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Students' beliefs and attitudes towards cooperative learning, and their relationship to motivation and approach to learning

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Abstract: This study investigates the beliefs and attitudes about group work of students entering their first year of university and beginning a training program based on cooperative learning activities. Its objective is to determine the extent to which these beliefs and attitudes depend on students' prior experience with group work, their motivation for studying, and their approach to learning. The study is based on the responses of 172 first-year university students to a questionnaire combining closed- and open-ended questions. The study shows that most students had a positive perception of group work, but did not spontaneously mention as benefits knowledge learning or the development of some crosscutting skills put forward by research on cooperative learning. It was found that the degree of reluctance towards group work is related to a low perception of its learning gains and the idea that it faces organisational constraints. The results also offer new insights into the origins of these beliefs and attitudes. The frequency of prior experience of group works is positively correlated with the perceived learning gains and negatively correlated with reluctance to work in groups. When considering motivation and deep approach to learning and their sub-dimensions, reflective approach to learning was found to be the main factor determining the perceived learning gains. These results suggest two avenues for teaching based on cooperative learning: discuss and clarify with students the mechanisms of cooperative learning, and structure the teaching to engage them in discussions to collectively self-regulate their activities.

Keywords: cooperative learning; motivation; approach to learning

Introduction

Cooperative learning leads overall to better learning performance than learning environments based on individual work, especially at the university (Johnson & Johnson 2002; Kyndt et al. 2013). It fosters the development of social relationships (Gillies 2004;

Tolmie et al. 2010) and of high-level cognitive skills such as argumentative skills and critical thinking (Schwarz & Baker 2017). Despite the evidence supporting the effectiveness of cooperative learning, like other active learning, traditional teaching methods such as lecturing are still the dominant mode of instruction in undergraduate courses (Nguyen et al. 2021). Teachers may be reluctant to change their teaching approach because of the time and investment required, but also because they fear students' resistance to active learning (Burke 2011; Tharayil et al. 2018). There are indeed some sources of resistance found among students, such as extra effort needed to actively construct knowledge as compared to learning in teacher-centered instruction (Owens et al. 2020). Some research also shows that students underestimate their learning in active environments compared to their peers in passive environments, when in fact they learn better (Deslauriers et al. 2019). Overall, students' perceptions of active learning are contrasted (Owens et al. 2020). In particular, in the case of collaborative learning, both negative and positive experiences were reported by students (Hammar Chiriac 2014; Lumpkin 2015; Machemer & Crawford 2007; Stover & Holland 2018).

Some authors have suggested that positive or negative perceptions of cooperative learning depend on several factors, including students' prior learning experiences and their self-awareness of how they learn (Stover & Holland 2018). Accordingly, when they enter university, students' attitudes and beliefs about cooperative learning would depend on their experience of cooperative learning in high school, as well as the approach to learning they believe to follow. Some studies have shown that when students have prior experience with group work, they are more engaged in new group works (Gillies 2003) and their learning becomes more effective (Zambrano et al., 2019). Regarding the approach to learning, recent studies point to positive correlations between collaborative learning practice and deep approach to learning (Gozalo et al. 2020; Loes & An 2021).

This suggests that exposure to collaborative learning activities leads to a deeper approach to learning. An influence in the other direction may also be hypothesized: the deeper students' approach to learning, the more they would develop positive attitudes and beliefs towards cooperative learning.

In this study, we investigated the attitudes and beliefs about cooperative learning of students entering their first year of university and beginning a training program based on cooperative learning activities. We examined the extent to which these attitudes and beliefs depend on their prior experience with group work, their motivation for studying, and their approach to learning.

Cooperative learning

Cooperative learning can be minimally defined by two elements: teachers provide a task to students that they have to complete together in small groups; they hold them accountable for their own learning and for helping each other (Buchs et al. 2016). For cooperative learning to be effective, two essential conditions have been put forward: goal interdependence (i.e., students perceive that they can only achieve their goal if others also achieve their own goal) and resource interdependence (i.e., students can only achieve their goal if others provide them with the necessary resources) (Johnson et al., 1990). In turn, to support goal interdependence, students should be given the task of solving a complex problem (i.e., one composed of many interacting elements) (Kirschner et al. 2011). However, this does not guarantee a genuinely cooperative functioning, as a complex problem can be solved through a strong division of labour and minimal interactions (Cohen 1994). Cooperative functioning involves students displaying a set of attitudes: be respectful and open to others, with a willingness to encourage, share and help each other, but also to question the views of others and resolve conflicts when they arise (Gillies 2004; Kyndt et al. 2013; Slavin 1996).

