

COOPERATIVE LEARNING AND SOCIAL SKILLS DEVELOPMENT

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ABSTRACT

In this chapter, we propose to review a series of cooperative learning studies that allow to pinpoint that social skills development is crucial for group work to be efficient in terms of cognitive/academic outcomes and that teachers can further this social skills development with a reasonable investment. We start with some highlights of a research programme showing how easily students can switch to competition even with cooperative instructions. We document this phenomenon at both university and at primary school levels. We then use this set of results to underline the importance of preparing students to cooperate when they have to work together. Finally, we summarise and document the benefits of two short simple interventions, one at university and the other at middle school, developed to address some potential resistance of teachers to invest in the development of social skills. The implications for teachers' ability to accompany cooperative group work are discussed.

Keywords: Social comparison; Threat; Preparation for cooperation;

Social skills development; Statistics learning; Cooperative controversy.

INTRODUCTION

Cooperative learning represents situations in which teachers structure group work with the aim to maximise both social and cognitive outcomes. Recommendations for structuring group work are based on clear theoretical foundations (Johnson & Johnson, 1989, 2005; Slavin, 2011) and an impressive amount of validating research that informs theory as well as practice (see, for example, Hattie, 2008; Johnson & Johnson, 2009a; Roseth, Johnson, & Johnson, 2008; Slavin, 1995, for a presentation of cooperative learning benefits for psychological, social, motivational and cognitive outcomes). Research has documented positive learning outcomes for learners who benefit from cooperative learning when compared with individualistic or competitive

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settings, from elementary school (e.g., Gillies, 2003) to university (e.g., Johnson & Johnson, 2002). Additionally, research has also shown that cooperative learning is not always effective. In this chapter, we propose to review a series of studies conducted within the cooperative learning framework that have examined the effectiveness of cooperative learning, and pointed out that (1) social skills development is a particularly important variable that enhances the efficacy of group work in terms of cognitive/academic outcomes and (2) it is possible to devise ways to allow teachers to implement this social skills development with a reasonable investment.

COOPERATIVE LEARNING AS A WAY TO STRUCTURE GROUP WORK

Different cooperative learning methods are frequently mentioned in the literature (see Abrami et al., 1995; Sharan, 1999). Following Davidson (1994), it is possible to identify some common elements of structuring group work across the different methods. Cooperative learning requires students to work in small teams, usually from two to five learners, in order to make possible *individualized face-to-face interactions* between members. The team is supposed to engage in a *real group task* (Cohen, 1994), which requires contribution from all members rather than a single individual. Thus, cooperative learning requires teachers to introduce and structure both *positive interdependence* and *individual responsibility/accountability* (Johnson & Johnson, 2005; Sharan, 2010; Slavin, 1990). Positive goal interdependence is crucial, as it allows learners to clearly perceive that their goal is positively linked to the goal of their partners. Learners must identify a common goal and become aware of their complementarity in achieving their goal, that is, they must realise that they can reach their goal if the other team members also reach it. Positive interdependence requires that teachers give a clear task to the team and structure positive goal interdependence. In addition, other dimensions of interdependence like reward, resource, role or task interdependence can reinforce interdependence (Johnson, Johnson, & Holubec, 1993). Teachers should also introduce individual responsibility to make sure that the contribution of all members in a team is possible, necessary and that individual leaning is visible. Moreover, it seems to us that it is particularly important to frame the team goal in terms of mutual responsibility for individual learning of each member and not merely in terms of a group product. The common goal of the team must be to ensure that every member understands, masters, and integrates the materials on which the team is working.

