Article

Effects of a Teacher-Led Intervention Fostering Self-Regulated Learning and Reading among 5th and 6th Graders—Treatment Integrity Matters

Nadine Schuler *, Caroline Villiger and Evelyn Krauß

Institute for Research, Development and Evaluation, University of Teacher Education Bern,
3012 Bern, Switzerland; caroline.villiger@phbern.ch (C.V.); evelyn.krauss@phbern.ch (E.K.)
* Correspondence: nadine.schuler@phbern.ch

Abstract: Self-regulated learning (SRL) is a crucial competence in our rapidly changing society, yet its systematic promotion in the classroom remains limited. Addressing this gap, this study reports on a teacher-led intervention to promote SRL within reading tasks among 5th and 6th grade students. Although some interventions have been implemented to promote SRL, little attention has been paid to promoting SRL in primary schools. Building on a previous SRL intervention, the current study added cooperative learning among students and parental involvement, two aspects that are assumed to add value when fostering SRL. A randomized controlled field trial was designed to evaluate the effect of an intervention using pre-test, post-test and follow-up measures. A total of 757 students from 40 classes participated in the study. The data were analyzed using a multilevel approach. This study revealed no significant difference in SRL or reading comprehension outcomes in the post-test and the follow-up test between students of the experimental and control group. Further investigations showed that several aspects of treatment integrity had a significant impact on SRL outcome. This study encourages future SRL and reading intervention studies to assess and analyze the multiple aspects of treatment integrity.

Keywords: self-regulated learning; reading comprehension; intervention study; primary school; treatment integrity; randomized controlled trial

1. Introduction

In a dynamic and uncertain world, SRL is essential in preparing young students to become active, lifelong learners who can competently navigate change [1]. Research highlights the importance of SRL not only for school success, but also for the continuous development of competences and skills [2]. SRL is generally defined as an active, cyclical process [3]. During this process students set goals, monitor, and control their cognition, motivation, and behavior based on their objectives and the environmental context [4] (p. 453). However, despite the presence of SRL practices in many schools, teachers rarely foster metacognitive knowledge or engage in strategy instruction by providing insights on why and how students could use strategies for learning [5,6]. To address this, several interventions were conducted to support teachers in fostering SRL among students. These studies reported varying effect sizes, ranging from none [7] to small [8] to medium [9]. The results show that while it may be challenging to demonstrate positive student outcomes, an intervention can potentially foster SRL.

Since SRL should preferably be promoted within specific subject areas [10], this intervention intends to promote SRL within reading tasks among 5th and 6th graders, recognizing the relevance of reading comprehension for overall school achievement. While reading can become a partially automized process, as with practice word recognition and decoding demand less conscious effort, comprehending more complex texts requires certain aspects of SRL, such as planning or monitoring [11]. Previous interventions promoting SRL

among 5th and 6th graders have understated cooperative learning among students, even though research has highlighted its beneficial impact on academic achievement and other dimensions of learning, including meta-cognitive, cognitive, and social aspects [12].

Additionally, it is crucial to include both teachers and parents as important actors in developing students' SRL [13,14]. However, research in this area remains limited, as Otto's [15] study is the only SRL intervention in primary school involving parents and teachers. To address these gaps, a ten-week school-based training program based on Stöger and Ziegler [16] was adapted to include cooperative learning and parental involvement in order to foster SRL within reading tasks among 5th and 6th graders. Furthermore, prior intervention studies fostering SRL within reading tasks [8,17] gave only minimal consideration to treatment integrity. Nevertheless, it is essential to account for treatment integrity since it can affect the success of an intervention [18]. In the present study, treatment integrity was taken into consideration.

2. Theoretical Background

2.1. The Process of Self-Regulated Learning

To effectively promote SRL, it is essential to establish a theoretical framework which illustrates the phases of SRL. The cyclical SRL model developed by Zimmerman [3], based on social cognitive theory [19], has attained widespread acceptance, and is widely used in empirical research [20]. Zimmerman's model [3] divides SRL into the following three phases: forethought, performance, and self-reflection. This model was expanded by Stöger and Ziegler [16], who divided the original three phases into a more detailed seven-step model. They divided the forethought phase into self-assessment, goal setting, and strategic planning; the second phase comprised strategy implementation, strategy monitoring, and strategy adjustment; and the third phase (self-reflection) came to include outcome evaluation. In a later development, Benick et al. [9] differentiated between strategy planning and time planning, since both strategic and temporal aspects are crucial when planning. Consequently, a combined version of the SRL cycle according to Stöger and Ziegler [16] and Benick et al. [9] consists of the following eight sub-steps (Figure 1): self-assessment, goal setting, time planning, strategy planning, strategy implementation, strategy monitoring, strategy adjustment, and outcome evaluation.
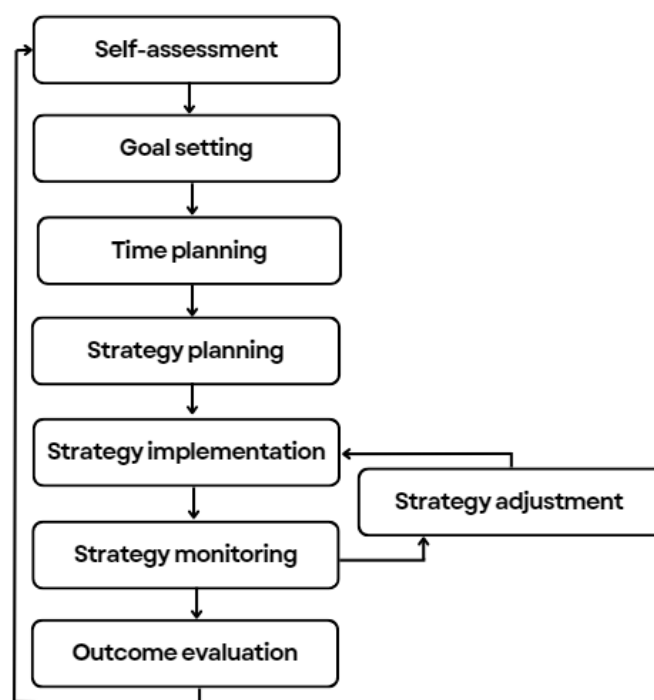

Figure 1. SRL cycle (Stöger and Ziegler [16]; Benick et al. [9]).

2.2. Promoting SRL—General Considerations

Some meta-studies (e.g., [10]) have found that interventions fostering SRL are most successful when based on social cognitive theory [19] and include cognitive, metacognitive, and motivational components. The cognitive component includes learners' conceptual and strategic knowledge, and their capacity to use cognitive learning strategies. The metacognitive component involves the learner's ability to plan, observe, and reflect on their learning process. The motivational component concerns student-initiated learning and students' level of persistence when challenges arise [21]. Research also indicates that students develop cognitive skills, behavioral strategies, and motivational beliefs in a domain- and context-specific manner [22]. These findings highlight the importance of subject- or task-specific instruction of SRL. In addition, teaching SRL independently of a subject domain might lead to difficulties in applying acquired competences to a particular subject [23].

Moreover, a successful intervention study should be age-appropriate. From the age of about eleven, the level of a child's cognitive development allows for conscious control of more complex thought and behavioral processes [24]. Consequently, interventions targeting 5th and 6th graders can implement more advanced strategies aimed at planning, monitoring, and evaluating their learning. It is still important to consider the variability in students' development, highlighting the need for differentiation (e.g., varying difficulty levels) [25].

A possible risk of instruction-based training is that while intensive training can produce short-term effects, training does not change practices in the long term, and the desired effects do not last. Therefore, efforts to change learning practices should ensure that what has been learnt is integrated into daily practice over a longer period. Souvignier and Trenk-Hinterberger [26] demonstrated that booster sessions ensure the retention of long-term effects by recalling and reapplying the contents of the initial training.

Furthermore, cooperative learning enhances students' ability to monitor and understand their own learning progress as they need to engage in metacognitive interaction [27]. In cooperative learning, students work in small groups to help each other learn, share responsibilities, and verbalize thoughts [28], enhancing not only metacognitive reflection, but also student motivation [29]. It is widely acknowledged that cooperative learning has positive effects on students' academic achievement (e.g., [28]). However, meta-analyses show mixed results regarding its effectiveness in SRL training [10,30]. Dignath et al. [10] attribute these inconsistent findings to students' unfamiliarity with cooperative learning and insufficient instruction on effective cooperative learning. When examining specific elements of cooperative learning, such as peer feedback, most studies indicate that it supports the development of SRL [31,32]. This is particularly the case when peer feedback is provided frequently and focuses on the learning process rather than on student characteristics [33]. Peer feedback involves at least two students providing and receiving feedback, which usually includes an evaluation of the peer's behavior and suggestions for future actions [34]. When implemented as a dialogical process, peer feedback fosters SRL for both the feedback recipient and the provider, as students are required to communicate, thus structuring and evaluating their actions and thoughts [35,36]. Despite its potential benefits, cooperative learning has rarely been systematically included in interventions fostering SRL among primary school students (e.g., [37]).

Beyond the classroom, students' learning is not only influenced by engagement with peers and teachers, but also with parents [14,38]. Parental behavior (e.g., motivational support, autonomy encouragement) plays an important role in the development of children's SRL [39]. Parents can support children by creating a learning environment characterized by responsiveness and encouragement and by helping students to organize their learning space (e.g., making it quiet and free of disturbances) [39,40]. Despite the important role that parents play in facilitating a favorable environment for SRL, interventions involving them are still rare (e.g., [15]).

