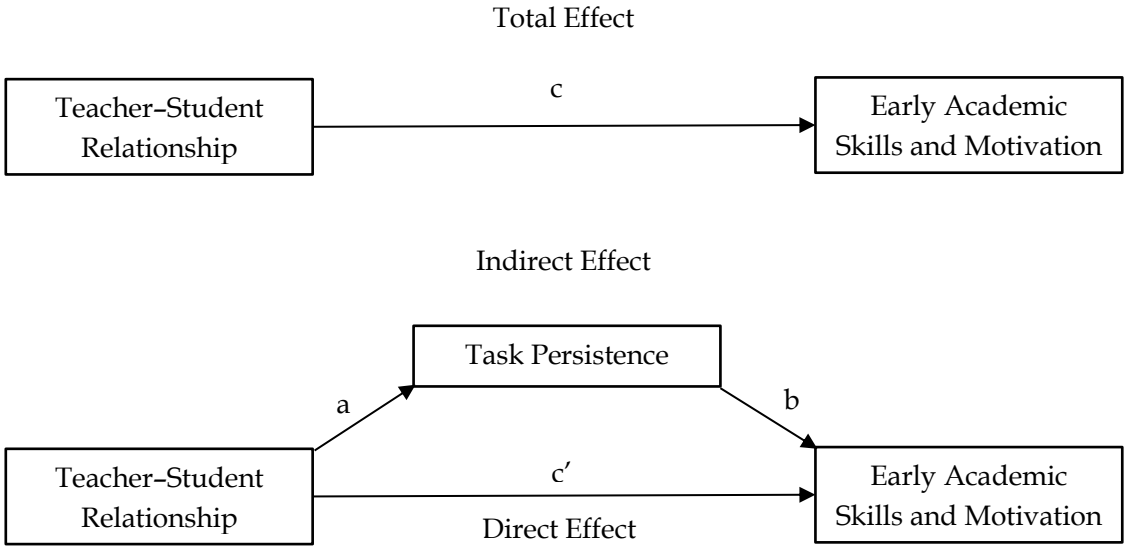

FIGURE 1. Mediation Model: Total, Direct and Indirect Effect (Field, 2013)

The task persistence acts as a mediator only if the relationship between the predictor and outcome (*path c'*) is smaller than that of the total effect. Partial mediation can be detected when *c'* is smaller than *c* but remains significant and full mediation can be detected when *c'* becomes non-significant (Field, 2013).

PROCESS macro was created by Andrew F. Hayes, and the latest version was updated in August 2019. Therefore, in the current thesis, the newest version *3.4* of the tool was used. The *PROCESS* macro became a popular tool to evaluate the regression coefficients in the mediation analysis because it calculates direct and indirect effects between variables (Hayes, 2017).

8 RESULTS

This section shows the results of the study and answers the main research questions. In the beginning, *descriptive statistics* are presented (Table 6). Then the data analysis is presented, which shows the *Spearman* and *Pearson* correlations between teacher–student relationship, task persistence and early academic skills and motivation. At the end of the section, mediation analysis is presented where task persistence acts as a mediator in the association between teacher–student relationship and early academic skills and motivation.

8.1 Descriptive Statistics

This section presents the overview of the study variables (Table 6) reported by the teachers and collected from tests and interviews of students.

TABLE 6 Descriptive Statistics

Variables	*n*	*M*	*SD*	*Potential Range*	*Actual Range*	*Skewness*
Teacher–Student Relationship						
Closeness	230	4.07	.66	1-5	2.14-5	-.32
Conflict	230	1.78	.80	1-5	1-4.5	.98
Task persistence	231	3.65	.92	1-5	1-5	-.52
Early Literacy Skills						
Vocabulary	229	18.03	3.93	0-30	7-26	-.46
Initial phoneme identification	229	9.99	3.04	0-12	0-12	-2.30
Initial phoneme deletion	229	3.53	4.67	0-12	0-12	.77
Letter knowledge	229	26.89	7.31	0-32	1-32	-2.07
Reading	229	6.71	5.94	0-16	0-16	.32
Writing	229	18.66	10.24	0-32	0-32	-.54
Early Numeracy Skills						
Number sequences	229	5.32	2.74	0-8	0-8	-.67
Addition	229	3.67	2.47	0-9	0-9	.69
Subtraction	229	4.76	2.86	0-9	0-9	-.43

Motivation						
Motivation to read	229	3.88	.93	1-5	1-5	-.78
Motivation to write	229	3.94	.90	1-5	1-5	-.68
Motivation to count	229	4.33	.74	1-5	1-5	-1.08

Table 6 shows that teachers reported having close relationships with students more often than conflicting. Teachers also reported that their students, on average, were quite persistent during learning activities in preschool. There were no students that scored maximum in a conflicting relationship with teachers. Students reported that, on average, they had high motivation for reading, writing and especially counting. Moreover, the scores of students varied between zero to the maximum score in phonological awareness, reading, writing and early numeracy skills. All of the students knew at least one of the letters and were able to correctly assign at least seven words for the pictures (vocabulary test).

8.2 Associations between Teacher–Student Relationship, Task Persistence and Early Academic Skills

To answer the first three research questions about the associations between teacher–student relationship, task persistence and early academic skills and motivation in preschool, *Spearman's* correlations were calculated (Table 7). The study sample was big enough to run the *Pearson's* correlational analysis (also presented in table 7). However, the *Kolmogorov-Smirnov test of normality* suggested that some variables (e.g. closeness, conflict, letter knowledge) were not normally distributed. Therefore, because of lesser sensitivity for the normality of distribution, *Spearman's* correlational analysis was more suitable for the purposes of the current thesis.

