Enhancing young students' high-level talk by using cooperative learning within Success for All lessons

Veldman, M. A.; Doolaard, S.; Snijders, T. A. B.; Bosker, R. J.

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Enhancing young students' high-level talk by using cooperative learning within Success for All lessons

M.A. Veldman, S. Doolaard, T.A.B. Snijders & R.J. Bosker

Abstract

This study examined whether students achieved high-level talk during group work because of involvement in cooperative learning within the Success for All (SfA) program. SfA is a comprehensive school program in which cooperative learning plays a key role, in addition to several other components such as parental involvement and tutoring. A quasi-experimental design with a treatment and a control group was used. At the end of the school year, grade-1 students (6- and 7-years-old children) executed a group task in small groups of four students. At that moment, SfA students had experienced cooperative learning within SfA lessons for a whole school year. In total, 160 students participated in this study. Using a coding scheme the quality of student's talk during group work was compared between treatment and control group. Compared to the control group, SfA students showed more high-level talk. SfA students expressed more extended elaborations of propositions and asked more open elaboration questions. Hence, the results of this study suggest that cooperative learning activities within SfA-lessons contributed to students' high-level talk.

Keywords: cooperative learning; high-level talk; Success for All; primary education.

1 Introduction

Although the importance of student interactions in small groups is widely acknowledged, the quality of the interaction is critical (Gillies, 2006; Mercer, 1996; Webb, 1991). It is often suggested that students' verbal behaviors during peer interaction are important mediators to improve learning when cooperative learning is implemented in the classroom (Howe et al., 2007; Webb, 1992; Veenman, Denessen, van den Akker, & van der Rijt, 2005). However, improving students' oral language is also an educational outcome in its own right, especially for students of early-elementary age. High-level talk is characterized by students expressing elaborated responses, such as explaining their ideas or giving reasons for their opinions and asking each other questions about the group process, for explanations, or to challenge each other's ideas. Numerous studies have focused on cooperative learning and students' verbal talk. These studies demonstrated that an effective implementation of cooperative learning can impact the development of students' interaction skills (e.g., Gillies, 2004, 2006; Krol et al., 2004). However, studies on cooperative learning rarely include 6- and 7-aged students, who are in the beginning of their elementary schooling. Most of the studies have taken place in a higher age range of primary and secondary school, probably because of the belief that young children are not able to work and learn together without interference of the teacher (Kutnick et al., 2008). In the current study, students are taken out of the classroom and executed a cooperative task in groups of four without the guidance of the teacher, to investigate whether cooperative learning enhanced the level of young students' talk.

1.1 High-level talk during group work

When high-level talk appears in peer interaction children offer opinions and give reasons to support those opinions (Mercer & Littleton, 2007). In line with the studies of Webb and colleagues on this topic (e.g., 1991; 2009), many scholars have pointed to the importance of elaboration. Elaboration on an issue, topic or idea refers to when students explain a concept, provide examples, adding details or supply specific argumentation

(Krol, Janssen, Veenman, & van der Linden, 2004; Kuhn, & Udell, 2003; Van Boxtel, Van der Linden, & Kanselaar, 2000; Veenman, Denessen, Van den Akker, & Van der Rijt, 2005).

Mercer (e.g., 2000) and others define high-level talk in peer interaction as exploratory talk. In exploratory talk, partners engage critically but constructively with each other's ideas (Mercer, Wegerif, Dawes, 1999). Exploratory talk can be distinguished from disputational talk and cumulative talk. Disputational talk refers to unproductive, often highly competitive disagreements, which will escalate from time to time. On the other hand, cumulative talk is a friendly kind of talk, but does not lead to any result in cognitive learning outcomes. The group members acknowledge ideas without questioning, challenging or reflecting upon them. For instance when friends work together, they may tend to accept opinions of each other without being sufficiently critical. This is the type of talk that appears when the children do cooperate, but share information in an uncritical way (Mercer, 1996; Mercer & Littleton, 2007; Wegerif & Mercer, 1997).

Clearly, the type of high-level talk that should be pursued in classroom peer interactions in Mercer's terms is exploratory talk. Exploratory talk is defined on the level of the group: students are able to critically build on each other's ideas. On an individual student level, this requires that students are able to use a high level of talk: students give elaborated responses, but also ask questions to challenge other students' ideas and question the group process.

1.2 Teaching high-level talk by means of cooperative learning

Mercer (1996) argues that a clear structure of 'ground rules' needs to be provided in order to prepare students to engage in genuine exploratory talk. Other scholars also stated that teachers need to explicitly teach the skills to enhance the level of talk and students need to be encouraged to use these skills to enrich discourse and increase learning (Gillies, 2004; Meloth & Deering, 1999; Webb & Farivar, 1994). Compared to traditional whole-class instruction, where students work individually or listen to the teacher passively, in cooperative learning settings all students get the chance to use various speech elements: ask questions, provide answers, give suggestions, and critically reflect on each other's ideas. During cooperative learning, all children get enough opportunities to explicate and formulate their thoughts and to test their thoughts in interaction with each other. The students are stimulated to think carefully about bringing their thoughts into words and explicating their formulations. When children work effectively together in groups, they learn to share their ideas, listen to other students' perspectives, construct new knowledge and understandings, seek new ways of clarifying differences and resolving problems, and give and receive help (Gillies, 2003).