2.3. Effectiveness of Previous Intervention Studies Promoting SRL within Reading Tasks at Primary School

To date, several studies have conducted training programs to foster SRL within reading tasks at primary school, with mixed results. Stoeger et al. [8] directed a teacher-led intervention and analyzed its impact on 4th graders' preference for SRL and their reading comprehension. The authors reported that students who received a combined training (SRL and text reduction strategies) showed a stronger preference for SRL in the post-test and follow-up test, compared to students in the control group or in the group that only received text reduction strategy training. Additionally, students in the combined training group were more adept at identifying the main ideas in texts after the intervention compared to the two other groups. However, only students without a migration background showed an improvement in the standardized reading comprehension test. Another study conducted by Lee et al. [17] analyzed the impact of teachers who implemented a training program to promote reading strategies and SRL among 6th graders. Participants were assigned to one of three groups: regular classroom instruction, domain-specific strategy instruction, and domain-specific strategy and SRL instruction. Results showed that there were no significant group differences in SRL or reading achievement in the post-test. Another intervention study that promoted SRL and reading comprehension was conducted by Núñez et al. [41] and assessed the impact of a teacher-led training program promoting SRL and reading comprehension strategies for 3rd and 4th graders. Results demonstrated that the intervention significantly improved the reported SRL and reading comprehension strategy use. The study highlighted that the intervention had a positive indirect effect on academic achievement through enhanced strategic activity. However, the researchers also found that the intervention had a small direct negative effect on academic achievement. Núñez et al. [41] argued that improved SRL competences do not necessarily result in direct performance improvements.

One potential explanation for the inconsistent results in these SRL intervention studies is the variety of reading strategies applied. Stoeger et al. [8] fostered the following three text reduction strategies: underlining main ideas, drawing mind maps, and writing summaries. Lee et al. [17] focused on the "think before, while and after reading strategy (TWA)", which contains strategies such as thinking about the author's purpose or summarizing the content. Núñez et al. [41] promoted self-questioning and summarizing the main ideas in one's own words. All these strategies have been shown to enhance reading comprehension (e.g., [42–44]), yet a combined approach of fostering SRL (e.g., goal setting, self-monitoring) and text reduction strategies seems to be particularly effective [8,45,46]. Text reduction strategies can also improve reading comprehension [8,47], and are appropriate for both average [48] and struggling readers [49]. Nevertheless, previous studies in this field did not control for cognitive abilities or parental education, although these are important predictors for reading comprehension (e.g., [50,51]). Furthermore, they did not include booster sessions, even though there is evidence that these can improve the maintenance of long-term effects [26]. In the present study, these aspects were considered to provide further insights into the promotion of SRL within reading tasks among primary school students.

2.4. Conducting Intervention Studies: Relevance of Treatment Integrity

Treatment integrity refers to the extent to which practices or programs are delivered as intended and how the recipient responds to them [52]. High levels of treatment integrity often influence outcomes positively [53]; it is also crucial in accurately interpreting the effectiveness of an intervention, as it prevents incorrect conclusions being drawn [18]. Sutherland et al. [54] conceptualize treatment integrity as a multidimensional construct with the following four components: adherence, competence of delivery, treatment differentiation, and child responsiveness. Adherence refers to the degree to which a teacher delivers the elements of an intervention; competence of delivery measures how well the teacher delivers those elements; treatment differentiation refers to the extent to which the teacher's implementation differs from the prescribed practices; and finally, child responsiveness

assesses how children respond to the intervention's implementation, for instance, assessed by the motivation they display. Child responsiveness is a component that has received little attention and has only been recently assessed. All four components are related to treatment outcomes [54].

Treatment integrity should be assessed regularly, for example on a weekly basis [55], as some aspects of implementation may alter over time [53]. This assessment can be conducted through teacher self-reports or direct observation. The latter provides a detailed overview of behavior and its context, potentially minimizing the bias that may arise from a retrospective report and enhancing the assessment's objectivity [56]. Nevertheless, this method is costly, time-intensive, and can be disruptive to the participants [56,57]. In contrast, indirect observation through teacher self-reports is cost and time-effective and offers valuable insights into the teacher's implementation that are not directly observable [54]. Nonetheless, responses might be influenced by social desirability [58].

Despite the increasing number of school-based studies that report on treatment integrity, the majority of these studies considered treatment integrity only marginally and focused mostly on adherence [59]. This is also the case for intervention studies fostering SRL within reading tasks. The present study paid particular attention to this point and considered treatment integrity throughout the implementation of the training.

3. The Current Study

Building on the SRL training of Stöger and Ziegler [16] that showed positive effects on preference for SRL and reading comprehension, the current study added the following two components to the training: cooperative learning and parental involvement. While teacher-led interventions tend to have lesser effects than researcher-led interventions, the former are valuable for supporting knowledge transfer in authentic learning environments [10]. Hence, in this study, teachers were trained to administer the training.

The aim of this study was to examine whether the adapted training led to positive effects on students' outcome variables (SRL, reading comprehension). Effects were analyzed twice, in the post-test (analyzing effects right after the main training) and in the follow-up (analyzing effects of the whole training, including booster sessions in the long-term). The following questions were addressed:

(1) Did the intervention significantly increase the reported SRL activities of the experimental group in comparison with the control group in the medium (post-test) and long term (post-test) (while controlling for gender, cognitive ability, first language, parental educational level, and participation in parental training)?

Hypothesis 1: *The intervention significantly increased the reported SRL activities of the experimental group compared to the control group in the medium term. In the long term, the effects of the intervention on the reported SRL activities were maintained, if not increased.*

(2) Did the intervention significantly increase reading comprehension in the experimental group in comparison with the control group in the medium and long term (while controlling for gender, cognitive ability, first language, parental educational level, and participation in parental training)?

Hypothesis 2: *The intervention significantly increased the reading comprehension of the experimental group compared to the control group in the medium term. Furthermore, booster sessions sustained the effect of the intervention on long-term reading comprehension.*

4. Materials and Methods

4.1. Sample Recruitment

An open call for participation was launched through various channels (e.g., flyers, teachers' magazine). About 80 interested teachers were given basic information about the study's timeline by phone and/or at an information event. In total, 41 teachers volunteered to participate in the intervention program and were randomly assigned to different conditions (SRL training, SRL training and parental involvement, and control group). However, four months after the training started, one class had to be excluded due to significant deviations from the training program (see chapter 5.4). Teachers in the control group did not participate in any training but were invited to attend the training after the intervention.

4.2. Participants

The participants were 757 5th/6th graders (6th grade: $n = 255$) from 40 classes. All students attended public schools in the German-speaking region of Switzerland. The average class size was about 22 students ($SD = 11.87$). The students' mean age was 11.29 ($SD = 0.71$). There was an even gender distribution (5th grade: 51.9% girls, 6th grade: 52.2% girls). In total, 75.2% spoke German as their first language (5th grade: 71.4%; 6th grade: 82.9%). Most of the 40 teachers were female (75.2%) with an average teaching experience of 22.30 years ($SD = 12.22$). The classes were randomly assigned to an experimental ($n = 27$ classes, $n = 500$ students) or a control group ($n = 13$ classes, $n = 257$ students). Classes from the same school were assigned to the same group. In total, 13 of the classes in the experimental condition were also randomly selected for one additional parental training session, which was attended by 157 out of 252 invited parents (attendance: 62.3%; 20.7% of the full sample). This design was chosen to evaluate whether parental training had an additional impact on the students' SRL.

All surveys were administered in schools by trained test administrators. In total, data were available from three measurements. The missing values were 2.6–5.3% for the students and up to 3.8% for the teachers. The missing data were missing at random [60].

5. Intervention Program

5.1. Teacher Training

Before implementing the training in their classes, the intervention group teachers attended three 3.5 h training sessions (outside of regular school hours). These interactive trainings (e.g., group discussions, self-reflection periods) were designed and delivered by SRL experts. The first training addressed SRL models, theories, and learning strategies. The second presented the structure of the two introductory weeks on reading comprehension strategies and the SRL cycle. In the third session, the concept for the eight-week training was explained and the teachers were instructed on cooperative learning. Teachers received a manual with lesson plans and required materials (e.g., learning diaries) and were invited to contact researchers with any queries about the training. Two optional online meetings were organized to discuss any implementation issues.

The control group teachers received written information about the data collection process before the pre-test and at regular intervals throughout the project. They did not receive any further instruction about SRL, but they were invited to attend the same training free of charge after the intervention.

5.2. Parental Training

For some classes, a parental training session was offered to parents on supporting their child's SRL at home. The content of the training was based on social-cognitive learning theory [19] and conceptual change theory [61]. Parents were encouraged to reflect upon their attitudes toward school and failure at school (failure mindset). Furthermore, strategies on how to facilitate SRL at home, such as organizing the learning space, were discussed. Parents were also presented with methods to provide motivational support and encourage autonomy amongst their children, without placing an emphasis on active

parental involvement [38,62]. Custom-designed videos were used to give examples of constructive and counterproductive parental behaviors in the context of learning. Parents received handouts covering the topics discussed. Those parents who had been initially excluded from attending the parent training were invited to attend the training after the intervention.

5.3. Students' Training

The students' SRL training was based on Stöger and Ziegler's [16] training, which was enhanced with cooperative learning and parental involvement. The ten weeks of training were delivered by the regular teachers over the course of five months (see Figure 2). The training was structured as follows: two introductory weeks were immediately followed by five weeks of training. After a break of a few weeks, three further weeks of training were given, using the same content as before, over a longer period of time (see booster sessions, Figure 2).
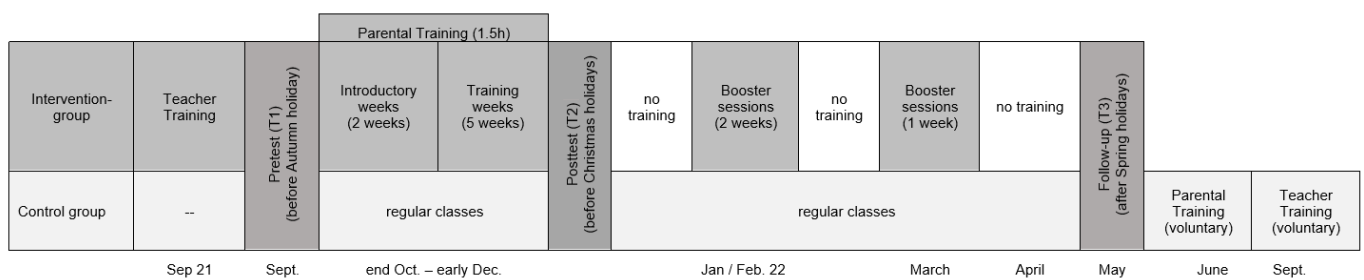

Figure 2. Overview of the study design.

