



# Influences of family based prerequisites, reading attitude, and self-regulation on reading ability

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Available online 20 March 2006

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## Abstract

This study investigated the effect of self-regulated learning, as indicated by academic self-concept, motivation and learning strategies, reading attitude and family based prerequisites on reading ability. Students ( $n=4018$ ) in the eighth grade answered the IEA reading literacy test, the self-regulated learning questionnaire and a student questionnaire about their background. The exploratory factor analysis (EFA) revealed that the self-regulated learning questionnaire did not measure the intended three dimensions, but only two: Verbal/General academic self-concept and a new dimension called Goal oriented strategies. Structural Equation Modelling (SEM) with a cross-validation sample was conducted to determine the effects in the final model. The strongest effect on reading ability was from Verbal/General academic self-concept ( $\beta = .43$  for final and  $\beta = .56$  for cross-validation model). Gender differences revealed that girls read better on narrative and expository texts, had a more positive reading attitude, and more positive verbal self-concept, whereas boys had a higher academic self-concept (not domain-specific), self-efficacy, control expectation, reported more memorising, elaboration, and instrumental motivation (all differences  $p < .001$ ).

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*Keywords:* Reading ability; Verbal/general academic self-concept; Goal orientation; Family based prerequisites; Reading attitude

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## 1. Introduction

Good reading ability is the key to success in school and this is one reason why researchers are trying to find significant educational and psychological variables that can explain variations in reading ability and academic achievement. These variables can be strictly cognitive like word recognition (e.g., Guthrie, Wigfield, Metsala, & Cox, 1999; Lyon, 1993), or they can be more socially cognitive as in this study. In this study reading literacy is defined as "...the ability to understand and use those written language forms required by society and/or valued by the individual." (Elley, 1992, p. 3). Reading and learning to read are in part cultural activities and occur in a cultural context, which means that the home environment is crucial when it comes to developing literacy. In line with this the goal of this study is to analyse the extent to which the student's family background, together with academic self-concept (further explained below), motivation, and learning strategies (these three are seen as important contributors to self-regulated learning), can predict and influence the adolescent's reading ability. The introduction is structured as follows. First, the Family based prerequisites for reading ability are discussed, and then the overarching concept of self-regulated learning is dealt with. In the following section of the introduction self-regulated learning in terms of academic self-concept, motivation and learning strategies is outlined. The final two parts of the introduction deal with the gender differences that have been found in reading ability, and provide the hypotheses for the present study.

### *1.1. Family based prerequisites for literacy*

Children who grow up in homes with many books and where the parents spend a lot of time on reading and writing very seldom develop problems with literacy in school (Lundberg, 1984; Snow, Burns, & Griffin, 1998). Parents' attitudes and thoughts about literacy are of great importance in children's literary development and children are influenced by the way in which literacy is used within the family. By living in and participating in an environment where others use literacy the child develops an understanding for the meaning and function of signs (Purcell-Gates, 1996). Researchers have concluded, from different assessments of literacy (e.g., IEA), that the single most important factor for predicting reading ability is the number of books in the household (e.g., Elley, 1992; Jacobson & Lundberg, 2000).

Demographic data also show that a majority of reading problems fall upon children from poor families with little education i.e., families with low socio-economic status (SES) who does not spend a lot of time on reading activities (Lundberg, 1984; Snow et al., 1998). A recent large-scale study, Programme for International Student Assessment (PISA) (OECD, 2001) has shown that there are considerable differences in reading ability between students from high SES and student from low SES homes.

Snow et al. (1998) describe four mechanisms for transmission of literacy between generations. Simple and direct transmission, which includes activities like reading storybooks and writing shopping lists, is the first mechanism. The second is participating in literary practice which means that the child learns the functional applications of literacy that are in use every day in the family. Key to this second point is to see the parents as models where literacy is employed when solving a problem. Children learn to use literacy in problem-solving from their models i.e., their parents. The third mechanism is to find pleasure and

engagement in literacy. Many researchers (e.g., Baker, Mackler, Sonnenschein, & Serpell, 2001) see enthusiasm about literacy activities and a positive climate when it comes to literacy, as routes to the development of active engagement in literacy tasks. Finally, parents can help children to develop the linguistic and cognitive mechanisms of oral language by means of singing songs, chanting nursery rhymes and other rhyming games (Snow et al., 1998). Purcell-Gates (1996) argued that a child who pays attention to and experiences many different kinds of literacy is more likely to understand the conceptual base of literacy—that writing is symbolic and is used for communication. Thus, there is a lot of support for the assumption that children growing up in a literacy rich environment where a positive value is ascribed to literacy will develop a positive attitude towards reading, which in turn will lead to good reading ability and also to positive thoughts about themselves in the reading situation. Thus, in this study, we hypothesize that the influence of the home environment, in the form of parent education, number of books in the home, and presence of a daily newspaper, in this study called Family based prerequisites, will be an important factor and has effect on reading ability and reading attitude, as well as on Verbal/General academic self-concept.

### *1.1.1. Reading attitude*

Reading attitude might be defined as a disposition to respond in a favourable or unfavourable manner in relation to reading. Some homes provide many opportunities for a favourable attitude toward reading; others provide very few. Students are likely to have a favourable attitude toward subjects they find interesting and an unfavourable one to those that are uninteresting. Attitudes are generally influenced by people around us (Harris & Sipay, 1990). Parents and teachers who enjoy reading tend to pass these attitudes on to children and students. According to Harris and Sipay (1990), “attitudes toward reading are influenced by children’s self-concepts, levels of reading ability, and interests, as well as by the attitudes and behaviours of their parents, peers, and, and teachers” (p. 668). However, it might be equally plausible that reading attitude influences reading ability, since a child with a positive attitude toward reading will most probably read more often and thus better than a child with a negative attitude toward reading. Studies generally show that good readers have a more positive attitude than poor readers toward reading (Wigfield & Asher, 1984). We hypothesize that reading attitudes are influenced by Family based prerequisites and Verbal/General academic self-concept and that reading attitudes will influence reading ability.

### *1.2. Self-regulated learning*

According to Boekaerts and Corno (2005) there is still no plain and straightforward definition of self-regulated learning, rather it is a versatile set of functions still under construction (Karoly, Boekaerts, & Maes, 2005). Boekaerts, Pintrich, and Zeidner (2000) indicate that no coherent general understanding of self-regulated learning has been agreed upon given the variety in the field. Zimmerman (1994) has referred self-regulated learning as to the “degree that individuals are metacognitively, motivationally, and behaviourally active participants in their own learning process” (p. 3). It has also been referred to as the processes by which individuals exercise control over their own thinking, their emotions and behaviour as they acquire knowledge (Zimmerman, 1989). According to Zimmerman (2001) self-regulation is not a mental ability, nor is it an academic performance; rather it is

a self-directive process through which learners transform their mental abilities into related academic skills. In line with this Boekaerts and Corno (2005) argue that self-regulated learning is a “dynamic and developing process” (p. 208) which occurs in various contexts.

