Students' Self-Report of Motivational Orientation and Teacher Evaluation on Coping and Motivational Orientation Related to Elementary Students' Mathematical Problem Solving and Reading Comprehension

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The present study examined the correlations between motivational orientation and students' academic performance in mathematical problem solving and reading comprehension. The main purpose is to see if students' intrinsic motivation is related to their actual performance in different subject areas, math and reading. In addition, two different informants, students and teachers, were adopted to check whether the correlation is different by different informants. Pearson's correlational analysis was a major method, coupled with regression analysis. The result confirmed the significant positive correlation between students' academic performance and students' self-report and teacher evaluation on their motivational orientation respectively. Teacher evaluation turned out with more predictive value for the academic achievement in math and reading. Between the subjects, mathematical problem solving showed higher correlation with most of the motivational subscales than reading comprehension did. The highest correlation was found between teacher evaluation on task orientation and students' mathematical problem solving. The positive relationship between intrinsic motivation and academic achievement was proved. The disparity between students' self-report and teacher evaluation on motivational orientation was also addressed with the need of further examination.

Keywords: Intrinsic vs extrinsic motivation, academic performance, mathematical problem solving, reading comprehension, students' self-report, teacher evaluation, teacher judgment

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Abstract

The present study was designed to investigate the relationship between student' mathematical problem solving and reading comprehension and students' self-report and teacher evaluation on motivational orientation among a large sample (N=879) of third- and fourth-grade students. The correlational analysis was conducted between students' self-report of their intrinsic vs. extrinsic motivational orientation and the scores of the tasks in two different subject areas. The second correlational analysis was carried out between teacher evaluation on students' coping and motivational orientation and the same academic performance. The regression analysis was tested to see how much predictive power two different informants (student and teacher) have on students' actual academic performance. Measures of intrinsic motivation was administered after the students accomplish their tasks in a different session, and teacher evaluation was administered while or after students' tasks. Correlation supported that both students' self-report and teacher evaluation are significantly correlated to students' actual performance in mathematical problem solving and reading comprehension. Regression revealed that teacher evaluation on coping and motivational orientation can better predict the students' academic performance than the students' self-report can. The two informants turned out to have low predictive power on mathematical problem solving and almost no predictive power on reading comprehension. Findings suggested that teacher evaluation on students' motivation may be a better informant of students' academic achievement than students' self-report may. With regard to two subjects, mathematical problem solving showed moderate positive relationship while reading comprehension revealed rather weak positive relationship with motivational orientation. Finally, the need of further qualitative research to explain the disparity between students' self-report and teacher evaluation is set forth.

1. Introduction

1.1 Motivational orientation, and mathematical problem solving and reading comprehension

Motivation is an umbrella term to describe any type of driving force for the actors to take a certain action. Among the various categorization for motivation, one of the basic distinction is intrinsic / extrinsic motivational orientation; with an intrinsic motivation, a person is moved to do something inherently interesting, whereas an extrinsic motivation makes a person to expect separable rewards (Ryan & Deci, 2000). The self-report scale utilized for measuring students' intrinsic / extrinsic motivational orientation in this study was devised by Harter (1981), in which five subscales are used; preference for challenge vs. preference for easy work, curiosity/interest vs. teacher approval, independent mastery attempts vs. dependence on the teacher, independent judgment vs. reliance on the teacher's judgment, and internal vs. external criteria for success / failure, the first three assessing motivational components and the other two cognitive-informational structures. The background theory of this scale is White's (1959) model of effectance motivation, which described motivation as mastey attempts to effectively interact with the environment. Based on White's theory, Harter (1981) "chose to define intrinsic motivation as an orientation toward learning and mastery in the classroom, pitting it against an extrinsic stance" (p. 310). The concept of intrinsic vs. extrinsic motivational orientation has attracted many researchers to relate it to students' academic performance. Boggiano and Katz (1991), for example, found that autonomy-inducing techniques that is more intrinsically oriented elicited better performance, more persistence, and more preference for challenge from the students while children with more extrinsically-oriented motivation were more inclined to show helpless behavior. Corpus, McClintic-Gilbert, and Hayenga's (2009) hierarchical multiple regression indicated that intrinsic motivation and classroom achievement influence one another in a positive and reciprocal way. Ginsburg and Bronstein (1993) revealed that, in their study of familial factors in relation to students' motivational orientation and academic performance, parental encouragement in response to grades and autonomy-supporting family styles were related to intrinsic motivation and higher academic performance. Lepper, Corpus, and Iyengar (2005) proved that intrinsic motivation is positively correlated with children's grades and standardized test scores at all grade levels, while extrinsic motivation is negatively correlated with academic

outcomes. Harter (1981) hypothesized that students with higher intrinsic motivation would develop higher perception of competence, showing higher academic achievement. Other Studies subsequently have associated intrinsic motivation and perception of competence with academic achievement (Harter & Connell, 1984; Goldberg & Cornell, 1998; Gottfried, 1985, 1990), which confirmed the correlation among intrinsic motivation, perception of competence, and school achievement.

Some studies proposed that intrinsic motivation was not significantly related to academic achievement in the elementary school students (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003). The same study, however, still supported the significant correlation between self-perceived competence and academic achievement. This result is also consistent with the finding of Miserandino (1996), in which the multiple regression analysis revealed that perceived competence was a significant predictor of math and social studies grades. With the evidence from multiple studies on the positive relationship between self-perception of competence and intrinsic motivation, we could assume that intrinsic motivation is a significant factor in one's academic achievement. Boggiano, Main, and Katz (1988), for instance, found in their correlational study, that children's perceptions of academic competence relates positively to their intrinsic interest in schoolwork. Gottfried(1985, 1990) also found that academic intrinsic motivation is significantly and positively correlated with children's school achievement and perceptions of academic competence, and negatively correlated with academic anxiety. Skaalvik and Rankin (1995) found that math and verbal general self-perceptions were strongly associated with intrinsic motivation, effort, and anxiety.

Relevant to the present study are the studies that investigated the relationship between intrinsic motivation and mathematics. Gottfried (1985) differentiated the subject-specific intrinsic motivation and general intrinsic motivation, and found, consistently from three studies that he has conducted, that math motivation emerged as the only significant predictor of math achievement. Gottfried, Fleming, and Gottfried (2001) examined the relationship between the age and the amount of academic intrinsic motivation and found that intrinsic motivation in math specifically showed the largest decline among other subjects from the middle elementary through the high school years. The same pattern has been found by Lee and Kim (2014) who investigated Korean students' longitudinal change of intrinsic motivatoin in English and math from middles

school through high school years, 11th grade. They have idenfied that math intrinsic motivation continually decreased across the whole observed years while English intrinsic motivation showed decrease middle school but increase again in high school.

The studies which explored the relationship between intrinsic motivation and reading comprehension has also triggered the present study. Wigfield and Guthrie (1997) explored the relationship between intrinsic and extrinsic motivation and the amount and breadth of their reading of fourth and fifth-grade students. The result showed that children with higher intrinsic motivation read more, and with more breadth, than students with lower intrinsic motivation. Other studies have subsequently explored the relationship between intrinsic motivation, reading amount, and reading comprehension or achivement. Becker, McElvany, and Kortenbruck's (2010) found that intrinsic motivation of fourth grade students positively predicts reading literacy of sixth grade students, and intrinsic motivation of fourth grade students and reading amount were highly correlated, and reading literacy of sixth grade students was statistically significantly predicted by reading amount of fourth grade students. The conclusion is that reading intrinsic motivation predicts the reading literacy with reading amount as a mediator. In parallel, Schaffner, Schiefele, and Ulferts (2013) studied the role of reading amount as a mediator of the effect of intrinsic and extrinsic reading motivation on reading comprehension. Their structural equation analysis indicated that reading amount fully mediated the positive effect of intrinsic reading motivation on higher order reading comprehension (paragraph- and passage-level comprehension). Wang & Guthrie (2004) included cultural variation into analyzing the relationship between intrinsic and extrinsic motivation, reading amount, past reading achievement, and text comprehension by studying Chinese and U.S. participants. Their result provided that intrinsic motivation predicted the text comprehension in both cultural groups after controlling for all other variables while reading amount did not predict the text comprehension after controlling for motivational variable.

Guthrie, Wigfield, Humenick, Perencevich, Taboada, and Barbosa (2006) probed the influence of stimulating tasks on reading motivation and comprehension, and found that motivation acted as a mediator in the effect of stimulating tasks on reading comprehension. Park (2011) also found the strong predictive power of reading motivation in reading performance when all the other variables such as gender and amount of literacy and informational reading out

of school, proving the importance of motivation in reading performance. Retelsdorf, Köller, and Möller (2011) controlled different variables – cognitive skills, familial, and demographic backgrounds - to check the effect of reading motivation on readign performance, and found the positive unique effects of reading enjoyment, one type of intrinsic reading motivation, and reading self-concept on the initial level of reading performance from the latetn growth curve modelling. Taboada, Tonks, Wigfield, and Guthrie (2009) examined the effects of motivational and cognitive variables on reading comprehension. Their result supported the notion that the internal motivation and the cognitive variables of background knowledge and student questioning make significant and independent contributions to reading comprehension with controlling a prior reading comprehension. Unrau, & Schlackman (2006) investigated the effects of intrinsic and extrinsic motivation on reading achievement for urban middle school students, analyzed by gender, ethnicity, and grade level. Their structural equation model revealed that intrinsic motivation had a strong positive relationship with reading achievement for Asian students than for Haspanic students. The study result of Bouffard, et al. (2003) was quite contrasting with other findings, but still showed some consistence. They found no significant contribution of either math or reading intrinsic motivation to children's year-ead marks, but perceived competence was significantly related to the academic achievement.