TABLE 7 Results of the Correlational Analysis

	Spearman correlations			Pearson correlations		
Variable	1	2	3	1	2	3
1. Closeness	—			—		
2. Conflict	-.635**	—		-.595**	—	

3. Task persistence	.503**	-.610**	—	.514**	-.619**	—
Early literacy skills						
4. Vocabulary	.283**	-.251**	.359**	.279**	-.261**	.380**
5. Initial phoneme identification	.227**	-.171**	.312**	.188**	-.236**	.376**
6. Initial phoneme deletion	.223**	-.203**	.315**	.218**	-.188**	.300**
7. Letter knowledge	.286**	-.288**	.442**	.264**	-.349**	.446**
8. Reading	.254**	-.226**	.426**	.241**	-.204**	.426**
9. Writing	.273**	-.224**	.441**	.283**	-.273**	.466**
Early numeracy skills						
10. Number sequences	.145*	-.138*	.395**	.181**	-.207**	.438**
11. Addition	.159*	-.132*	.279**	.162*	-.138*	.269**
12. Subtraction	.104	-.120	.242**	.156*	-.176**	.280**
Motivation						
13. Motivation to read	.247**	-.255**	.302**	.263**	-.272**	.354**
14. Motivation to write	.136*	-.145*	.207**	.158*	-.188**	.234**
15. Motivation to count	.129	-.126	.112	.153*	-.184**	.187**
Control measures						
16. Gender	-.177**	.183**	-.223**	-.165*	.219**	-.221**
17. Age of students (in months)	.034	-.045	.156*	.038	-.068	.166*
18. Highest education of parents	.152*	-.091	.092	.174**	-.112	.171**
19. Work experience of teachers (in years)	.201**	-.092	.100	.157*	-.007	.083
20. Class size	-.091	.134*	-.176**	-.087	.090	-.175**

* $p < .05$. ** $p < .01$.

Concerning the first research question, *Spearman* correlational analysis showed that close relationship between teacher and student significantly positively correlated with early academic skills and motivation and conflicting teacher–student relationship negatively correlated with early academic skills and motivation. The closer teacher–student relationship teachers have reported about their students, the higher early academic skills and motivation students had. On the other hand, the more conflicting teacher–student relationship teachers have reported, the lower early academic skills and motivation students had. The exception was a non-significant correlation between teacher–student relationship and

subtraction and motivation to count. Concerning the second research question, the results showed that task persistence positively correlated with early academic skills and motivation, except motivation to count. The higher task persistence teachers reported about their students, the better early academic skills and motivation to read and write students had. Finally, concerning the third research question, the results showed significant positive associations between close teacher–student relationship and task persistence and negative associations between conflicting teacher–student relationship and task persistence. The closer relationship between teachers and students was reported by teachers, the higher task persistence students showed. On the other hand, the more conflicting teacher–student relationship was reported by the teachers, the lower task persistence students showed.

8.3 Mediation of Task Persistence in the Associations between Teacher–Student Relationship and Early Academic Skills and Motivation

To answer the fourth and the main research question about the mediation of task persistence in the association between teacher–student relationship and early academic skills in preschool, *PROCESS* tool for mediation analysis was used. The tables 8–13 show direct and indirect (via task persistence) predictions from a teacher–student relationship (closeness and conflict) to early literacy, early numeracy skills and motivation. The paths in Tables 8–13 represents paths *a*, *b*, *c*, and *c'* (Figure 1). Additional five variables (gender, age in months, highest education of parents, the experience of teachers in years and class size) were chosen accordingly to the work of Silinskas with colleagues (2016) and Pakarinen with colleagues (2011) as control variables. Although the control variables were entered as covariates in the mediation analyses, their results will not be presented for clarity reasons.

The aim of the mediation analysis using *PROCESS* tool was to identify whether task persistence mediates the association of teacher–student relationship and early academic skills and motivation. In other words, the aim was to analyse

whether teacher–student relationship correlates with early academic skills and motivation via task persistence. The significant relations between the teacher–student relationship and task persistence and between task persistence and early academic skills and motivation must be found for the mediation of task persistence to be tested.

Table 8 presents the direct and indirect effect of close teacher–student relationship on early literacy skills. *Path a* shows the significant effect of teacher–student closeness on task persistence (*b* = .64, *p* = .00, 95%CI[.47; .80]) in the presented model. *Path a* is identical in all the presented models in Table 8; therefore, it was presented only once for the clarity reasons. *Path c* shows the total effect of teacher–student closeness on early literacy skills when the direct and indirect effects (via task persistence) are estimated together. *Path b* presents the effect of task persistence on student outcomes (literacy skills). *Path c'* shows the direct effect of teacher-student closeness (predictor) on early literacy skills (outcome) when task persistence is taken into account in the mediation model (see Figure 1). Moreover, the indirect effect shows the combined effect size of both teacher–student closeness and task persistence on early literacy skills. Also, the unstandardized, or *raw* coefficients (R^2, *b, SE, p, LLCI, ULCI*) were reported to show the results from the original data, and standardized or normalized coefficients (β, *LLCI, ULCI*) were reported for the better understanding of the strength of the effect between variables. R^2 shows the percentage of how much teacher–student closeness or conflict, task persistence and control variables together predict the variance of different early academic skills (outcomes). In the PROCESS macro mediation analysis, *path b* and *path c'* are presented in one model, thus only one R^2 was presented (next to *path b*). Table 8 shows significant positive total effect (path c) of closeness to vocabulary (*b* = 1.22, p = .00, 95%CI[.47; 1.98]), phoneme deletion (*b* = 1.35, p = .01, 95%CI[.41; 2.29]), letter knowledge (*b* = 2.18, p = .00, 95%CI[.84; 3.53]), reading skills (*b* = 1.71, p = .00, 95%CI[.56; 2.87]) and writing skills (*b* = 3.57, p = .00, 95%CI[1.65; 5.49]), except phoneme identification. However, the direct effect (path c') of teacher–student closeness, when task persistence was taken into account, was non-significant for vocabulary (*b* = .46, p = .28,

95%CI[-.37; 1.29]), phoneme deletion (*b* = .59, p = .27, 95%CI[-.45; 1.63]), letter knowledge (*b* = .16, p = .82, 95%CI[-1.24; 1.56]), reading skills (*b* = .15, p = .81, 95%CI[-1.07; 1.38]) and writing skills (*b* = .58, p = .56, 95%CI[-1.41; 2.58]). In the mediation model, all *paths a* and *b* (and indirect paths) stayed significant, suggesting that task persistence can act as a full mediator between closeness and early literacy skills, except for phoneme identification.

The indirect effect of closeness and early literacy skills through the task persistence completely eliminated the direct effect (Table 8) of teacher–student closeness on early literacy skills. Moreover, 95% confidence interval of standardized indirect effect on vocabulary (β = .13, 95%CI[.06; .21]), phoneme deletion (β = .11, 95%CI[.04; .18]), letter knowledge (β = .19, 95%CI[.11; .27]), reading (β = .17, 95%CI[.10; .26]) and writing (β = .19, 95%CI[.12; .28]) did not include zero, which confirmed the significance of the indirect paths.