To become self-regulated learners the students must regulate not only their behaviour but also their underlying motives i.e. their performance related cognition, beliefs, intentions, and emotions. This implies that students who develop effective self-regulated learning are mentally active in their own learning process and exert a significant degree of control over goal attainment instead of being a passive recipient of information (Schunk, 1994), and this is assumed to lead to high performance. According to Guthrie, Schafer, Wang, and Afflerbach (1995) reading comprehension is likely to be facilitated by deliberate use of different strategies and this will add further to the explanation of children’s frequency and amount of reading. These metacognitive strategies seem to be fundamental for the understanding of texts (Guthrie et al., 1995) and seem to predict achievement more accurately than cognitive strategies (Zimmerman, 1994). To understand the meaning of a text the students need to monitor their comprehension (Pressley & Ghatala, 1990) and thus self-regulated learning is important for reading ability and achievement. Despite the lack of a simple definition of SRL, Artelt, Baumert, Julius-McElvany, and Peschar (2003) argue that some measurable characteristics of students are associated with a tendency to regulate learning, as well as with greater performance. These three main aspects of SRL are included in this study, namely, (a) academic self-concept, (b) motivation, and (c) learning strategies. Hence, this is not an unbiased view of self-regulated learning; rather it is centred on some positive characteristics that put students in a better position to regulate their learning (Artelt et al., 2003).

### *1.3. Academic self-concept*

Academic self-concept is a hierarchical and multidimensional structure (see Byrne, 1996; Marsh, 1993; Marsh & Hattie, 1996), with the Verbal/academic and the math/academic self-concept at the top and the different subject areas, such as Swedish, Science and Math, at the bottom of the model (see Marsh, 1993; and Marsh & Hattie, 1996 for a full description). According to Byrne (1996), there is still no precise definition of academic self-concept but Strein (1993) noted that two elements seem to be present in most research, both of which are consistent with the original model proposed by Shavelson, Hubner, and Stanton (1976). The first element is that the self-concept reflects descriptive (“I like to read”) as well as evaluative (“I am good at reading”) aspects of self-perception. The second element is that focus is mostly on competence rather than attitude, and due to different self-beliefs students will display diverse levels of cognitive, social, and emotional engagement in school (Bong & Skaalvik, 2003). Many researchers emphasize that individuals inferentially process self-relevant information from various frames of reference, both internal and external, to form a self-concept, and furthermore, that self-concept cannot be understood if these frames of reference are neglected (Bong & Skaalvik, 2003; Marsh, Hau, & Craven, 2004; Marsh & Köller, 2004; Skaalvik & Skaalvik, 2002, 2004).

Marsh and Yeung (1997) suggested that academic achievement is accepted as a factor that influences academic self-concept. This is in line with several researchers who have found a reciprocal relationship between academic achievement and academic self-concept where academic self-concept is both a cause and an effect of academic achievement (e.g., Byrne, 1984, 1996; Marsh & Craven, 1997; Marsh & Köller, 2004). Dweck and colleagues

(see Dweck, 2000) have shown that when no difficulties arise confidence in intelligence is a good predictor of academic achievement. The important question still to be answered is how these processes function (Marsh, Byrne, & Yeung, 1999).

McCombs (2001) argue that one of the reasons why students self-regulate during learning is to enhance or actualise their self-concept. Individual, domain-specific self-perceptions are assumed to determine how students will self-regulate when learning in that domain. Academic self-concept is so widely perceived as important that theorists from diverse theoretical traditions now include them in revisions of their theory. A highly developed self-concept is seen as the ultimate goal for self-regulated learning, and experiences that are incompatible with students' identities are avoided (Zimmerman & Schunk, 2001). In this study, we focus on the Verbal/General academic self-concept which we hypothesize affects reading ability and motivation, as well as reading attitude.

#### 1.4. Motivation

Why do students study and why do they bother to learn? Students can seek achievement for different reasons and these reasons affect the way in which they approach, engage in and respond to the academic situation (e.g., Ablard & Lipschultz, 1998). Some students want to augment their own competence and others want to show superior ability. Dweck and Elliot (1983) identified two different goals. The first category is called learning oriented or task-oriented goals for achievement. The mere aspect of learning is important and the student feels emotions such as pride, success and accomplishment as a result of their developing competence. They have a desire to become smarter. The second goal category is performance oriented or ego-oriented, where the goal is to demonstrate ability and gain positive reactions to their competence (Dweck, 2000; Meece, 1994). Research has shown that the socialisation environment in the home helps to establish students' conceptions of ability and what achievement goals they strive to reach (Ames & Archer, 1987).

Students with learning goals focus on understanding the material. They want to learn even though they might perform less well. Because of this they are persistent and put a lot of effort into the challenge, and they will modify their effort if they fail (Ablard & Lipschultz, 1998). In contrast, the students with performance goals focus on the performance itself. These students are at risk of appearing intellectually incompetent since they avoid challenges, and that could make them believe that they lack ability (Dweck, 1986). Both these goals are natural and necessary, and can stimulate achievement. At times students need to master new tasks and acquire new skills, and at other times they need to display and validate the skills they already have. In the best of worlds students could achieve both goals at the same time. Unfortunately they are often in conflict. When proving ability becomes so important that it drives out learning goals, problems with performance goals arise (Dweck, 2000).

Research (see Anderson & Keith, 1997) has shown that the aspects that seem to be most important for academic motivation are: (a) effort and choice of activity, (b) locus of control and (c) self-efficacy or faith in one's ability to succeed at a given task. Perceived self-efficacy can be defined as "people's judgements of their capabilities to organize and execute the sources of action required to manage prospective situations" (Bandura, 1986, p. 391).

Outcome and self-efficacy expectations provide learners with representations of future consequences, and these representations help learners to set goals for themselves (Schunk, 2001). Thus, motivation to self-regulate involves two cognitive sources: self-efficacy and

outcome expectations and goals (Schunk, 2001). Self-regulated learners have been characterised as students with adaptive motivational beliefs (Wolters, 1999), more intrinsically motivated (Sweet, Guthrie, & Ng, 1998), and also to have a large arsenal of cognitive strategies that they are metacognitively skilled at using (Wolters, 1999); hence motivation and learning strategies (further described below) are closely intertwined. Students with well-developed self-regulated learning seem to be more intrinsically motivated. As a result of the above we hypothesize that motivation will affect learning strategies and reading ability, and will be influenced by Verbal/General academic self-concept, where self-efficacy is an important element.

### *1.5. Learning strategies*

Learning strategies can be globally defined as mental processes that learners can, more or less intentionally, use to help themselves learn and understand something new, and they are seen as essential for self-regulated learning (Somuncuoglu & Yildirim, 1999). Various cognitive and metacognitive strategies have been found to foster active cognitive engagement in learning and result in higher levels of achievement (Pintrich & De Groot, 1990). In this study, we concentrate on three different types of learning strategies: memorising, elaboration and control strategies. Learning strategies vary both within and between individuals and the general assumption is that deliberate use of strategies, no matter what the strategy is, is positively associated with effective learning (Warr & Downing, 2000).

Memorising or rehearsal is a procedure where the student repeats to him- or herself the material being learned. This does not involve reflecting on the material or seeing how it fits with other material. Instead mental repetition is central (Warr & Downing, 2000). Memorising can be viewed as a surface approach to learning, rather than as meaning orientated (Somuncuoglu & Yildirim, 1999). Memorising can also be seen as emphasising performance rather than intellectual mastery of the material (Warr & Downing, 2000).

Elaboration strategies on the other hand are more concerned with mastery of the material. These are procedures to examine implications, and to make mental connections between material to be learned and existing knowledge. This does not stop at fitting different aspect together, but goes further to seek to increase understanding by changing the way material is viewed in the context of other information (Warr & Downing, 2000). These strategies are termed deep cognitive strategies, since they facilitate long-term retention of the target information (Somuncuoglu & Yildirim, 1999).