Moreover, to promote effective cooperative functioning, several authors have stressed the importance of group self-regulation that addresses group functioning to better coordinate the actions of students when performing the task (Kyndt et al. 2016; Slavin 1996). This has been confirmed by a recent study which shows that higher performing groups have a greater proportion of metacognitive discourse about the group's process (Kuhn et al. 2020). In other words, to cooperate effectively, students must also learn to function cooperatively and be willing to cooperate. This may explain why prior experience with group work improves the performance of the group (Zambrano et al., 2019). During this prior experience, students may have internalized patterns of group functioning.

It can be assumed that students' attitudes towards group work and their willingness to cooperate depend on their prior experience and beliefs about group work. In this regard, several studies have investigated university students' beliefs concerning group work based on their experience of this learning environment (Hammar Chiriac 2014; Peterson & Miller 2004; Lumpkin 2015; Phipps et al. 2001; Stover & Holland 2018). The most recurring positive experiences reported by students were that working in a group promotes learning academic knowledge and fosters the development of collaborative skills, in that students gain advanced knowledge about how groups work, and how other members behave and work in groups. They appreciated the fact that different members of a group contribute to the work with different knowledge and prior experiences. They also valued the group atmosphere and associated both learning and social gains with the feeling of being a member of a group.

Negative experiences were frequently associated with social constraints. Students were concerned about inequities in responsibility and work sharing, and complained about students not contributing to group work. They felt that it was difficult to reach agreement, and that conflict and the need to compromise impeded individual learning.

They also felt that the group atmosphere could impede learning. Besides, they criticized group processes and associated ineffective group work with a loss of concentration, or tedious discussions involving a waste of time. Some students expressed reluctance to work in groups. They indicated that they disliked active learning, felt they had to learn the content on their own, and preferred lectures.

Approach to learning

As we suggested above, students' attitudes and beliefs about cooperative learning may also depend on their self-reported approach to learning. *Approach to learning* is a complex construct which involves two components: students' motivation for engaging in a learning task, and the way they are actually engaging in the learning task (Biggs 1994). Research has identified three distinct approaches to learning: deep, surface and strategic approaches (Biggs & Tang 2011; Entwistle et al. 2013). *Deep approach* combines intrinsic motivation for the learning task with a strong cognitive engagement into this task consisting in relating the various contents of knowledge being taught so as to better understand them. More precisely, students with a deep approach try to relate the different pieces of knowledge such as facts, concepts, models or formulae (integrative approach), and tend to question the learning tasks and self-evaluate the way they are processing (reflective approach) (Nelson Laird et al. 2008). *Surface approach* combines extrinsic motivation with a shallow cognitive engagement consisting of simply memorizing as much knowledge contents as possible. More precisely, students with a surface approach tend to learn the different pieces of knowledge without considering their relationships (fragmented approach), and without questioning the learning tasks or self-evaluating the way they are processing (unreflective approach) (Lindblom-Ylänne et al. 2019). As for the *strategic approach*, it combines a form of extrinsic motivation focused on achieving exams with a systematic organization of studying (Entwisle 2009).

In addition to the integrative/fragmented and reflective/unreflective sub-dimensions, a social sub-dimension can also be included in the approach to learning. Students may seek to better understand the content being taught by interacting with their peers or their teachers, whether by asking for further explanations about that content, by confronting their ways of understanding it, or by critically discussing it. Therefore, the way students interact with their peers and with teachers can also be considered as characterizing the approach to learning. As a matter of fact, this social sub-dimension is included in some of the questionnaires used to study the approach to learning (Nelson Laird et al. 2008).