The general hypothesis in the cooperative learning tradition is that the way the group work is structured influences interactions among members and

interactions inside the team determine members' learning (Gillies, 2007; Johnson & Johnson, 1989; Slavin, 2011; Webb & Palincsar, 1996). Therefore, positive interdependence and individual responsibility are supposed to elicit social/academic supports, encouragement of learners, and *constructive interactions*, like exchange of information and co-construction of knowledge. More precisely, some research has identified particular constructive interactions, such as summarising information (Spurlin, Dansereau, Larson, & Brooks, 1984), questioning (King, 1999) or giving explanations (Webb, 1985, 1991), which are relevant for the quality of learning and can easily be elicited thanks to cooperative scripts (proposing specific cognitive activities, O'Donnell, 1999; O'Donnell & Dansereau, 1995).

Regarding confrontation and argumentation, their relation with learning depends on the way in which conflicts are elaborated, as illustrated by research on socio-cognitive conflict and social influence (Buchs, Butera, Mugny, & Darnon, 2004; Doise & Mugny, 1984; Quiamzade & Mugny, 2001) and on controversy (Johnson & Johnson, 2007; Johnson & Johnson, 2009b). To understand the results presented hereafter, it is important to keep in mind that in this literature, learning proceeds from conflict between partners, to the extent that the conflict between partners is regulated to allow them to construe conflict as a chance to develop new knowledge and not as a struggle for competence.

Three main forms of conflict regulation have been identified. Epistemic conflict regulation focuses on the resolution of the divergence regarding the task (knowledge and understanding of points of view) and favours cognitive progress through deep processing and integration of information (Darnon, Muller, Schragger, Pannuzzo, & Butera, 2006), like in cooperative controversy (see Johnson & Johnson, 2009b). The two other regulations focus on social comparison regarding competence (relational regulation; Sommet et al., 2014). When learners recognise they are less competent, they are likely to solve confrontation through compliance, taking the partners' point of view uncritically. Because of this protective relational regulation, learners may not achieve cognitive benefits because they do not fully process information. When learners are motivated to defend their own competence, they are likely to compete, trying to demonstrate that they are right and others are wrong (Sommet, Darnon, & Butera, in press). Competitive conflict regulation forces individuals to focus on closed-minded adherence to their own point of view and rejection of partner's propositions, which can be detrimental for cognitive progress (like in debate, see Johnson & Johnson, 2009b).

Cooperative learning is supposed to produce an environment in which epistemic conflict regulation should take place, with confrontation leading to a better understanding of the problem, deep processing of information, reconceptualisation and integration. However, in the next section, we will document how easily learners interpret the competence of partners as a threat

to their own competence, notwithstanding a cooperative learning setting. To this effect, we highlight some results from a research programme that documents how easily students can switch to a competitive mode of relationship even when asked to follow cooperative instructions, and therefore regulate conflict in a relational competitive way.

THREATENING SOCIAL COMPARISON IN COOPERATIVE LEARNING

The early work we developed was designed to introduce interactive formats for psychology students working on texts during their workshops in order to boost students' involvement and learning. We devised protocols designed to meet the requirements for effective cooperation. Indeed, we introduced positive goal interdependence in all conditions by stressing that students had to care for both their own learning and their partners' learning. The goal of the team was to reach mastery of both students who received a feedback regarding their level of mastery. Moreover, students were working on materials highly relevant to their curriculum. The content of the texts studied during the experiment was a part of the general area to be reviewed for the final exam. Thus, the feedback they received after each session gave them an opportunity to assess their level of mastery. In order to enhance individual responsibility, we proposed that students work in dyads on two texts at each session. We introduced two roles, summarisers (encouraging explanations), and listeners (encouraging questioning), to facilitate partner's participation, in line with scripted cooperation (O'Donnell, 1999). Students alternated in these roles during the task (to enhance motivation, Spurlin et al., 1984).

With this general paradigm, we decided to investigate the effects of resource interdependence, that is, the way information is distributed in dyads. Some students worked with positive resource interdependence, that is, on complementary information (each student read only one text), whereas other students worked without resource interdependence, that is, on identical information (each student read the two texts). In these two situations, each student was responsible for summarising one text while the partner facilitated the explanation, and their roles were reversed for the second text. The aim of the first set of studies was to compare these two settings as well as test the two alternative hypotheses.