Following are more related studies which adopted Harter's (1981) self-report scale in their studies. Lepper et al. (2005) modified Harter's (1981) self-report scale to examine the relationship between intrinsic / extrinsic motivational orientation and academic achivement, and found that intrinsic motivation is positively correlated with academic achievement, measured by students' GPA and scores on standardazed tests in reading and mathmatics, while extrinsic motivation is negatively correlated with the academic achivement. Goldberg & Cornell (1998) have adopted the scale, and academic achievement was measure by reading comprehension, mathematics concepts, and mathematics problem solving. The result revelaed that intrinsic motivation influenced perceived competence and that perceived competence subsequently influenced academic achievement.

On the basis of theoretical background of White (1959) and practice of scale by Harter (1981), the present study aimed to investigate how self-report of the intrinsic motivation relates to students' performance in mathematical problem solving and reading comprehension tasks.

Mathematical problem solving and reading comprehension were selected as variables to be examined in that they require higher level cognitive functions (Anderson, 1987; Paris, Lipson, & Wixon, 1983).

As such, the first hypothesis in the present study is that the students with higher intrinsic motivation in their early elementary school years have better achievement in mathematical problem solving and reading comprehension, which will offer another evidence to the previous studies about the positive relation between intrinsic motivation and academic achievement.

1.2 Teacher evaluation on students' coping and motivational orientation and mathematical problem solving and reading comprehension

Despite the critical role of motivational orientation in academic performance, learning cannot be separable from its environment; interaction of cognitive, motivational, social, and situational factors should be considered together when it comes to learning (Lehtinen, Vauras, Salonen, Olkinuora, & Kinnunen, 1995). In this model of coping and motivational orientation, three different types of coping strategies are discussed: task-oriented coping, ego-defensive coping, and social-dependence type coping. Students with task orientation approach the newly-given task with the emotions like curiosity, interest, and enthusiasm, followed by task-oriented coping behaviors like exploring, recognizing, and mental transformation of the task elements, along with systematic planning. This produces fulfillment of expectations and reinforces the students' self-efficacy, which in turn, will affect the next task-approaching behavior in a positive way such as persistence in task-related efforts, more cultivated cognitive strategies. Ego-defensive coping refers to students' tendency to feel anxiety, fear of failure, and other conflict-laden, inhibitory emotional states when facing a new task, which results in avoidance-type coping strategies. The students do not expect their success in taks, attributing their failure to their own capability and their success to luck or the ease of the task. Social-dependence type coping emerges by the students whoose generalized motivational disposition toward a new task is seeking help and approval from others. This type of students expect their success with high possibility but only with the teacher's help and feedback. The value of their task compeletion also depends on the teacher's approval and consequent rewards. They commonly lack the independence in conducting the task. To examine the characteristics of this coping and

motivational orientation in more detail, Lehtinen et al. (1995) examined longitudianl case studies, online research on classroom learning, and intervention studies. The results revealed that both task-oriented and nontask-oriented coping tendencies were systematically enhanced in typical school interaction over several years. It was also found that the coping tendencies are not caused from the students' way of thinking but through the reciprocal interaction with teacher behavior. Although the coping strategies that students use are situation specific – students can vary the coping strategies according to the learning environment and nature of the task – it was found that the students with high initial task orientation improved their task orientation in the intervention program, which offered training in social and emotional coping skills and text-processing strategies and metacognitive skills, while the students with social dependent or ego-defensive copin strategies became even more non-task oriented.

A triadic model of coping and motivational orientations encompassing basic motivational orientation dimensions and corresponding sets of coping strategies; task orientation, social dependence, and ego-defensive orientation has been developed by several researcher groups since 1970's (see Lehtinen et al., 1995; Lepola, Salonen, Vauras, & Poskiparta, 2004; Olkinuora & Salonen, 1992; Salonen, 1988; Vauras, Salonen, Lehtinen, & Lepola, 2001). The emergence of the model is based on the criticism of the traditional perspective which attribute the learning difficulty to a stable and etiological causes, rendering the remedial program to be peripheral, not addressing the fundamental change in learning and thinking process (Vauras, Lehtinen, Kinnunen, & Salonen, 1992). They tried to understand the development of subnormal performance of the students with Learning Difficulty (LD) from a mutimodal perspectives including cognitive functioning, motivational and socioemotional coping. In the intervention program, they combined intensive remediation with systematic changes in classroom teaching, and the learning environment in the classroom, organized along the principles and methods of the intervention program.

Salonen, Lehtinen, and Olkinuora (1998) dealt the issue of teacher expectatoin and its influence on students' development of coping and motivational orientation, which is an important part in the interaction between guiding person and students regarding the reinforcement of a certain coping and motivational orientation. They presented two conclusions. First, teacher expectations have different effect on different types of orientation tendencies; task-

oriented students are not very sensitive to the teacher expectation whereas non-task-oriented students are much more likely to be affected much by them. Second, the effect of self-fulfilling prophecies is not sufficient to explain the emergence of divergent orientations of students. Vauras, Salonen, and Lehtinen (2008) elaborated their explanation of the triadic model. There are three significant factors involved in the activity structure of motivational orientations, comprising three different sub-types of motivational orientation, as depicted in Figure 1. The first panel presents a task-oriented coping activity, with which students can engage in persistent mastery efforts encountering the novelty and challenge of a new task. The second panel indicates a social dependence-oriented coping, with which the students have no genuine motivation toward solving the task, but focus on receiving social approval from guiding adult or peers. They usually seek a social help in the process of completing the task. The last panel shows an ego-defensive coping. The students who possess this coping strategy see tasks as having a negative valence, leading them to engage in avoidance behavior.

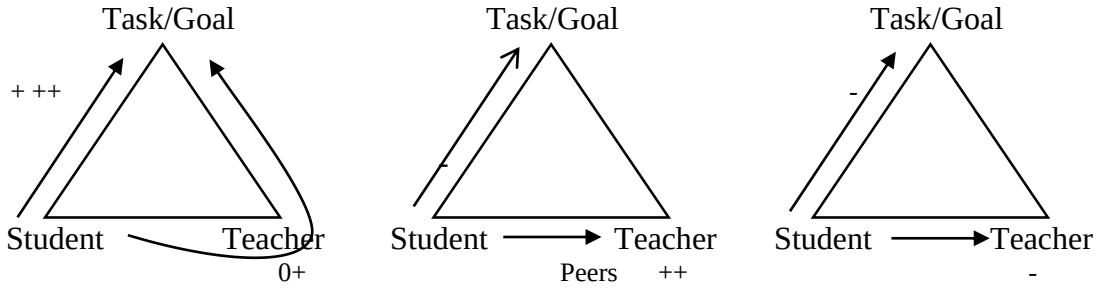

Figure 1. Basic activity structures of motivational orientations. Adapted from *Contemporary Motivation Research* (5), by M. Wosnitza, S. A. Karabenick, A. Efklides, and P. Nenniger (Eds.), 2008, Cambridge, MA: Hogrefe & Huber Publishers. Adapted with permission.

Based on this basic model, they further developed an integrative model for multimodal micro-genetic and long-term developmental interactions (see Salonen et al., 1998; Vauras et al., 2008). In their model, students' motivational orientation is not explained by simple interaction between task and student, but is an adaptating process of students toward complex learning environment, built through a self-reinforcing transactional cycles between three significant factors- task, student, and teacher - through a long period of time since the early development of motivational and socio-emotional orientation (Lehtinen at al., 1995). Figure 2 decribes a complex process of the way students approach the new task in a single situation is becoming internalized as a tendency to be presented and applied repeatedly in further learning situation through their own cognitive, socio-emotional, metacognitive, and motivational orientation and

interaction with guiding person (Vauras et al., 2008). In the study of Vauras et al. (2008), the case study of Heidi (a female student followed from third to sixth grade) provided evidence that non-task-oriented tendencies are formed and cumulated through interactions with guiding adult during long-term development and maintained by situational conditions. This implies that one's intrapersonal processes and person-situation interactions can be changed by changes in interpersonal interaction patterns with guiding person.

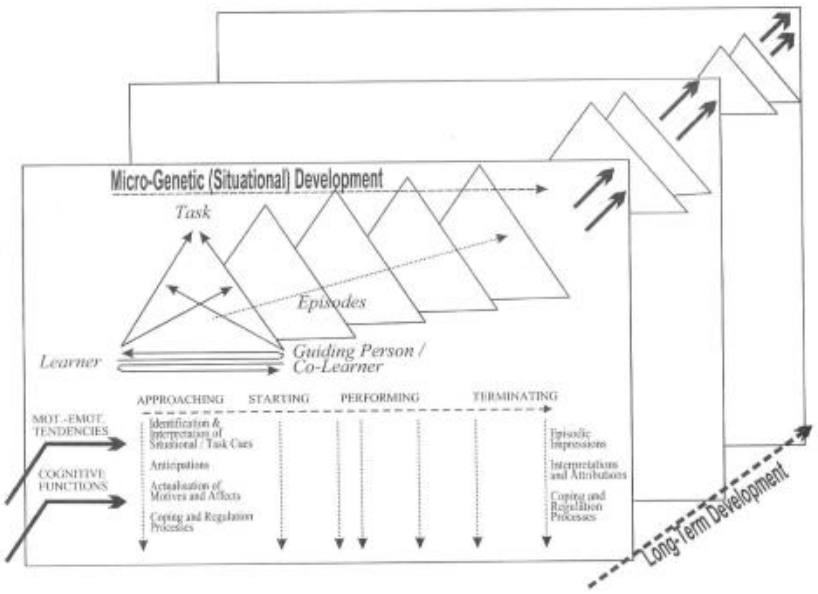

Figure 2. An integrative model for multimodal micro-genetic and long-term developmental interactions. Adapted from *Contemporary Motivation Research* (5), by M. Wosnitza, S. A. Karabenick, A. Efklides, and P. Nenniger (Eds.), 2008, Cambridge, MA: Hogrefe & Huber Publishers. Adapted with permission.