During the first introductory week in class, teachers addressed the importance of text comprehension strategies and introduced three text reduction strategies. These included the following: 1. underlining and making lists of the main ideas, 2. drawing mind maps that contain the main ideas, and 3. summarizing the main ideas in their own words [8,16]. Students learned and practiced how to use these strategies effectively when reading. At the end of this week, students were given an overview with advice on text reduction strategies and encouraged to refer to this summary as required throughout the program. During the second introductory week, students applied their knowledge about reading comprehension strategies to become familiar with the SRL cycle (see Figure 1). Teachers explained the eight SRL steps using "Sail the Mouse". This fictional character was used as a first-person narrator to help students better understand the SRL steps, as storytelling supports students' understanding [63]. The lessons contained examples from everyday situations, such as preparing for a sports competition, which include setting measurable and achievable goals. Finally, teachers gave students an overview of what the training program consisted of in the following weeks.

During the training weeks, the students applied the reading comprehension strategies and SRL steps four days a week (no training on Wednesdays). Over this period, students were expected to work through the eight steps of the SRL cycle repeatedly and actively. The learning process was supported by a learning diary, helping students to reflect on their strategy use and supporting their SRL development [64].

Since the reading texts covered natural science topics (e.g., animals, human body), the training took place in German and science classes. Every week, the students were expected to read three texts at school and apply the SRL cycle when reading. The texts developed by Stöger and Ziegler [16] contained ten main ideas and students could set a goal for each, defining how many main ideas they would find. Each one was approximately 420 words long and of similar difficulty. To accommodate students in different grades, a second simplified version of each text was generated by the study's authors according to specific guidelines. These guidelines included the use of shorter words and favored active over passive sentences. This gave students a choice best suited to their reading level.

Two types of cooperative learning were implemented: (1) discussing experiences regarding strategy use, and (2) questioning about the text. Research indicates that questioning enhances learning as it encourages learners to engage deeply with the content [42]. Moreover, dialogic peer feedback about strategy use requires students to verbalize their thoughts and actions, promoting metacognition [36]. To support this self-directed group work, students used flashcards to provide a clearly defined procedure of their cooperative tasks and to allocate specific roles to each student (e.g., questioning, providing feedback). In addition, teachers gave students instruction and support on how to elaborate their thoughts and provide peer feedback. As (peer) feedback should be provided frequently to further support the development of SRL [33], cooperative learning opportunities were scheduled three times a week.

5.4. Treatment Integrity

Throughout the intervention, teachers provided weekly self-reports by completing online questionnaires on how they were implementing the training and additional information about the students' motivation, the number of cooperative learning sessions, and their perception of the implementation quality. The treatment integrity analysis revealed that most of the teachers implemented the training program as intended, as they all completed the two introductory weeks, and their students read at least 17 of the 24 texts during the training weeks. One class had to be excluded since the implementation of their training diverged significantly (they did not use the standardized learning diary).

In the follow-up test, the control group class teachers were asked whether they fostered SRL in class during the school year and if so, how, and to what extent. Approximately 60% indicated that they fostered SRL in class during the school year through a range of activities, such as lessons in which students could plan their daily or weekly activities, choose difficulty levels, and reflect on their learning. Some teachers also gave lessons in which students worked on self-chosen content or individual projects. Topics such as fostering independence, help-seeking, and responsibility were also mentioned. However, none of these teachers used systematic SRL training. Additionally, 42.9% of the control group teachers said that they did not foster SRL in class during the school year.

6. Instruments

6.1. Self-Regulated Learning

Students' SRL was assessed three times with a twenty-four-item questionnaire, based on the eight-step SRL model (self-assessment, goal setting, time planning, strategy planning, strategy implementation, strategy monitoring, strategy adjustment, and outcome evaluation) (see Figure 1). The instrument combines scales validated in previous studies [9,65,66]. Each step of the model was measured using three items, with responses provided on four-point Likert scales (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Accordingly, higher values indicate higher levels of self-reported SRL. The internal consistency of the SRL overall scale can be considered satisfactory with Cronbach's alpha values ranging from $\alpha = 0.88$ in the pre-test, $\alpha = 0.90$ in the post-test, and $\alpha = 0.91$ in the follow-up test.

6.2. Reading Comprehension

Reading comprehension was measured three times using the standardized "Frankfurter Leseverständnistest" (FLVT; [67]). The test consisted of a non-fiction text of medium length (570 words) with 18 multiple-choice questions. Students received one point for each correct answer (Range: 0–18). FLVT is a widely used test with a satisfactory reliability of Cronbach's $\alpha = 0.88$. The theoretical framework of this test is based on the cognitive process model proposed by van Dijk and Kintsch [68]. This model differentiates between surface-level reading, characterized by the ability to provide a basic summary of the text, and in-depth comprehension which allows the reader to disclose complex connections found

within the text as well as from prior knowledge. The FLVT incorporates this model [68] by assessing both levels of understanding.

6.3. Control Variables

6.3.1. Cognitive Abilities

Cognitive abilities were measured at pre-test with the language-independent test "CFT 20-R" [69] (Part 1). This test, with a maximum score of 56 points, demonstrates high internal consistency, with a Cronbach's α of 0.92.

6.3.2. First Language

Student's first language was assessed by the question, 'What is your native language?'. A list of the 12 most spoken languages in Switzerland was given. The option 'other language' was available for students speaking a language other than these 12. A dummy variable was created to compare native and non-native speakers.

6.3.3. Parental Educational Level

To evaluate parental educational level, parents were asked to indicate the most recent degree of education attained. The response options provided were 'none', 'compulsory school', 'vocational apprenticeship', 'vocational baccalaureate', 'baccalaureate', 'higher specialized education' (e.g., federal diploma), and 'university of applied sciences'/'university'. These options were categorized into 'low' (no education, compulsory school, vocational apprenticeship), 'medium' (vocational baccalaureate, baccalaureate, higher specialized education), and 'high' (university of applied sciences/university). These three categories (low = 31.7%, medium = 29.7%, high = 38.5%) were coded into dummy variables, with 'medium' educational level serving as a reference category.

6.3.4. Participation in Parental Training

Parental participation in parental training was recorded and associated with the corresponding student. This variable was categorized as a dummy variable indicating attendance or non-attendance.

6.4. Treatment Integrity

The four aspects of treatment integrity (adherence, child responsiveness, competence of delivery, treatment differentiation) were assessed through standardized weekly online teacher reports. Teachers reported on the number of texts they read with the class, the frequency of collaborative learning sessions focused on questioning or strategy usage (adherence), and the motivation levels of students (child responsiveness, measured by "How motivated were pupils generally during the training week?", scale: 1 = not motivated to 5 = very motivated), and the perceived competence of delivery, measured by "How was the overall implementation of the training?" (scale: 1 = not well, 5 = very well). Lastly, treatment differentiation was controlled by teachers' updates on the overall implementation progress and students' use of the material in class.

7. Statistical Analyses

Due to the hierarchical structure of the data (students nested in classes), multilevel analyses were conducted using the software 'Mplus 8.10' [70]. To examine the development of the reported SRL activities and the reading comprehension, respectively, two analyses were conducted—one predicting outcome at post-test, and one predicting outcome at follow-up—to investigate for medium- and long-term effects. SRL was modeled as a latent variable to explicitly model measurement errors. In line with the eight-step SRL model, each step was conceptualized as a first-order factor and calculated as a second-order factor. All other variables were used as manifest variables. Relevant control variables (gender, first language, cognitive abilities, and parental education level) were included in all analyses. Parental participation in the parent training was also used as a control variable, as not

all parents of the SRL training and parental involvement condition attended the training. Subsequently, all students who received the SRL training formed the experimental group.

The effect of the intervention on the development of SRL (Hypothesis 1) was analyzed with a multilevel structural equation model (ML-SEM), while the effect on reading comprehension (Hypothesis 2) was analyzed with a (manifest) multilevel analysis. To evaluate the model fit of the ML-SEM models, several fit indices commonly applied to latent-variable models were used, namely, the Satorra–Bentler scaled chi-square test [71], the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Hu and Bentler [72] suggest that values of CFI/TLI ≥ 0.95 and RMSEA/SRMR ≤ 0.05 indicate a good model fit.

Preliminary analyses testing longitudinal measurement invariance were conducted for SRL. However, longitudinal multilevel confirmatory factor analyses with the second-order SRL model with twenty-four items and eight factors were too complex and failed to converge. Therefore, the measurement invariance was tested with single-level models. Furthermore, the longitudinal measurement invariance was checked following the recommendations of Liu et al. [73] for ordinal data. This testing includes the assessment of invariance over time through a series of models; it starts with a baseline model to ensure that factor loadings are consistent over time. This first step is followed by more restrictive models: the loading invariance model (same factor loadings across time), the threshold invariance model (consistent thresholds for response categories), and the unique factor invariance model (equal unique factor variances over time) [73]. In addition, since SRL was conceptualized as a second-order construct, measurement invariance was tested by a series of increasingly restricted models comparing the construct over time (supplements: (a) configural model, (b) first-order factor loadings, (c) second-order factor loadings, (d) thresholds of measured variables, (e) intercepts of first-order factors, (f) disturbances of first-order factors, and finally, (g) disturbances of measured variables) [74]. When comparing the models [73,74], a CFI and TLI decline of 0.01 or less were used as a reference to indicate that the measurement invariance hypothesis should not be rejected [75].