Control strategies are seen as metacognitive strategies. These strategies basically consist of planning, monitoring and regulating to help students control and execute their learning processes (Somuncuoglu & Yildirim, 1999). Warr and Downing (2000) suggest three areas of control strategies. Emotion control functions ward off anxiety and prevent concentration failures caused by intrusions of anxiety-linked thoughts. Motivation control involves procedures to maintain motivation and attention when there is limited interest in the task. Finally, comprehension monitoring assesses the degree to which learning goals are being reached and modifies learning behaviour if necessary. From this line of argument we hypothesize that learning strategies are important for reading ability. We also hypothesize that learning strategies will be directly influenced by motivation and verbal/general academic self-concept.

### 1.6. Gender differences

Several studies show that gender is a significant factor when trying to explain reading ability and academic achievement. However the results of these studies have until recently been somewhat inconsistent (Hay, Ashman, & Van Kraayenoord, 1998). Several studies have found (e.g., Skaalvik & Rankin, 1990; Wagemaker, 1996) that girls achieve higher reading comprehension scores, whereas some studies have failed to show gender differences (e.g., Rowe, 1991). Høien and Lundberg (1999) concluded that many studies show that dyslexia is three to four times as common in boys as in girls, but they also stated that some scientists suggest that the difference is negligible and stems from the fact that less attention has been given to girls' problems. In two recent international studies conducted by OECD, Programme for Internationale Student Assessment (PISA) in 2000 and 2003, 15-year-old females performed significantly better in reading than males of the same age in 32 respectively 39 countries (OECD, 2001, 2004). In PISA 2000 there was a statistically significant gender difference in mathematics in about half of the countries. In all of these males did better. Twenty-four OECD-countries showed no statistically significant gender difference in science achievement. The advantage of females in reading in PISA 2000 shown in all countries was substantially larger than the advantage of males in mathematics shown in about half of the countries. Three reading scales were used: reflection, interpretation, and information. Females tended to be furthest ahead in the reflection aspects of reading.

Several studies have found stereotypic gender differences in self-concept in specific domains such as English and Math (Anderman, Eccles, Yoon, Wigfield, & Blumenfeld, 2001; Eccles, Wigfield, & Schiefele, 1998; Marsh, Köller, Trautwein, Lüdtke, & Baumert, 2005). In PISA 2000 (OECD, 2001), 15-year-old females in the majority of countries reported emphasising memorisation strategies more than males. However, Sweden showed a statistically significant difference in the reverse direction. Boys reported to use memorisation strategies more often than girls. In almost all countries males reported using elaboration strategies more often than females and females reported using control strategies more often than males. In all countries except Korea, females more frequently than boys stated that they usually get good marks in language related subjects and that they learn quickly (OECD, 2001).

### 1.7. Hypotheses

The main purpose of this study was to investigate the relations between the Family based prerequisites, self-regulated learning (academic self-concept, motivation and learning strategies), reading attitude, and reading ability. The set of relations we will describe below is displayed in Fig. 1.

Based on the theories and related research presented here our hypotheses are that family background in terms of Family based prerequisites will have direct paths to reading ability, and reading attitude (e.g., Purcell-Gates, 1996; Snow et al., 1998). Family based prerequisites influences academic self-concept (Byrne, 1996), and motivation (Ames & Archer, 1987), hence there will be direct links to Verbal/General academic self-concept and motivation. Parallel to this we hypothesize that a young person's Verbal/General academic self-concept will have direct paths to reading ability (Marsh & Yeung, 1997), motivation (e.g., Anderson & Keith, 1997), learning strategies (e.g., Warr & Downing, 2000), and reading attitude (Purcell-Gates, 1996; Snow et al., 1998). Motivation will have a direct path to

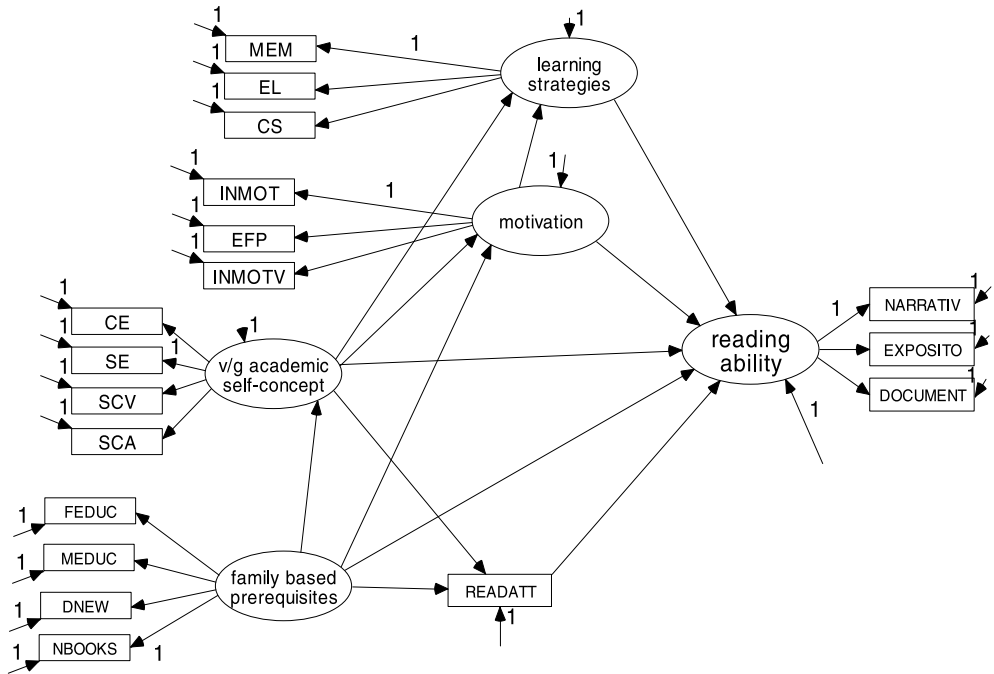


Fig. 1. Hypothesized model. MEM, memorisation; EL, elaboration; CS, control strategies; INMOTV, instrumental motivation; EFP, effort and persistence; INMOTV, verbal instrumental motivation; CE, control expectancy; SE, self-efficacy; SCV, self-concept verbal; SCA, self-concept academic; FEDUC, father's education; MEDUC, mothers education; DNEW, daily newspaper; and NBOOKS, number of books at home.

reading ability, and since it is important for choice of activity (Anderson & Keith, 1997) it will have a direct link to learning strategies. We believe that learning strategies will have a direct path to reading ability (Warr & Downing, 2000), and the same hypothesis stands for reading attitude, that it will have a direct path to reading ability (e.g., Purcell-Gates, 1996; Snow et al., 1998).

The results of gender differences in reading ability are not fully consistent but most research has shown that girls perform better than boys thus our hypothesis is that girls will show a better reading ability than boys. We will also investigate whether there are gender differences in the underlying variables; reading attitude and self-regulated learning.

## 2. Method

### 2.1. Participants

The critical sample of students in 8th grade in Stockholm in the spring of 2000 was 6099. Thirty-five students who attended schools for children with behavioural or cognitive problems were removed from the sample. 1390 students were removed from this particular study since they did not have Swedish as their mother tongue. Of the remaining 4674 students, 656 (14%) were either absent, refused to participate, failed to complete both the questionnaire and the reading test, or completed one or both instruments inaccurately. This gives us a participation rate of 86%, and among the 4018 students included in the final

sample 2000 (49.8%) were male and 2018 (50.2%) were female. Students' ages ranged from 13 years and 4 months to 16 years and 11 months ( $M = 14$  years and 8 months,  $SD = .3$ ). The students in the final sample came from 62 schools, of which 53 were public schools and 9 were private. For the structural equation model (*SEM*) the sample was randomly split to produce a cross-validation sample. Two individuals had no data for any of the items of interest for Family based prerequisites. Therefore they were removed when we split the sample. The main sample consisted of 2/3 ( $n = 2632$ ) of the final sample, and the cross-validation sample consisted of 1/3 ( $n = 1384$ ) of the final sample.