One of the theoretical background of the triadic orientation and coping model is a notion coping and motivational orientation distinguishing between task-focused / mastery oriented (intrinsically motivated), ego-focused / helpless, and socially focused (extrinsically motivated) modes of motivation and coping behaviors (Vauras et al., 2008), in which task-focused and mastery oriented (intrinsically motivated) motivation are categorized together, and socially focused motivation is considered equivalent with extrinsic motivation. Hence, the model of coping and motivational orientation has integrated the concept of intrinsic vs. extrinsic motivational orientation. Moreover, academically high performers has revealed that they commonly possess mastery motivation in the interview (Harter, 1985), which embeds not only

intrinsic motivation in the task but also aspiration to self-evaluate their level of mastery (Lehtinen at al., 1995). In the notion of coping and motivational orientation, what it means to be task-oriented is cognitively, meta-cognitively, motivationally, and emotionally engaged in the task. This concept of task orientation inspired me to raise my second research question.

My second research question concerns the issue of teacher evaluation on students' coping and motivationa orientation and its relation to students' mathematical problem solving and reading comprehension. How teachers perceive their students' academic achievement can have significant influence on the students' academic performance by means of teachers' instructional decisions. Hoge (1983) has reviewed the psychometric properties of teacher-judgment measures of pupil aptitude, classroom behaviors, and achievement levels by analyzing reliability and validity of the measure. Hoge and Coladarci (1989), from the literature review on the relationship between teacher judgment and student achivement, concluded that teachers' achivement judgments are generall veridical, and mentioned its implication for the practical use of teacher-based assessment. Alvidrez and Weinstein (1999) examined the relationship preschool teachers' perception and students' later academic achievement, and found that the judgments teachers made about the cognitive ability of students at age four had a predictive relationship with school achievement 14 years later. The strongest prediction was found with the children who teacher underestimated IQ scores, and the weakest prediction was for children from more orderly or career- or community- active homes. The implication from the result is the caution toward blind use of teacher rating as important evidence of student achievement and behavioral attributes. Begeny, Krouse, Browm, and Mann (2001) examined teachers' judgment of students' reading performance across five different measures of reading ability. They found that teachers had considerable difficulty in accurately judging students' reading levels, and were better judges of high-performing readers than low- and average-performing readers. Helwig, Anderson, and Tindal (2001) investigated the inlfuence of student gender on teachers' perceptions of students' mathematics achievement. The result presented that mathematics and reading achievement test scores, coupled with student effort, were significant predictors of teacher rating of student mathematics achievement while gender was not. Feinberg and Shapiro's (2003) study suggested that teacher predictions of oral reading fluency of third to fifth-grade students would be accurate for the actual student performance in reading. Bailey and Drummond (2006) focused on teachers' understanding of early literacy and accuracy of identifying the students at risk. The

result showed some discordance between teachers' specific reasons for concern and their broader conceptions of early literacy. Teacher rating and student performance also revealed discordance. They recommend teachers to use multiple sources for evaluation and develop professional skills in understanding and identifying the students' literacy level. Beswick, Willms, and Sloat (2005) also compared the teacher rating and standardized tests of kindergarten children on their literacy skills. Teacher ratings were likely to underestimated the student' litaracy skills measured by a standardized test, and most closely related to extraneous variables such as gender, behavior, and family background. The negative predictive value for the teache rating was also found in the study by Teisl, Mazzocco, and Myers (2001), which assessed the predictie value of kindergarten teachers' ratings of children for later first-grade academic achievement. Begeny, Eckert, Montarello, and Storie (2008) investigated teachers' judgment accuracy across a continuum of assessment methods, and the result suggested that teachers were more accurate in measuring the performance of the students with strong oral reading fluency skill than the students with average to low oral reading fluency.

With all those potential influences, the accuracy of teacher judgment or evaluation on students' academic achievement has received attention and actively studied (Coladarci, 1986; Demaray & Elliott, 1998; Hoge & Coladarci, 1989) in many aspects such as test familiarity and student disability status (Hurwitz, Elliott, & Braden, 2007), possible baising factors that influence the accuracy; students' academic achievement level or ability (Demaray & Elliott, 1998; Hoge & Butcher, 1984; Coladarci, 1986; Hoge & Coladarci, 1989; Impara & Plake, 1998), the quality of instruction (Helmke & Schrader, 1987), student gender (Hoge & Butcher, 1984; Hoge & Coladarci, 1989), teacher difference (Hoge & Coladarci, 1989), subject matte difference (Hopkins, George, & Williams, 1985; Hoge & Coladarci, 1989).

Contrast to the above studies which tapped the cognitive aspects as an object of teacher evaluation, represented as academic achievement, the present study looks into students' coping and motivational orientation, which involves cognitive, motivational, and socio-emotinal process within a wider context of interpersonal relationships and adaptations (Vauras, Salonen, Lehtinen, & Kinnunen, 2009). Several previous studies have adopted teacher rating on students' affective factors such as behavioral engagement in mathematics learning (Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015), student adaptation (Gest, Domitrovich, & Welsh, 2005), and

children's social competence and behavior problems (Mashburn, Hamre, Downer, & Pianta, 2006). Kajamies, Vauras, and Kinnunen (2010) has also used teacher rating for measuring the amount of task orientation and coping strategies of the students in their typical classroom behavior.

Englehard (2002), however, described the systematic errors in teachers' ratings which cause biases in their assessment, influneced by various factors such as erros in the act of rating, teachers' psychoogical or personal characteristics, rating context, etc. Nontheless, teacher rating is considered reliable and efficient method for assessing students' competencies in that teachers interact with students on a daily basis within a school context (Kenny & Chekaluk, 1993), and it is less costly and time intensive (Mashburn et al., 2006). Kenny and Chekaluk (1993) also found the substantial concurrent validity between teacher-based and test-based assessments of elementary school children in kindergarten and first and second grade children in reading.

Taking all the importance and benefits of the teacher evaluation into account, my second hypothesis presumes that the teacher evaluation on students' coping and motivational orientation relates significantly to students' mathematical problem solving and reading comprehension.

1.3 Concordance and discordance between students' self-report and teacher evaluation

Since both of the self-report and teacher evaluation is to measure students' motivational orientation, it would be worthwhile to see the concordance and disconrdance between two results in regard to students' actual academic performance. Rimm-Kaufman, et al. (2015) have conducted bivariate correlation analysis to see to what extent different informants - observed behavioral engagement, teacher-reported behavioral engagment, and student-reported engagment – show concordance and discordance in measuring students' engagement in math class. The result showed higher coeffient within each measure than between measures, and lowest correlation values were between student-reported and teacher-reported engagement values (Rimm-Kaufman et al., 2015). In the same vein, my third hypothesis is that teacher evaluation on students' coping and motivational orientation would show discordance on a significant level with students' self-report of intrinsic motivation.

1.4 Research Question

Three questions which motivated this study are as follows: (a) How does student self-report of intrinsic vs. extrinsic motivational orientation relate to their mathematical problem solving and reading comprehension skill? (b) How does the teacher evaluation on students' coping and motivational orientation relate to students' mathematical problem solving and reading comprehension skill? (c) To what extent do student self-report and teacher evaluation show concordance and discordance in terms of two subject areas?

Based on theoretical expectation, the following hypotheses were advanced: (a) Intrinsic motivation is positively related to students' academic performance in mathematical problem solving and reading comprehension. (b) Teacher evaluation on students' coping and motivational orientation is significantly related to students' academic performance in mathematical problem solving and reading comprehension. (c) Students' self-report and teacher evaluation on students' motivational orientation are able to predict students' academic performance in mathematical problem solving and reading comprehension. (d) Correlational coefficient between teacher evaluation on coping and motivational orientation and students' academic achievement is higher than between students' self-report and students' academic achievement.

2. Method

2.1 Participants

The data used in the study was extracted from the data collected for the Quest for Meaning project (Kajamies, et al., 2010). The total number of the participants were 879, consisting of two large groups of 429 students and 450 students. The mean and median age was 10 years 4 months (SD 4 months) in the first group and 9 years and 2 months (SD 4months) in the second group. The students had parental permission to participate in the study and spoke Finnish as their native language. The students were from 15 schools and 64 classes. The students followed the standard curriculum of Finnish general education, including teaching in mathematics and reading comprehension (Kajamies, et al., 2010). The number of the teachers who evaluated students' coping and motivational orientation are 78, 42 in the first cohort and 39 in the second cohort.

2.2 Measures

2.2.1 Students' self-report of motivational orientation

Harter's self-report scale of intrinsic vs. extrinsic orientation (Harter, 1981) was employed to measure the degree to which the students are intrinsically motivated. Among the total five subscales, three subscales – preference for challenge vs. preference for easy work, curiosity/ interest vs. teacher approval, and independent mastery vs. dependence on the teacher – indicates whether the child is *intrinsically motivated* to engage in the mastery process, while the other two subscales – independent judgment vs. reliance on teacher's judgement and internal vs. external criteria for success / failure – comprise *cognitive-informational* structures (Harter, 1981). Participants are asked to complete the questionnair, in a different session, after their mathematical problem solving and reading comprehension tasks.

Table 1. Sample Items and Scoring for Each of te Five Subscales

Score					Score	
Really true for me	Sort of true for me	Subscale dimension			Sort of true for me	Really true for me
		Preference for challenge	vs.	Preference for easy work		
4	3	Some kids like to go on to new work that's at a more difficult level	but	Other kids would rather stick to the assignments that are pretty easy to do	2	1
		Curiosity /interest	vs.	Pleasing teacher /getting grades		
4	3	Some kids do extra projects because they learn about things that interest them	but	Other kids do extra projects so they can get better grades	2	1
		Independent mastery	vs.	Dependence on teacher		
4	3	Some kids keep trying to figure out the problem on their own	but	When some kids get stuck on a problem they ask the teacher for help	2	1
		Independent judgment	vs.	Reliance on teacher's judgment		
4	3	Some kids think they should have a say in what work they do	but	Other kids think the teacher should decide what work to do	2	1
4	3	Internal criteria	vs.	External criteria	2	1

Some kids know whether or not they're doing well in school without grades	but	Other kids need to have grades to know how well they are doing in school

Note. From "A New Self-Report Scale of Intrinsic Vs. Extrinsic Orientaion in the Classroom: Motivational and Informational Components" by S. Harter, 1981, *Developmental Psychology*, 17(3), p. 305.