Indeed, on the one hand, some studies have suggested that working on complementary information can stimulate student involvement in terms of asking questions or requiring clarification and giving explanation (Lambiotte et al., 1987) due to reciprocal interdependence. Indeed, knowing that the other is dependent on oneself for accessing some information and that oneself is also dependent on the partner to access some other information would direct students to be more involved in information exchange. Moreover, the

representation of complementary knowledge may emphasize the relevance of the relationship with the partner and elicit cooperation as an appropriate way to interact and work (Butera, Huguët, Mugny, & Pérez, 1994; Gruber, 2000).

On the other hand, working on identical information could also favour confrontation and comparison of points of view. Indeed, as both partners can access the same information, they can understand it in different ways and confront their positions. This, in turn, may allow members to compare and judge each other's competence. Lambiotte et al. (1987) suggested that this situation might emphasize evaluative pressure between peers, as compared to working with complementary information. We argue that because students are socialised in a competitive society (Kasser, Cohn, Kanner, & Ryan, 2007) and educational system (Harackiewicz, Barron, & Elliot, 1998), they can easily switch to a competitive comparison of competences even within a cooperative situation. Thus, even in a cooperative learning setting, distributing identical information may have the potential to produce competitive conflict regulations.

THREATENING SOCIAL COMPARISON AT UNIVERSITY DURING COOPERATIVE LEARNING

In our two first studies on this matter (Buchs, Butera, & Mugny, 2004), second year psychology students were required to work in cooperative dyads during three sessions. The studies took place during regular student workshops. During each session, students worked on two psychological texts with the same partner. The results indicated that compared to identical information, when students worked on complementary information, they demonstrated more positive reactions (Buchs, Butera, & Mugny, 2004, study 1). In particular, students who were summarisers spent more time giving explanations, expressed more ideas, and reported more efforts to explain informations while listeners asked more questions and received more answers. In contrast, when they worked on identical information, students spent more time to confront their points of view and they expressed more negative reactions. Therefore, the climate was more positive and cooperative when students worked on complementary information.

Thus, in a second study, we asked specific questions regarding both perceived confrontations and social comparison (frequency of checking that the partner was correct, evaluating partner's competence, trying to appear more competent than partner, wondering how to appear competent compared to the partner) (see Buchs, Butera, & Mugny, 2004, study 2). The results indicated that students reported more confrontations, as well as more social comparison, when working on identical information than when working on complementary information. Thus, working on identical information elicits competitive relational confrontations between students. Reading the same text

permitted students to compare and question their and their partner's competences despite the cooperative instructions.

Regarding learning, our results underlined two different mechanisms in the two conditions. The quality of partner's informational input appeared to be a moderator of learning when students worked on complementary information¹ while competitive relational confrontations appear to be responsible for students' poor learning when they work on identical information. To document how easily the competition can alter the effects of cooperative learning, we concentrate on that last point. Our results, in line with those of Lambiotte et al. (1987), indicated that students performed poorer when they worked on identical information obtained from the texts that are not too difficult. Interestingly, our results indicated that competitive relation confrontations mediated the effect of the distribution of information. These competitive confrontations are responsible for the negative effect of working on identical information (Buchs, Butera, & Mugny, 2004; see also Buchs, Pulfrey, Gabarrot, & Butera, 2010).

Thus, working with identical information appeared to altered the representation of the interaction that should be typical of cooperative learning. In order to test this idea, we looked at the relationship between the perception of the partners' competence and students' learning. Logically, cooperative learning produces an environment in which the competences of group members should be viewed as a source of informational support. Partner's competence was therefore supposed to be welcomed and likely to favour learning. However, our results suggested that it was the case only when students worked on complementary information. The interaction between perceived partner's competence and the distribution of information suggested that the perception of partner's competence was threatening and detrimental for student learning when students worked on identical information: the higher the partner's competence, the worse they performed. On the contrary, when working on complementary information, the higher the partner's competence, the better they performed. This relation was found both for the perceived competence assessed by the questionnaire (Buchs, Butera, & Mugny, 2004) and for actual partner's competence (manipulated through the use of a confederate, Buchs & Butera, 2009). We interpret this negative effect of the partner's competence on learning under identical information in terms of the