TABLE 8 Closeness, Task Persistence and Literacy Skills: Mediation Analysis

Closeness as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.33	.45	.64	.08	.00	.47	.80
Vocabulary as an outcome							
Path c (Total effect)	.16	.21	1.22	.38	.00	.47	1.98
Path b	.21	.29	1.20	.31	.00	.59	1.80
Path c′ (Direct effect)		.08	.46	.42	.28	-.37	1.29
Unstandardized indirect effect	-	-	.76	.23	-	.36	1.25
Standardized indirect effect	-	.13	-	.04	-	.06	.21
Phoneme identification as an outcome							
Path c (Total effect)	.13	.11	.51	.30	.10	-.09	1.11
Path b	.21	.35	1.14	.24	.00	.67	1.61
Path c′ (Direct effect)		-.05	-.22	.33	.50	-.87	.43
Unstandardized indirect effect	-	-	.73	.18	-	.39	1.13
Standardized indirect effect	-	.16	-	.04	-	.09	.23
Phoneme deletion as an outcome							
Path c (Total effect)	.12	.19	1.35	.48	.01	.41	2.29
Path b	.16	.24	1.19	.38	.00	.43	1.95
Path c′ (Direct effect)		.08	.59	.53	.27	-.45	1.63

Unstandardized indirect effect	-	-	.76	.26	-	.31	1.33
Standardized indirect effect	-	.11	-	.04	-	.04	.18
Letter knowledge as an outcome							
Path c (Total effect)	.24	.20	2.18	.68	.00	.84	3.53
Path b	.35	.41	3.18	.52	.00	2.15	4.20
Path c′ (Direct effect)		.01	.16	.71	.82	-1.24	1.56
Unstandardized indirect effect	-	-	2.02	.47	-	1.17	3.03
Standardized indirect effect	-	.19	-	.04	-	.11	.27
Reading as an outcome							
Path c (Total effect)	.17	.19	1.71	.59	.00	.56	2.87
Path b	.27	.38	2.45	.45	.00	1.56	3.35
Path c′ (Direct effect)		.02	.15	.62	.81	-1.07	1.38
Unstandardized indirect effect	-	-	1.56	.36	-	.91	2.36
Standardized indirect effect	-	.17	-	.04	-	.10	.26
Writing as an outcome							
Path c (Total effect)	.23	.23	3.57	.98	.00	1.65	5.49
Path b	.35	.43	4.69	.74	.00	3.23	6.14
Path c′ (Direct effect)		.04	.58	1.01	.56	-1.41	2.58
Unstandardized indirect effect	-	-	2.98	.66	-	1.79	4.36
Standardized indirect effect	-	.19	-	.04	-	.12	.28

Table 9 presents the direct and indirect effect of conflicting teacher–student relationship on early literacy skills. The meanings of the paths (total, indirect and direct effects) are the same in all the tables as described for the Table 8. *Path a* confirms the significant effect of teacher–student conflict on task persistence (*b* = -.67, *p* = .00, 95%CI[-.80; -.55]) in the presented model. Results show significant negative total effect (*Path c*) of conflict on vocabulary (*b* = -.97, p = .00, 95%CI[-1.61; -.34]), phoneme identification (*b* = -.58, p = .02, 95%CI[-1.08; -.08]), phoneme deletion (*b* = -.93, p = .02, 95%CI[-1.72; -.14]), letter knowledge (*b* = -2.54, p = .00, 95%CI[-3.64; -1.44]), writing skills (*b* = -2.69, p = .00, 95%CI[-4.31; -1.08]) and lower effect on reading skills (*b* = -.98, p = .05, 95%CI[-1.96; -.01]). However, the direct effect (path c′) of teacher–student conflict, when task persistence is taken into account, was non-significant on vocabulary (*b* = -.09, p = .81, 95%CI[-.85; .67]), phoneme identification (*b* = .20, p = .50, 95%CI[-.39; .80]), phoneme deletion

(*b* = .01, p = .98, 95%CI[-.94; .96]), letter knowledge (*b* = -.56, p = .39, 95%CI[-1.84; .73]), reading skills (*b* = 1.07, p = .06, 95%CI[-.04; 2.18]) and writing skills (*b* = .91, p = .33, 95%CI[-.92; 2.73]). All *paths a* and *b* (and indirect paths) remained significant, which showed that task persistence can act as a full mediator between conflict and early literacy skills.

The indirect effect of conflict and early literacy skills through the task persistence completely eliminated the direct effect (Table 9) of teacher–student conflict on early literacy skills. Moreover, 95% confidence interval of standardized indirect effect on vocabulary (β = -.18, 95%CI[-.28; -.08]), phoneme identification (β = -.20, 95%CI[-.30; -.12]), phoneme deletion (β = -.16, 95%CI[-.26; -.07]), letter knowledge (β = -.21, 95%CI[-.31; -.13]), reading (β = -.27, 95%CI[-.37; -.18]) and writing (β = -.27, 95%CI[-.37; -.18]) did not include zero, which confirmed the significance of the indirect paths.

TABLE 9 Conflict, Task Persistence and Literacy Skills: Mediation Analysis

Conflict as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.44	-.56	-.67	.06	.00	-.80	-.55
Vocabulary as an outcome							
Path c (Total effect)	.15	-.20	-.97	.32	.00	-1.61	-.34
Path b	.21	.31	1.31	.34	.00	.64	1.97
Path c′ (Direct effect)		-.02	-.09	.39	.81	-.85	.67
Unstandardized indirect effect	-	-	-.88	.25	-	-1.39	-.39
Standardized indirect effect	-	-.18	-	.05	-	-.28	-.08
Phoneme identification as an outcome							
Path c (Total effect)	.14	-.15	-.58	.25	.02	-1.08	-.08
Path b	.21	.36	1.17	.26	.00	.65	1.69
Path c′ (Direct effect)		.05	.20	.30	.50	-.39	.80
Unstandardized indirect effect	-	-	-.79	.20	-	-1.19	-.43
Standardized indirect effect	-	-.20	-	.05	-	-.30	-.12
Phoneme deletion as an outcome							
Path c (Total effect)	.11	-.15	-.93	.40	.02	-1.72	-.14
Path b	.15	.28	1.40	.42	.00	.56	2.23
Path c′ (Direct effect)		.00	.01	.48	.98	-.94	.96