2.2.1.1 Intercorrelations among subscales

The result of the intercorrelations among subscales were not consistent with the one conducted by Harter (1981). In her analysis, the intercorrelations among curiosity, challenge, and independent mastery were moderate to high while independent judgment and internal criteria showed a moderate relationship to each other. With the present data, the analysis showed that challenge and curiosity shows high correlation whereas mastery bears relatively high correlations with challenge, judgment, and criteria, distinctive from Harter's (1981) factor analysis, in which curiosity, challenge, and mastery defines one factor and judgment and criteria the second.

Table 2. Intercorrelations within Harter's Intrinsic vs. Extrinsic Motivational Orientation

	1	2	3	4	5
1. Challenge	1	.406**	.378**	-.048	.233**
2. Curiosity	-	1	.115**	-.065	.178**
3. Mastery	-	-	1	.429**	.429**
4. Judgment	-	-	-	1	.284**
5. Criteria	-	-	-	-	1

**. Correlation is significant at the 0.01 level (2-tailed).

2.2.2 Teacher evaluation on coping and motivational orientation

Students' coping and motivational orientations in a typical classroom were evaluated with a Likert-type scale by the classroom teachers (Vauras, et al., 2009). The scale ranges from 1 (never) to 5 (very often) (Salonen, Kajamies, & Vauras, 2015). Based on confirmatory factor analysis, four sub-scales were constructed: task orientation, social dependence, and externalizing and internalizing ego-defensiveness. Students' coping and motivational orientations are indicated by the mean score of each orientation in sub-scales. The amount of items, alpha coefficients and

examples of the items are presented in table 3 (Kajamies, Vauras, Volet, & Iiskala, 2016.). Teachers assessed students' task orientation simultaneoulsy or afterward the students' tasks, not acknowledging the result of students task performance.

Table 3. Examples of Coping and Motivational Orientation Items

Motivational orientation	Items	α	Item examples
Task-oriented	8	.95	Is pleased when s/he is able to fill gaps in his/her knowledge, solve problems, and develop his/her skills further
			Tries hard-headedly to understand the things that are to be learned
			Tries to clarify difficult parts, ambiguities, and contradictions in the texts, teaching, and conversations
			Considers how things fit together
			Tries to solve the problems independently
			Tests his/her skills in the tasks that hit his/her highest mastery level
			Works persistently
			Puts more effort in tasks when difficulties and failure arise
Social dependence	5	.82	Tries in different ways to get the tips from the teacher
			Tries to get the teacher's sympathy
			Changes a wrong answer quickly to a new, often contradictory one
			Imitates other students' action and answers
			Answers and acts in the ways that s/he thinks are appreciated by the teacher
Ego defensive externalizing	4	.89	Expresses negative emotions against new tasks and things (e.g. pulling a face or sighing)
			Plays, draws, daydreams, or engages in other substitute actions
			Shows inappropriate, outburst-like answering and acting, and emotional reactions
			Moves restlessly when asked to answer the questions or do the tasks

Ego defensive internalizing	3	.76	Shows excitement symptoms when asked to answer questions or do tasks (blushing, clumsy, shaking, or other similar symptoms)
			Answers quietly, using unclear or few words
			Shows retiring behavior and avoids social contacts

Note. From "MOSA – Motivationaalisen suuntautumisen arviointi. [Evaluation of the student's motivational orientation, in Finnish]" by Salonen, P., Kajamies, A., & Vauras, M., 2016, Unpublished scale. Finland, University of Turku, Centre for Learning Research.

2.2.3 Mathematical problem solving

Students in the first cohort were asked to accomplish 15 one-step and multi-step problems and those in the second cohort 16 problems for two hours. The problems were formed on the basis of the problems used in the earlier studies (Verschaffel, Greer, De Corte, 2000), and the translated version is reported in Kajamies, Vauras, Kinnunen, & Iiskala (2003). The level of the problems were relatively challenging. Examples of the problems are shown in table 3.

Students were guided to specify the calculation steps in their problem solving. Students received two points for the correct calculation step and right answer, and one point for the wrong calculation step. The total point was used as an indicator of the student's mathematicla problem solving skill. The maximum score was 86, and the alpha coefficient was .77 (Kajamies et al., 2010).

Table 3. Examples of Problems in Group Measurements

Problems	Calculation steps	Answer
You are playing basketball with your friends. The team opposing you gets 24 points in the first period. It makes three points less than your own team. Both teams get the same amount of points in both periods. How many points were got in the whole game?	24 + 3 = 27, 27 + 24 = 51, 51 × 2 = 102	102 points
Twenty-two congressmen were taken to a presidential banquet by cab. One cab took four passengers. How many cabs were needed?	22/4 = 5, remainder 2	6 cabs

Note. From "Instructing Low-Achievers in Mathematical Word Problem Solving" by Kajamies, A., Vauras, M., & Kinnunen, R., 2010, *Scandinavian Journal of Educational Research*, 54(4), p. 337.

2.2.4. Reading comprehension

Students' reading comprehension was assessed with a challenging task in which students are asked to read a text and solve four open questions and 17 cloze tasks (Salonen, Vauras, & Kajamies, 2015). The evaluation criteria of the students' answers hinged on the depth of understanding of the text and the inference-making skills, and the maximum score was 54 points. The amount of total points was used as an indication of the reading comprehension skills. The alpha coefficient was .84. (Vauras, Kajamies, & Kinnunen, 2016).

3. Results

3.1 Correlations between students' self-report of motivational orientation and their mathematical problem solving and reading comprehension skills

The realtionship between students' academic performance in mathematical problem solving and reading comprehension and their self-report of intrinsic vs. extrinsic motivational orientation (as measured by Harter's scale) was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. To test the normality, the K-S test was conducted, and the result was that the percentage on the mathematical problem sovling, $D(854) = 0.05$, $p < .001$, reading comprehension, $D(854) = 0.06$, $p < .001$, challenge, $D(854) = 0.05$, $p < .001$, curiosity, $D(854) = 0.07$, $p < .001$, mastery, $D(854) = 0.06$, $p < .001$, judgment, $D(854) = 0.06$, $p < .001$, criteria, $D(854) = 0.06$, $p < .001$, task orientation, $D(854) = 0.06$, $p < .001$, social dependence, $D(854) = 0.09$, $p < .001$, internalizing ego-defensiveness, $D(854) = 0.11$, $p < .001$, and externalizing ego-defensiveness, $D(854) = 0.12$, $p < .001$, were all significantly non-normal. With large sample sizes, however, most normal-theory-based tests are sturdy to non-normality, and if the non-normality is not obvious in the normal probability plot for a large data sample, it probably will not have a serious influence on the results of a normal-theory-based tests ("PROPHET Stat Guide," 1997). In addition, examining the Q-Q Plots of all the variables revealed that most variables showed normaility on everage; some variables had outliers, but they did not have any significant influence on the normality. Altman and Bland

(1995) also discussed that distribution of the data can be ignored if the sample consists of hundreds of observations.

As table 4 shows, bivariate correlations between Harter's intrinsic vs. extrinsic motvational oreintation, and mathematical problem solving and reading comprehension were computed. The result supported the hypothesis that intrinsic motivation is positively and significantly correlated to children's academic performance as measure by the multiple tasks, with significant correlations ranging from .1 to .28 ($p < .01$). All the five subscales in the self-report of the motivational orientation were significantly correlated with the students' mathematical problem solving and reading comprehension. The highest correlation coefficient was .287 between mathematical problem solving and the criteria, the tendency to have the internal criteria to check their own academic performance without external criteria. The reason why criteria and mastery shows highest correlation would be, in my assumption, that those two sub-scales are most likely to estimate learners' willingness to master the learning material to make it their own knowledge, and its concomitant responsibility in learning. The lowest correlation coefficient is .1 between mathematical problem solving and the curiosity level, which indicates whether the students do a certain task out of interest or not. The lowest correlation with the curiosity could be explained by the fact that curiosity relies on learners' disposition to satisfy their curiosity and interest, not highly related to persistence to master the knowledge. Inspite of the significant correlation, none of the correlation shows very high correlational coefficient between the students' actual academic performance and their self-report motivational orientation.

Table 4. Intercorrelations between Sef-Report of Motivational Orientation and Academic Performance

	1	2	3	4	5	6	7
1. Mathematical problem solving	1	.547**	.224**	.100**	.282**	.201**	.287**
2. Reading comprehension	-	1	.160**	.143**	.190**	.190**	.215**
3. Challenge	-	-	1	.406**	.378**	-.048	.233**
4. Curiosity	-	-	-	1	.115**	-.065	.178**
5. Mastery	-	-	-	-	1	.429**	.429**
6. Judgment	-	-	-	-	-	1	.284**
7. Criteria	-	-	-	-	-	-	1

**. Correlation is significant at the 0.01 level (2-tailed).

3.2 Correlation between teacher evaluation on students' coping and motivational orientation and their mathematical problem solving and reading comprehension skills

The analysis of correlation revealed that teacher evaluation on the amount of students' task orientation is positively correlated with the students' academic performance both in mathematical problem solving and reading comprehension, showing high coefficient .513 and .419 respectively. The correlational coefficient here are higher than the one of the students' self-report of their intrinsic motivation, which shed light on the issue of the teacher judgment accuracy. Compared to the correlational coefficients of students' self-report of their motvational orientation, teacher evaluation of the students' task orientation gives more convincing correlations with students' academic performance.

The analysis with other variables, social dependence, and internalizing and externalizing ego-defensiveness, presents significantly negative correlations with smaller coefficients. Regarding mathematical problem solving, externalizing ego-defensiveness showed the highest coefficient while internalizing ego-defensiveness the lowest. On the other hand, the highest coefficient with reading comprehension was social dependence whereas the lowest was internalizing ego-defensiveness. I assume that internalizing ego-defensiveness is rather harder to spot than other variables for the teachers from the students' behavior at the exact moment, leading to somewhat unclear teacher evaluation, and low coefficient.