Although the majority of the students in primary schools spend their classroom learning time sitting in small groups (Blatchford, Kutnick, Baines & Galton, 2003; Kutnick & Blatchford, 2014), in common practice students are given few opportunities to actively engage with their peers in ways that are cognitively enhancing (Baines, Blatchford & Kutnick, 2003; Baines, Rubie-Davies & Blatchford, 2009; Kutnick, Blatchford & Baines, 2002). In these settings, student-student interaction often involves off-task talk or procedural talk of limited value to learning (Mercer & Littleton, 2007). Students are left dependent on the teacher for cognitive information and support (Baines, Blatchford & Kutnick, 2008). Classroom talk mainly consists of teacher-based, relatively closed questions (Smith, Hardman, Wall & Mroz, 2004), which offers students few opportunities for collaborative discussion and for practicing their verbal skills.

1.3 Cooperative learning within Success for All

Success for All (SfA) lessons are designed to enable teachers to foster cooperative learning activities that encourage high-level talk of students. Success for All is a comprehensive school program wherein cooperative learning plays a key role. The program has been

shown to be effective in promoting student achievement in the US and the UK (Borman, Slavin, Cheung, Chamberlain, Madden, & Chambers, 2007; Tracey e.a., 2014; Quint, Zhu, Balu, Rappaport, DeLaurentis, 2015), and is currently under adaptation for the Dutch educational practice.

The cooperative learning approach in the Dutch SfA-lessons involves a) the use of cooperative learning structures, such as *Numbered Heads, Heads Together* and *Think-Pair-Share*, b) explicit instruction in cooperative behaviors, for example one of these cooperative behaviors is summarized as 'explain your ideas and ask each other questions', c) a reward system aimed at motiving student to work effectively together. Teachers have a very active role in implementing the cooperative learning approach in the classroom, including explicit instruction in how to behave during group work and serving as a modelling example for effective cooperative skill development. We suggest that a complete implementation of the cooperative learning approach in the SfA lessons with lot of opportunities for peer interaction, but also explicit instruction in cooperative behaviors may lead to an increase in students' proficiency to engage in high-level talk. More information on cooperative learning in the SfA-intervention is included in the method section.

1.4 Aims and hypotheses

The aim of the study is to explore whether the SfA program is successful in promoting young students' talk when they work together on a cooperative task without the guidance of a teacher. Within SfA lessons students are explicitly taught to use high-level talk and have many opportunities to practice their dialogical skills in interactions with their peers. Therefore, it is hypothesized that because of involvement in SfA lessons students learned to engage in high-level talk within group work and express more (extended) elaborations of propositions, ask more open elaboration or group process questions and express more (extended) elaborations about the group process.

2 Method

2.1 Design

A quasi-experimental design with a treatment and a control group was used. At the end of the school year 2015-2016, grade-1 students (6- and 7-year-olds) performed a cooperative learning task in small groups of four students. The processes of group work during the cooperative task in the treatment group and the control group were compared using a coding scheme. When the cooperative learning task took place, the students in the treatment group had been following SfA program lessons for one school year. The Dutch SfA program was integrated in an established Dutch reading method in grade 1. The control schools followed the same reading method. Teachers in control schools were not given any instructions concerning teaching methods or cooperative learning methods. Nonetheless, they may have used group work if that was part of their normal teaching approach. For instance, one of the three control schools applies the principles of Dalton. As part of the Dalton vision, group work may have been more commonly used in this school. It was expected, however, that students in the control classes would mostly experience whole-class teacher-led situations and individual learning situations, like most other classes in the Netherlands (Veenman, Kenter, & Post, 2000, see also, e.g., Baines, Blatchford, & Kutnick, 2008 and Blatchford, Baines, Rubie-Davies, Bassett & Chowne, 2006).

2.2 Intervention

Teachers implemented cooperative learning in their classrooms as part of a broader intervention, namely the comprehensive school program Success for All (SfA). At the moment of the current study, the SfA program was implemented in ten grade-1 classes of six schools in the Netherlands. SfA lessons in language and reading skills including cooperative learning were given every school day for a full school year, and lasted about ninety minutes. Instruction in SfA lessons is characterized by scripted lesson plans that make extensive use of cooperative learning in pairs and small groups. Cooperative learning plays a key role in every SfA-lesson. Within the