Unstandardized indirect effect	-	-	-.94	.29	-	-1.54	-.41
Standardized indirect effect	-	-.16	-	.05	-	-.26	-.07
Letter knowledge as an outcome							
Path c (Total effect)	.27	-.27	-2.54	.56	.00	-3.64	-1.44
Path b	.35	.38	2.95	.57	.00	1.83	4.07
Path c′ (Direct effect)		-.06	-.56	.65	.39	-1.84	.73
Unstandardized indirect effect	-	-	-1.98	.44	-	-2.90	-1.17
Standardized indirect effect	-	-.21	-	.05	-	-.31	-.13
Reading as an outcome							
Path c (Total effect)	.15	-.13	-.98	.49	.05	-1.96	-.01
Path b	.28	.48	3.05	.49	.00	2.08	4.02
Path c′ (Direct effect)		.14	1.07	.56	.06	-.04	2.18
Unstandardized indirect effect	-	-	-2.05	.35	-	-2.78	-1.42
Standardized indirect effect	-	-.27	-	.05	-	-.37	-.18
Writing as an outcome							
Path c (Total effect)	.22	-.20	-2.69	.82	.00	-4.31	-1.08
Path b	.35	.49	5.35	.81	.00	3.76	6.94
Path c′ (Direct effect)		.07	.91	.93	.33	-.92	2.73
Unstandardized indirect effect	-	-	-3.60	.63	-	-4.90	-2.41
Standardized indirect effect	-	-.27	-	.05	-	-.37	-.18

Table 10 presents the direct and indirect effect of close teacher–student relationship on early numeracy skills. Results have shown significant positive total effect (Path c) of closeness on addition (b = .60, p = .02, 95%CI[.12; 1.09]) and small effect on number sequence skills (b = .55, p = .05, 95%CI[.01; 1.09]). However, the direct effect (path c′) of teacher–student closeness, when task persistence is taken into account, was non-significant on addition (b = .11, p = .67, 95%CI[-.42; .65]) and number sequence skills (b = -.37, p = .18, 95%CI[-.92; .18]). In the mediation model, all paths a and b (and indirect paths) remained significant, suggesting that task persistence can act as a full mediator between closeness and addition and number sequences skills. Unfortunately, subtraction cannot be analysed as a mediator, because of non-significant correlation between teacher–student closeness and subtraction skills.

The indirect effect of closeness and early numeracy skills through the task persistence completely eliminated the direct effect (Table 10) of teacher–student closeness on early numeracy skills. Moreover, 95% confidence interval of standardized indirect effect on addition (β = .13, 95%CI[.06; .21]) and number sequences (β = .22, 95%CI[.15; .30]) did not include zero, suggesting the mediation of task persistence in the association of teacher–student closeness and early numeracy skills.

TABLE 10 Closeness, Task Persistence and Numeracy Skills: Mediation Analysis

Closeness as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.33	.45	.64	.08	.00	.47	.80
Number sequences as an outcome							
Path c (Total effect)	.15	.13	.55	.27	.05	.01	1.09
Path b	.31	.49	1.45	.20	.00	1.05	1.85
Path c′ (Direct effect)		-.09	-.37	.28	.18	-.92	.18
Unstandardized indirect effect	-	-	.93	.17	-	.62	1.28
Standardized indirect effect	-	.22	-	.04	-	.15	.30
Addition as an outcome							
Path c (Total effect)	.16	.16	.60	.25	.02	.12	1.09
Path b	.21	.29	.77	.20	.00	.38	1.16
Path c′ (Direct effect)		.03	.11	.27	.67	-.42	.65
Unstandardized indirect effect	-	-	.49	.15	-	.24	.80
Standardized indirect effect	-	.13	-	.04	-	.06	.21
Subtraction as an outcome							
Path c (Total effect)	.16	.14	.59	.28	.04	.04	1.15
Path b	.22	.30	.93	.22	.00	.48	1.37
Path c′ (Direct effect)		.00	.00	.31	.99	-.60	.61
Unstandardized indirect effect	-	-	.59	.15	-	.30	.91
Standardized indirect effect	-	.14	-	.04	-	.07	.21

Table 11 presents the direct and indirect effect of conflicting teacher–student relationship on early numeracy skills. Results have shown significant negative total effect (Path c) of conflict on number sequences (*b* = -.61, p = .01, 95%CI[-1.06; -.16]) and addition skills (*b* = -.43, p = .04, 95%CI[-.84; -.02]). However, the direct

effect (path c′) of teacher–student conflict, when task persistence was taken into account, was non-significant on number sequences (*b* = .43, p = .10, 95%CI[-.08; .93]) and addition skills (*b* = .17, p = .49, 95%CI[-.32; .66]). As both paths a and b (and indirect paths) remained significant, it is possible to draw the conclusion that task persistence can act as a mediator between conflict and number sequences and addition skills.

The indirect effect of conflict on early numeracy skills through the task persistence completely eliminated the direct effect (Table 10) of teacher–student conflict on early numeracy skills. Moreover, 95% confidence interval of standardized indirect effect on number sequences (β = -.29, 95%CI[-.39; -.21]) and addition (β = -.19, 95%CI[-.29; -.10]) did not include zero, suggesting the significance of indirect paths.

TABLE 11 Conflict, Task Persistence and Numeracy Skills: Mediation Analysis

Conflict as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.44	-.56	-.67	.06	.00	-.80	-.55
Number sequences as an outcome							
Path c (Total effect)	.16	-.17	-.61	.23	.01	-1.06	-.16
Path b	.32	.52	1.55	.22	.00	1.11	1.98
Path c′ (Direct effect)		.12	.43	.25	.10	-.08	.93
Unstandardized indirect effect	-	-	-1.04	.17	-	-1.39	-.74
Standardized indirect effect	-	-.29	-	.05	-	-.39	-.21
Addition as an outcome							
Path c (Total effect)	.15	-.13	-.43	.21	.04	-.84	-.02
Path b	.21	.33	.89	.22	.00	.47	1.32
Path c′ (Direct effect)		.05	.17	.25	.49	-.32	.66
Unstandardized indirect effect	-	-	-.60	.15	-	-.92	-.33
Standardized indirect effect	-	-.19	-	.05	-	-.29	-.10
Subtraction as an outcome							
Path c (Total effect)	.17	-.18	-.65	.23	.01	-1.11	-.19
Path b	.22	.30	.91	.25	.00	.42	1.39
Path c′ (Direct effect)		-.01	-.04	.28	.88	-.60	.51
Unstandardized indirect effect	-	-	-.61	.18	-	-.97	-.26