Table 5. Correlations between Teacher Evaluation on Coping and Motivational Orientation and Students' Academic Performance

	Task orientation	Social dependence	Internalizing ego-defensiveness	Externalizing ego-defensiveness
Mathematical problem solving	.513**	-.289**	-.242**	-.303**
Reading comprehension	.419**	-.267**	-.158**	-.223**

**. Correlation is significant at the 0.01 level (2-tailed).

3.3 Regression Analysis

Regression analysis was conducted to check the predictable power of the students' self-report and teacher evaluation on the motivational orientation on students' mathematical problem solving and reading comprehension. The result is presented in the table 6. In the first analysis, a simple linear regression was calculated to predict mathematical problem solving based on the sum score of the reading comprehension. Reading comprehension was entered to control for its effect. A significant regression equation was found ($F(1, 853) = 353.698$, $p < .000$), with an R^2 of .293. When the students' self-report of the intrinsic motivation was put as independent variables, a significant regression equation was found ($F(6, 848) = 74.498$, $p < .000$), with an R^2 of .345. Among the sub-variables of motivational orientation, curiosity and judgment were not significant to predict students' mathematical problem solving. Criteria showed the strongest predictive power but the coefficient was not highly different from other variables.

Table 6. Regression Analysis of Students' Self-Report of Motivational Orientations on Mathematical Problem Solving

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	18.457	1.235		14.943	.000
Reading comprehension	1.036	.055	.541	18.807	.000
2					
Constant	-.703	3.494		-.201	.841
Reading comprehension	.922	.056	.482	16.568	.000
Challenge	2.783	.882	.106	3.153	.002
Curiosity	-1.105	.881	-.039	-1.254	.210
Mastery	2.586	1.015	.091	2.549	.011
Judgment	1.294	.941	.045	1.376	.169
Criteria	2.981	.892	.106	3.342	.001

On the next step, teacher evaluation on students' coping and motivational orientation was also tested for its predicting power. Reading was also entered for control for its effect. In the first model, a significant regression equation was found ($F(1, 865) = 367.799$, $p < .000$), with an R^2

of .298. In the second model, a significant regression equation was found ($F(5, 861) = 116.117$, $p < .000$), with an R^2 of .403. Task orientation was the only significant variables among the coping and motivational orientation, showing the strongest predictive power among other variables, even including reading and students' self-report of motivational orientation. The coefficient of each variable is presented in the table 7.

Table 7. Regression Analysis of Teacher Evaluation of Coping and Motivational Orientations on Mathematical Problem Solving

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	18.127	1.225		14.793	.000
Reading comprehension	1.050	.055	.546	19.178	.000
2					
Constant	5.382	4.103		1.312	.190
Reading comprehension	.768	.056	.400	13.705	.000
Task orientation	6.760	.775	.307	8.728	.000
Social dependence	.034	.834	.001	.041	.967
Ego-defensiveness (internal)	-.778	.624	-.037	-1.246	.213
Ego-defensiveness (external)	-1.128	.685	-.056	-1.647	.100

The regression analysis to predict the reading comprehension was conducted based on students' mathematical problem solving scores and their self-report of motivational orientation. Mathematical problem solving score was entered to control for its effect. The coefficient of the independent variables are shown in the table 8. A significant regression equation was found ($F(1 ,853) = 353.698$, $p < .000$), with an R^2 of .293. When the students' self-report of the intrinsic motivation was added as independent variables, a significant regression equation was found ($F(6, 848) = 63.422$, $p < .000$), with an R^2 of .310. Among the factors of motivational orientation, only curiosity and judgment were found to be significant to predict students' reading comprehension, with curiosity having the most predictive power for reading comprehension.

Table 8. Regression Analysis of Students' Self-Report of Motivational Orientations on Reading Comprehension

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	9.289	.651		14.261	.000
Mathematical problem solving	.283	.015	.541	18.807	.000
2					
Constant	1.898	1.873		1.013	.311
Mathematical problem solving	.265	.016	.508	16.568	.000
Challenge	.151	.476	.011	.317	.751
Curiosity	1.331	.471	.089	2.827	.005
Mastery	-.277	.546	-.019	-.507	.612
Judgment	1.347	.503	.089	2.677	.008
Criteria	.523	.481	.036	1.087	.277

On the next step, teacher evaluation on students' coping and motivational orientation was also tested for its predicting power. Mathematical problem solving was entered for control for its effect. In the first model, a significant regression equation was found ($F(1, 865) = 367.799$, $p < .000$), with an R^2 of .298. In the second model, a significant regression equation was found ($F(5, 861) = 85.001$, $p < .000$), with an R^2 of .330. Task orientation and social dependence was the significant factors among the variables in the coping and motivational orientation. Task orientation showed the strongest predictive power for the reading comprehension while social dependence showed negative predictive power. The coefficient of each variable is presented in the table 9.

Table 9. Regression Analysis of Teacher Evaluation of Coping and Motivational Orientations on Reading Comprehension

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	9.224	.641		14.389	.000
Mathematical problem solving	.284	.015	.546	19.178	.000
2					
Constant	4.270	2.257		1.891	.059
Mathematical problem solving	.233	.017	.448	13.705	.000

Task orientation	2.180	.439	.190	4.967	.000
Social dependence	-1.186	.457	-.093	-2.592	.010
Ego-defensiveness (internal)	.601	.344	.055	1.750	.080
Ego-defensiveness (external)	.479	.378	.046	1.268	.205

The regression analysis to predict the mathematical problem solving was calculated based on students' self-report of motivational orientation and teacher evaluation of coping and motivational orientation. The coefficient of the independent variables are shown in the table 10. When the students' self-report of motivational orientation was put as independent variable R^2 was .134, and changed to .325 as teacher evaluation variables were added. Based on the result of coefficient analysis, teacher evaluation turned out with more power in predicting students' mathematical problem solving.

Table 10. Regression Analysis of Students' Self-Report and Teacher Evaluation of Motivational Orientation on Mathematical Problem Solving

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	1.323	3.986		.332	.740
Challenge	3.806	1.006	.145	3.782	.000
Curiosity	.208	1.004	.007	.207	.836
Mastery	2.994	1.164	.106	2.572	.010
Judgment	3.480	1.072	.120	3.245	.001
Criteria	4.601	1.017	.164	4.525	.000
2					
Constant	-8.345	5.359		-1.557	.120
Task orientation	8.749	.801	.401	10.919	.000
Social dependence	-.575	.889	-.024	-.646	.518
Ego-defensiveness (internal)	.157	.665	.008	.236	.813
Ego-defensiveness (external)	-1.774	.743	-.090	-2.389	.017

When the reading comprehension was set as a dependent variable, the coefficient of the independent variables are shown in the table 11. When the students' self-report of motivational orientation was put as independent variable R^2 was .087, and changed to .222 as teacher evaluation variables were added. Teacher evaluation showed more predictive power again than students' self-report of motivational orientation, but both of the informants revealed smaller predictive power for reading comprehension than for the mathematical problem solving. As seen in the table 11, mastery, among other variables in the self-report, was found to be a non-significant factor. This result is quite contrasting to the one with mathematical problem solving, in which curiosity was the only non-significant factor. It might be because of the subject characteristics; mathematics might require students' tendency to persistently solve the problem while reading comprehension might be more based on student's ongoing interest and understanding in the text.

Table 11. Regression Analysis of Students' Self-Report and Teacher Evaluation of Motivational Orientation on Reading Comprehension

Model	B	SE (B)	β	*t*	Sig. (*p*)
1					
Constant	2.042	2.151		.949	.343
Challenge	1.222	.542	.089	2.255	.024
Curiosity	1.402	.540	.094	2.595	.010
Mastery	.434	.626	.029	.694	.488
Judgment	2.358	.576	.155	4.096	.000
Criteria	1.721	.547	.117	3.147	.002
2					
Constant	-3.854	3.025		-1.274	.203
Task orientation	4.083	.452	.356	9.041	.000
Social dependence	-1.338	.502	-.105	-2.666	.008
Ego-defensiveness (internal)	.695	.376	.063	1.851	.064
Ego-defensiveness (external)	.081	.419	.008	.193	.847

The result presents that teacher evaluation on students' coping and motivational orientation shows moderate predictive power for the both subjects, and students' self-report of motivational orientation shows rather lower predictive power. In predicting both of the mathematical problem solving and reading comprehension, teacher evaluation showed stronger predictive power than students' self-report of motivational orientation. With regard to reading comprehension, students' self-report explains only 1.3%, from which we could infer that teachers or parents cannot predict students' actual achievement from their self-report of intrinsic motivational level. In general, students' self-report showed less predictive value than teacher evaluation on motivational orientation did on mathematical problem solving reading comprehension. It could be either that the intrinsic motivation is not associated closely with the academic achievement or that the participants inclined to overestimate their intrinsic motivation.

It was found that students' self-report of intrinsic motivation and teacher evaluation on coping and motivational orientation have relatively low predictive power on students' mathematical problem solving, and almost no predictive power on students' reading comprehension. Comparing two scales, students' self-report seems not to be able to predict students' academic performance. This result can bear several translations. First, the mathematical problem solving can be more related to the factors affecting the school work than the reading comprehension can. Solving math problem requires mastering the concepts and skills in a sequential way, which most students would acquire in classes. From the teacher's point of view, one's task orientation would be well reflected in students' learning behavior in class like the effort to master the concept and active engagement in solving the problem. In comparison, reading comprehension can be more flexible in acquisition and improvement in terms of the setting, environment, and the amount of reading. Besides the literacy and literature class, students have hundreds ways to practice their reading skill everywhere. Therefore, there is a possibility that how teachers evaluate students based on their learning behavior in school can hardly predict the students' reading comprehension. Unlike mathematics which demands desire for challenge and mastery, one's curiosity and interest in the contents can be another important motivator in reading. The regression analysis also revealed that predictive power of curiosity is significant in reading, but not in math.