SfA-lessons the cooperative learning approach involves a) cooperative learning structures, such as *Think-Pair-Share, Numbered Heads,* and *Heads Together*, b) explicit instruction in cooperative behaviors, such as "explain your ideas and ask questions", and c) a reward system aimed at motivating children to work effectively together. The cooperative behaviors are introduced in the grade-1 lessons. One of the cooperative behaviors is summarized as 'explain your ideas and ask questions', which is especially relevant for affecting students' talk. Every week the teacher highlights one specific cooperative behavior. During this week, teachers give instruction in this specific behavior, including giving modelling examples and reflection together with students. Teachers have to monitor the groups during cooperative learning activities and intervene when needed. By monitoring the groups, teachers can give students directly feedback on their cooperative behaviors when it is immediately relevant. At the end of every SfA-lesson and at the end of the week, teachers evaluate and reflect together with students on the group work and the highlighted cooperative behavior of the week. When students showed high-quality cooperative behaviors, they are rewarded for this. For instance, a team cheer is used to celebrate good teamwork. Hence, teachers have a very active role in the implementation of the cooperative learning activities in their classroom. Teachers in the SfA program are taught strategies and given tools to help their students work cooperatively. Teachers receive the required materials and manuals containing descriptions of every single SfA lesson. Furthermore, SfA provides professional training in how to teach SfA lessons and in the use of cooperative learning in these lessons by means of an initial training course right before the start of the school year, meetings with teachers of different SfA schools and classroom visits (see Slavin, Madden, Chambers & Haxby, 2009 for more information on SfA).

2.3 Sample

Schools were assigned to the treatment group or the control group in accordance with agreements among the school boards, the municipality, and the Dutch research and development team of Success for All. The SfA schools and control schools were all located in the north of the Netherlands and in the same neighborhoods.

Groups of four students were selected from every class of the participating schools. The selection of students was based on active informed parental consent for making video observations in research on the Dutch SfA program. Ethical consent for the video recordings was obtained from the Ethical Committee Pedagogical and Educational Sciences from the University of Groningen. Subsequently, the teachers were asked to compose heterogeneous groups of four students. The teachers were asked to form the group heterogeneous in many ways, but with language achievement as the most important factor. By asking the teachers to compose heterogeneous groups, all groups were mixed so there were no groups of only high-achievers or only low-achievers. This study involved 96 students of ten classes from six treatment schools and 64 students of eight classes from three control schools. Thus, in total 160 students were involved in this study.

2.4 Procedure

The groups of four students were taken out of the classroom in order to perform the group task in a separate room. By taking the students out of the classroom, a controlled setting without distractions was created. All groups of four students both from the treatment and the control group executed precisely the same task. It should be noted that the SfA students did not execute the task in their own team (the small groups in which the students work together on a daily basis) and the group task used in the study is not used in the Dutch SfA program. Neither the treatment group nor the control group was familiar with the cooperative learning strategy used in this study. At the start of the session, the test leader tried to make the students feel comfortable by a little chat and gave the instruction about what was expected from them in the task. The instructions were the same for all groups. The instruction involved that the

goal of the task was to effectively work together to come to the best possible solution. In total, the sessions took about 15 to 30 minutes per group.

2.5 Group task

The group task was designed specifically for this study, as the significance of the task design is often emphasized to support productive group work (Cohen, 1994; Howe & Tolmie, 2003; Mercer & Littleton, 2007). Within the task, the test leader told a story that ended with a social problem. The story used in the task is about Lot and Tim, two children that want to play together after school time. Lot got a new computer game and Lot and Tim want to play together with this new game. However, at Lot's home there is a dog and Tim is afraid of dogs. At the end of the story, the students were asked how Lot and Tim could solve this problem.

It was deliberately chosen to use a social problem within the task, as moral or religious problems could be associated with stronger emotions. As the talk between students was investigated in the present study, a task in which students should only discuss orally was used, to circumvent for instance a lack in reading proficiency. Moreover, the task involved an open-ended question lacking a single right answer as it is often suggested that open-ended tasks are more effective in facilitating productive interaction than more closed tasks focused on finding one correct answer (Cohen, 1994; Slavin, Hurley, Chamberlain, 2003).

First, the students had to think for themselves about a solution for the problem. Second, the test leader asked them to write down (or draw) three solutions for solving the problem within their own part of a cooperative learning placemat. The placemat, printed on a large piece of paper (A2 format), is divided into five fields. One part for every child to write down their solution(s) and one part in the middle where they can write down as a group their final solution. By giving students appropriate time to think first, it was assumed that the quality of the students' responses improved and they all could contribute to the discussion. After all the students had thought about the problem individually and written something down in their own field of the cooperative learning placemat, the test leader asked them to discuss what the best solution for the problem would be. Finally, they had to write down, as a group, their cooperative solution in the center of the placemat. When the students were finished, the test leader asked them why they had chosen their solution and evaluated the group work process with the students.

The cooperative learning placemat is a well-known cooperative learning activity and the task meets the five characteristics of cooperative learning as described by Johnson and Johnson (2009): 1) Positive interdependence, that is the group members must work together to accomplish the common goal of having one final solution; 2) Individual accountability, i.e. group members are responsible for their contribution to the achievement of the goal; 3) The group members have face-to-face interaction; 4) Social or small-group are needed for the group work; 5) Group processing, i.e. group reflection on the collaborative effort.

2.6 Data collection

In order to make it possible to transcribe students' talk, video-observations were used. The cameras of two tablets were directed towards the group of four students at different places in the room. By using two cameras all the students' faces were visible on the videos. Furthermore, an audio recorder lay on the table to make sure that the talk of all students could be heard to transcribe it later. Because the students had spent some time in the room before the group discussion started, they had had the opportunity to get used to the equipment. Moreover, the same equipment had been used in the classrooms earlier that school year, which made the students somewhat accustomed to the technical devices. While filming the tablet screens turned black to avoid distraction.