Standardized indirect effect	-	-.17	-	.05	-	-.27	-.07

Table 12 illustrates the direct and indirect effect of close teacher–student relationship on motivation. Results revealed significant positive total effect (Path c) of closeness on motivation to read (*b* = .34, p = .00, 95%CI[.15; .52]) and motivation to write (*b* = .19, p = .04, 95%CI[.01; .38]). However, the direct effect (path c') of teacher–student closeness, when task persistence was taken into account, was non-significant on motivation to read (*b* = .18, p = .09, 95%CI[-.03; .38]) and motivation to write (*b* = .07, p = .52, 95%CI[-.14; .28]). Results confirmed that task persistence can act as a mediator between closeness and motivation to read and write. Unfortunately, motivation to count cannot be analysed as a mediator, because of non-significant correlation between teacher–student closeness and motivation to count.

The indirect effect of closeness on motivation through the task persistence completely eliminated the direct effect (Table 10) of teacher–student closeness on motivation. Moreover, 95% confidence interval of standardized indirect effect on motivation to read (β = .11, 95%CI[.04; .18]) and write (β = .09, 95%CI[.02; .17]) did not include zero, suggesting the mediation of task persistence in the association of teacher–student closeness and motivation.

TABLE 12 Closeness, Task Persistence and Motivation: Mediation Analysis

Closeness as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.33	.45	.64	.08	.00	.47	.80
Motivation to read as an outcome							
Path c (Total effect)	.16	.23	.34	.09	.00	.15	.52
Path b	.20	.24	.25	.08	.00	.10	.40
Path c' (Direct effect)		.12	.18	.10	.09	-.03	.38
Unstandardized indirect effect	-	-	.16	.05	-	.06	.27
Standardized indirect effect	-	.11	-	.04	-	.04	.18
Motivation to write as an outcome							
Path c (Total effect)	.04	.14	.19	.09	.04	.01	.38
Path b	.07	.21	.20	.08	.01	.05	.35

Path c′ (Direct effect)		.05	.07	.11	.52	-.14	.28
Unstandardized indirect effect	-	-	.13	.05	-	.03	.23
Standardized indirect effect	-	.09	-	.04	-	.02	.17
Motivation to count as an outcome							
Path c (Total effect)	.04	.18	.20	.08	.01	.04	.36
Path b	.07	.21	.17	.06	.01	.04	.29
Path c′ (Direct effect)		.08	.09	.09	.29	-.08	.27
Unstandardized indirect effect	-	-	.11	.05	-	.02	.20
Standardized indirect effect	-	.09	-	.04	-	.02	.17

Table 13 presents the direct and indirect effect of conflicting teacher–student relationship on motivation. Results have shown significant negative total effect (Path c) of conflict on motivation to read (*b* = -.28, p = .00, 95%CI[-.44; -.13]) and write (*b* = -.20, p = .01, 95%CI[-.36; -.05]). However, the direct effect (path c′) of teacher–student conflict, when task persistence was taken into account, was non-significant on motivation to read (*b* = -.12, p = .22, 95%CI[-.30; .07]) and write (*b* = -.09, p = .38, 95%CI[-.28; .10]). As both paths a and b (and indirect paths) remained significant, mediation analysis suggested that task persistence can act as a mediator between conflict and motivation to read and write.

The indirect effect of conflict and motivation through the task persistence completely eliminated the direct effect (Table 10) of teacher–student conflict on motivation. Moreover, 95% confidence interval of standardized indirect effect on motivation to read (β = -.14, 95%CI[-.22; -.05]) and write (β = -.10, 95%CI[-.20; -.01]) did not include zero, which confirmed the significance of indirect paths.

TABLE 13 Conflict, Task Persistence and Motivation: Mediation Analysis

Conflict as a predictor	R^2	β	*b*	*SE*	*p*	*LLCI*	*ULCI*
Path a	.44	-.56	-.67	.06	.00	-.80	-.55
Motivation to read as an outcome							
Path c (Total effect)	.16	-.23	-.28	.08	.00	-.44	-.13
Path b	.19	.24	.25	.08	.00	.08	.41
Path c′ (Direct effect)		-.10	-.12	.10	.22	-.30	.07
Unstandardized indirect effect	-	-	-.17	.05	-	-.27	-.06

Standardized indirect effect	-	-.14	-	.04	-	-.22	-.05
Motivation to write as an outcome							
Path c (Total effect)	.06	-.18	-.20	.08	.01	-.36	-.05
Path b	.07	.18	.18	.08	.04	.01	.34
Path c′ (Direct effect)		-.07	-.09	.10	.38	-.28	.10
Unstandardized indirect effect	-	-	-.12	.06	-	-.23	-.01
Standardized indirect effect	-	-.10	-	.05	-	-.20	-.01
Motivation to count as an outcome							
Path c (Total effect)	.05	-.20	-.19	.07	.00	-.32	-.06
Path b	.07	.19	.15	.07	.04	.01	.29
Path c′ (Direct effect)		-.10	-.09	.08	.25	-.25	.07
Unstandardized indirect effect	-	-	-.10	.05	-	-.21	.00
Standardized indirect effect	-	-.10	-	.05	-	-.21	.00

In conclusion, the results from the current thesis revealed that task persistence can act as a mediator in the association of teacher–student relationship and early academic skills and motivation. In other words, the closer teacher–student relationship was, the higher task persistence students had, and the higher early literacy skills (except phoneme identification), number sequences, addition skills and motivation to read and write preschool students had. In contrast, the more conflicting teacher–student relationship was, the lower task persistence students had, and the lower early literacy skills, number sequences, addition skills and motivation to read and write preschool students had.

9 DISCUSSION

This section discusses the findings of the current research by describing the importance of teacher–student relationship for task persistence, early academic skills and motivation of preschool students. In the beginning, relations between the measured constructs are discussed as are the answers to the main research questions. Then limitations and suggestions for future research are presented. In the end, possible practical implications are discussed to emphasize the significance of the findings of the current research.