Second, the low R^2 of students' self-report in regression analysis as well as its low correlation coefficient can have several possible translations. One is that intrinsic motivation is not greatly related to students' academic performance. But this assumption should be asserted

with caution not only because multiple of previous studies have confirmed the significant correlation between intrinsic motivation and academic achievement, but also intrinsic motivation could affect even in indirect way to students achievement, e.g. through enhanced self-perception of competence. One careful assumption could be that students' willingness to learn new and challenging things, as reflected in intrinsic motivation, can loosely related to the willingness to understand and master the learning material, which might be more strongly decide the school performance. Another supposition concerns the validity of the adopted scale. If the scale were not able to estimate the amount of intrinsic motivation well, it could have affected the correlation in the present study. Although plentiful studies proved the validity and reliability of Harter's scale, the present study showed some contrasting result with factor analysis; the sub-scale of mastery was categorized with judgment and criteria. In Harter's study (1981), mastery was categorized with challenge and curiosity as an intrinsic motivation construct. However, it can also be a matter of translation such as meaning distortion or cultural difference in translation. Other studies would need closer examination on the potential affecting factors.

The last possibility is that students' could have overestimated or underestimated their own motivation level. It is related to the issue regarding whether or not young elementary schoolchildren can make accurate judgment of their motivation and competence. Age, gender, and academic domain have been the related controversial topics. Some authors asserted that children are able to differentiate the level of their motivation and competence in their first grade (Bordeleau & Bouffard, 1999; Eccles, Wigfield, Harold, & Blumenfield, 1993; Marsh, Crave, & Debus, 1991, 1998; Wigfield & Harold, 1992; Wigfield, Eccles, Suk Yoon, Harold, Arbreton, Freedman-Doan, & Blumenfield, 1997), while others insisted that the ability to differentiate emerges around grade three (Harter, 1992; Harter & Pike, 1984; Paris & Byrnes, 1989). Bouffard et al. (2003) took the age and gender into consideration and found that the age at which children can make different judgment on their motivation and competence according to different academic domains may be associated to the gender variability of the sample.

3.4 Concordance and discordance between students' self-report and teacher evaluation on their motivaional orientation

Correlation analysis was conducted between motivational and coping orientation and intrisic vs. extrinsic motivational orientation to examine the extent of agreement between two measures. Harter's (1981) sub-scales were expected to have positive correlation with task

orientation and negative correlation with social dependence, defensiveness internalizing and exteralizing. The result in the present study revealed the modest cross-informant agreement, which is consistent with other studies (Gresham, Elliot, Cook, Vance, & Kettler, 2010; Konold & Pianta, 2007; Renk & Phares, 2004, Rimm-Kaufman et al., 2015).

Task orientation is significantly correlated with all of the sub-scales in Harter's scale at the 0.01 level except for judgment which was at 0.05 level. The highest correlation coefficient was .26 between task oreintation and challenge, followed by criteria (.22), mastery (.21), curiosity (.17), and judgment (.07). The correlation ordering between two scales could be construed by the fact that the items of task orientation are likely to measure the learner's tendency to challenge difficult problems and tasks and test the extent of their mastery, and persistance in tasks. The less correlation between curiosity and task orientation could be explained by the fact that the nature of curiosity and interest is somewhat temporary and less counts on learner's concentration, persistent effort when facing difficulties, eagerness to do challenging tasks, and being "absorbed" in the given task (Salonen, Lepola, & Vauras, 2007), which are the crucial characteristics of task orientation. It is a noteworthy finding that judgment least correlates with task orientation among other Harter's (1981) subscales and positively correlates with externalizing ego-defensiveness (.08), which is the contradictory result of the initial assumption. The reason behind this contradictory correlation cannot be easily deduced, but my conjecture is that the items to measure judgment is more likely to be related to a learner's self-confidece and insistence in their decision and opinions, possibly not highly associated with engagement or persistence in a specific task. Its positive correlation with externalizing self-defensiveness would be that a learner can raise his/her voice in their own opinions in a more exagerating way to defend their ego and not to lose face in public.

The fact that overall students' self-report and teacher evaluation shows low correlation shows disparaties in perspectives. Teachers evaluate students' coping and motivational oreintation based on students' learning behavior, which might offer more objective stance for undertanding the motivational orientation. However, observed behavior cannot explicitly explain the cognitive and emotional parts, which could be reported better by student self-reports. Therefore, it would be hard to conclude that teacher evaluation is always reliable than students'

self-report because students' motivational orientation should be considered in an integrative framework in which context, self-systems, and action are interacting (Rimm-Kaufman, 2015).

Table 10. Correlations between Motivational Orientation and Coping, and Intrinsic vs. Extrinsic Motivational Orientation

Motivational Orientation and Coping / Intrinsic vs. Extrinsic Motivational Orientation	Task Orientation	Social Dependence	Ego-Defensiveness, Internalizing	Ego-Defensiveness, Externalizing
Challenge	.261**	-.074*	-.169**	-.116**
Curiosity	.176**	-.057	-.109**	-.179**
Mastery	.217**	-.116**	-.113**	-.028
Judgment	.074*	-.050	-.072*	.088**
Criteria	.221**	-.129**	-.167**	-.086*

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4. Discussion

4.1 Low correlations between students' self-report of motivational orientation and their academic performance in reading and math

Low predictable value of the students' self-report of their motivational orientation on the actual academic perforamnce in mathematical problem solving and reading comprehension was discussed above with some possible assumptions. The low correltion, compared with the one with the teacher evaluation, may imply several important educational points. Age of the sample students should be taken into consideration. There has been not an agreed age at which children can make accurate judgment of their own motivation level; some say it is already from the first year in the elementary school while others argue that it is not until they reach third or fourth grade. Given that intrinsic motivation is positively related to academic achievement through elemenatry and middles school years (e.g., Harter, 1981; Harter & Jackson, 1992; Newman, 1990; Tzuriel, 1989), students then might have not been able to judge their own motivational level, e.g. overestimation or underestimation. Another case could be that the intrinsic motivation of the students are not closely linked to students' academic achievement arount that age point. Having strong intrinsic motivation can be one affecting factor in students' academic achievement but there should be a variety of factors included such as cognitive competence, self-regulation,

meta-cognitive skills, etc. Therefore, all the variables should be considered together when it comes to measuring the effectiveness and accuracy of students' self-report of motivational orientations in terms of academic achievement. Even low correlation, however, can be significant in that students themselves only can look into their own internal emotional status, which could be missed by other informants like teachers, parents, or academic performance.

4.2 Accuracy of teacher judgment

Higher correlation between teacher judgment on students' coping and motivatinoal orientation, and their actual academic performance was confirmed in the present study. This result supports that teacher evaluation is rather objective, reliable, and accurate than students' self-report in predicting students' academic performance. Teachers' judgement and evaluation on the students including their academic ability, emotional status, and social realtionship have been used as a diagnostic and evaluative method through students' academic years. The various influences of teacher evaluation are mentioned in the introductory part of this study. One point that researchers as well as teachers should be cautious is that overreliance on teacher-reported data would cause them to miss students' intrapsychic processes (Rimm-Kaufman, 2015). Gottfried (1985) also pointed out that teachers can only make inferences about intrinsic motivation on the basis of overt behaviors, students' verbalizations, or indirect sources. Teacher evaluation is conducted mostly by observation in class, individual interview, and students' ongoing academic records, most of which focus on the externalized behavior or expression. However, students' cognitiveand emotional flow which reflects students' actual intrapsychic processes is hard to catch from the teacher's viewpoint. Mashurn et al. (2006) pointed out that teacher rating reflects teachers' attributes and perceptions, and some systematic tendencies were also found from teachers' rating in regard of gender (Robinson & Lubienski, 2011), and externalizing vs. internalizing problems (Konold & Pianta, 2007).

However, the high correlation between teacher evaluation of students' coping and motivation level and students' actual academic performance might have derived from so called "halo effect," which indicates the cognitive bias in which observer's overall impression of the object influence observer's feeling or thought about the object in a specific properties (Long-Crowell, E). In this case, teacher's existing impression about a specific student, based on their

previous school performance might have affected their evaluation of the students' coping and motivational orientation, contributing to relatively high correlation and predictive power for the actual student performance in math and reading.

4.3 Diagnostic use of extremes and outliers

Statistical analysis can distinguish extremes and outliers from the sample. Those who show too low scores in mathematical problem solving and reading comprehension can be spotted and receive special care from teachers and parents. Examining the association of academic performance and motivational orientation of the extremes can give implication for the further study on the issue of coping and motivational problem of students with LD, which has been the topic for many researchers (Kajamies et al., 2010; Lepola et al., 2004; Olkinuora, & Salonen, 1992; Salonen, 1988; Salonen et al., 2007; Zisimopoulos, & Galanki, 2009). To offer most proper cognitive and motivational support to the students with LD, early identification of learning difficulty is crucial. Diagnosis can be achieved by integrational analysis of students' scores in academic performance and their motivatonal orientation. Low motivation can be a signal for childrens' negative self-image or low self-esteem, which can have a negative long-term effect in their future academic performance, and also in their social relationship. It is critical to spot those children who need cognitive and emotional support and provide optimal scaffolding before those low motivation and potential negative emotions are fossilized.

4.4 Comparison between maths and reading

Comparing the correlations of two subject areas gave some implications. The score of mathematical problem solving shows higher correlation than reading comprehension in all the sub-scales of students' self-report, except for curiosity, and teacher evaluation on the motivational orientation. This result is consistent with the Gottfried's (1985), in which math achievement showed the highest correlation with the motivational inventory among other subjets. In the same study, the author mentioned two possible explanations for the singularity of math intrinsic motivation as a specific component of math achievement. First explanation is that children with higher instrinsic motivation in math may better able to master challenging and difficult math tasks since math is perceived as a more difficult and challenging subject area.

Licht and Dweck (1984) also found that fifth-grade mastery-oriented chilren performed better on a confusing, difficult task. High correaltion of the teachers' evaluation on students' task oreintation with students' achievement in math may be related to the fact that students with higher math motivation display more learning-oriented behaviors in calss such as persistence, concentration, or direct verbalizations about math, thereby being easily identified by their teachers (Gottfried, 1985). Stodolsky (1988) also found that students need teacher instruction more when learning math than social studies. Stodolsky & Grossman's (1995) study, high school teachers are also reported to experience less autonomy in regard to course content than did social studies teachers. Gottfried et al. (2001) assume that teachers may have communicated their lack of autonomy to students, or perhaps the curriculum discouages student autonomy. Thus, less autonomy in learning mathematics might be associated the high correlation with teacher evaluation.