¹ The positive interactions that take place when students worked on complementary information lead to positive learning only when the partner provided a good informational input. Because of informational dependence, students had to rely on their partners' informational input. Our results underlined that factors that influence the quality of the summary of the partner, i.e., the difficulty of the text (Buchs, Butera, & Mugny, 2004), the possibility to take notes and to rely on notes and text during the discussion (Buchs, Pulfrey, Gabarrot, & Butera, 2010), the competence of the partner (Buchs & Butera, 2009), moderated the learning of students working on complementary information.

threatening effect of focusing on social comparison of competence, a threat that arises as soon as comparison is possible, the general cooperative framework notwithstanding.

THREATENING SOCIAL COMPARISON IN ELEMENTARY SCHOOL DURING COOPERATIVE LEARNING

Our research suggested that this threatening social comparison might also appear in elementary schools (Buchs, Chanal, & Butera, 2014). A pilot experiment supported to some extent that working on identical information may force students to focus on social comparison. Pupils working on identical information admitted that they tried to be better than their partner, felt more frustrated because their partner explained well, reported that they wondered how to appear good, wanted to compare themselves with their partner, and were afraid to be less strong compared to their partner. The means are in the predicted direction, but not all results reach significance. Nevertheless, in two subsequent studies, we replicated the interaction patterns found in Buchs, Butera, and Mugny (2004) with university students regarding the relation between the partner's competence (assessed by the number of correct informational inputs proposed by summarisers) and pupil learning. In both studies, partner's competence was positively related to students' performance when students worked on complementary information, but when working on identical information, this relation was negative. Thus, even if elementary school pupils did not report much social comparison during cooperative learning, our results suggested that they may experiment it to some extent, which makes partner's competence problematic when the situation provides the opportunities to make comparisons (i.e., when working on identical information).

In sum, this research programme has shown that a threatening social comparison of competences may occur even in a well-defined cooperative learning setting. We believe that these interferences happen because pupils and students are socialised in highly competitive and individualistic societies (cf., Schwartz, 2007). Thus, cooperative learning represents a powerful tool based on values of tolerance and benevolence, but a tool that has to operate in a society that is based increasingly on values of achievement, power, and competition, at least when concerning Western industrialised countries. In that society, learners are neither socialised to engage in cooperative learning nor used to it; thus, students are not likely to cooperate spontaneously or efficiently. As pointed out by Slavin et al. (1985), a way to overcome those difficulties is to learn to cooperate in order to cooperate to learn.

OUR PERSPECTIVE: PREPARING STUDENTS FOR COOPERATION

We recognised that cooperative learning might be at odds with the more general competitive and individualist culture in which pupils and student are embedded, which might be necessary to teach them how to cooperate; thus, we set out to analyse the factors that may counter such a competitive culture.

FAVOURING A CLIMATE ORIENTED TOWARD MASTERY RATHER THAN PERFORMANCE

Some research has shown that in order to reduce focus on social comparison, it could be useful to favour student's mastery goals (striving to learn and improve competence) instead of performance goals (striving to achieve as compared with others and demonstrating competence) (Darnon, Butera, & Harackiewicz, 2007). Indeed, the type of relationship with the teacher and class structure (Stipek & Mac Iver, 1989) has been found to orient students toward differential achievement goals (Urduan & Turner, 2005). Following Meece, Anderman, and Anderman (2006), teachers stressing the understanding and effort rather than good answers has been found to be conducive to an increase in mastery goals. More specifically, research on motivational climate summarises the essential elements in the acronym TARGET, namely Task, Authority, Recognition, Grouping, Evaluation and Time (Ames, 1992; Maehr & Midgley, 1991). Indeed, mastery orientation is enhanced when the teacher structures the task to reduce social comparison, delegates a part of authority by involving learners in some decisions, promotes recognition of all students, values their efforts, groups students to support help, regulates errors and manages time while limiting stress.