2.7 Coding scheme

The analyzed dialogue includes children's utterances from the moment the test leader gave a sign to start the discussion, until the

Table 1
The coding scheme including examples

Category	Codes	Examples
1. Propositions	1.1 Proposition without elaboration	*"Yes" "No"* (Referring to contributions of other children)
	1.2 Proposition with restricted elaboration	*"I had locking up the dog"* *"I wrote down they have to play at Tim's place."*
	1.3 Proposition with extended elaboration	Giving an elaboration as response to an elaboration question. *"Someone stays with the dog in the garden, because they can play in the house then."*
2. Questions	2.1 Closed question	Questions to be answered with yes or no. *"May I first write down my plans?"*
	2.2 Open restricted question	*"What did you say?"* *"What?"* *"What does it say there?"*
	2.3 Open elaboration question	*"And what if Lot doesn't want that?"* As a response to the suggestion they could play at Lot's place.
	2.4 Open group process question	*"Shall we start with saying our solutions one by one?"*
3. Group process propositions	3.1 Proposition about group process without elaboration (promoting the group process)	*"You!"* *"Yes" "No"* (Referring to contributions of other children about the group process)
	3.2 Proposition about group process with restricted elaboration (promoting the group process)	*"You start with giving your solution"*
	3.3 Proposition about group process with extended elaboration (promoting the group process)	*"No we should show our best solution, so we have to write down our best sentence."* *"You may write it down, because it is your solution."*
	3.4 Blocking group process, e.g., ridiculing other children.	*"You don't tell your story, because you cannot read."* *"I will not join"* Calling names.
4.Concluding/ summarizing	4.1 Summarizing/concluding without elaboration	*"Ready!"* *"We are done."*
	4.2 Summarizing/concluding with restricted elaboration	*"Our solution is to put the dog in garden"*
	4.3 Summarizing/concluding with extended elaboration	This would be a final answer, including an explanation of why they chose this answer.
5. Procedural propositions	5. Talking about how to write (or draw) things down.	When children spell a word. *"You have to write it down like this"*
6. Off task propositions	6. Talking about something not related to the task.	*"Yesterday we ate fries"* *"It is very noisy outside"*
7. Asking test leader	7. Questions towards the test leader.	*"And now?"* (Asking the test leader what to do)
8. Fragment test leader	8. Utterances of the test leader.	
9. Other	9. Nonverbal communication or inaudible fragments.	

moment the test leader started to evaluate the final group solution. The duration of this process differed per group from 3 minutes until 15 minutes. Students' dialogue was fully transcribed, and subsequently analyzed using the coding scheme as shown in Table 1. The coding scheme was specially developed for the current study. It was inspired by the coding scheme on students' verbal behavior of Gillies (2004), but was adapted to be appropriate for studying the type and levels of talk young-aged students for this specific task. Each fragment, meaning an utterance of one child until another child reacts, was assigned a code. As the utterances of students of this young age are mostly not very long, it was not needed to segment the utterances. To give insight in coding, examples of utterances of the students during the group work are also presented in the Table 1. In total, 5,752 student verbal utterances were coded (excluding categories 8 and 9 of the coding scheme). One researcher coded all transcripts to make comparison between treatment group and control group more reliable. To check the reliability of the coding scheme a second researcher coded one third of all groups. Agreement between coders was high: Cohen's kappa was .83 (Landis & Koch, 1977). High-level talk is operationalized by the following categories in the coding scheme expressing *restricted and extended elaborations* (1.2: Propositions with restricted elaborations, 1.3: Propositions with extended elaborations, 4.2: Summarizing/concluding with restricted elaborations and 4.3: Summarizing/concluding with extended elaborations), *proposing open questions* (2.2: Open restricted questions and 2.3: Open elaboration questions), and *propositions and questions about the group process* (2.4: Open group process questions, 3.2: Group process propositions with restricted elaborations and 3.3: Propositions about group process with extended elaborations).

2.8 Analyses

For analysis, the frequency of specific codes was divided by the total sum of codes per student so that the proportion scores per student of each category served as the unit of statistical analysis. Taking the proportion is a way to control for the duration of the task, which was not prescribed, and for the total number of utterances. It was not clear *a priori* whether the absolute number or the proportion is a better measure, and we opted for the proportion as this seemed the most direct way to control for different task durations. The task duration was further used as a control variable, as mentioned in the next section. To be able to give a detailed insight in differences in students' talk between the treatment and the control group, all categories of the coding scheme were analyzed separately. The categories 'fragment test leader' and 'other' were not taken into account within the analysis, because within this study the verbal utterances of students were examined. Scores of the dependent variables were not distributed normally. Therefore, relationships between control variables age and pretest and dependent variables were first analyzed using Kendall' tau correlations. Using Mann-Whitney U tests it was checked whether the SfA group and the control group differed in the duration of the task, the mean age within the groups and the mean score on the pretest within the groups. As the data were non-normal and clustered in 40 groups of four students, we used clustered Wilcoxon rank sum tests, a test for two-group comparisons for non-normal clustered data (Rosner, Glynn & Lee, 2006). Using clustered Wilcoxon rank sum tests is was first examined whether there were differences between the SfA group and the control group in pretest and age. Subsequently, clustered Wilcoxon rank sum tests were conducted for all dependent variables separately to investigate whether there were differences between the SfA and control group. As there were 16 dependent variables, we used the False Discovery Rate approach (Benjamin & Hochberg, 1995) to adjust *p*-values to counteract the problem of multiple comparisons. At the same time, balancing between the rejections of type I and of type II errors, we decided to test one-sided for two reasons: 1) we hypothesized positive effects of the SfA program, 2) increase of power. We did a power analysis using the software Optimal Design Plus (Spybrook, Bloom, Cong-