## 2.2. Material

### 2.2.1. Reading tests

The reading test consisted of a paper-and-pencil test with 9 texts taken from the IEA Reading Literacy (International Association for the Evaluation of Educational Achievement) conducted 1990/91. The domains or types of reading materials were as follows:

1. Narrative prose: continuous texts in which the writers' aim is to tell a story. They follow in a linear time sequence and are usually intended to entertain or involve the reader emotionally. The selected extracts ranged from short fables to lengthy stories of more than 1000 words (Elley, 1992). This test included two texts with five items each with a Cronbach's  $\alpha$  of .68.
2. Expository prose: continuous texts designed to describe, explain, or otherwise convey factual information or opinion to the reader (Elley, 1992). This test included three texts of which two had four items, and one text had six items. The reliability of this test was .72
3. Documents: structured information presented in the form of charts, tables, maps, graphs, lists or sets of instructions. These materials were organized in such a way that students had to search, locate, and process selected facts rather than read every word of continuous text (Elley, 1992). This test included four different texts where three texts had three items, while one text had seven items. The Cronbach's  $\alpha$  for this test was .65.

These three domains of reading ability are intended to reflect different aspects of reading comprehension; hence they will be used as separate indicators for the latent variable reading ability in the *SEM*.

### 2.2.2. Self-regulated learning questionnaire

The Self-Regulated Learning Questionnaire (SRLQ) is a new instrument that was developed for the Programme for International Student Assessment (PISA) (Artelt et al., 2003). The instrument was translated to Swedish from both English and French and back again to make sure that the translation was as accurate as possible.

The original instrument has 51 items and 14 shorter scales, which distinguishes three latent self-regulated learning dimensions: (a) self-concept, (b) motivation, and (c) learning strategies (see Peschar, Veenstra, & Molenaar, 1999a, 1999b, for a full description of the development, validation and reliability measurement of the instrument). The scales were constructed and evaluated on theoretical and content issues so that a dimension should contain more than one scale to achieve balance and to prevent overlap between scales. In this study, we used a modified version of the instrument, which consisted of 45 items and 12 shorter scales. The scales for math have been removed since this study concerns reading literacy.

The initial exploratory factor analysis (EFA) revealed that the instrument did not measure three latent variables since only two factors with eigenvalue over 1 came out of the analysis. We used principal component extraction with varimax rotation. The scales of the dimension self-concept loaded well together with an Eigenvalue of 5.48 but the dimensions motivation and learning strategies loaded together as one dimension. However one of the scales aimed at measuring motivation did not fit and was thus removed. For the further analyses we created a new latent variable which was called *Goal oriented strategies* with an Eigenvalue of 1.12. The new concept Goal oriented strategies was created on the basis of the EFA. In the conceptual model we had assumed there to be three dimensions of self-regulated learning. The result, however, showed that there were only two dimensions: academic self-concept and the newly created Goal oriented strategies. The result could either be due to measurement difficulties, or it could be a reflection of the reality that there are only two dimensions in the self-regulated learning questionnaire.

For the measurement of the latent variable Verbal/General academic self-concept we used four scales. (a) Control expectation: The reliability (Cronbach's  $\alpha$ ) range from 0.69 to 0.84. (b) Self-efficacy: This scale had the lower boundary of reliability of 0.71 and the higher boundary of 0.85. (c) Self-concept verbal: Marsh (1990), has developed a short version of Self-Description Questionnaire from which this and the following scales are taken. The reliability of the scale is between 0.75 and 0.84. (d) Self-concept academic (not domain specific) where the reliability scores vary between 0.76 and 0.84 (Peschar et al., 1999a). The reliability for these four scales combined was .86.

For the new latent variable Goal oriented strategies, five scales were included. (a) Instrumental motivation: Longitudinal studies (e.g., Eccles, 1994) have found that career-related instrumentality expectations are important predictors of performance. The reliability of the instrumental motivation scale is between 0.77 and 0.86. (b) Effort and Persistence in Learning: This scale has its base in the domain-general persistence scale developed by Peschar (see Peschar, Veenstra, & Molenaar, 1999c). The reliability of the scale varies between 0.76 and 0.87 (Peschar et al., 1999a). (c) Memorising: The memorising scale is a short version of the Das Kieler Lernstrategien-Inventar (KSI) (Baumert, Heyn, & Köller, 1994). The scale's reliability is between 0.60 and 0.83. Due to a translation error one item had to be removed from the memorising scale. (d) Elaboration: This is a short version of the elaboration scale on the KSI (Baumert et al., 1994). The reliability of the Elaboration scale is between 0.71 and 0.81. (e) Control Strategies: This scale summarizes the KSI subscales planning, monitoring, and regulation. The alpha values are between 0.62 and 0.81 (Peschar et al., 1999a). The reliability for these five scales combined was .83. (See Appendix A for all items in each of these used scales). An overview of the latent variables and their indicators can be seen in Table 1, where scales, number of items, Eigenvalues, and reliability scores are presented.

### 2.2.3. Reading attitude

For the measuring of the variable reading attitude a short questionnaire from PISA (Schultz, 2002) was used. Here, the students are asked to state their attitude towards different aspects of reading and towards books. The questionnaire consists of nine items and the students are asked to grade to what extent they agree with the statements on a 4-point Likert scale. The negatively stated questions were reversed before the analysis began. The reliability of this scale is 0.88.

Table 1

Overview of the three latent variables, eigenvalue, Cronbach's  $\alpha$ , and their indicators (number of items within parenthesis)

Latent variable		
V/G academic self-concept	Goal oriented strategies	Family based prerequisites
Eigenvalue = 5.48	Eigenvalue = 1.12	Eigenvalue = 2.06
$\alpha = .86$	$\alpha = .83$	$\alpha = .62$
Control expectation (4)	Instrumental motivation (3)	Mother's education (1)
Self-efficacy (4)	Effort and persistence (4)	Father's education (1)
Self-concept verbal (3)	Memorising (4)	Daily newspaper (1)
Self-concept academic (3)	Elaboration (4)	Number of books (1)
	Control strategies (5)	

#### 2.2.4. Family based prerequisites

To measure the latent variable Family based prerequisites, we used four variables from the student questionnaire. Four variables could be seen as minimal but due to the student questionnaire not being too long we used those items that previously had been shown to predict reading ability the most. These items were mother's education, father's education (OECD, 2001), total number of books present in the home (Jacobson & Lundberg, 2000), and a daily newspaper. The EFA with principal component extraction and varimax rotation resulted in one factor that loaded well together with an Eigenvalue of 2.061 that explained 51.52% of the variance. Since only one factor was extracted, rotation could not be applied. (For an overview of the latent variables and their indicators see Table 1). The reliability of this scale was .62

#### 2.3. Data analysis

As a result of the EFA we found out that there were only two dimensions of self-regulated learning. Hence, our theoretical model did not fit and needed to be changed. Maximum-likelihood estimation in Amos 5 Structural Equation Modelling software (this program uses model specification through a path diagram interface) was used to examine the effect of the latent as well as the measured variables on reading achievement. According to Hoyle and Panter (1995) there is a growing body of research that indicates that maximum likelihood performs well under less than perfect analytical conditions and, thus has been found to be very robust. Model modification and cross-validation have been used as suggested by MacCullum (1995) to reduce the possibility that the relations found were a product of chance.