Research indicates that achievement goals frame the meaning of social relationships (Poortvliet & Darnon, 2010). When students endorse mastery goals, they may perceive other students as relevant sources of information, offering means for progressing and improving their competence. They are likely to perceive a strong positive interdependence with others. Thus, mastery goals can foster student involvement in exchange of information and cooperation. In contrast, students focused on performance goals may perceive other students as potential competitor. As they need to outperform others to affirm their own competence, they are likely to perceive negative interdependence and reduce their willingness to cooperate. This may decrease the benefit of social interactions for learning outcomes.

Moreover, the relation between students' mastery goals and help seeking is positive whereas the relation with performance goals is null or negative (see Poortvliet & Darnon, 2014). Indeed, it has been shown that the perception of the classroom climate (Karabenick, 2004), as well as instructions focusing pupils on different goals (Butler & Neuman, 1995), predict learners' attitudes toward help-seeking. Finally, mastery goals are associated with epistemic

regulation of interpersonal disagreement, whereas performance goals are associated with relational regulation (Darnon et al., 2006). Thus, classroom climate may prepare students to cooperate and allow learners to feel secure to learn through cooperation.

SOCIAL SKILLS DEVELOPMENT AS A COOPERATIVE NUDGE

Many researchers have emphasized the importance of preparing students to cooperate (Blatchford, Kutnick, Baines, & Galton, 2003; Johnson & Johnson, 2006; Webb, 2009) to promote constructive interactions. Cooperative skills are indeed important for the quality of the interactive work; nevertheless, as we have argued, not all students may master them, and if they are, it is possible that learners do not see the utility of using them. Therefore, when proposing a learning situation in which peer interactions are the main component, it is important to create a context in which cooperative skills can be developed.

Teaching Cooperative Skills

Within the cooperative learning framework, “learning together” (Johnson, Johnson, & Holubec, 1998, 2008) proposes to teach explicitly cooperative skills. To summarise this perspective, several steps can be proposed to develop cooperative skills in daily classroom work (Bennett, Rolheiser, & Stevahn, 1991; Johnson & Johnson, 2006). First, it is important for students to understand why cooperative skills are important by making them reflect on the importance of cooperative skills based on situations involving good examples and counter examples. Second, teachers have to indicate explicitly how to display cooperative skills. It can be useful to construct a visible cooperative tool in the classroom serving as a reference for learners. This tool suggests ways to improve group functioning and the quality of interactions by giving concrete examples on how to express the targeted skill both in words and in behaviours. Active participation of learners in the creation of such a cooperative tool increases their motivation. Practice and observation follow the introduction of a specific skill. Learners practice the targeted skill while working on a scholarly task structured according to cooperative learning elements.

Observations can be done using a pre-established grid. The teacher or a designed member in each group can fill the grid. Items in the grid can be quantified (e.g., how many times did a learner propose an idea?) or qualified (e.g., how did a learner do to encourage pairs?). The filled grid can serve to reflect on group processing. This reflection will cast the light on the ways in which the skill was expressed and the ways in which its expression can be

improved. Teachers give constructive feedback and positively reinforce learners. The last step concerns the consolidation of the cooperative skill, including reflection, by putting it into practice in different contexts to allow students to become aware of their progression (Clarke, Wideman, & Eadie, 1990) and thus increase their motivation.

Teachers can introduce an explicit work on cooperative skills (Gillies, 2007; Johnson et al., 1998, 2008), which needs to be done systematically. Each cooperative skills should be addressed during different sessions, and once integrated in the students' routine, a new one can be introduced.