5. Limitations and Future Research

One limitation of this study is that different measurement were used for students' self-report and teacher evaluation on the motivational orientation. Even though there was a significant correlations between the result of two scales, the characteristics of two items were not completely identical; the coping and motivaitonal orientation scale for teacher evaluation was partly based on the concept of Harter's scale which was used for the students' self-report. Therefore, the validity of comparison between two correaltional analysis results can be week. I suggest that future studies use the same scale for both informants, student and teacher, to measure coping and motivational orientation.

Another limitation of this study is that students' academic performance was tested in temporary condition, which cannot be easily genaralized as student achievement. Since the data used in the present study was collected for the purpose of screening and pre-study before the later intervention program, the students' scores in mathematical problem solving and reading comprehension were collected in one-time test context. Compared to school records or test result of standardized tests, the reliability of the measurement for academic performance can be low, which affects the value for genaralization. It would be more reliable to conduct the longitudinal

study to track the students' academic achievement as well their change in coping and motivational orientation as the grade ascends to attain more reliability in generalization.

Third limitation is related to teacher evaluation. When teachers are asked to judge their own students, it is hard to exclude the possibility of reflecting their attribute, tendency, and bias in evaluation, harming the objectivity of the evaluation. For instance, the high correlation between task orientation and students' actual performance could be partly because of the fact that advanced students get more attention from the teachers. Teachers then could catch the behavior of those advanced students more often, which could have given more accurate basis when it comes to marking on the inventory. As mentioned in the result part above, moreover, there is a limitation in investigating students' internal state with the external instrument like observation. Interviewing the students who show the biggest disparity between the self-report and teacher evaluation on the motivational orientation could give deeper insight into students' internal motivational state.

Reference

Altman, D. G., & Bland, J. M. (1995). Statistics notes: the normal distribution. *BMJ : British Medical Journal, 6975*, p. 298.

Alvidrez, J., & Weinstein, R. S. (1999). Early Teacher perceptions and later student academic achievement. *Journal of Educational Psychology, 4*, P. 731-746.

Anderson, J. (1987). Skill acquisition: Compilation of weak-method proble solutions. *Psychological Review, 2*, P. 192-210.

Bailey, A. L., & Drummond, K. V. (2006). Who is at risk and why? teachers' reasons for concern ad their understanding and assessment of early literacy. *Educational Assessment, 3&4*, p. 149-178.

Becker, M. M. (2010). Intrinsic and extrinsic reading motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology, 4*, P. 773–785.

Begeny, J. C., Eckert, T. L., Montarello, S. A., & Storie, M. S. (2008). Teachers' perceptions of students' reding abilities: An examination of the relationship between teachers' judgements and students' performance across a continuum of rating methods. *School Psychology Quarterly, 1*, P. 43-55.

Begeny, J. C., Krouse, H. E., Brown, K. G., & Mann, C. M. (2011). Teacher Judgements of Students' Reading Abilities Across a Continuum of Rating Methods and Achievement Measures. *School Psychology Review, 1*, P. 23-38.

Beswick, J. F., Willms, J. D., & Sloat, E. A. (2005). A comparative study of teacher ratings of emergent literacy skills and student performance on a standardized measure. *Education, 1*, P. 116-137.

Boggiano, A. K., & Katz, P. (1991). Maladaptive achievement patterns in students: the role of teachers' controlling strategies. *Journal of Social Issues, 4*, P. 35-51.

Boggiano, A. K., Main, D. S., & Katz, P. A. (1988). Children's preference for challenge: The role of perceived competence and control. *Journal of Personality and Social Psychology, 1*, P. 134-141.

Bordeleau, L., & Bouffard, T. (1999). .Perceptions de compe´tence, motivation intrinse`que et rendement scolaire chez des e´le`ves de la premie`re anne´e du primaire [Perceived competence, intrinsic motivation and academic achivement among first grade children]. *Enfance*, S. 379-395.

Bouffard, T., Marcoux, M., Vezeau, C., & Bordeleau, L. (2003). Changes in self-perceptions of competence and intrinsic motivation among elementary schoolchildren. *British Journal of Educational Psychology*, P. 171-186.

Coladarci, T. (1986). Accuracy of teacher judgments of student responses to standardized test items. *Journal of Educational Psychology, 2*, P. 141-146.

Corpus, J. H., McClintic-Gilbert, M. S., & Hayenga, A. O. (2009). Within-year changes in children's intrinsic and extrinsic motivational orientations: Contextual predictors and academic outcomes. *Contemporary Educational Psychology*, P. 154-166.

Demaray, M. K., & Elliot, S. N. (1998). Teachers' judgments of students' academic functioning: A comparison of actual and predicted performances. *School Psychology Quarterly, 1*, P. 8-24.

Eccles, J., Wigfield, A., Harold, R. D., & Blumenfield, P. (1993). Age and gender differences in children's self and task perceptions during elementary school. *Child Development*, P. 830-837.

Engelhard, G. J. (2002). Monitoring raters in performance assessments. In G. Tindal , & T. M. Haladyna , *Large-scale assessment programs for all students* (P. 261-288). Mahwah, NJ: Lawrence Erlbaum.

Examining normality test results. (18. March 1997). (B. Corporation, Produzent) Von PROPHET StatGuide: http://www.basic.northwestern.edu/statguidefiles/n-dist_exam_res.html abgerufen

Feinberg, A. B., & Shapiro, E. S. (2003). Accuracy of Teacher Judgements in Predicting Oral Reading Fluency. *School Psychology Quarterly*, P. 52-65.

Feinberg, A. B., & Shapiro, E. S. (2009). Teacher accuracy: An examination of teacher-based judgements of students' reading with differing achieving levels. *Journal of Educational Research*, P. 453-462.

Gest, S. D., Domitrovich, C. E., & Welsh, J. A. (2005). Peer academic reputation in elementary school: Associations with changes in self-concept and academic skills. *Journal of Educational Psychology*, P. 337-346.

Ginsburg, G. S., & Bronstein, P. (1993). Family Factors Related to Children's Intrinsic/Extrinsic Motivational Orientation and Academic Performance. *Child Development*, P. 1461-1474.

Goldberg, M. D., & Cornell, D. G. (1998). The Influence of Intrinsic Motivation and Self-Concept on Academic Achievement in Second- and Third- Grade Students. *Journal for the Education of the Gifted, 2*, P. 179-205.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology, 6*, P. 631-645.

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 3*, pp. 525-538.

Gottfried, A. E., Fleming, J., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 1*, P. 3-13.

Gresham, F. M., Elliott, S. N., Cook , C. R., Vance, M. J., & Kettler, R. (2010). Cross-informant agreement for ratings for social skill and problem behavior ratings: An investigation of the social skills improvement system - rating scales. *Psychological Assessment*, P. 157-166.

Guthrie, J. T., Wigfield, A., Humenick, N. M., Perencevich, K. C., Taboada, A., & Barbosa, P. (2006). Influences of stimulating tasks on reading motivation and comprehension. *Journal of Educational Research, 4*, P. 232-245.

Harter , S., & Connell, J. P. (1984). A model of children's achievement and related self-perceptions of competence, control, and motivational orientation. *Advances in Motivation and Achievement*, P. 219-250.

Harter , S., & Jackson, B. K. (1992). Trait vs. nontrait conceptualizations of intrinsic/extrinsic motivational orientation. *Motivation and Emotion*, P. 209-230.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informationa components. *Developmental Psychology, 3*, P. 300-312.

Harter, S. (1992). The relationship between perceived competence, affect, and ,motivational orientation within the clssroom: Process and patterns of change. In A. K. Boggiano, & T. S. Pittman, *Achievement and motivation: A social developmental perspective* (P. 77-114). New York: Cambridge University Press.

Harter, S., & Pike, R. (1984). The pictorial scale of perceived competence and social acceptance for young children. *Child Development*, P. 1969-1982.

Helmke, A., & Schrader, F. -W. (1987). Interactional effects of instructional quality and teacher judgement accuracy on achievement. *Teaching and Teacher Education*, P. 91-98.

Helwig,, R., Anderson, L., & Tindal, G. (2001). Influence of elementary student gender on teachers' perceptions of mathematics achievement. *Journal of Educational Psychology, 2*, P. 93-102.

Hoge, R. D. (1983). Psychometric properties of teacher-judgement measures of pupil aptitudes, classroom behaviors, and achievement levels. *The Journal of Special Education*, P. 401-429.

Hoge, R. D., & Butcher, R. (1984). Analysis of teacher judgements of pupil achievement levels. *Journal of Educational Psychology, 5*, P. 777-781.

Hoge, R. D., & Coladarci, T. (1989). Teacher-based judgements of academic achievement: A review of literature. *Review of Educational Research, 3*, P. 297-313.

Hopkins, K. D., George, C. A., & Williams, D. D. (1985). The concurrent validity of standardized achievement tests by content area using teachers' ratings as criteria. *Journal of Educational Measurement, 3*, P. 177-182.

Hurwitz, J. T., Elliott, S. N., & Braden, J. P. (2007). The influence of test familiarity and student disability status upon teachers' judgments of students' test performance. *School Psychology quarterly, 2*, P. 115-144.

Impara, J. C., & Plake, B. S. (1998). Teachers' ability to estimate item difficulty: A test of the assumptions in the Angoff standard settin gmethod. *Journal of Educational Measurement, 1*, P. 69-81.

Kajamies, A., Vauras, M., & Kinnunen, R. (2010). Instructing low-achievers in mathematical word problem solving. *Scandinavian Journal of Educational Research, 4*, P. 335–355.