We have cross-validated the final model on a sample consisting of 1384 individuals. To judge the fit of the model, multiple fit indices were used. For the initial findings we used the  $\chi^2$  which tests the lack of fit resulting from over-identifying restrictions placed on a model (Hoyle & Panter, 1995), the smaller the  $\chi^2$  the better the fit of the model. The  $\chi^2$  assesses the magnitude of the discrepancy between the sample and the fitted covariance matrix. However, there are some problems associated with the  $\chi^2$  test, one of the concerns is focused on the sample size issue. The  $\chi^2$  test is asymptotic which means that it holds as sample size gets large enough. But with increased statistical power of the test that follows a large sample, a minor difference between the sample covariance matrix and the fitted model may be over-estimated and lead to the rejection of the specified model (Hu & Bentler, 1995).

The root mean square error of approximation (RMSEA) was used to test the fit of a single model. A RMSEA of about .05 or below indicates a close fit of the model and a value of .08 or less would indicate a reasonable error of approximation (Browne & Cudeck, 1993). As a judgment of absolute fit we used the goodness-of-fit index (GFI) which indexes the relative amount of the observed variance and covariances accounted for by the model (Hoyle & Panter, 1995). As incremental fit indices we used the Tucker–Lewis index (TLI), which compares the lack of fit of a target model to the lack of fit of a baseline model, usually the independence model, and the comparative fit index (CFI) which indexes the relative reduction in lack of fit as estimated by the noncentral  $\chi^2$  of a target model versus a baseline model (Hoyle & Panter, 1995). According to Hoyle and Panter (1995) the value .90 stands as an agreed-upon cut-off for overall fit indices to suggest an adequate fit and .95 suggests good fit.

### 3. Results

#### 3.1. Structural Equation Modelling

A two-step approach was used to answer the research questions. The first step was to test the measurement models, i.e. confirmatory factor analysis (CFA) for how well the latent variables were measured by the manifest variables. One modification for each of the models was made on the basis of the data. For the measurement model for Family based prerequisites we allowed covariance between the error variances for mother's and father's education. For the measurement model for Verbal/General academic self-concept covariance between the error variances for self-concept academic (SCA) and self-concept verbal (SCV) was allowed. Finally, for the measurement model of Goal oriented strategies covariance between the error variances for instrumental motivation (INMOT) and effort and persistence (EFP) was allowed. All three CFAs revealed good fit of the models as judged by both  $\chi^2$  and the fit indexes. The results of the measurement models are shown in Table 2.

The next step was to test the full SEM where the three latent variables are connected to the manifest variable reading attitude, and all are connected to the outcome variable: the latent model for reading ability. In the first SEM gender was included as a manifest variable but there was an almost null correlation between gender and reading ability thus it did not contribute to the model. Hence gender was removed for the second model. The second model, both the final model and the cross-validation model, proved to be good as judged by the fit indexes (see Fig. 2).

For the final model and cross-validation model 34 and 39% respectively of the variance in reading ability was accounted for. All standardized effects for both the final model and the cross-validation model were significant and are shown in Table 3. The strongest

Table 2  
Fit indices of measurement models, final model and cross-validation model

Model	$\chi^2$ (df)	<i>p</i>	GFI	TLI	CFI	RMSEA
Measurement model for V/G academic self-concept	.056 (1)	.812	1.000	1.000	1.000	.000–.032
Measurement model for goal oriented strategies	2.06 (4)	<.001	.996	.990	.996	.028–.061
Measurement model for family based prerequisites	.23 (1)	.268	1.000	.999	1.000	.000–.054
Final model	771.33 (108)	<.001	.967	.954	.963	.047–.052
Cross-validation model	511.33 (108)	<.001	.958	.947	.958	.047–.057

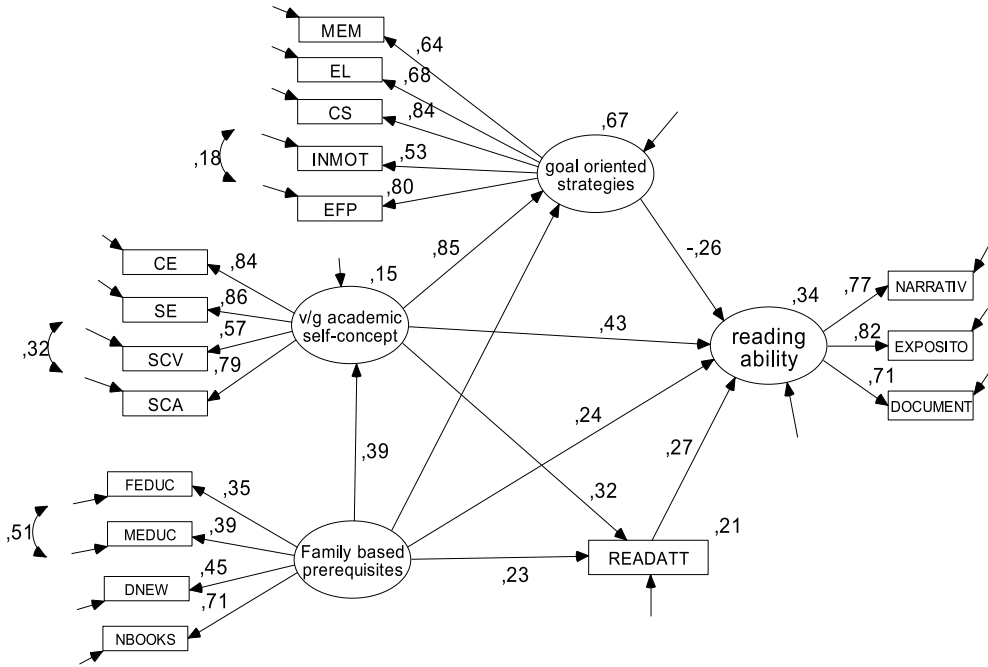


Fig. 2. Standardized parameter estimates for the final model ( $n = 2632$ ): factor loadings, regression coefficients and explained variance. MEM, memorisation; EL, elaboration; CS, control strategies; INMOT, instrumental motivation; EFP, effort and persistence; CE, control expectancy; SE, self-efficacy; SCV, self-concept verbal; SCA, self-concept academic; FEDUC, father’s education; MEDUC, mothers education; DNEW, daily newspaper; and NBOOKS, number of books at home.