Positive Effects of Training on Cooperative Skills

Gillies and her colleagues tested the effect of training general cooperative skills. Teachers from Grades 3, 5 (Gillies & Ashman, 1998), and 8 (Ashman & Gillies, 1997; Gillies & Ashman, 1996) acquainted with cooperative learning introduced a cooperative skills training (two 45-minute sessions) to some students. Students had to demonstrate their interpersonal skills (e.g., active listening, taking into account the other's perspective, expression of ideas, constructive criticism of ideas) and collaborative skills to work in small groups (e.g., take turns, share the tasks equally, resolve differences of opinion and conflicts).

The ways to demonstrate cooperative skills in behaviour and speech were compiled using a cooperative tool. Younger learners were invited to role-play while older students developed their own ways through collective and small group discussions. All learners worked in teams several times a week for a couple of weeks. The results showed that those who had benefited from working in cooperative groups interacted more constructively compared to learners who did not benefit from cooperative groups. Benefits were observed for the increase of quality of cooperation, helping behaviours, quality of explanations and learning as compared with earlier observations (after a few weeks of work) when measuring both students' feelings and external observers' evaluation. These effects were maintained throughout the study and the differences between trained and untrained learners persisted beyond the school year (Gillies, 1999, 2002).

Other strategies focus on interactions that are more specific. For example, King (1994) offered training on guided questioning based on a series of general questions to promote reading comprehension. Two sets of questions were proposed—comprehension questions (Describe in your own words: “Why is it important?”), and integration or connection questions (Explain why: “Explain how ...; What similitudes between ... and ...?; What would happen if ...?; Find another example of ...; What are the strengths and weaknesses of?”). Learners played two roles—asking questions and giving elaborated explanations (partners must go beyond the factual content by

making connections, giving explanations based on inferences and justifications). This format of discourse promotes the emergence of divergent points of view between learners. Using this kind of questions allows checking their understanding of the materials and favours active process of information and co-construction of knowledge. King (1997) later added interpersonal and communication skills and introduced other types of questions with increasing complexity in the program ASK to THINK - TEL WHY©®. The introduction of these strategies appeared to be beneficial for deep understanding of the content among students from Grades 4 to 7.

Learners can also be trained in giving and receiving elaborated help. During a study (Webb & Farivar, 1994), cooperative instructions with communication skills were given to all learners for five weeks. Introducing additional training to develop cooperative skills related to elaborated help (focus on strategies and explanations of how to solve the math problems rather than answers) proved to have a positive effect on learning mathematics (Fuchs et al., 1997). This type of training has also shown beneficial effects for reading comprehension (Fuchs, Fuchs, Kazdan, & Allen, 1999).

In sum, all these results emphasise that training relatively general cooperative skills (interpersonal and collaborative skills, questioning, or elaborated help) can have a positive effect on interactions and learning.

RESULTS

Toward Short Interventions for Preparing Students to Cooperation

As the “Learning together” method suggests, the groups’ scholarly task should be designed first, followed by designing the appropriate cooperative skill(s). By proceeding this way, the chosen skills are likely to be relevant for teamwork and helpful for learning (Abrami et al., 1995). Thus, in order to boost cooperative benefits for learning outcomes, we argue that an effective preparation for cooperative learning should explain why and how to cooperate to accomplish the specific academic task. We conducted two studies to demonstrate that even a single-session short training on targeted cooperative rules and skills relevant for the task may favour constructive interactions and improve learning.

Preparing Students for Cooperation at Middle School

In a study conducted in middle school (Golub & Buchs, 2014), pupils from Grade 6 (11.8 year) were involved in dyadic cooperative controversy on argumentative texts during one session (135 minutes). Controversy refers to a situation in which ideas or opinions of one person are incompatible with those of another person, and both try to reach an agreement. The cooperative controversy is based on a strong positive interdependence regarding goals,

roles and resources. It is generally structured in five steps. Pupils have to prepare a persuasive case for a given position, present this position in a compelling and interesting way, argue persuasively while refuting the opposing position and rebutting criticisms of their position, take the opposing perspective, and derive a synthesis integrating all the positions (Johnson & Johnson, 2007).