9.1 Teacher–Student Relationship and Early Academic Skills and Motivation

The first research question asked about the associations between teacher–student relationship and early academic skills and motivation. The current research confirmed the significance of teacher–student relationship for the early academic skills and motivation of preschool students. Correlational analysis showed that closeness and conflict statistically significantly related to all the early literacy skills that were measured in the current thesis (vocabulary, initial phoneme deletion, initial phoneme identification, letter knowledge, reading and writing). Results of the present study were consistent with the previous studies in the field that showed relations between teacher–student relationship and early literacy skills (Caputi et al., 2016; Lippard et al., 2017). For instance, research of Caputi and colleagues (2016) has shown that the teacher–student relationship correlates with the verbal abilities of students. Moreover, Lippard with colleagues (2017) found that the teacher–student relationship was associated with early reading skills. Findings of the current thesis suggested that the closer teacher–student relationship was, the better early literacy skills preschool students had. In contrast, the more conflicting teacher–student relationship was, the lower early literacy skills students had. Alternatively, it is worth mentioning that these associations can work in both ways, suggesting that the better early literacy skills students

have achieved, the closer relationship with teachers they had. These results are not surprising as *teaching through interaction theory* (Pianta et al., 2012) suggests that the positive classroom environment is essential for the better academic outcomes of students. Previous studies found that the conflicting relationship between teachers and students prevents students from feeling secure to ask for more help and reach for better learning support and, in turn, students reach lower early academic skills (White, 2013).

The correlational analysis also showed significant associations between teacher–student relationship and math-related skills, such as number sequences and addition. Subtraction did not significantly correlated to teacher–student relationship. Therefore, this study only partially confirmed the previous studies which showed correlations between teacher–student relationship and early numeracy skills of primary school students (Kiuru et al., 2014). It might be that the teacher–student relationship plays a bigger role in subtraction skills of students when they enter the primary school when teaching subtraction becomes more important. The findings of the current thesis showed that the closer teacher–student relationship was, the better skills of number sequences and addition students had; and the more conflicting teacher–student relationship was, the lower skills in number sequences and addition preschool students had. These associations can be explained by applying *attachment theory* (Bowlby, 1982). When students and teachers develop close relationships with each other, students feel more safe and secure to reach for help and comfort and, in turn, their early academic skills increase. Moreover, the *bioecological theory* emphasizes the importance of positive interpersonal relationships on human development and the guidance of adults (teachers) in increasing engagement of students and their academic outcomes and development at school (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2007).

Findings of the study revealed associations between teacher–student relationship and motivation of students in reading and writing. It was expected to find the associations between teacher–student relationship and all the parts of measured motivation (seen as interest), as studies show associations between

teacher–student relationship and autonomous motivation, literacy and mathematics learning motivation (Opdenakker et al., 2012; Stephanou, 2014). Unfortunately, the correlational analysis in the present thesis did not show significant associations between teacher–student relationship and motivation to count. However, this finding is quite surprising as students reported higher interest in math-related tasks than reading or writing. The variance in motivation to count was smaller than the variance in motivation to read and write, therefore it is possible that the analysis could not detect the connections between teacher–student relationship and motivation to count. One of the possible explanations for this result could be that some students might lose interest in math tasks if it becomes more challenging, even though they had close relationships with their teachers. Moreover, teacher–student relationship was measured from the perspectives of the teachers and motivation was measured by the interviews of students, and there could have been inconsistencies on the perceptions of students and teachers. The results of the current study showed that the closer teacher–student relationship was, the higher motivation students had; and the more conflicting teacher–student relationship was, the lower motivation in reading and writing students had. However, these results can show reciprocal relations, thus suggesting that the more motivation student has shown, the closer relationship with that student the teacher perceived. The findings can be explained by the *expectancy-value theory*, which states that relationship with important adults can shape believes of children about own abilities and increase motivation towards learning (Wigfield & Eccles, 2000). Therefore, it can be assumed that the close teacher–student relationship increases the positive beliefs about the abilities of students to achieve higher and raise the interest of children in academic activities, such as reading, writing, and counting. Moreover, according to the *self-determination theory*, the close relationships between teachers and students can raise the satisfaction of need for the *relatedness* of students and, in turn, increase their motivation to learn (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013).

In conclusion, results showed that teacher–student relationship related to early literacy skills, number sequences, addition skills and motivation to read

and write of preschool students. These relations could have been found because of the importance of closeness with teachers for positive school outcomes (Hamre & Pianta, 2001). In educational settings, teachers become important figures for the development of students, providing a warm and supportive environment for successful learning (Hamre & Pianta, 2001; Heatly & Votruba-Drzal, 2017). Therefore, conflict with a teacher might create an unsafe environment and decrease early academic skills and motivation of preschool students.

9.2 Task Persistence and Early Academic Skills and Motivation

The second research question asked about the extent to which task persistence of children correlated with early academic skills and motivation of preschool students. Results of the study revealed that task persistence statistically significantly correlated with early literacy skills and early numeracy skills. Findings were consistent with the previous research which have shown relationships between task persistence and academic skills (Kiuru et. al., 2014; Jõgi & Kikas, 2015). The present study showed that the higher task persistence of preschool students was reported by the teachers, the higher early literacy and numeracy skills preschool students had. In contrast, the lower task persistence teachers reported about the students, the lower early academic skills students had. These findings are not surprising as previous studies have shown that students, who have high task persistence are more willing to put more effort and attention into the tasks and more likely to complete even the most difficult tasks without switching to less challenging ones (Kiuru et al., 2014; Jõgi & Kikas, 2015). Therefore, children who exhibit higher task persistence end up obtaining higher academic skills.

The findings of the current study also showed the relations between task persistence and motivation to read and write. These results were consistent with the results of other studies that found positive relationships between task persistence and motivation, or willingness to do the tasks (Bulotsky-Shearer et al., 2011). However, there were no significant correlations found between task per-

sistence and motivation to count. The possible explanations for these inconsistencies could be similar as for the non-significance of associations between teacher–student relationship and motivation to count. Some of the students might not persist in tasks when it becomes difficult, even though they have a high interest in math-related tasks. Moreover, task persistence was also measured from the perspectives of the teachers and motivation was measured by the interviews of students, which could have caused inconsistencies between the perceptions of students and teachers. However, results showed that the higher task persistence of students teachers reported, the higher motivation to read and write students stated; and the lower task persistence of students was reported by the teachers, the lower motivation to read and write students had. These results are not surprising as some of the previous research viewed task persistence as an indicator of motivation (Berhenke, Miller, Brown, Seifer, & Dickstein, 2011). Students who persist in challenging tasks can keep up with the requirements and engage in learning activities easier than students with low task persistence. In turn, the motivation of students gets higher, and students get more confident to engage in other difficult tasks in the future as well (Berhenke et al., 2011).