Table 3  
Standardized direct effects on study variables for both final model and cross-validation model

Path	Final model	Cross-validation model
To reading ability		
From family based prerequisites	.24	.22
From V/G academic self-concept	.46	.56
From goal oriented strategies	-.26	-.35
From reading attitude	.27	.26
To reading attitude		
From Family based prerequisites	.23	.23
From V/G academic self-concept	.32	.33
To goal oriented strategies		
From Family based prerequisites	-.08	-.11
From V/G academic self-concept	.85	.88
To V/G academic self-concept		
From Family based prerequisites	.39	.43

Note. All paths significant at  $p < .001$ .

positive effect on reading ability across both models was from Verbal/General academic self-concept with a  $\beta$  value of .43 for the final model and a  $\beta$  value of .56 for the cross-validation model. Family based prerequisites as well as Goal oriented strategies, and reading

Table 4

Pearson product-moment correlation matrix of endogenous variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	
Inst. motivation	1												
Eff. and persistence	.513	1											
Memorising	.385	.518	1										
Elaboration	.334	.516	.404	1									
Control strategies	.460	.679	.550	.591	1								
Control expectation	.387	.573	.442	.515	.608	1							
Self-efficacy	.353	.536	.446	.558	.548	.726	1						
Self-concept verbal	.227	.381	.240	.330	.389	.463	.491	1					
Self-concept academic	.347	.551	.384	.438	.492	.650	.688	.604	1				
Reading attitude	.164	.323	.147	.285	.332	.314	.322	.390	.337	1			
Expository	.143	.175	.108	.147	.197	.249	.299	.289	.340	.353	1		
Narrative	.088	.121	.064	.110	.149	.207	.232	.239	.280	.351	.633	1	
Document	.145	.182	.094	.160	.193	.280	.297	.290	.362	.308	.580	.835	1

Note. All correlations significant at  $p < .01$ .

attitude had moderate effects on reading ability, with Goal oriented strategies having a negative effect, whereas the other two had positive effects on reading achievement. Parameter estimates below .1 (even though significant) are considered weak and are hidden, thus in Fig. 2 we hide the parameter estimate for the path from Family based prerequisites to Goal oriented strategies.

### 3.2. Bivariate analysis

We examined the interrelationships among the endogenous variables, both latent and measured, using Pearson product-moment correlations to see if the predictions were supported. The correlation matrix is presented in Table 4.

All three scores of reading ability was significantly positively correlated to all the measured variables, with the strongest correlation for Narrative were with reading attitude ( $r = .35$ ). For Expository the strongest correlations were with reading attitude ( $r = .35$ ) and self-concept academic ( $r = .34$ ). The same results were found with Documents where again the strongest correlations were with self-concept academic ( $r = .36$ ) and reading attitude ( $r = .31$ ). Reading attitude had rather homogenous correlations with the other variables but the strongest correlation, except the above already mentioned, was with self-concept verbal ( $r = .39$ ), where 15% of the variance is accounted for. The correlations between the scales of Goal oriented strategies and the scales of Verbal/general self-concept were all positive and significant. The correlation coefficients varied between  $r = .23$ –.61, where the strongest correlation was between control expectation and control strategies.

### 3.3. Gender differences

To examine gender differences in the three different aspects of reading ability, Goal oriented strategies (5 scales), verbal/general academic self-concept (4 scales), and reading attitude, a MANOVA (13 variables  $\times$  2 gender) was conducted using these variables as dependent variables and gender as the independent variable. Means and standard deviations are reported in Table 5.

Table 5  
Means and standard deviation for the endogenous variables

Variable	Girls ( $n = 2018$ )		Boys ( $n = 2000$ )		Total ( $n = 4018$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Narrative	7.9	2	7.5*	2	7.7	2
Expository	10.9	2.5	10.6*	2.6	10.7	2.6
Document	12.9	2.3	12.8	2.5	12.9	2.4
Reading attitude	26.5	5.3	23.6*	5.4	25.1	5.5
<i>Verbal/General academic self-concept</i>						
Control expectation	11.6	2.6	12*	2.5	11.8	2.7
Self-efficacy	10.2	2.7	11.3*	2.7	10.7	2.7
Self-concept verbal	9.1	1.9	8.8*	1.9	9	1.9
Self-concept academic	8.2	2.3	8.5*	2.2	8.4	2.3
<i>Goal oriented strategies</i>						
Memorising	7.4	2.1	8*	2.1	7.7	2.1
Elaboration	9.7	2.8	10.3*	2.7	10	2.7
Control strategies	14.3	3	14.1	3	14.2	3
Instrumental motivation	9.9	2.2	10.2*	2.1	10	2.2
Effort and persistence	11.4	2.7	11.5	2.6	11.4	2.7

\* Significant difference between boys and girls at  $p < .001$ .

The multivariate test was significant  $F_{\text{mult}}(13, 4004) = 76.66, p < .001$ , with an estimated effect size of  $\eta^2 = .20$ . The univariate  $F$  test revealed that girls achieved significantly higher on two aspects of reading ability: Narrative  $F_{\text{univ}}(1, 4016) = 44.32, p < .001$ , and Expository  $F_{\text{univ}}(1, 4016) = 11.18, p < .001$ . No differences were found on Documents. The univariate  $F$  test also showed that girls reported more verbal academic self-concept  $F_{\text{univ}}(1, 4016) = 35.85, p < .001$ , and had a more positive attitude towards reading  $F_{\text{univ}}(1, 4016) = 301.990, p < .001$  than boys.

According to the univariate  $F$  test boys reported significantly more memorising strategies  $F_{\text{univ}}(1, 4016) = 59.05, p < .001$ , elaboration strategies  $F_{\text{univ}}(1, 4016) = 49.52, p < .001$ , instrumental motivation  $F_{\text{univ}}(1, 4016) = 19.58, p < .001$ , control expectation  $F_{\text{univ}}(1, 4016) = 31.45, p < .001$ , self-concept academic  $F_{\text{univ}}(1, 4016) = 22.59, p < .001$ , and self-efficacy  $F_{\text{univ}}(1, 4016) = 157.47, p < .001$ . No significant differences were found on control strategies or effort and persistence.

In brief, we can conclude that the path analysis revealed rather strong Beta weights across the endogenous and exogenous variables with the strongest effect on reading ability from Verbal/General academic self-concept. The correlations between all three measures reading ability and all study variables were all positive and significant. Gender differences were found on all variables except Document, control strategies, and effort and persistence. Girls scored higher the other two reading ability measures, Narrative and Expository, reported more verbal academic self-concept and a more positive reading attitude, whereas boys reported more frequent use of memorising, elaboration, instrumental motivation, and reported more control expectation, self-concept academic, and self-efficacy.

#### 4. Discussion

A set of hypothesis about relations between family based prerequisites, reading attitude, self-regulation, and reading achievement based on theories and related research were

presented. The existence of each of the separate links between the variables has got support from earlier research (see Section 1). However, in our final model all the variables were connected into a complex pattern of relations. The model was tested for the collected data from more than 4000 students and the result showed the latent variables to be well measured by the manifest variables. Furthermore, both the final model and the cross-validation model proved to have good fit. More than one third of the variance in reading ability was accounted for and all standardized effects for the models were significant.

Following the final model, the discussion will start with the direct and indirect influences from parent education, number of books in the home and presence of a daily newspaper, here called Family based prerequisites, on reading ability. Family based prerequisites showed direct positive moderate influence on reading ability  $\beta = .24$  in the final model and  $\beta = .22$  in the cross-validation model. Well educated parents are usually better equipped to stimulate the cognitive and linguistic development of their children and thus their academic growth. For example, investigations have shown a significant difference in vocabulary among children from academic and non academic backgrounds (e.g., Snow et al., 1998; Sonnenschein & Munsterman, 2002; Wigfield & Guthrie, 1997). The influence from Family based prerequisites to Reading attitude was moderate ( $\beta = .23$ ) in both the final model and the cross-validation model. The influence from Reading attitude on reading ability ( $\beta = .27$  respectively  $\beta = .26$ ) confirms earlier studies generally showing that good readers have a more positive attitude than poor readers toward reading (Wigfield & Asher, 1984). Thus, our hypothesis based on earlier research (Lundberg, 1984; Purcell-Gates, 1996; Snow et al., 1998) showing Family based prerequisites to be an important factor with a positive effect on reading ability, both directly and indirectly through Reading attitude, was confirmed.