Due to the complexity of the longitudinal ML-SEM analyses, factor scores were extracted from a first-order measurement model. The factor scores of the eight first-order factors were then used as indicators of the general SRL latent factor, simplifying the measurement model in the subsequent analyses. Factor scores may not explicitly control for measurement error, but they offer a reliable approach to this issue because they assign greater weight to items characterized by lower measurement errors and therefore provide partial control for measurement errors [76]. The extracted factor scores were used to calculate the longitudinal ML-SEM using the robust maximum likelihood estimator (MLR) [70]. Individual variables (e.g., gender, first language) were group-mean centered, and level two variables (e.g., condition) were grand-mean centered [77]. Since the hypotheses of this study were directional, the *p*-values were interpreted one-tailed with a significance level of $p < 0.05$ [78].

Furthermore, when longitudinal measurement invariance across time was tested, the preliminary models revealed a negative covariance matrix due to a correlation higher than one between latent variables. Consequently, modification indices were analyzed, and two items were excluded. The excluded items were one item of strategy implementation ("First I think about the best way to approach tasks and then proceed accordingly.") and one item of 'outcome evaluation' ("I think about how my grades have changed from one exam to the next."). The reasons for their exclusion were twofold: the modification indices suggested an improved model fit upon their removal, and these items might have assessed different aspects of the respective SRL step in comparison with the other items. These adapted models achieved a satisfactory model fit and showed a CFI and TLI decline of 0.01 or less when compared, indicating that the measurement invariance hypothesis should not be rejected [75] (Appendix A).

The intra-class correlation coefficients (ICC) varied from a low to medium range (ICC of the eight factor scores of the SRL pre-test: 0.03–0.07; post-test: 0.04–0.07; follow-up

test: 0.01–0.07; reading comprehension: pre-test: 0.23; post-test: 0.18; follow-up test: 0.16), whereas [79] suggest that ICC values from 0.05 to 0.10 represent a small to medium effect, indicating a group effect. Given the class-level administration of the intervention program, multilevel analyses were conducted to control for this aspect.

8. Results

8.1. Descriptives, Zero-Order Correlations, and Group Differences

Table 1 presents an overview of the correlations, means, and standard deviations for SRL and reading comprehension in the pre-test (T1), post-test (T2), and follow-up test (T3), as well as for control variables. There were significant positive correlations between SRL variables at the pre-test, post-test, and the follow-up test. Furthermore, a significant positive correlation between gender and SRL was found, which indicates that girls reported more SRL activities than boys. There were also positive correlations in reading comprehension across all three measurement points. Native German-speaking students showed generally higher reading scores, indicating better reading comprehension. Additionally, cognitive abilities were positively correlated with reading comprehension. Non-native German speakers reported more SRL activities than German-speaking students. Lower parental education level correlated negatively with reading comprehension scores whereas higher educational level showed a positive correlation. None of the variables were correlated with parental training.

Moreover, group differences regarding students' characteristics were analyzed with an independent *t*-test in the pre-test. The chi-square test was employed for dummy variables. No differences were found in the means of the dependent variables (SRL, reading comprehension) between the groups (SRL: $t(734) = -0.397$, $p = 0.69$, reading comprehension: $t(735) = -1.464$, $p = 0.14$). Nor were there any differences in cognitive abilities ($t(732) = -1.182$, $p = 0.24$), gender (χ^2 (1, N = 757) = 1.674, $p = 0.20$) or parental education level (low: χ^2 (1, $N = 703$) = 0.967, $p = 0.33$, high: χ^2 (1, $N = 703$) = 0.288, $p = 0.59$) between the intervention and control group at pre-test. However, there was a significant group difference in first language, with proportionally more native German speakers in the control group (χ^2 (1, $N = 747$) = 3.975, $p = 0.05$).

In terms of treatment integrity, the data showed that the intervention classes read on average 21 texts during the entire training (*SD* = 2.68). The classes implemented an average of 1.69 (*SD* = 0.64) cooperative learning sessions on the topic of 'questioning' and 1.89 (*SD* = 0.63) sessions on the topic of 'strategy use' per week. Furthermore, the overall motivation level of the students was relatively high (*M* = 3.31; *SD* = 0.60). Teachers reported that the implementation of the training went well (*M* = 4.01, *SD* = 0.52).

8.2. Intervention Effects on Dependent Variables

8.2.1. Results for SRL Activities

The results of the structural part of the multilevel SEM analyses of the reported SRL activities are presented in Table 2. This Table shows post-test results in model 1 and follow-up results in model 2, with both controlling for the pre-test. The models had good model fit values (Table 2). Furthermore, individual variables (level 1) and group assignment (level 2) were implemented as predictors. The variance explained by the model was lower in the follow-up test compared to the post-test. As expected, the SRL activities reported in the pre-test strongly predicted those in the post-test and the follow-up test. None of the control variables predicted the reported SRL activities in the post-test or in the follow-up test. Table 2 shows that classes that participated in the training program did not report more SRL activities in the post-test compared to classes in the control group. Similarly, there was no increase in reported SRL activities in the follow-up test for classes in the experimental condition compared to those in the control group.

Table 1. Means, standard deviation, and zero-order correlation of the study variables.

	N	Control M/n	Control SD/%	Experimental M/n	Experimental SD/%	1	2	3	4	5	6	7	8	9	10	11	12	13
1. SRL pretest	736	3.04	0.46	3.06	0.45	--												
2. SRL post-test	721	3.09	0.44	3.08	0.45	0.67 **	--											
3. SRL follow-up	728	3.01	0.47	3.02	0.46	0.59 **	0.72 **	--										
4. RC pre-test	737	10.99	4.18	11.46	3.99	−0.08 *	−0.08 *	−0.10 **	--									
5. RC post-test	717	12.13	3.69	12.65	3.35	−0.11 **	−0.05	−0.09 *	0.69 **	--								
6. RC follow-up	729	12.73	3.47	13.13	3.36	−0.09 *	−0.01	−0.01	0.63 **	0.74 **	--							
7. Cognitive abilities	734	35.46	6.62	36.04	6.22	−0.13 *	−0.11 **	−0.13 **	0.42 **	0.43 **	0.39 **	--						
8. Gender (1 = Female)	757	*125*	48.6%	*268*	53.6%	0.08 *	0.08 *	0.09 *	−0.02	0.06	0.08 *	0.01	--					
9. First LG (1 = Germ.)	747	*203*	79.6%	*359*	73.0%	−0.15 **	−0.09 *	−0.16 **	0.28 **	0.30 **	0.29 **	0.16 **	−0.01	--				
10. PEL (1 = low)	703	*71*	29.3%	*152*	33.0%	0.08 *	0.05	0.02	−0.15 **	−0.22 **	−0.18 **	−0.21 **	−0.01	−0.15 **	--			
11. PEL (1 = high)	703	*90*	37.2%	*171*	39.3%	−0.08 *	−0.05	−0.01	0.19 **	0.27 **	0.27 **	0.23 **	−0.02	0.12 **	−0.54 **	--		
12. Condition (1 = EC)	757	--	--	--	--	0.02	−0.01	0.01	0.05	0.07	0.05	0.04	0.05	−0.07 *	0.04	0.02	--	
13. Particip. parents	500	--	--	--	--	0.06	0.03	0.04	0.06	0.06	0.07	0.01	0.01	0.01	−0.03	−0.01	0.01	--

Note: *n* control group = 257; *n* experimental group = 500. SRL = self-regulated learning, RC = reading comprehension, first LG = first language, Germ. = German, PEL = parental education level, EC = experimental condition, particip. parents = participation parents. For dichotomous variables, the number of cases (italic) and the percentages of the specified category are reported in the columns *M* and *SD*. Correlations for the variable 'participation parents' were only calculated for the experimental group. SRL was calculated with manifest values. ** $p < 0.01$, * $p < 0.05$.

Table 2. Predicting SRL activities (standardized results of the structural part of the ML-SEM analysis).

	Model 1 (Post-Test)		Model 2 (Follow-Up)	
	β	*SE*	β	*SE*
SRL				
Intercept	−0.06	0.18	−0.15	0.29
Level 1				
Pre-test SRL	0.67 *	0.03	0.58 *	0.04
Gender (1 = female)	0.03	0.04	0.04	0.03
First language (1 = German)	0.02	0.03	−0.04	0.03
Cognitive abilities	0.02	0.03	−0.03	0.04
PEL (1 = low)	0.02	0.03	0.02	0.03
PEL (1 = high)	0.02	0.03	−0.01	0.04
Particip. parent. (1 = yes)	0.01	0.03	0.03	0.03
Level 2				
Condition (1 = Experimental)	−0.03	0.18	−0.03	0.27
R^2 Level 1	0.45	--	0.34	--
R^2 Level 2	0.56	--	0.30	--

Note: N = 757 students from 40 classrooms. SRL = self-regulated learning, PEL = parental educational level, Particip. Parent. = participation parental training. Model fit post-test: χ^2 = 24,042.399, df = 256, CFI = 0.983, TLI = 0.982, RMSEA = 0.047, SRMR within = 0.032, SRMR between = 0.136. Model fit follow-up test: χ^2 = 26,484.005, df = 256, CFI = 0.982, TLI = 0.981, RMSEA = 0.051, SRMR within = 0.027, SRMR between = 0.177. R^2 = explained variance in the dependent variable by the independent variables. * $p < 0.05$.

8.2.2. Results for Reading Comprehension

Table 3 presents results of the multilevel analysis for reading comprehension in the post-test in model 1 and in the follow-up in model 2, both controlled for the initial reading comprehension score. The reading comprehension in the pre-test strongly predicted reading comprehension, both in the post-test and in the follow-up test. Girls showed a higher increase in reading comprehension than boys in the post- and follow-up tests, as did students with German as a first language compared to their counterparts. Cognitive abilities and parent educational background were also significant predictors for the reading comprehension (post- and follow-up test). Parental participation did not predict reading comprehension in the post-test nor did the group condition. These findings were consistent in the follow-up test, where neither parental involvement nor group condition predicted reading comprehension. Nevertheless, these models explained more variance in the outcome variable at the class level compared to the previous model that predicted SRL.