Table 2
Kendall's tau correlation coefficients for dependent and control variables[1]

		Propostiois			Questions				Group process				Concluding			Procedural	Off task	Asking test leader		
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5	6	7	Age	Pretest
1. Propositions	1.1 Without elaboration		.06	-.04	-.03	-.04	.03	-.09	-.05	-.14	-.06	.14	.01	-.06	--	.05	-.03	-.02	-.04	-.09
	1.2 With restricted elaboration			.03	-.02	-.19*	-.004	-.10	-.23*	-.20*	-.20*	-.12	.004	-.05	--	-.18*	-.23*	-.16	-.14	-.10
	1.3 With extended elaboration				.07	-.11	.32*	.17*	-.05	.17*	.21*	-.15	.01	.10	--	-.05	-.06	-.01	-.06	.09
2. Questions	2.1 Closed question					.08	-.07	.03	-.08	-.07	-.12	.06	.03	.23*	--	.12	.09	.01	.10	.11
	2.2 Open restricted question						.01	-.06	.04	.01	-.04	.11	-.02	-.04	--	.13	.11	-.05	.01	.08
	2.3 Open elaboration question							.15	-.10	.04	.04	-.07	.14	.10	--	.08	-.03	-.001	.05	.06
	2.4 Group process question								-.03	.12	.17*	-.20*	.05	.09	--	-.08	-.13	-.04	.08	.11
3. Group process	3.1 Without elaboration									.21**	.14	.13	.01	.01	--	.01	.05	.10	.50	.13
	3.2 With restricted elaboration										.31*	.02	-.04	.15	--	-.12	.14	-.004	.13	.06
	3.3 With extended elaboration											-.11	-.07	.17	--	-.06	-.06	.004	.02	.04
	3.4 Blocking group process												.05	.08	--	.11	.18*	.19*	.01	.01
4.Concluding/ summarizing	4.1 Without elaboration													-.02	--	-.03	-.05	.14	.05	.08
	4.2 With restricted elaboration														--	.05	-.04	-.02	.09	.14
	4.3 With extended elaboration																--	--	--	--
5. Procedural propositions	5. Talking about how to write (or draw) things down.																.20**	.08	.02	.11
6. Off task	6. Talking about something not related to the task.																	.19*	.00	.04
7. Asking test leader	7. Questions towards the test leader.																		.14	0.1
Age																				-.01
Pretest																				

*p < .01

1 Means and standard deviations of the dependent variable are given in Table 3.
Means and standard deviation of control variables are given in the method section.

don, Hill, Martinez &, Raudenbush, 2011). In this study 40 groups of 4 students participated (assumed intraclass correlation ρ = .15), meaning that with an intended high power of .80 (Cohen, 1992) we would be able to determine an effect size of approximately .45 with a one-sided significance level of .05. This is considered to be a high effect size, which confirmed our decision to test one-sided in order to obtain sufficient power. Effect sizes were calculated and reported by using Cohen's *r* as data were nonparametric (Fritz, Morris, & Richler, 2012).

2.9 Control variables

In non-parametric tests control variables are usually not included in the linear model, because there is no linear model. This is the case also for the clustered Wilcoxon rank sum test. Therefore, for the control variables it was checked whether there were significant differences between the SfA and the control condition. If significant differences would be found, further analyses would have been necessary. Three variables were considered as controls. The first was students' age at the day they performed the group task (SfA: M = 7.16, SD =.46, Control: M = 7.16, SD = .47). The second was a pretest of students' oral language skills conducted at the beginning of the school year. The test used is a subtask of a test of which reliability and validity have been assessed as good (Verhoeven & Vermeer, 2006). In this test, the students were assessed whether they achieve consistency in the meaning of a story. Based on the pictures they saw, the students had to tell a story. Using a checklist with a scale of 1-16 it was assessed whether the story was well told (SfA: M = 8.58, SD = 2.76, Control: M = 8.55, SD = 2.39). From the total of 160 students participating in this study, there was one missing score on the oral language skills test. The third variable for which the difference between the SfA and the control groups was checked was the duration of the task. This varied between groups from 3 minutes until 15 minutes (SfA: M = 7.65 min, SD = 4.13 min, Control: M = 7.65 min, SD = 4.13 min).