A home full of books, where the parents are assumed to be good reading models who spend a lot of time on reading activities, has a high probability of stimulating a positive attitude to reading among children (Purcell-Gates, 1996). Children growing up in a literacy rich environment, where a positive value is ascribed to literacy, will develop a positive attitude towards reading. These factors will in turn lead to good reading ability. However, the assumed indirect effects from Family based prerequisites through Verbal/General academic self-concept on reading proved to be stronger than those through Reading attitude. The analysis showed strong influence from Family based prerequisites to Verbal/General academic self-concept ( $\beta = .39$  respectively  $\beta = .43$ ). Well educated parents, many books and a daily newspaper at home constitute an environment with a direct and positive influence on students' beliefs in their own abilities to perform well at school (Snow et al., 1998). Fathers and mothers who themselves have been successful in their studies might expect their children to be successful at school as well, and therefore pay more attention to and show more interest in their child's academic achievements (Snow et al., 1998). Higher expectations and additional attention and interest from parents might explain the positive influence on the Verbal/General academic self-concepts of students from a more intellectual home background.

As is shown in Fig. 2 there is also an assumed indirect link from Family based prerequisites via both Verbal/General academic self-concept and Reading attitude to reading ability. The result showed a strong, positive influence from Verbal/General academic self-concept to Reading attitude ( $\beta = .32$  respectively  $\beta = .33$ ). This is in line with Strein (1993) who stated that self-concept reflects descriptive (“I like to read”) as well as evaluative (“I am good at reading”) aspects of self-perception. Reading attitude obviously shares one

dimension with academic self-concept. There is a general trend among both children and adults to like what they are good at. However, the hypothesized influence of Family based prerequisites on Goal oriented strategies got almost no support. There might be a highly plausible explanation to this. There are two links from Family based prerequisites to Goal oriented strategies. One direct and one mediated by Verbal/General academic self-concept. Well educated parents convey to their children high expectations of success at school, and the result of this is that the student develops a positive Verbal/General academic self-concept, which in its turn highly motivates them to employ different learning strategies, since such students are sure to succeed. This might mean that almost all the effect of Family based prerequisites on Goal oriented strategies are accounted for by Verbal/General academic self-concept.

The strongest direct influence on reading ability came from Verbal/General academic self-concept ( $\beta = .43$  respectively  $\beta = .56$ ). This result is in line with findings in many studies of relations between different background factors and reading achievements (see e.g., Taube & Mejdning, 1996). Marsh, Parker, and Barnes (1985) reported that self-concept correlated as high as .78 with reading in grades 7 and 8. Although, our model shows only the influence from Verbal/General academic self-concept to reading ability the relationship might in reality be expected to be reciprocal. Good reading comprehension, which is an important factor in relation to most subjects at school, leads to a positive academic self-concept and a positive academic self-concept leads to better reading (e.g., Byrne, 1996; Marsh & Yeung, 1997). The Verbal/General academic self-concept of a 14-year-old student is based on numerous learning occasions during several years at school and frames of reference. Some students have many successful learning experiences behind them while others have gone through painful experiences of academic failure. The former students have probably developed a positive academic self-concept and the latter a more negative (e.g., Marsh et al., 2000; Skaalvik & Skaalvik, 2002, 2004). When a student who has a strong belief in his or her ability to manage different tasks at school is faced with the requirements of a reading comprehension test, he or she will most probably start to work less anxious and more persistent than a student with a negative academic self-concept, who might be distressed and hindered in his or her performance by strong feelings of inferiority and thus perform less well on the test (Ablard & Lipschultz, 1998).

The assumed influence of Verbal/General academic self-concept on Goal oriented strategies was found to be the strongest of all in the both the final model ( $\beta = .85$ ) and the cross-validation model ( $\beta = .88$ ). In fact, more than two thirds of the variance in Goal oriented strategies was explained by Verbal/General academic self-concept. A positive Verbal/General academic self-concept seems to be a key motivating factor (Anderson & Keith, 1997) in relation to using different kinds of learning strategies. A student with a positive Verbal/General academic self-concept expects to succeed and thus is able to invest a lot of effort with minimal risk of failure (Ablard & Lipschultz, 1998). He or she can be confident of benefiting from the cost of invested efforts (Anderson & Keith, 1997). From the viewpoint of a student with a negative academic self-concept it may be more expedient to apply minimal effort, and when the expected failure occurs, he or she can always claim the lack of effort as a reason, which will be less threatening to the self-concept. Research on the so called helpless pattern seems to confirm this picture (Dweck, 2000; Meece, 1994; Torgesen, 1977).

Finally, next after Verbal/General academic self-concept, Goal oriented strategies shows the strongest direct influence on reading ability, taking both the final model

( $\beta = -.26$ ) and the cross-validation model ( $\beta = -.35$ ) into account. This negative influence from students' reported use of strategies on their reading achievement is an unexpected result. From earlier research we hypothesized that reading comprehension was likely to be facilitated by deliberate use of different strategies (e.g., Guthrie et al., 1995). Metacognitive strategies were assumed to be fundamental for the understanding of texts (Guthrie et al., 1995). To understand this unexpected moderate negative influence from reported use of goal oriented strategies to reading achievement the scales within this dimension need to be examined. One of the scales within Goal oriented strategies is instrumental motivation. It includes items like: *I study to improve my chances of getting a job* and *I study to make sure that my future will be economically stable*. In a report from the PISA study (Artelt et al., 2003) it was found that instrumental motivation as measured by these items did not have a clear association with reading literacy. In 19 out of 26 reported countries the effect was in fact, as in the present study, negative (Artelt et al., 2003, p. 105). This was not interpreted as a sign that being motivated by external factors such as a wish to get a good job might cause worse performance at school. Rather, it was taken as related to the composition of the group of students most likely to be thinking of the labour market as early as 15 years of age.

Furthermore, when comparing the results of the present study to those of PISA another interesting pattern is shown. The impact of control strategies on reading literacy in all Nordic countries, and only in those, was in fact negative (Artelt et al., 2003, p. 105). This could imply that there are some cultural aspects that are quite different in the Nordic countries, when compared to the other participating countries. Thus, the self-regulated learning dimension, Goal oriented strategies, consists of two scales that, as previously used in Sweden, has shown negative associations with reading literacy (Artelt et al., 2003). In this light our result with the negative impact of goal oriented strategies on reading ability is not so surprising, rather it follows the pattern found in PISA. This can also be compared to the study by Townsend and Teo (2005) where the impact of self-efficacy and self-regulation on reading ability were investigated. They found that self-efficacy was positively associated with reading ability and that self-regulated learning in fact negative, though not significant. They however concluded that self-efficacy and self-regulation are interconnected in achievement and that the effect of self-regulation might be included in the effect of self-efficacy.

In summary, the results from the data analysis show that Family based prerequisites both directly and indirectly through Verbal/General academic self-concept and reading attitude significantly influenced reading ability. Verbal/General academic self-concept showed a direct and strong influence on Goal oriented strategies and on reading ability.