To conclude, the current thesis showed the importance of task persistence for the development of the early academic skills and motivation of preschool students. While promoting task persistence of students, teachers can also increase the early academic skills and motivation.

9.3 Teacher–Student Relationship and Task Persistence

The third research question asked about the degree to which teacher–student relationship and task persistence correlated with each other. Results from the present study showed a positive correlation between closeness dimension of teacher–student relationship and task persistence and negative correlation between the conflict dimension of teacher–student relationship and task persistence. These results aligned well with the previous studies in the field that

showed the associations between teacher–student relationship and task persistence as a part of engagement (Papadopoulou & Gregoriadis, 2016), classroom behaviours (Lippard et al., 2017) and associations between teacher emotional support and task persistence (Kikas & Tang, 2018). Findings of the current study revealed that the closer teacher–student relationship teachers perceived, the higher task persistence of students teachers tend to report. On the other hand, the more conflicting teacher–student relationship teachers perceived, the lower task persistence they have assigned to their students. The current study highlighted the importance of close teacher–student relationship for the task persistence of preschool students. Studies showed that when students feel supported, they more likely put effort and attention to challenging tasks (Kiuru et al., 2014). Therefore, the close relationship between the teacher and the student increases perceived support by the student and in turn increases task persistence. However, results can also show that the more persistent student has been, the more affection teacher felt towards the student, thus the teacher reported a closer relationship.

The results of the study are not surprising taking into account the previous studies which show the importance of teacher–student relationship for the better school adjustment, positive behaviour, engagement and also task persistence of students (Papadopoulou & Gregoriadis, 2016; Lippard et al., 2017; Kikas & Tang, 2018). Therefore, the current study contributed to the previous research by supporting the connection between close teacher–student relationship and high task persistence and between conflicting relationships of teacher and student and low task persistence.

9.4 Indirect Associations Between Teacher–Student Relationship and Early Academic Skills

One of the aims of the fourth research question was to investigate indirect connections between teacher–student relationship and early academic skills via task persistence. Significant correlations between separate variables were one of the

criteria that had to be reached before the possibility of mediation of task persistence could be expected. Therefore, this part of the thesis discusses the cases when task persistence was found to act as a mediator in the association between teacher–student relationship and early academic skills.

The results of the current study among the preschool students were similar to the results in the previous study among primary school students, showing the mediation of task-focused behaviour between positive teacher affect and academic skills (Kiuru et al., 2014). Moreover, the current thesis analysed the relationship of the teacher and the student and concentrated on teacher perceived feelings from and towards teachers whereas in the previous study only positive teacher affect was investigated (Kiuru et al., 2014). The present study also added a broader perspective by concentrating on task persistence from the teacher point of view. As task persistence was being often analysed in a primary school and onwards in various cultural backgrounds (e.g. Kiuru et al., 2014; Kikas & Silinskas, 2015), the current study also provided a better understanding about the phenomena in the Lithuanian preschool classrooms.

Mediation analysis of the current study revealed that the task persistence can act as a mediator between closeness and conflict dimensions of the teacher–student relationship and early literacy skills (vocabulary, initial phoneme identification [in relations to conflict], initial phoneme deletion, letter knowledge, reading and writing). It means that the closer teacher–student relationship was, the higher task persistence students had, and, in turn, the better early literacy skills children have gained. On the other hand, the more conflicting relationship teachers and students had, the less task persistence students have demonstrated, and the lower literacy skills children have gained. Unfortunately, task persistence was found as a mediator between the conflict and initial phoneme identification, but not closeness and initial phoneme identification. It is difficult to determine the main reason for this from the research data, but it is possible to speculate that the phoneme identification task was completed well no matter which level of closeness student perceived. The conflicting relationship might have had a stronger effect on phoneme identification than closeness.

Results have also revealed that task persistence mediated the association of teacher–student relationship and number sequences and addition skills. The findings of the present study suggested that the closer teacher–student relationship was, the higher task persistence students demonstrated and, thus, the better number sequences and addition skills they had. On the other hand, the more conflicting relationships with students teachers perceived, the lower task persistence of students they have reported, and the lower number sequence and addition skills preschool students had. Unfortunately, mediation analysis at the present study did not show the mediation of task persistence in the association of teacher–student relationship and subtraction skills. These findings contradicted the previous research which showed mediation of task persistence between teacher–student relationship and math skills (Kiuru et al., 2014). These contradictions could have occurred because of the samples from the different developmental stages, as the sample from the current thesis comprised of around six-year-old preschool children and Kiuru and colleagues (2014) included primary school students. Thus, there is a chance that teacher–student relationship is playing a more significant role in subtraction in later school years when subtraction takes a more important part in the school curriculum in Grade 1.

In conclusion, the present findings answered to one of the main research questions by showing full mediation of task persistence in the association of teacher–student relationship and early literacy skills and mediation of task persistence in the association of teacher–student relationship and a part of early numeracy skills (number sequences and addition).

9.5 Indirect Associations between Teacher–Student Relationship and Motivation

The other part of the fourth research question asked whether task persistence can act as a mediator in the association of teacher–student relationship and motivation of preschool students. In the present study, the positive correlations were found between the dimension of closeness and motivation to read and write of preschool students and the negative correlations between the conflict dimension

and motivation to read and write. It was also found that task persistence of preschool students and motivation to read and write positively correlated with each other. These findings and the mediation analysis assisted in drawing conclusions about the mediation of task persistence in the association of teacher–student relationship and motivation of preschool students in Lithuania.

The findings of the current study showed that task persistence mediated the associations between teacher–student relationship and motivation to read and write. However, there was no mediation found in the association of teacher–student relationship and motivation to count. The variance of answers in motivation to count was smaller than the variance in motivation to read and write, thus these differences could be the reason that it was difficult to find connections between teacher–student relationship and motivation to count. The findings were partially consistent with the previous studies that showed relations between task persistence, teacher–student relationship and motivation of students (Stephanou, 2014; Opdenakker et al., 2012; Bulotsky-Shearer et al., 2011). However, there were no previous studies spotted that would specifically analyse the mediation of task persistence in the association of close and conflicting teacher–student relationships and motivation to read, write and count. As there were no correlations found between teacher–student relationship and motivation to count and also task persistence and motivation to count, the possible mediation, in this case, was not discussed. However, the study supported the importance of teacher–student relationship for the motivation of students by revealing the mechanism that the closer teacher–student relationship was, the higher task persistence children demonstrated, and the higher motivation to read and write they have felt. In contrast, the more conflicting relationships with students teachers perceived, the lower task persistence of students the teachers tend to report and the lower motivation to write and read students actually had.