3 Results

Correlational analysis (Table 2) showed that there were no significant associations between any of the dependent variables and the control variables age and pretest. To give insight in the data correlations between the dependent variables are also shown in Table 2. There was no significant difference between the SfA group and control group in the duration of the task (Mann-Whitney U = 184.5, = 24, = 16, p = .84). At the level of the small groups, there were no significant differences between the SfA group and the control group in the mean age within the groups (Mann-Whitney U = 181, = 24, = 16, p = .76) or in the mean score on the pretest in the group (Mann-Whitney U = 191.5, = 24, = 16, p = .99). Also when tested at the student level, there were no significant differences between SfA and control group with regard to age (clustered Wilcoxon rank sum test: z = -.09, p = .92) or pretest (clustered Wilcoxon rank sum test: z = .19, p = .85). Summarizing, no significant differences were found between the SfA group and the control group for the control variables, and the comparison by the clustered Wilcoxon rank-sum test could proceed as planned.

Table 3 shows the means and standard deviations of the scores of all dependent variables for both the SfA group and the control group. Concluding or summarizing with extended elaborations did not occur in the SfA group nor in the control group. The results of the clustered Wilcoxon rank sum tests for the dependent variables are also given in Table 3. There were significant differences between treatment and control group for several dependent variables. According to Cohens' guidelines for r (Fritz, Morris & Richler, 2012), the effect sizes related to these significant differences are considered as between small (r = .1) and medium (r = .3).

SfA students provided significantly more propositions with extended elaborations, compared to the control group (p < .05 with False Discovery Rate correction). On average 4.0 propositions with extended elaborations were made in SfA groups compared to on average 2.0 propositions with extended elaborations in

Table 3

Results of clustered Wilcoxon rank sum tests for dependent variables (N = 160)

Dependent variables		Total *M(SD)*	SfA group *M(SD)*	Control group *M(SD)*	Z-values	p-values[1]	Cohen's *r*
1. Propositions	Without elaboration	.102(.09)	.088(.09)	.124(.11)	-1.23	.25	-.10
	With restricted elaboration	.213(.16)	.218(.17)	.204(.15)	.24	.61	.02
	With extended elaboration	.028(.06)	.040(.07)	.010(.02)	2.89	.03*	.23
2. Questions	Closed question	.003(.01)	.001(.01)	.005(.02)	-2.26	.04*	-.18
	Open restricted question	.034(.05)	.026(.04)	.045(.07)	-.15	.93	-.01
	Open elaboration question	.025(.05)	.035(.06)	.010(.02)	2.52	.03*	.20
	Group process question	.089(.10)	.096(.10)	.077(.10)	1.24	.61	.10
3. Group process propositions	Without elaboration	.119(.10)	.119(.10)	.118(.12)	.10	.62	.01
	With restricted elaboration	.120(.11)	.142(.12)	.087(.09)	1.98	.08	.16
	With extended elaboration	.011(.03)	.015(.03)	.004(.02)	2.53	.03*	.20
	Blocking group process	.021(.05)	.017(.04)	.026(.06)	-.17	.62	-.01
4.Concluding/ summarizing	Without elaboration	.015(.035)	.013(.03)	.018(.04)	-.96	.34	-.08
	With restricted elaboration	.004(.014)	.003(.01)	.006(.02)	-.64	.78	-.05
	With extended elaboration	.000(.00)	.000(.00)	.000(.00)	--	--	--
5. Procedural propositions	Talking about how to write (or draw) things down.	.118(.13)	.107(.10)	.134(.16)	-.09	.62	-.01
6. Off task	Talking about something not related to the task.	.091(.12)	.068(.10)	.126(.15)	-1.83	.08	-.14
7. Asking test leader	Questions towards the test leader.	.004(.02)	.003(.01)	.007(.04)	-.14	.62	-.14

[1]One-sided and adjusted using the FDR method

** p < .05*

the control groups. Furthermore, SfA students ask each other significantly more open elaboration questions (SfA: *M* = 4.13 per group; control: *M* =1.88 per group). Thus it should be noted that these high-level utterances do not occur very often during the task. On average, students gave less than one proposition with extended elaboration and less than one open elaboration question per task. In propositions with extended elaborations, students give reasons for their opinions. One example of giving reasons for an opinion in the group talk is the following: Child 1: *"They should bring the dog to their neighbors, because then they can play, because the dog is not there."* Child 2: *"But what if the neighbors are not at home?"*. Child 3*: "Then they could bring the dog to the other neighbors, that's why you have two neighbors"*. Both child 1 and child 3 give an argument for their stated proposition. Child 2 responds with an open elaboration question that elicits reasons for opinions. This example illustrates students' high-level talk, in which students offer arguments, which may be valid or not, and group members question, challenge and reflect on each other's ideas.