The analyses of gender differences showed, as expected, that girls on average were better readers than boys, which is in line with the results from PISA 2000 and 2003 (OECD, 2001; OECD, 2004). Girls achieved significantly higher on narrative and expository texts, while no differences were found on Documents. In the IEA Reading Literacy study 1991 (Elley, 1992) girls were better in the overall score and in Narrative and Expository reading. The smallest differences were found in documents. In our study girls had a more positive reading attitude which also follows the regular pattern of research results (e.g., Elley, 1992). Boys had, in spite of their lower reading results, a more positive academic self-concept with respect to three of the four scales included, self-concept academic, self-efficacy, and control expectation whereas girls had a better verbal academic self-concept which follows the regular pattern of stereotypic academic self-concepts (e.g., Anderman et al., 2001; Marsh & Hattie, 1996; Marsh et al., 2005). Boys also reported significantly

more Goal oriented strategies with higher frequency of memorising, elaboration and instrumental motivation, which to some extent is in line with results from PISA 2000 (OECD, 2001). In PISA 2000, 15-year-old females in the majority of countries reported emphasising memorisation strategies more than males. However, Sweden showed a statistically significant difference in the other direction. Swedish boys used memorisation more often than girls. In almost all countries, males reported using elaboration strategies more often than females and females reported using control strategies more often than males (OECD, 2001).

#### *4.1. Limitations of the study*

Fourteen percent of the sample was lost because the students were either absent, failed to complete both the questionnaire and the reading test, completed one or both instruments inaccurately, or refused to participate where the two latter categories were almost negligible. The students took the reading test and following student questionnaire (SRLQ included) on two separate occasions, thus most of the falling off is accounted for by students who were ill and therefore absent on one or both of these occasions. This could be a potential problem if this group of students represents a certain cluster with specific attributes, but since these students are not deliberately skipping school we assume that the falling off is random and does not influence the result in a specific way.

A possible disadvantage in the present study is that the indicators of the latent variables are of different length where Family based prerequisites only have four items as indicators. This might bias the result since longer instruments are more reliable than shorter ones and do not have so much restriction of range. We however chose items that in previous research had been shown to have great predictive power on reading ability with acceptable reliability and therefore hoped to reduce the potential bias. The advantages of conducting SEM is the holistic approach where the full picture is estimated immediately, instead of using standard approaches, like multiple regression or ANOVA, where the model has to be analyzed path by path. Thus, it is a more comprehensive and flexible approach since it provides means for testing more complex and specific hypotheses than standard approaches (Hoyle, 1995). This also helps to avoid capitalizing on chance since not so many calculations are needed. In SEM there is also a compelling capacity to estimate and test relations between latent variables which is not possible in standard approaches. There are possibilities to isolate concepts from uniqueness and unreliability of their indicators which enhances the probability of identifying relations and close to their population values (Hoyle, 1995).

The fact that the SRLQ did not yield the intended three dimensions needs to be addressed further. To our knowledge this instrument has not been used in this way in any published studies yet and the searches in the databases resulted in no records found. In the reporting of the results from PISA 2000 (Artelt et al., 2003) the scales were used separately with overarching themes, however figures on how well the separate scales actually measure the overarching themes were not presented. This might be interpreted as an indication of that no factor analysis were made on the three dimensions only on the scales separately. There are no reported results for the full factor structure for the three dimensions in either the synthesis report or the technical report (Peschar et al., 1999a, 1999b), for the development of the instrument, there are only recommendations

for using the instrument that way. The fact that the Nordic countries had a somewhat different pattern regarding the goal oriented strategies (as mentioned above) and their impact on reading literacy might also have contributed to our inability to reproduce the factor structure.

A closer look at items in the verbal instrumental motivation scale that was removed (Because reading is fun, I wouldn't want to give it up, I read in my spare time, and When I read, I sometimes get totally absorbed) reveals that these seem to be measuring something else than the other motivation scales (see [Appendix A](#)). The first item has two parts; one which is more reading attitude *reading is fun*, and one which is more use of strategy *I wouldn't want to give it up* more than motivation. The second item *I read in my spare time* is measuring voluntary reading and the third *When I read, I sometimes get totally absorbed* is difficult to define but seems to be far away from motivation. This calls for more research on this instrument to reveal whether it measures the intended three or only two dimensions of self-regulated learning, as was found in this study.

A more serious limitation could be that this study uses a general rather than a domain-specific construct for self-regulation and is centered on self-regulated learning instead of being centered on self-regulated reading. Undoubtedly, proficient readers have strategies to repair any comprehension failures and motivate themselves to read. They are extremely active and use different strategies reflectively for making sense of the text coordinated with and empowered by content domain knowledge ([Brown & Pressley, 1994](#)). However, it is not certain that being a self-regulated learner is the same as being a self-regulated reader. Further studies need to address this issue with careful and controlled designs where as many between-condition variables as possible are controlled for.

## 5. Conclusions

Our analyses here have shown the great importance of providing the students with a positive academic self-concept (here Verbal/General academic self-concept), which is strongly influenced by the student's Family based prerequisites and probably also by earlier experiences of reading success or failure. Well educated parents seem to be more able to support the development of a positive Verbal/General academic self-concept in their children. Thus, to provide all children with good opportunities for becoming good readers, an important mission for educators at school is to strengthen the students' trust in their own ability to succeed in literacy activities and to ascribe a positive value to reading. Further research is needed to develop strategies which can be used for enhancement of students' academic self-concept and thus help them to become able readers. Finally, attention should be paid to the lower reading performance showed by boys. Reading materials with a content more suitable for male interests might engender a love of reading among young males that lasts a lifetime ([Brozo, 2002](#)).

## Acknowledgments

The authors wish to thank the three anonymous reviewers and Professor Carl Martin Allwood for their insightful comments and thoroughness when reviewing previous versions of this article. An earlier version of this article was presented at the XII European Conference on Developmental Psychology, 24th–28th of August 2005, Tenerife, Spain.

## Appendix A

### Items and scales from the Self-regulated Learning Questionnaire (SRLQ)

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#### M: Instrumental motivation

- I study to increase my job opportunities
- I study to ensure that my future will be financially secure
- I study to get a good job

#### M: Effort and persistence

- When studying, I work as hard as possible
- When studying, I keep working even if the material is difficult
- When studying, I try to do my best to acquire the knowledge and skills taught
- When studying, I put forth my best effort

#### LS: Memorising

- When I study, I try to memorise everything that might be covered
- When I study, I memorise as much as possible
- When I study, I memorise all new material so that I can recite it
- When I study, I practice by saying the material to myself over and over

#### LS: Elaboration

- When I study, I try to relate new material to things I have learned in other subjects
- When I study, I figure out how the information might be useful in the real world
- When I study, I try to understand the material better by relating it to things I already know
- When I study, I figure out how the material fits in with what I have learnt.

#### LS: Control strategies

- When I study, I start by figuring out what exactly I need to learn
- When I study, I force myself to check to see if I remember what I have learned
- When I study, I try to figure out, as I read, which concepts I still haven't really understood
- When I study, I make sure that I remember the most important things
- When I study, and I don't understand something, I look for additional information to clarify the point

#### ASC: Control expectation

- When I sit myself down to learn something really hard, I can learn it
- If I decide not to get any bad grades, I can really do it
- If I decide not get any problems wrong, I can really do it
- If I want to learn something well, I can

#### ASC: Self-efficacy

- I'm certain I can understand the most difficult material presented in readings
- I'm confident I can understand the most complex material presented by the teacher
- I'm confident I can do an excellent job on assignments and tests
- I'm certain I can master the skills being taught

#### ASC: Self-concept verbal

- I'm hopeless in English [Swedish] classes (R)
- I learn things quickly in English [Swedish] class
- I get good marks in English [Swedish]

#### ASC: Self-concept academic

- I learn thing quickly in most school subjects
  - I'm good at most school subjects
  - I do well in tests in most school subjects
- 

*Note.* M, intended to fit in the dimension Motivation; LS, intended to fit in the dimension learning strategies; and ASC, intended to fit in the dimension academic self-concept.

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