In order to positively design these stages, we adapted three targeted rules from the original controversy: (1) Listening to the partner's ideas and trying to understand all ideas even if one doesn't agree; (2) criticising ideas but not people; and (3) finding the best solution together rather than proving one's right. These rules were reinforced by a general cooperative skill, namely the demonstration of social support. More specifically, we observed pupils in two different dyadic controversy conditions: control controversy and experimental controversy. In both conditions, we explained the five steps to the pupils and introduced the cooperative skill and the targeted cooperative rules. Pupils were informed that the goal was to engage in a discussion within a dyad so that both pupils master the whole information; they would have to present a common position at the end of the assignment and individually answer questions on both positions afterwards (positive goal interdependence and individual responsibility). In each dyad, one pupil had to defend arguments for having dogs as pets while the other had to defend arguments against having dogs as pets (random assignment).

In the control controversy, pupils worked in cooperative controversy with simple instructions, i.e., with a mere introduction of the three cooperative rules and social support skill. In the experimental condition, the pupils benefited from the same instructions, complemented by a preparation for cooperation. We added two components designed to prepare pupils to cooperate: (a) communicating positive norms for cooperative work by underlying the value and benefits of cooperation for learning (valorisation of cooperation for learning, i.e., why to cooperate); and (b) preparing pupils to cooperate by proposing a specific short training (how to cooperate). Indeed, a specific training on the targeted cooperative skill "showing support" (10-min) was introduced before presenting the steps of the controversy. First, they had to individually write what "showing support" means to them. Inside the dyads, they had to share the list of ideas and to consensually choose one idea from these put forward by each partner and present it to the whole group. Then, collective discussions on the three targeted cooperative rules (10-min) were proposed: Some examples and counter-examples were introduced and pupils added other suggestions in their own words. These suggestions were noted on the blackboard and the experimenter reminded pupils of the importance of these through the activity.

Experimental controversy corresponds to our focal intervention. Two judges coded the number of elements of criticism and the number of questions

and used a five-point scale to evaluate social support, attention toward their partner and the overall quality of cooperation inside dyads. Individual understanding regarding the content of texts was assessed at the end of the procedure.

The results indicated that our learning outcome test was easy for pupils ($M = 3.75$, $SD = 0.51$, on a four-point scale, range from 2 to 4). Pupils who benefited from preparation for cooperation scored higher compared to pupils in the control condition but the difference between the two conditions was not significant. Regarding student interactions, the low number of elements of criticism against their partner and high number of behaviours showing active listening were similar in both conditions. These observations may be interpreted in terms of a general cooperative framework prompted by scripted cooperation. Indeed, pupils are more likely to listen to their partner when personal criticism is low in both conditions and the structure of controversy reinforces personal responsibility, positive goals, resources and role interdependence. However, other results revealed the added value of preparing pupils for cooperation. Specifically, interactions were evaluated as more constructive in the experimental controversy. Indeed, pupils who had benefited from this specific work on social support and targeted cooperative rules demonstrated more social support and more attention toward their partner, and they asked more questions. Overall, the preparation for cooperation enhanced the general quality of cooperation inside dyads.

Preparing Students for Cooperation at University

We argue that cooperative learning may face several obstacles at university. First, the general organisation of courses in higher education (usually one meeting per week for 90 minutes during four months with a heavy curriculum) does not favour group work. Moreover, the development of social skills is often perceived as secondary and not particularly relevant to higher education teachers (Gillies, 2008), and educational goals at university essentially focus on the learning of academic knowledge. In addition to the general competitive environment (Kasser et al., 2007), students at university perceive university as a competitive educational system, one where performance goals and striving to outperform others may lead to success (Darnon, Dompnier, Delmas, Pulfrey, & Butera, 2009). The results presented above (Buchs, Butera, & Mugny, 2004) emphasise that competitive social comparisons with partners may take place even during cooperative learning. As university students are likely to focus on performance goals, and they are neither socialised for cooperative learning nor used to it, we argue that preparation for cooperative learning must overcome these challenges by explaining why and how to cooperate in the specific academic task (Buchs, Gilles, & Butera, 2014).