8.2.3. Understanding the Effects: Considering Treatment Integrity Variables

Treatment integrity can significantly influence intervention effects [53] and was therefore taken into consideration to gain a deeper insight into the outcomes. To calculate the effects of the treatment integrity variables, only intervention classes were examined. The treatment integrity variables were used as a predictor (level 2, see Table 4) to analyze their impact on SRL and reading comprehension outcome variables. The same control variables as in the previous analyses were included. To examine the independent influence of each treatment integrity variable, separate models were calculated. The mean amount of cooperative learning sessions focused on strategy use was used as a variable to predict SRL, while the mean number of cooperative learning sessions on questioning was included as a variable to predict reading comprehension because they are assumed to have specific relevance on each outcome variable. All other treatment integrity variables (quantity of texts, students' motivation, reported competence of implementation) were used for both analyses (SRL and reading comprehension).

Table 3. Predicting reading comprehension (standardized results of the multilevel analysis).

	Model 1 (Post-Test)		Model 2 (Follow-Up)	
	β	*SE*	β	*SE*
Reading comprehension				
Intercept	6.79	1.20	7.07	3.26
Level 1				
Pre-test reading	0.63 **	0.04	0.55 **	0.04
Gender (1 = female)	0.07 *	0.03	0.10 **	0.03
First language (1 = German)	0.09 **	0.03	0.10 **	0.04
Cognitive abilities	0.15 **	0.04	0.13 **	0.04
PEL (low)	0.10 **	0.04	0.13 **	0.04
PEL (high)	−0.06	0.04	0.01	0.04
Particip. parent.	0.03	0.03	0.01	0.02
Level 2				
Condition (1 = Experimental)	0.13	0.14	0.06	0.15
R^2 Level 1	0.47	--	0.38	--
R^2 Level 2	0.86	--	0.84	--

Note: N = 757 students from 40 classrooms. PEL = parental educational level, Particip. Parent. = participation parental training. R^2 = explained variance in the dependent variable by the independent variables. ** $p < 0.01$; * $p < 0.05$.

8.2.4. Predicting SRL Activities with Treatment Integrity Variables

The SRL activities in the pre-test significantly predicted those in the post-test (Model 1). However, none of the other control variables predicted the SRL activities in the post-test, indicating similar results with this smaller sample size as in the previous analysis (Table 2). Several implementation variables had a significant influence on the reported post-test SRL activities. The mean numbers of cooperative learning sessions about strategy use per week (adherence) significantly predicted the SRL activities in the post-test. Another aspect of adherence, the number of texts read, showed a trend towards a positive effect on the reported SRL activities in the post-test ($p = 0.09$). Students' motivation perceived by teachers (child responsiveness) had a significant effect on the SRL activities in the post-test. Competence of delivery did not have a significant influence on the post-test SRL activities. When predicting SRL activities at follow-up (Model 2), the SRL pre-test variable again turned out to be significant. As with the post-test, none of the control variables, except for first language, significantly predicted the SRL activities at follow-up. No significant effects for the implementation variables on the SRL activities were observed in the follow-up test.

8.2.5. Predicting Reading Comprehension with Treatment Integrity Variables

The same analyses as before (Table 3) were conducted for reading comprehension as a dependent variable. However, there were no significant effects of any implementation variables either in the post-test or in the follow-up test. Therefore, the findings are not presented in detail.

Table 4. Predicting SRL activities with treatment integrity variables.

	SRL (Post-test)				SRL (Follow-Up)			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
	β *(SE)*	β *(SE)*	β *(SE)*	β *(SE)*	β *(SE)*	β *(SE)*	β *(SE)*	β *(SE)*
Intercept	−0.04 (0.25)	−0.11 (0.24)	−0.05 (0.27)	−0.06 (0.26)	−0.11 (0.28)	−0.18 (0.30)	−0.12 (0.31)	−0.13 (0.31)
Level 1								
Pre-test SRL	0.66 ** (0.03)	0.67 ** (0.03)	0.67 ** (0.03)	0.67 ** (0.03)	0.57 ** (0.04)	0.58 ** (0.04)	0.57 ** (0.04)	0.57 ** (0.04)
Gender (1 = female)	0.01 (0.05)	−0.01 (0.05)	0.01 (0.05)	0.01 (0.05)	0.06 (0.04)	0.04 (0.04)	0.06 (0.04)	0.06 (0.04)
First language (1 = German)	0.02 (0.04)	0.01 (0.04)	0.01 (0.04)	0.02 (0.04)	−0.09 * (0.04)	−0.08 * (0.04)	−0.09 * (0.04)	−0.09 * (0.04)
Cognitive abilities	0.03 (0.03)	0.04 (0.03)	0.03 (03)	0.03 (0.03)	−0.01 (0.05)	−0.01 (0.05)	−0.01 (0.05)	−0.01 (0.05)
PEL (low)	0.04 (0.05)	0.04 (0.05)	0.04 (0.05)	0.04 (0.05)	−0.02 (0.04)	−0.02 (0.04)	−0.02 (0.04)	−0.02 (0.04)
PEL (high)	0.01 (0.05)	0.01 (0.04)	0.01 (0.05)	0.01 (0.05)	−0.03 (0.04)	−0.04 (0.04)	−0.03 (0.04)	−0.03 (0.04)
Particip. Parent.	0.02 (0.04)	0.02 (0.04)	0.02 (0.04)	0.02 (0.04)	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)
Level 2								
Adherence (CL)	0.36 * (0.22)	-	-	-	0.44 (0.38)	-	-	-
Adherence (QT)	-	0.26 (0.21)	-	-	-	0.16 (0.26)	-	-
Child resp. (SM)	-	-	0.37 ** (0.19)	-	-	-	0.48 (0.30)	-
Comp. Deliv. (CD)	-	-	-	−0.01 (0.16)	-	-	-	−0.05 (0.22)
R^2 Level 1	0.45	0.46	0.45	0.45	0.34	0.35	0.34	0.34
R^2 Level 2	0.89	0.75	0.89	0.75	0.97	0.76	0.97	0.85

Note: N = 500 students from 27 classrooms. Standardized results of the multilevel analysis. PEL = parental educational level, Particip. Parent. = participation parental training, CL = cooperative learning, QT = Quantity texts, SM = student motivation, CD = perceived quality of implementation. Model fit post-test: χ^2 = 1125.276–1174.363, *df* = 336, CFI = 0.941, TLI = 0.939, RMSEA = 0.073, SRMR within = 0.085, SRMR between = 0.160–0.165. Model fit follow-up test: χ^2 = 668.486–685.251, *df* = 337, CFI = 0.978, TLI = 0.977, RMSEA = 0.047–0.049, SRMR within = 0.053, SRMR between = 0.154–0.172. R^2 = explained variance in the dependent variable by the independent variables. ** $p < 0.01$; * $p < 0.05$.

9. Discussion

The main goal of this study was to examine the effects of an existing SRL intervention program [16] enhanced with cooperative learning and parental involvement. Contrary to expectations, students in the intervention group did not report more SRL activities in the post-test compared to control group students. Similar results were observed in the follow-up test, as no increase in reported SRL activities was found. This suggests that the intervention, including the booster sessions, did not increase students' reported SRL activities in the medium or long term. Additionally, while improvements in reading comprehension were observed in both groups, there were no significant differences in the medium or long term between the groups. To gain a better understanding of these outcomes, treatment integrity was examined.

This study's outcomes are surprising, particularly because Stoeger et al. [8] found a significant effect on the SRL preference in the training group. Unlike Stoeger and Ziegler's research, this study measured the reported SRL activities. This difference highlights a critical insight: an improvement in preference for SRL does not necessarily lead to a change in behavior. However, it is important to distinguish whether an intervention changes only the students' attitudes towards SRL or leads to a change in their learning behavior. Similar results were found in studies focusing on teachers, as noted by Steinbach and Stoeger [80] and Spruce and Bol [81]. Both found no significant correlation between teachers' attitudes towards SRL and their actual SRL teaching practices. Nevertheless, it should be noted that the current study did not assess the actual SRL competences of the students, but rather their self-reported SRL activities, which in turn tend to show low correlations with actual SRL competences [82].

Moreover, the absence of significant effects in intervention studies is not uncommon in educational research [83], possibly because transmitting knowledge is complex and influenced by various factors. There are several potential explanations for the lack of intervention effects: one might be the initially high levels of student agreement to engage in SRL activities. This suggests a ceiling effect, meaning that it might be difficult to achieve more SRL activities. Students' responses regarding the willingness to engage in SRL activities might be influenced by social desirability or overconfidence, which is particularly common among underachieving students [84]. However, if self-reports are influenced by social desirability or overconfidence, it might be challenging to measure actual progress. Moreover, it is crucial to note that approximately 60% of the teachers in the control group reported promoting SRL in their class, although they did not use systematic training. This suggests a high level of interest and initiative to promote SRL, despite a lack of a structured approach and raises the question of whether this high level of interest could potentially reduce differences in outcomes. Nevertheless, this lack of an approach in fostering students' SRL underscores the importance of teacher-led interventions that provide teachers with the necessary knowledge to implement SRL effectively and sustainably. Consistent with previous findings that researcher-led interventions generally yield more effects than those led by teachers, this study shows that achieving an impact with teacher-led interventions continues to be challenging; further approaches to enhance the effectiveness of teacher-led interventions should therefore be considered, for example, by cultivating a closer cooperation between researchers and teachers [10].

The parental training did not have an influence on the students' SRL. This finding is not surprising given that the parental training consisted of only one 1.5 h session addressing parental (emotional) learning support rather than focusing on specific SRL steps. It is possible, however, that the parental training affected the students' learning motivation more than SRL activities. Unfortunately, students' learning motivation was not measured in this study.