In the SfA group there was also more talk about the group process using extended elabo-

rations, compared to the control group. Thus, the SfA students explained their ideas about the group process significantly more than the control group. Group process propositions with extended elaborations were about how to start or continue the group process using arguments for opinions. Examples of group process propositions with extended elaborations are *"You can start, because you did not start to nag"* and *"First you say what you think is the best solution, then you and then you, because then we can discuss"*. SfA students sometimes referred explicitly to what they had learned in the SfA lessons, for instance referring to the cooperative learning structure *Heads together* or to the numbers all students have for *Numbered Heads*: *"Now heads together, like the teacher always says, to think about the best solution", "What numbers are you? […] Okay then you can start because you have the lowest number"*. Other group process propositions with extended elaborations were often statements why they should choose a solution, not based on substantive ground but on group process reasons. For instance, *"We should choose the solution of [child 1], because she had the most votes"* or *"I think we should choose the funniest solution, my solution is the funniest, so we choose mine"*.

Students of the control group asked each other more closed questions compared to the SfA group. Closed questions are questions that ask for a yes or a no, not directly eliciting arguments for opinions. However, only 13 of in total 5,752 verbal utterances were closed questions and six of these utterances came from one student. Hence, we cannot attribute this result to a genuine difference between the SfA and control group.

4 Conclusion and discussion

This study investigated whether students who experienced cooperative learning for a whole school year in the context of the SfA program showed enhanced high-level talk during a group task. A quasi-experimental design was used. At the end of the school year, grade-1 students (6- and 7-year-olds) executed a group task in groups of four children. A coding scheme was used to determine the type and level of talk students used during the task. SfA students showed more high-level talk compared to the control group. This indicates that students' talk may improve when cooperative learning as implemented in SfA lessons is established within classrooms, which is in line with the stated hypotheses.

During the group task the SfA students expressed significantly more propositions with extended elaborations and open elaboration questions, compared to the control group. Although it should be noted that utterances that are of a high-level do not occur very often, in SfA groups more reasons were provided for opinions, and group members asked each other more questions to explain their ideas and to challenge and reflect upon each other's ideas. Within the SfA lessons students interact with each other in teams, hence, they are used to work and learn together in interaction with peers. We suggest that SfA students know better what is expected from them when they have to work together with their peers on a task. Moreover, they are explicitly taught rules for effective group work. This may explain our finding that SfA students talk more about their group process. In some cases, SfA students explicitly referred in the group work to cooperative learning tools they had learned in SfA lessons, for instance specific cooperative learning structures such as *Heads Together* and *Numbered Heads* (see for more information Slavin, Madden, Chambers, & Haxby, 2009). The explicit rules for effective cooperative learning used in the SfA lessons also include that students have to explain ideas and ask each other questions. This may have contributed to the result that SfA students show more propositions with extended elaborations and ask each other more open elaboration questions during the group task. Asking each other questions is expected to elicit more extended elaborations, so these findings may be related. The findings of this study suggest that the SfA lessons, by means of cooperative learning, can contribute to the dialogical skills of students. Similar findings, that children who work in cooperative groups provide more elaborated responses, have been reported by others (e.g., Gillies

2004; Webb & Farivar, 1999), and it is often suggested that these kind of verbal behaviors are important mediators for learning (Howe et al., 2007; Webb, 1992; Veenman, Denessen, van den Akker, & van der Rijt, 2005). Hence, if cooperative learning is implemented effectively within classrooms, it may be expected that a higher level of student's talk within group work leads also to better other student outcomes, such as better reading comprehension.

Although there is evidence that young children are capable of participating in group work activities (Kutnick & Berdondini, 2009; Kutnick, Ota & Berdondini, 2008), it is often suggested that young children are not able to work and learn together. In this study, the age of the students was not related to the level of dialogue; but age differences were small. Moreover, examined at a level that is appropriate for children of this young age, this study shows that children of approximately 6 and 7 years old are able to explain their propositions and give reasons for their arguments. Summarizing and concluding with an extended elaboration appeared to be too demanding for students of this young age in this group task, as none of the students showed these verbal behaviors. Further, group process propositions with extended elaborations also appeared to be challenging. However, as the SfA group showed more extended group process propositions, it is suggested that these verbal behaviors in group processes can be improved. Therefore, we recommend to implement cooperative learning in educational practice for young-aged students in elementary schools.

4.1 Limitations and contributions to other studies

Some limitations to this study are the following. First, the dependent variables were defined as the proportion of utterances of a specific category compared to the total number of utterances per student. We followed the approach that we thought best; but we cannot exclude the possibility that absolute frequencies would have been a better measure. To avoid chance capitalization we elaborated only one possibility. We found there was no significant difference in duration of the task between the SfA and the control group, which suggests that there is no issue of bias here. Nevertheless, the influence of the duration of the task and of the number of utterances should be explored more in-depth in further research. Second, in this study the group task took place in a controlled setting outside the classroom. Although this has the advantage that distractions are diminished, further research is needed to investigate whether high-level talk also occurs during SfA lessons. Other studies (Mercer, 2000; Webb & Mastergeorge, 2003) that focused on the quality of children's talk suggested that, although high-level interaction within cooperative learning groups is a necessity for promoting other student learning outcomes, these interactions are rarely found in the classroom. This study, however, showed that students of this age are capable of showing high-level talk. Third, surprisingly the pretest of oral language skills did not correlate with the dependent variables. Another test, for instance an IQ test, might have served as a better pretest than the test used in the present study. However, there were no significant differences between the SfA and the control group with respect to the oral language test, supporting the comparability of these groups in this quasi-experimental design. Furthermore, although the inter-rater reliability of the instrument was high, the observation-instrument was developed especially for this study. To validate the observation instrument, it can be studied in further research whether a different method, for instance a more detailed qualitative discourse analysis, will lead to similar outcomes.