In conclusion, the current study only partially confirmed one of the main research questions by showing that task persistence mediated the association of teacher–student relationship and only motivation to read and write. There was

no mediation of task persistence found in the association of teacher student-relationship and motivation to count.

9.6 Limitations and Future Research

The current study was not without its limitations. First of all, the current study was concurrent. Therefore, future research should concentrate on carrying on and analysing data from the longitudinal studies. In that case, research would be able to show possible predictions and better explain how teacher–student relationship, task persistence and academic skills and motivation are connected to each other across time. For instance, in the current study, task persistence was shown to act as a mediator between teacher–student relationship and early academic skills and motivation, but it is not clear whether teacher–student relationship affected task persistence and the school outcomes, or, the other way around, school outcomes affected task persistence and teacher–student relationship. Therefore, longitudinal analyses need to be performed to support the main claims of the current study. The second aspect that could be considered is that teacher–student relationship and task persistence were measured from the perspective of the teacher. Even though teachers are professionals that should be able to observe the classroom and objectively report their observations, there is always a place for subjectivity. In the present study, teachers might have felt a closer relationship with those students who performed well or those who demonstrated positive behaviour and persistence during the class activities. Therefore, the fact about possible subjectivity of the evaluations of teachers should be considered while drawing conclusions. Relations between teacher–student relationship and task persistence could have also been found because both constructs were rated by teachers and teachers might have felt that students who are closer to them demonstrate more positive behaviour and are more task persistent (Lippard et al., 2017).

The third limitation is that, although preschool groups in Lithuania can be placed in kindergartens (educational institutions for children aged zero to six) or

in primary schools, all the preschool classes that participated in the present study were based in schools, not in kindergartens. Moreover, the data gathering was taking place in the first year that preschool education became compulsory, many preschool teachers were former kindergarten or primary school teachers. In this case, preschool teachers were primary school teachers with additional qualification courses allowing to teach in preschool. Even though all preschools in Lithuania have to follow the same curriculum (LR Ministry of Education and Science, 2014a), preschool teachers from the current sample might have put more emphasis on academic skills. Finally, future research should also take a closer look at the operationalization of motivation of preschool students because, in contradiction to the previous research, some motivational factors were not connected to the teacher–student relationship and task persistence.

9.7 Implications for the Field of Education

The results of the current thesis not only provide guidelines for future research but also have some important practical implications for educators and the field of education. Teachers play a crucial role in the development of academic skills and motivation of students. Moreover, as the current study shows, not only instructional but also emotional support in the teacher and student interaction is vital for the successful development of the academic skills and motivation of students. Moreover, the present study shows that teacher–student relationship matters for the persistence of students in preschool tasks, which increase the early academic skills and motivation of students.

This study concentrated on the preschool age, which is an important developmental stage for the preparation of children to transition into formal schooling. Therefore, the findings provided a tool for preschool teachers to monitor the effectiveness of their practices from the early developmental stage. That is, when teachers are aware of the role of task persistence in the association of the teacher–student relationship and early academic skills and motivation, they can observe the classroom and see whether their relationship with students are close enough

to increase the task persistence of students and, in turn, enhance the early academic skills and motivation of preschoolers. For example, teachers can observe their classrooms and notice whether students are persistent in a class activity or not. The teacher might see task persistence as one of the indicators that a positive relationship with a student was maintained to support the persistence of students. On the other hand, if a student cannot concentrate on the task, turns the attention to other activities easily, and does not complete challenging tasks, these indicators warn the teacher about the possible difficulties in the academic development of the preschool student. Noticing these indicators at an early stage, allows teachers to prevent student from facing difficulties in the academic domain. The current thesis suggested that there might be an issue with the relationship between the teacher and the student in the first place, which could have affected the task persistence of students. When the teacher perceives that the relationship with the student is conflicting and distant, he or she can think about the consequences that this relationship might cause (lower persistence and in turn lower academic skills and motivation). In this situation, the teacher would be advised to create a plan about the possible solutions to maintain a close relationship with a student and find ways how to approach, communicate or support the student. Finding interests of the student, supporting the autonomy and various other teacher practices can assist in maintaining a close teacher–student relationship and, in turn, early academic skills and motivation of the preschool students through the task persistence.

Moreover, not only teachers but also school administration should be aware of the importance of close teacher–student relationship on task persistence and early academic skills and motivation of students. It is important to set a supportive environment for the teachers too to help them maintain good relationships with students, which will further increase the academic outcomes of their students.

10 CONCLUSIONS

The results of the current study have shown the associations between teacher–student relationship (closeness and conflict), task persistence and early academic skills and motivation. In particular, the results of the present thesis supported the proposed mechanisms that task persistence mediates the association between teacher–student relationship and preschool student early academic skills and motivation (despite few exceptions for phoneme identification, subtraction skills and motivation to count). Moreover, the present thesis complements previous research by showing that the closer teacher–student relationship reported by teachers was, the higher task persistence students showed, and the higher early academic skills and motivation preschool students demonstrated. In contrast, the more conflicting relationship between the teacher and the student was reported, the lower task persistence students showed, and the lower early academic skills and motivation preschool students had. The current thesis provided teachers with a tool to monitor whether their relationship with students is positive, as the positive relationship is crucial for the future academic outcomes of students. That is, teachers should monitor task persistence of students and use this information as one of the signs which can identify the students who need more support in developing their academic skills and who need a closer relationship with the teacher. Maintaining close teacher–student relationship is important because conflicting relationships can lead to the lower task persistence and, in turn, lower academic skills and motivation of students.

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APPENDIX

Stimulus material for measuring the interest of students (Motivation)

This stimulus material was used to interview students using Task-value scale (TVS-C; Nurmi & Aunola, 1999; based on Eccles et al., 1983). After being presented with a question measuring the interest of reading-, writing- or counting-related tasks at home and pre-school, children were asked to point to one of the faces.