The lack of intervention effects regarding reading comprehension may be due to the intervention's primary focus on SRL. Additionally, the experimental group's higher proportion of non-native German speakers may have introduced additional challenges, such as limited vocabulary. While the aim of this training was to improve students' ability to

apply text reduction strategies, it did not necessarily lead to an improvement in the results of the reading comprehension test. The test (FLVT) assessed surface-level reading skills (e.g., basic summary of the text) as well as in-depth comprehension (e.g., identifying complex connections within the text). This training focused on fostering text reduction strategies (e.g., drawing a mind map to illustrate connections within the text), thereby promoting some (but not all) abilities assessed by the FLVT. Moreover, it should be noted that reading comprehension also relies on a wider range of skills such as word recognition, vocabulary, or background knowledge, which were only fostered implicitly (and not explicitly) through this training [85].

Despite the lack of intervention effects, this study presents interesting results about treatment integrity by demonstrating that several implementation variables can significantly affect the outcomes of the intervention (e.g., [54]). For instance, adherence, which was measured by the amount of cooperative learning sessions about strategy use, had a positive effect on the SRL post-test outcome. This suggests that frequent cooperative learning sessions with discussions about SRL can lead to more SRL activities. This result is in line with several studies that underline the beneficial effects of cooperative learning on diverse aspects of learning (e.g., [86]). In addition, the number of texts read during the training showed a tendency toward a positive effect on the reported SRL activities in the post-test, highlighting the importance of regular practice. Furthermore, child responsiveness plays a vital role in the success of such a training as higher perceived motivation of students also positively influenced the SRL outcome variable in the post-test. These results indicate that the training can be effective when it is implemented as intended.

To summarize, these results suggest that the implementation of cooperative learning sessions and a motivating learning environment are crucial elements in fostering SRL. Considering the complexity of SRL, which involves planning, monitoring, and reflecting on learning processes, repeated practice plays an important role in developing students into competent self-regulated learners.

Although significant medium-term effects of treatment integrity variables on reported SRL activities were found, these effects were not observed in the long-term data. A potential reason for this could be that there were only three booster session weeks after the main intervention, with no further sessions for nearly two months until the follow-up testing, potentially minimizing the effects of treatment integrity. Moreover, there were no effects of treatment integrity variables on reading comprehension (post- and follow-up). This could be explained by the assessment, as general reading comprehension was measured, and not only the specific competences fostered through the intervention (e.g., finding main ideas).

Limitations and Future Directions

This study offers interesting insights into fostering SRL and treatment integrity; nevertheless, it is important to acknowledge its limitations. For a more objective assessment of SRL beyond self-reports, future studies should consider evaluating students' learning journals [87]. However, as journal entries reflect a subjective evaluation of one's behavior, it would be beneficial to assess changes in students' SRL using methods such as the think-aloud method [88] or a microanalytic assessment method [89]. Furthermore, SRL was only measured in terms of quantity, indicating that a greater number of SRL activities by students would result in a higher score. This should be viewed critically, as learning can be successfully regulated through few SRL strategies if they are suitable for the task and the learner is proficient when using them [90]. Another limitation of this study is that students' motivation was only measured through teacher reports, even though motivation is equally essential for SRL as metacognitive and cognitive aspects [20]. Furthermore, motivation may have been an important variable when analyzing the effects of the parental training.

Additionally, the teachers were informed of the study topic before randomized allocation to the experimental and control groups to reach informed consent, which might have potentially increased the control group teachers' sensitivity to SRL.

While this study represents an advancement upon previous intervention studies [8,17,41] by assessing and analyzing the effects of multiple components of treatment integrity, it nonetheless relies on self-reported teacher data and single-item assessment. Direct observations are considered as a benchmark in treatment integrity measurement [91], but they require significant time and financial resources [57,92]. Furthermore, they only capture observable, frequent practices [52], and can distract participants [56]. Additionally, the assessment of competence of delivery should be viewed critically, given that it was based on self-reported measures of implementation success, which may not measure actual competence. Nevertheless, it offers an insightful and non-intrusive way to observe the teachers' perceived competence. An essential goal for future research, therefore, is the development of a reliable instrument to comprehensively assess the four components of treatment integrity (adherence, competence of delivery, treatment differentiation, and child responsiveness).

When designing interventions to foster SRL within reading tasks among primary school students, a combination of text reduction strategies and metacognitive components (visually supported by a SRL cycle, as in the present study) proves to be a favorable approach. Furthermore, two core domains of academic learning are targeted: reading, and self-regulation. Based on the current findings about the benefits of cooperative learning when fostering SRL, the next steps in reading instruction could be to implement group sessions over a certain period that give students the opportunity to share insights about their learning processes and advise each other on effectively using text reduction strategies. Teachers should prepare students thoroughly to this task and scaffold this process with questions that stimulate active and meaningful conversation. To enhance reading comprehension further, it would be valuable to incorporate additional strategies beyond text reduction, such as activating prior knowledge [93] or making inferences.

In conclusion, despite the absence of intervention effects, this study offers valuable insights into the importance of treatment integrity. It highlights the importance of adherence and child responsiveness when fostering SRL. The creation of a motivating learning environment and the integration of consistent, systematic practice appear to be key components in the successful promotion of SRL. Moreover, providing students with frequent, carefully introduced opportunities for cooperative learning to discuss and reflect about their SRL activities is a promising element when fostering SRL.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Appendix A

Table A1. T1–T2 Model fits for SRL invariance models.

Model	Model Description	χ^2	df	MD$\Delta\chi^2$	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA
MPa	Configural model	1839.463 *	868	-	0.947	-	0.942	-	0.038	-
MPb	First-order factor loadings	1857.721 *	882	27.329	0.947	0.000	0.943	0.001	0.038	0.000
MPc	Second-order factor loadings	1875.031 *	889	25.003 *	0.946	−0.001	0.943	0.000	0.038	0.000
MPd	Thresholds of measured variables	1886.077 *	924	55.249	0.948	0.002	0.946	0.003	0.037	0.001
MPe	Intercepts of first-order factors	1928.489 *	931	56.454 *	0.946	−0.002	0.945	−0.001	0.038	−0.001
MPf	Disturbances of first-order factors	1930.454 *	953	69.424 *	0.947	0.001	0.947	0.002	0.037	0.001
MPg	Disturbances of measured variables	1948.825 *	960	31.368 *	0.946	−0.001	0.947	0.000	0.037	0.000

Note. N = 757 students; MP = model post-test; SRL = self-regulated learning; χ^2 = WLSMV chi square; df = degrees of freedom; MD$\Delta\chi^2$ = chi square difference test based on the Mplus DIFFTEST function for WLSMV estimation; *CFI* = Comparative fit index; *TLI* = Tucker–Lewis index; *RMSEA* = Root mean square error of approximation; Δ = difference to previous model; * $p < 0.01$.

Table A2. T1–T3 Model fits for SRL invariance models.

Model	Model Description	χ^2	df	MD$\Delta\chi^2$	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA
MFa	Configural model	1837.910 *	868	-	0.943	-	0.938	-	0.039	-
MFb	First-order factor loadings	1891.956 *	882	36.205 *	0.943	0.000	0.938	0.000	0.039	0.000
MFc	Second-order factor loadings	1902.617 *	889	16.697	0.942	−0.001	0.939	−0.001	0.039	0.000
MFd	Thresholds of measured variables	1936.116 *	924	74.095 *	0.942	0.000	0.941	−0.002	0.038	0.001
MFe	Intercepts of first-order factors	1960.111 *	931	34.739 *	0.941	−0.001	0.941	0.000	0.038	0.000
MFf	Disturbances of first-order factors	1962.980 *	953	70.834 *	0.943	0.002	0.943	−0.002	0.037	0.001
MFg	Disturbances of measured variables	1997.701 *	960	42.316 *	0.941	−0.002	0.942	0.001	0.038	−0.001

Note. N = 757 students; MF = model follow-up test; SRL = self-regulated learning; χ^2 = WLSMV chi square; df = degrees of freedom; MD$\Delta\chi^2$ = chi square difference test based on the Mplus DIFFTEST function for WLSMV estimation; *CFI* = Comparative fit index; *TLI* = Tucker–Lewis index; *RMSEA* = Root mean square error of approximation; Δ = difference to previous model; * $p < 0.01$.

References

1. OECD Future of Education and Skills 2030. OECD Learning Compass 2030. A Series of Concept Notes. Available online: https://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/OECD_Learning_Compass_2030_Concept_Note_Series.pdf (accessed on 5 June 2024).
2. Sitzmann, T.; Ely, K. A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychol. Bull.* **2011**, *137*, 421–442. [CrossRef] [PubMed]
3. Zimmerman, B.J. Attaining self-regulation: A social cognitive perspective. In *Handbook of Self-Regulation*; Boekaerts, M., Pintrich, P.R., Zeidner, M., Eds.; Academic Press: San Diego, CA, USA, 2000; pp. 13–39.
4. Pintrich, P.R. The role of goal orientation in self-regulated learning. In *Handbook of Self-Regulation*; Boekaerts, M., Pintrich, P.R., Zeidner, M., Eds.; Academic Press: San Diego, CA, USA, 2000; pp. 402–451.
5. Dignath, C.; Büttner, G. Teachers' direct and indirect promotion of self-regulated learning in primary and secondary school mathematics classes—Insights from video-based classroom observations and teacher interviews. *Metacognition Learn.* **2018**, *13*, 127–157. [CrossRef]
6. Kistner, S.; Rakoczy, K.; Otto, B.; Klieme, E.; Büttner, G. Teaching learning strategies. The role of instructional context and teacher beliefs. *J. Educ. Res. Online* **2015**, *7*, 176–197. [CrossRef]
7. Heirweg, S.; De Smul, M.; Merchie, E.; Devos, G.; Van Keer, H. The long road from teacher professional development to student improvement: A school-wide professionalization on self-regulated learning in primary education. *Res. Pap. Educ.* **2021**, *37*, 929–953. [CrossRef]
8. Stoeger, H.; Sontag, C.; Ziegler, A. Impact of a teacher-led intervention on preference for self-regulated learning, finding main ideas in expository texts, and reading comprehension. *J. Educ. Psychol.* **2014**, *106*, 799–814. [CrossRef]
9. Benick, M.; Dörrenbächer-Ulrich, L.; Weißenfels, M.; Perels, F. Fostering SRL in primary school students: Can an additional teacher training enhance the intervention effects? *Psychol. Learn. Teach.* **2021**, *20*, 324–347. [CrossRef]
10. Dignath, C.; Büttner, G.; Langfeldt, H.-P. How can primary school students learn self-regulated learning strategies most effectively? A meta-analysis on self-regulation training programmes. *Educ. Res. Rev.* **2008**, *3*, 101–129. [CrossRef]
11. Artelt, C.; Schneider, W. Cross-country generalizability of the role of metacognitive knowledge for students' strategy use and reading competence. *Teach. Coll. Rec. Voice Scholarsh. Educ.* **2015**, *117*, 1–32. [CrossRef]
12. Johnson, D.W.; Johnson, R.T. An educational psychology success story: Social interdependence theory and cooperative learning. *Educ. Res.* **2009**, *38*, 365–379. [CrossRef]