In the present study, students' talk was examined at the student level. However, in future research also the level of the group should be taken into account. In group work it is not only important how the student performs, but also how the group as a whole performs. Processes that occur on the level of the group may have influenced the level of students' talk. Even though the method of analysis took into account that students were clustered in groups, group process aspects were not measured in the current study. Fur-

thermore, the level of interest here was the talk of young students during group work, and differences between the group solutions of the SfA group and the control group were not studied. It would be relevant in future research to study how the level of talk is related to the quality of the solutions. We expect that more high-level talk expressions of students will lead to more thoughtful solutions, as more high-level talk means a greater chance on collaborative discussion between students. For instance, more open questions of students will ask for more explicit elaborations of the proposed solutions, which may lead to a more focused discussion about why one solution is better than the other.

This study is the first attempt to explore students' peer interactions after one year of implementation of the SfA program in the Netherlands. The effect size of the program's effect on the high-level talk of students is considered between small and medium. It is expected that better implementation as well as a longer implementation of the SfA program may lead to larger effects. Multi-year studies of the Success for All program have found better outcomes with each successive year of program implementation (Chamberlain, Daniels, Madden, & Slavin, 2007). Thus, it is expected that the Dutch SfA program and the implementation of the program will improve after more years. In this study, the SfA program as a whole was compared to control schools. Therefore, the exact reasons why the program worked well for enhancing high-level talk during group work of students are not clear. It may be that not only cooperative learning, but also other factors related to the SfA program may have influenced the results. However, by using cooperative learning in the context of reading and language, SfA targets on improving student's dialogue and language skills. Within SfA lessons students are explicitly taught to use high-level talk and have many opportunities to practice their dialogical skills in interactions with their peers by means of cooperative learning. Because of this, we think it is plausible that using cooperative learning as implemented in the SfA lessons has led to the higher level of talk of students.

This study contributes to other studies by examining talk of young school-aged children after a whole school year of implementation of a cooperative learning program. Most other studies that focused on communication skills of students during group work focused on older students and took little consideration of the capabilities of younger children (see also Kutnick, Ota & Berdondini, 2008). Moreover, although there are a few studies that investigated long-term interventions (e.g., Krol et al. 2004), these studies were mostly based on short-term cooperative learning programs (e.g., Gillies, 2002; Webb & Farivar, 1999) as opposed to a whole school year using cooperative learning as in the SfA program. Although the accomplishment and sustainability of implementation of cooperative learning in daily practice requires persistence, especially on the part of the teachers, this study has the practical implication that it seems worth the effort to implement cooperative learning in the early grades of primary school.

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Authors

Marij Veldman is a PhD-student at the department of Educational Sciences, University of Groningen. **Simone Doolaard** is a senior teacher/researcher at the department of Educational Sciences, University of Groningen. **Tom Snijders** is a professor of Methodology and Statistics at the department of Sociology, University of Groningen. **Roel Bosker** is a professor of Educational Sciences at the department of Educational Sciences, University of Groningen.

Correspondence: M.A. Veldman, Department of Educational Sciences, Faculty of Behavioural and Social sciences, University of Groningen, Grote Rozenstraat 3, 9712 TG Groningen; E-mail: m.a.veldman@rug.nl

Samenvatting

Het vergroten van de mondelinge taalvaardigheid van jonge leerlingen door samenwerkend leren in Success for All-lessen

In deze studie is onderzocht of leerlingen die een jaar lang Success for All-lessen hebben gevolgd een hoger niveau van mondelinge taalvaardigheid tijdens groepswerk laten zien dan leerlingen in een controleconditie. Success for All (SfA) is een schoolverbeteringsprogramma met als hoofddoel het vergroten van de taal/leesvaardigheid van alle leerlingen. Samenwerkend leren is een belangrijk component van het programma, naast verschillende andere componenten zoals ouderbetrokkenheid en tutoring. Aan het eind van het schooljaar, werkten groep 3-leerlingen (6 á 7 jaar oud) samen aan een groepstaak, d.w.z. het bespreken van een sociaal dilemma, in groepjes van vier leerlingen. In totaal participeerden 160 leerlingen in deze studie: 96 leerlingen in de SfA-conditie en 64 leerlingen in de controleconditie. Met behulp van een codeerschema zijn alle uitingen van de leerlingen gecodeerd. Wilcoxon rank sum testen laten bij de SfA-leerlingen een hoger niveau van mondelinge taalvaardigheid zien. In vergelijking tot de leerlingen in de controleconditie uiten de SfA-leerlingen meer uitgebreide elaboraties van proposities en stellen ze meer open elaboratievragen. De resultaten deze studie wijzen erop dat samenwerkend leren in SfA-lessen bijdraagt aan de mondelinge taalvaardigheid van jonge basisschoolleerlingen.

Kernwoorden: samenwerkend leren; mondelinge taalvaardigheid; Success for All; basisonderwijs