The objectives of this intervention at university were twofold: (a) documenting the additional value of a short intervention focused on preparing students to cooperate and (b) demonstrating that just a few minutes of intervention are enough to enhance the feeling of competence of psychology students in statistics and to increase their statistics learning.

Psychology students participated in the study for 90 minutes (one single session). We compared three conditions during a statistics workshop involving an exercise phase and a subsequent individual learning post-test. In both conditions, we emphasized student learning and understanding. The objectives of the training were to master the content of the workshop. We compared three conditions that manipulated the exercise phase, individual work, cooperative dyadic instructions (structuring three basic components of cooperative learning: positive goal interdependence, individual responsibility and constructive interactions), and cooperative dyadic interactions (the three basic components with an additional cooperative nudge, explaining why and how to cooperate in this task), to test whether a progressive gradual increase in benefits occurs as the cooperative structure is reinforced. We predicted a linear progression from individual training to cooperative dyadic interactions, suggesting that cooperative dyadic instructions would stand in the middle both for individual learning post-test and for student's feeling of competence concerning the training exercises. As this feeling is particularly important for psychology students learning statistics, it could mediate the effect of training conditions on individual learning.

The results² indicated a linear trend in the individual learning measured at post-test from individual training to cooperative interactions, with cooperative instructions in the middle. Similarly, the feelings of competence progressed linearly from individual training to cooperative interactions, cooperative instructions standing in middle. Finally, we found that feelings of competence mediated the effect of training on learning. When students' feeling of competence was entered in the regression, the linear progression was reduced. It became non-significant while students' feeling of competence remained significant. Moreover, when comparing the two dyadic conditions, it appeared that the specific work on why and how to cooperate enhanced perceived cooperation inside dyads and reduced reported social comparison. Thus, our intervention likely addressed some challenges of implementing cooperative learning in the overall competitive atmosphere at university.

This intervention underlined the additional value of preparing students to cooperate to increase their learning and competence, which remains a

² We computed two orthogonal contrasts for testing our hypotheses. The first contrast L1 represented the linear progression (-1 for individual, 0 for cooperative instructions, and +1 for cooperative interactions) and should be significant; whereas the second contrast D2 represented the deviation from linear (respectively +1, -2, +1) and is supposed to be non-significant.

recurrent question for psychology students learning statistics. An intervention that explained why and how to display cooperative skills appeared to boost cooperative benefits. The feeling of competence was responsible for the progression of students' statistics learning, pointing out the mediational role of students' perception of competence in the effects of cooperative learning on learning outcomes. Thus, this short single-session intervention points out that introducing cooperative learning while preparing students to cooperate is possible at university, and it can be helpful even in difficult contexts.

CONCLUSION

In this chapter, we argue that learners are neither socialised for cooperative learning nor used to it, and we point that threatening social comparison may appear even with cooperative instructions. This may represent a discouraging challenge for teachers who would like to promote cooperative group work; hence, we proposed two directions for overcoming these difficulties. First, it seems important to favour a climate oriented toward mastery rather than performance, as it can foster the willingness to cooperate, to seek help and to regulate conflicts in a constructive way. Second, we invite teachers to prepare their learners for cooperation. Our results underline that a preparation for cooperation, which explains why and how to cooperate in a specific task, enhances the emergence of cooperative gains, especially in terms of students' ability to interact in constructive ways. The good news for teachers willing to implement cooperative learning is that this preparation for cooperation may require a short investment of time and limited resources, so it could take place even when managing a heavy curriculum. We hope that these results increase teachers' willingness to prepare their learners for cooperation when structuring cooperative learning and promote innovative cooperative learning situations that would sustain long-term social and cognitive growth in the classroom.

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