13. Alvi, E.; Gillies, R.M. Teachers and the Teaching of Self-Regulated Learning (SRL): The Emergence of an Integrative, Ecological Model of SRL-in-Context. *Educ. Sci.* **2020**, *10*, 98. [CrossRef]

14. Žerak, U.; Jurišević, M.; Pečjak, S. Parenting and teaching styles in relation to student characteristics and self-regulated learning. *Eur. J. Psychol. Educ.* **2023**, *39*, 1327–1351. [CrossRef]

15. Otto, B. *SELVES Schüler-, Eltern- und Lehrertrainings zur Vermittlung Effektiver Selbstregulation. [SELVES Student, Parent, and Teacher Training to Promote Effective Self-Regulation]*; Logos: Berlin, Germany, 2007.

16. Stöger, H.; Ziegler, A. *Trainingshandbuch Selbstreguliertes Lernen II. Grundlegende Textverständnisstrategien für Schüler der 4. Bis 8. Jahrgangsstufe. [Training Manual for Self-Regulated Learning II. Basic Text Comprehension Strategies for Students in Years 4 to 8]*; Pabst: Lengerich, Germany, 2008.

17. Lee, M.; Lee, S.Y.; Kim, J.E.; Lee, H.J. Domain-specific self-regulated learning interventions for elementary school students. *Learn. Instr.* **2023**, *88*, 101810. [CrossRef]

18. Gearing, R.E.; El-Bassel, N.; Ghesquiere, A.; Baldwin, S.; Gillies, J.; Ngeow, E. Major ingredients of fidelity: A review and scientific guide to improving quality of intervention research implementation. *Clin. Psychol. Rev.* **2011**, *31*, 79–88. [CrossRef] [PubMed]

19. Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory*; Prentice-Hall: Hoboken, NJ, USA, 1986.

20. Panadero, E. A review of self-regulated learning: Six models and four directions for research. *Front. Psychol.* **2017**, *8*, 422. [CrossRef] [PubMed]

21. Landmann, M.; Perels, F.; Otto, B.; Schnick-Vollmer, K.; Schmitz, B. Selbstregulation und selbstreguliertes Lernen [self-regulation and self-regulated learning]. In *Einführung in Die Pädagogische Psychologie [Introduction into Pedagogical Psychology]*, 2nd ed.; Wild, E., Möller, J., Eds.; Springer: Berlin, Germany, 2015.

22. Bong, M. Between-and within-domain relations of academic motivation among middle and high school students: Self-efficacy, task value, and achievement goals. *J. Educ. Psychol.* **2001**, *93*, 23–34. [CrossRef]

23. Boekaerts, M. Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learn. Instr.* **1997**, *7*, 161–186. [CrossRef]

24. Vandevelde, S.; Van Keer, H.; Rosseel, Y. Measuring the complexity of upper primary school children's self-regulated learning: A multi-component approach. *Contemp. Educ. Psychol.* **2013**, *38*, 407–425. [CrossRef]

25. Veenman, M.V.J.; Van Hout-Wolters, B.H.A.M.; Afflerbach, P. Metacognition and learning: Conceptual and methodological considerations. *Metacognition Learn.* **2006**, *1*, 3–14. [CrossRef]

26. Souvignier, E.; Trenk-Hinterberger, I. Implementation eines Programms zur Förderung selbst-regulierten Lesens. Verbesserung der Nachhaltigkeit durch Auffrischungssitzungen. [Implementation of a Program to Foster Reading Competence: Improving Long-Term Effects by Using Booster-Sessions]. *Z. Für Pädagogische Psychol.* **2010**, *24*, 207–220. [CrossRef]

27. Hadwin, A.F.; Järvelä, S.; Miller, M. Self-regulated, co-regulated, and socially shared regulation of learning. In *Handbook of Self-Regulation of Learning and Performance*; Schunk, D.H., Greene, J.A., Eds.; Routledge: London, UK, 2011; pp. 65–84.

28. Slavin, R.E. Cooperative learning in elementary schools. *Education* **2015**, *43*, 5–14. [CrossRef]

29. Chiu, M.M.; Kuo, S.W. From Metacognition to Social Metacognition: Similarities, Differences, and Learning. *J. Educ. Res.* **2009**, *3*, 1–19.

30. De Boer, H.; Donker, A.S.; Kostons, D.D.; van der Werf, G.P.C. Long-Term Effects of Metacognitive Strategy Instruction on Student Academic Performance: A Meta-Analysis. *Educ. Res. Rev.* **2018**, *24*, 98–115. [CrossRef]

31. Bellhäuser, H.; Liborius, P.; Schmitz, B. Fostering self-regulated learning in online environments: Positive effects of a web-based training with peer feedback on learning behavior. *Front. Psychol.* **2022**, *13*, 813381. [CrossRef] [PubMed]

32. Van den Boom, G.; Paas, F.; van Merriënboer, J.J. Effects of elicited reflections combined with tutor or peer feedback on self-regulated learning and learning outcomes. *Learn. Instr.* **2007**, *17*, 532–548. [CrossRef]

33. Schünemann, N.; Spörer, N.; Völlinger, V.A.; Brunstein, J.C. Peer feedback mediates the impact of self-regulation procedures on strategy use and reading comprehension in reciprocal teaching groups. *Instr. Sci.* **2017**, *45*, 395–415. [CrossRef]

34. Hattie, J.; Timperley, H. The Power of Feedback. *Rev. Educ. Res.* **2007**, *77*, 81–112. [CrossRef]

35. Ajjawi, R.; Boud, D. Researching feedback dialogue: An interactional analysis approach. *Assess. Eval. High. Educ.* **2015**, *42*, 252–265. [CrossRef]

36. Mercer, N.; Littleton, K. *Dialogue and the Development of Children's Thinking: A Sociocultural Approach*; Routledge: London, UK, 2007.

37. Pino-Pasternak, D.; Basilio, M.; Whitebread, D. Interventions and classroom contexts that promote self-regulated learning: Two intervention studies in United Kingdom primary classrooms. *Psykhe* **2014**, *23*, 1–13. [CrossRef]

38. Pino-Pasternak, D.; Whitebread, D. The role of parenting in children's self-regulated learning. *Educ. Res. Rev.* **2010**, *5*, 220–242. [CrossRef]

39. Dermitzaki, I.; Kallia, E. The role of parents and teachers in fostering children's self-regulated learning skills. In *Trends and Prospects in Metacognition Research across the Life Span*; Moraitou, D., Metallidou, P., Eds.; Springer: Berlin, Germany, 2021; pp. 185–207. [CrossRef]

40. Bagais, R.; Pati, D. Associations between the home physical environment and child self-regulation: A conceptual exploration. *J. Environ. Psychol.* **2023**, *90*, 102096. [CrossRef]

41. Núñez, J.C.; Tuero, E.; Fernández, E.; Añón, F.J.; Manalo, E.; Rosário, P. Effect of an intervention in self-regulation strategies on academic achievement in elementary school: A study of the mediating effect of self-regulatory activity. *Rev. Psicodidáctica* **2022**, *27*, 9–20. [CrossRef]

42. King, A. Facilitating elaborative learning through guided student-generated questioning. *Educ. Psychol.* **1992**, *27*, 111–126. [CrossRef]

43. Mason, L.H. Teaching students who struggle with learning to think before, while, and after reading: Effects of self-regulated strategy development instruction. *Read. Writ. Q.* **2013**, *29*, 124–144. [CrossRef]

44. Risko, V.J.; Walker-Dalhouse, D.; Bridges, E.S.; Wilson, A. Drawing on text features for reading comprehension and composing. *Read. Teach.* **2011**, *64*, 376–378. [CrossRef]

45. Souvignier, E.; Mokhlesgerami, J. Using self-regulation as a framework for implementing strategy-instruction to foster reading comprehension. *Learn. Instr.* **2006**, *16*, 57–71. [CrossRef]

46. Jitendra, A.K.; Hoppes, M.K.; Xin, Y.P. Enhancing main idea comprehension for students with learning problems: The role of a summarization strategy and self-monitoring instruction. *J. Spec. Educ.* **2000**, *34*, 127–139. [CrossRef]

47. Slavin, R.E.; Lake, C.; Chambers, B.; Cheung, A.; Davis, S. Effective reading programs for the elementary grades: A best-evidence synthesis. *Rev. Educ. Res.* **2009**, *79*, 1391–1466. [CrossRef]

48. Griffin, C.C.; Malone, L.D.; Kameenui, E.J. Effects of graphic organizer instruction on fifth-grade students. *J. Educ. Res.* **1995**, *89*, 98–107. [CrossRef]

49. Kim, A.-H.; Vaughn, S.; Wanzek, J.; Wei, S. Graphic organizers and their effects on the reading comprehension of students with LD: A synthesis of research. *J. Learn. Disabil.* **2004**, *37*, 105–118. [CrossRef]

50. Artelt, C.; Schiefele, U.; Schneider, W.; Stanat, P. Leseleistungen deutscher Schülerinnen und Schüler im internationalen Vergleich (PISA): Ergebnisse und Erklärungsansätze. [Reading performance of German pupils in international comparison (PISA): Results and explanatory approaches]. *Z. Für Erzieh.* **2002**, *5*, 6–27. [CrossRef]

51. Myrberg, E.; Rosén, M. Direct and indirect effects of parents' education on reading achievement among third graders in Sweden. *British Journal of Educational Psychology* **2009**, *79*, 695–711. [CrossRef] [PubMed]

52. McLeod, B.D.; Southam-Gerow, M.A.; Weisz, J.R. Conceptual and methodological issues in treatment integrity measurement. *Sch. Psychol. Rev.* **2009**, *38*, 541.