Kajamies, A., Vauras, M., Kinnunen, R., & Iiskala, T. (2003). *MATTE-Matematiikan sanallisten tehtävien ratkaisutaidon ja laskutaidon arviointi [Evaluation of the student's mathematical word problem solving and arithmetic skills; in Finnish].* Centre for Learning Research. Turku, Finland: University of Turku.

Kajamies, A., Vauras, M., Volet, S., Kinnunen, R., & Lehtinen, E. (2016). Creating and taking up opportunities for strategy learning while scaffolding low-achievers' reading comphrehension.

Kenny, D. T., & Chekaluk, E. (1993). Early reading performance:A comparison of teacher-based and test-based assessments. *Journal of Learning Disabilities*, P. 227-236.

Konold, T. R., & Pianta, R. C. (2007). The influence of informants on ratings of children's behavioral functioning. *Journal of Psychoeducational Assessment*, P. 222-236.

Lee, H., & Kim, Y. (2014). Korean adolescents' longitudinal change of intrinsic motivation in learning English and mathematics during secondary school years: Focusing on gender difference and school characteristics. *Learning & Individual Differences*, P. 131-139.

Lehtinen, E., Vauras, M., Salonen, P., Olkinuora, E., & Kinnunen, R. (1995). Long-term development of learning activity: Motivational, cognitive, and social interaction. *Educational Psychology, 1*, P. 21-35.

Lepola, J., Salonen, P., Vauras, M., & Poskiparta, E. (2004). Understanding the development of subnormal performance in children from a motivational-interactionist perspective. In H. Switzky, *Internatoinal Review of Research in Mental Retardation: Personality and motivational systems in mental retardation* (P. 145-189). San Diego: Elsevier Academic Press.

Lepper, M. R., Corpus, H. J., & Iyengar, S. S. (2005). Intrinsic and Extrinsic Motivational Orientations in the Classroom: Age Differences and Academic Correlates. *Journal of Educational Psychology, 2*, P. 184-196.

Licht, B. G., & Dweck, C. S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology*, P. 628-636.

Long-Crowell, E. "The Halo Effect: Definition, Advantages & Disadvantages". Psychology 104: Social Psychology. study.com. Retrieved March 30, 2016.

Marsh , H. W., Craven, R. G., & Debus, R. (1998). .Structure, stability and development of young children's self-concept: A multicohort-multioccasion study. *Child Development*, P. 1030-1053.

Marsh, H. W., Craven , R. G., & Debus, R. (1991). Self-concepts of young children 5 to 8 years of age: Measurement and multidimensional structure. *Journal of Educational Psychology*, P. 417-430.

Mashburn, A. J., Hamre, B. K., Downer, J. T., & Pianta, R. C. (2006). Teacher and classroom characteristics associated with teachers' ratings of prekindergartners' relationships and behaviors. *Journal of Psychoeducational Assessment*, P. 367-380.

Miserandino, M. (1996). Children who do well in school: Individual difference in perceived competence and autonomy in above-average children. *Journal of Educational Psychology*, P. 203-214.

Newman, R. S. (1990). Children's help-seeking in the classroom: The role of motivational factors and attitudes. *Journal of Educational Psychology*, P. 71-80.

Olkinuora, E., & Salonen, P. (1992). Adaptation, motivational orientation, and cognition in a subnormally-performing child: A systemic perspective for training. In B. Wong, *Interverntion research in learning disabilities: Aninternational perspective* (P. 190-213). New York: Springer-Verlag.

Paris, S. G., & Byrnes, J. P. (1992). The constructivist approach to self-regulation and learning in the classroom. In B. J. Zimmerman, & D. H. Schunk, *Self-regulated learning and academic achievement* (P. 169-200). New York: Springer-Verlag.

Paris, S., Lipson, M., & Wixon, K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, P. 293-316.

Park, Y. (2011). How motivational constructs interact to predict elementary students' reading performance: Examples from attitudes and self-concept in reading. *Learning and Individual Differences, 4*, P. 347–358.

Renk, K., & Phares, V. (2004). Cross-informant ratings of social competence in children and adolescents. *Clinical Psychology Review*, P. 239-254.

Retelsdorf, J., Köller, O., & Möller, J. (2011). On the effects of motivation on reading performance growth in secondary school. *Learning and Instruction, 4*, P. 550–559.

Rimm-Kaufman, S. E., Baroody, A. E., Larsen, R. A., Curby, T. W., & Abry, T. (2015). To what extent do teacher–student interaction quality and student gender contribute to fifth graders' engagement in mathematics learning? *Journal of Educational Psychology, 1*, P. 170–185.

Robinson, J. P., & Lubienski, S. T. (2011). The development of gender achievement gaps in mathematics and reading during elementary and middle school. *American Educational Research Journal*, P. 268-302.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, P. 54-67.

Salonen, P. (1988). Learning disabled children's situational orientations and coping strategies. *Nordisk Pedagogik*, P. 70-75.

Salonen, P., Kajamies, A., & Vauras, M. (2015). MOSA - Motivationaalisen suuntautumisen arviointi [Evaluation of the student's motivational orientation, in Finnish]. *Unpulished scale*. Finland: Cenre for Learning Research.

Salonen, P., Lehtinen, E., & Olkinuora, E. (1998). Expectations and beyond: The development of motivation and learning in a classroom context. In J. Brophy, *Advances in research on teaching: Expectations in the classroom* (Bd. 7, P. 111-150). Greenwich, CT: JAI Press.

Salonen, P., Lepola, J., & Vauras, M. (2007). Scaffolding interaction in parent-child dyads: Multimodal analysis of parental scaffolding with task and non-task oriented children. *European Journal of Psychology of Education, 1*, P. 77-96.

Schaffner, E., Schiefele, U., & Ulferts, H. (2013). Reading amount as a mediator of the effects of intrinsic and extrinsic reading motivation on reading comprehension. *Reading Research Quarterly, 4*, S. 369-385.

Skaalvik, E. M., & Rankin, R. J. (1995). A test of the internal/external frame of reference model at differenct levels of math and verbal self-perception. *American Educational Research Journal*, P. 161-184.

Stipek, D. J. (1992). The child at school. In M. Bornstein, & M. E. Lamb, *Developental psychology: An advanced textbook* (P. 579-625). Hillsdale, NJ: Erlbaum.

Stodolsky, S. (1988). *The subject matters.* Chicago: University of Chicago Press.

Stodolsky, S., & Grossman, P. (1995). The impact of subject matter on curricular activity: An analysis of five academic subjects. *Americal Educational Research Journal*, P. 227-249.

Taboada, A., Tonks, S. M., Wigfield , A., & Guthrie, J. T. (2009). Effects of motivational and cognitive variables on reading comprehension. *Reading and Writing, 1*, P. 85–106.

Teisl, J. T., Mazzocco, M. M., & Myers, G. F. (2001). The utility of kindergarten teacher ratings for predicting low academic achievement in first grade. *Journal of Learning Disabilities*, P. 286-293.

Tzuriel, D. (1989). Development of motivational and cognitive informational orientations from third to ninth grades. *Journal of Applied Developmental Psychology*, P. 107-121.

Unrau, N., & Schlackman, J. (2006). Motivation and its relationship with reading achievement in an urban middle school. *The Journal of Educational Research, 2*, P. 81-101.

Vauras, M., Kajamies, A., & Kinnunen, R. (2016). Reading comprehension test. [Evaluation of the student's reading comprehension, in Finnish]. *Unpublished test*. Finland : University of Turku, Centre for learning Research.

Vauras, M., Lehtinen, E., Kinnunen, R., & Salonen, P. (1992). Socioemotional coping and cognitive processes in training learning-disabled children. In Y. B. Wong, *Contemporary intervention reserach in learning disabilities: An international perspective* (P. 163-189). New York: Springer-Verlag.

Vauras, M., Salonen, P., & Kinnunen, R. (2009). Influence of group processes and interpersonal regulation on motivation, affect and achievement. In M. Maehr, S. Karabenick, & T. Urdan, *Advances in Motivation and Achievement* (Bd. 15, S. 275-314). London: Emerald Group Publishing.

Vauras, M., Salonen, P., Lehtinen, E., & Kinnunen, R. (2008). Motivation in school from contextual and longitudinal perspectives. In M. Wosnitza, S. A. Karabenick, A. Efklides, & P. Nenniger, *Contemporary Motivaion Research: from Global to Local Perspectives* (P. 1-23). Cambridge: Hogrefe & Huger Publishers.

Vauras, M., Salonen, P., Lehtinen, E., & Lepola, J. (2001). Long-term development of motivation and cognition in family and school contexts. In S. Volet, & S. Järvelä, *Motivation in learning contexts: Theoretical and methodological implicatons* (P. 285-305). Amsterdam: Pergamon.

Verschaffel, L., Greer , B., & De Corte, E. (2000). *Making sense of word problems.* Lisse, The Netherlands: Swets & Zeitlinger.

Wang, J. -Y., & Guthrie, J. T. (2004). Modeling the effects of intrinsic motivation, extrinsic motivation, amount of reading, and past reading achievement on text comprehension between U.S. and Chinese students. *Reading Research Quarterly, 2*, P. 162-186.

White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, P. 297-323.

Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their r eading. *Journal of Educational Psychology, 3*, P. 420–432.

Wigfield, A., & Harold, R. D. (1992). Teacher belief and children's achievement self-perceptions: A developmental perspective. In D. H. Schunk, & J. L. Meece, *Student perceptions in the classroom* (P. 95-121). Hillsdale, NJ: Lawrence Erlbaum Associates.

Wigfield, A., Eccles, J. S., Suk, Y. K., Harold, R. D., Arbreton, A. J., Freedman-Doan, C., & Blumenfield, P. C. (kein Datum). Change in children's competence beliefs and subjective task values across the elementary school years: A 3-year study. *Journal of Educational Psychology*, P. 451-469.

Zisimopoulos, D. A., & Galanki, E. P. (2009). Academic Intrinsic Motivation and Perceived Academic Competence in Greek Elementary Students with and without Learning Disabilities. *Learning Disabilities Research & Practice, 1*, P. 33-43.