53. Durlak, J.A. The importance of doing well in whatever you do: A commentary on the special section, "Implementation research in early childhood education". *Early Child. Res. Q.* **2010**, *25*, 348–357. [CrossRef]

54. Sutherland, K.S.; McLeod, B.D.; Conroy, M.A.; Mccormick, N. Developing treatment integrity measures for teacher-delivered interventions: Progress, recommendations and Future Directions. *Sch. Ment. Health* **2021**, *14*, 7–19. [CrossRef]

55. Baker, C.N.; Kupersmidt, J.B.; Voegler-Lee, M.E.; Arnold, D.; Willoughby, M.T. Predicting teacher participation in a classroom-based, integrated preventive intervention for preschoolers. *Early Child. Res. Q.* **2010**, *25*, 270–283. [CrossRef] [PubMed]

56. Yoder, P.; Symons, F. *Observational Measurement of Behavior*; Springer: Berlin, Germany, 2010.

57. Schoenwald, S.K. It's a bird, it's a plane, it's. . . fidelity measurement in the real world. *Clin. Psychol. Sci. Pract.* **2011**, *18*, 142–147. [CrossRef] [PubMed]

58. Meyers, C.; Brandt, W.C. *Implementation Fidelity in Education Research: Designer and Evaluator Considerations*, 1st ed.; Routledge: London, UK, 2014. [CrossRef]

59. Sanetti, L.M.H.; Charbonneau, S.; Knight, A.; Cochrane, W.S.; Kulcyk, M.C.M.; Kraus, K.E. Treatment fidelity reporting in intervention outcome studies in the school psychology literature from 2009 to 2016. *Psychol. Sch.* **2020**, *57*, 901–922. [CrossRef]

60. Little, R.J.A. A test of missing completely at random for multivariate data with missing values. *J. Am. Stat. Assoc.* **1988**, *83*, 1198–1202. [CrossRef]

61. Limón, M.; Mason, L. (Eds.) *Reconsidering Conceptual Change: Issues in Theory and Practice*; Springer Dordrecht: Dordrecht, The Netherlands, 2002.

62. Bruder, S.; Perels, F.; Schmitz, B. Selbstregulation und elterliche Hausaufgabenunterstützung. Die Evaluation eines Elterntrainings für Kinder der Sekundarstufe I. [Self-regulation and parental homework support. Evaluation of a parental training for children in lower secondary school]. *Z. Für Entwicklungspsychologie Und Pädagogische Psychol.* **2004**, *36*, 139–146. [CrossRef]

63. Prins, R.; Avraamidou, L.; Goedhart, M. Tell me a story: The use of narrative as a learning tool for natural selection. *Educ. Media Int.* **2017**, *54*, 20–33. [CrossRef]

64. Dörrenbächer, L.; Perels, F. More is more? Evaluation of interventions to foster self-regulated learning in college. *Int. J. Educ. Res.* **2016**, *78*, 50–65. [CrossRef]

65. Steinbach, J. *Selbstreguliertes Lernen in der Grundschule. Die Bedeutung der Einstellungen von Lehrkräften und Eltern [Self-Regulated Learning in Primary School. The Relevance of Parents' and Teachers' Attitude]*; Logos: Berlin, Germany, 2016.

66. Ziegler, A.; Stöger, H.; Grassinger, R. Diagnostik selbstregulierten Lernens mit dem FSL-7. [Diagnostics of self-regulated learning with the FSL-7]. *J. Für Begabtenförderung* **2010**, *10*, 24–33.

67. Souvignier, E.; Trenk-Hinterberger, I.; Adem-Schwebe, S.; Gold, A. *FLVT 5-6. Frankfurter Leseverständnistest für 5. Und 6. Klassen. [FLVT Frankfurt Reading Comprehension Test for 5th and 6th Graders]*; Hogrefe: Göttingen, Germany, 2008.

68. Van Dijk, T.; Kintsch, W. *Strategies of Discourse Comprehension*; Academic Press: San Diego, CA, USA, 1983.

69. Weiss, R.H. *CFT 20-R. Grundintelligenztest Skala 2—Revision mit Wortschatztest und Zahlenfolgentest [CFT 20-R. Basic Intelligence Test Scale 2—Revision with Vocabulary Test and Number Sequence Test]*, 2nd ed.; Hogrefe: Göttingen, Germany, 2019.

70. Muthén, L.K.; Muthén, B.O. *Mplus (Version 8)*; Muthén & Muthén: Los Angeles, CA, USA, 2017.

71. Satorra, A.; Bentler, P.M. Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika* **2010**, *75*, 243–248. [CrossRef]

72. Hu, L.T.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model.* **1999**, *6*, 1–55. [CrossRef]

73. Liu, Y.; Millsap, R.E.; West, S.G.; Tein, J.Y.; Tanaka, R.; Grimm, K.J. Testing measurement invariance in longitudinal data with ordered-categorical measures. *Psychol. Methods* **2017**, *22*, 486–506. [CrossRef] [PubMed]

74. Chen, F.F.; Sousa, K.H.; West, S.G. Teacher's Corner: Testing Measurement Invariance of Second-Order Factor Models. *Struct. Equ. Model. A Multidiscip. J.* **2005**, *12*, 471–492. [CrossRef]

75. Cheung, G.W.; Rensvold, R.B. Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct. Equ. Model. A Multidiscip. J.* **2002**, *9*, 233–255. [CrossRef]

76. Gagné, M.; Morin, A.J.S.; Schabram, K.; Wang, Z.N.; Chemolli, E.; Briand, M. Uncovering relations between leadership perceptions and motivation under different organizational contexts: A multilevel cross-lagged analysis. *J. Bus. Psychol.* **2020**, *35*, 713–732. [CrossRef]

77. Enders, C.K.; Tofighi, D. Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychol. Methods* **2007**, *12*, 121–138. [CrossRef]

78. Rasch, B.; Friese, M.; Hofmann, W.J.; Naumann, E. *Quantitative Methoden. Band 1 [Quantitative Methods. Volume 1]*, 3rd ed.; Springer: Berlin, Germany, 2010.

79. LeBreton, J.M.; Senter, J.L. Answers to 20 questions about interrater reliability and interrater agreement. *Organ. Res. Methods* **2007**, *11*, 815–852. [CrossRef]

80. Steinbach, J.; Stoeger, H. How primary school teachers' attitudes towards self-regulated learning (SRL) influence instructional behavior and training implementation in classrooms. *Teach. Teach. Educ.* **2016**, *60*, 256–269. [CrossRef]

81. Spruce, R.; Bol, L. Teacher beliefs, knowledge, and practice of self-regulated learning. *Metacognition Learn.* **2015**, *10*, 245–277. [CrossRef]

82. Artelt, C. Wie prädiktiv sind retrospektive Selbstberichte über den Gebrauch von Lernstrategien für strategisches Lernen? [How predictive are retrospective self-reports on the use of learning strategies for strategic learning?]. *Z. Für Pädagogische Psychol.* **2000**, *14*, 72–84. [CrossRef]

83. Kraft, M.A. Interpreting effect sizes of education interventions. *Educ. Res.* **2020**, *49*, 241–253. [CrossRef]

84. Kruger, J.; Dunning, D. Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *J. Personal. Soc. Psychol.* **1999**, *77*, 1121–1134. [CrossRef] [PubMed]

85. Oakhill, J.; Cain, K.; Elbro, C. *Understanding and Teaching Reading Comprehension: A Handbook*; Routledge: London, UK; Taylor & Francis Group: New York, NY, USA, 2015.

86. Van Leeuwen, A.; Janssen, J. A systematic review of teacher guidance during collaborative learning in primary and secondary education. *Educ. Res. Rev.* **2019**, *27*, 71–89. [CrossRef]

87. Schmitz, B.; Klug, J.; Schmidt, M. Assessing self-regulated learning using diary measures with university students. In *Handbook of Self-Regulation of Learning and Performance*; Schunk, D.H., Greene, J.A., Eds.; Routledge: London, UK, 2011; pp. 251–266.

88. Greene, J.A.; Robertson, J.; Croker Costa, L.J. Assessing self-regulated learning using think aloud methods. In *Handbook of Self-regulation of Learning and Performance*; Schunk, D.H., Greene, J.A., Eds.; Routledge: London, UK, 2011; pp. 313–328.

89. Cleary, T.J. Emergence of self-regulated learning microanalysis: Historical overview, essential features, and implications for research and practice. In *Handbook of Self-Regulation of Learning and Performance*; Schunk, D.H., Greene, J.A., Eds.; Routledge: London, UK, 2011; pp. 329–345.

90. Wirth, J.; Leutner, D. Self-Regulated Learning as a Competence. *Z. Für Psychol./J. Psychol.* **2008**, *216*, 102–110. [CrossRef]

91. Sanetti, L.M.H.; Kratochwill, T.R. Toward developing a science of treatment integrity: Introduction to the special series. *Sch. Psychol. Rev.* **2009**, *38*, 445–459.

92. Hogue, A.; Dauber, S.; Lichvar, E.; Bobek, M.; Henderson, C.E. Validity of therapist self-report ratings of fidelity to evidence-based practices for adolescent behavior problems: Correspondence between therapists and observers. *Adm. Policy Ment. Health Ment. Health Serv. Res.* **2014**, *42*, 229–243. [CrossRef]

93. Smith, R.; Snow, P.; Serry, T.; Hammond, L. The role of background knowledge in reading comprehension: A critical review. *Read. Psychol.* **2021**, *42*, 214–240. [CrossRef]