Motivation

A limitation of the current conception of the approach to learning is that it is based on a binary conceptualization of motivation, either intrinsic or extrinsic, and excludes amotivation (i.e. the absence of motivation, which characterizes a number of students). A more refined conceptualization of *motivation* can be used, such as the one developed by Ryan and Deci (2000) in the frame of self-determination theory (SDT). This theory revises the classic distinction between *intrinsic motivation*, which describes spontaneous interest in the activity due to the inherent satisfaction of doing it, and *extrinsic motivation*, where interest is conditioned by external consequences of doing the activity such as rewards or punishments. According to SDT, students may internalize the extrinsic reasons for engaging in an activity and associate a sense of volition with them. The more these extrinsic reasons are internalized, the more individuals are self-determined in their behaviours. Therefore, several forms of extrinsic motivation can been distinguished depending on their location on a self-determination continuum: *external*, *introjected*, and *identified regulation*. According to SDT, *intrinsic motivation* lies at the highest point on this continuum, while *amotivation* lies at the lowest.

Intrinsic motivation can also be conceived as taking many forms (Vallerand et al. 1992; Carbonneau et al. 2012): intrinsic motivation *to know*, *to accomplishment*, and *to stimulation*. The multiple forms of intrinsic and extrinsic motivation can be combined in the framework of SDT to provide a construct that allows for a more detailed study of students' motivation and the identification of more specific profiles (Ratelle et al. 2007; Cassignol et al. 2019).

Conceptual framework and research questions

In this study, motivation and approach to learning are considered as conceptually distinct. This allows for a more detailed investigation of the relationships of these two constructs with students' attitudes and beliefs about cooperative learning. For conceptual clarity, we also make a distinction between group work and cooperative learning. Group work does not necessarily imply cooperative learning, it depends on the attitude of the students and the resulting group functioning. This is what justifies the interest in investigating students' attitudes and beliefs about group work.

This study focuses on students' attitudes and beliefs about group work as they enter their first year of university and are involved in a learning environments designed to promote cooperative learning. The research questions investigated can be stated as follows:

- RQ1: What beliefs do students have about group work?
- RQ2: To what extent do they have a reluctant attitude towards group work and to what extent does this attitude depend on their beliefs about group work?
- RQ3: To what extent do their attitudes and beliefs about group work depend on their prior experience with group work?

- RQ4: To what extent do their attitudes and beliefs about group work depend on their motivation for studying and their approach to learning?

Materials and methods

Participants and procedure

The participants in this study were first-year students at a French university. They were engaged in a three-year pre-professional training for primary school teachers. A specific feature of this training is that it offered students many situations of cooperative learning, that is, situations in which they had to work in groups on complex tasks and were encouraged to cooperate. The study is based on students' responses to a questionnaire. This questionnaire was administered electronically to 291 students, three months after the start of their first year of study. 172 students answered all the questions (59.1% of respondents). These students had an average age of 19.62 (SD = 1.24) with 94.2% being female.

Measures

The questionnaire was composed of 48 questions, some of which were adapted from the literature, while others were created by the researchers who conducted this study (for the complete questionnaire, see Tables S1 to S3 in the Supplemental materials). The question wording was adjusted after a qualitative pre-test based on semi-structured interviews with five students and one test with 92 students from the previous year.

Attitudes and beliefs about group work

Seven questions were related to students' attitudes and beliefs about group work. Three were open-ended and four closed-ended. To the latter, students had to answer on a 7-point Likert scale of agreement or frequency. A first closed-ended question was designed to

measure students' attitude about group work. This question was phrased in a negative way in order to stimulate students to reflect on their attitude and reduce desirability bias ('Are you reluctant to work in groups?'). Two closed-ended and one open-ended questions aimed to understand this attitude in relation to their experience of group work in high school. Two open-ended questions then sought to elicit students' beliefs about group work and addressed its benefits and constraints. Finally, students were asked to answer a closed-ended question about the gains from group work in terms of knowledge learning (one item) and the development of skills, such as critical thinking or autonomy (five items). The six items in this last question measure a scale we termed '*learning gains*' (McDonald's $\omega = .85$). Students' responses to the three open-ended questions were analysed in terms of a set of categories (see Table 1). These were identified using an empirical and iterative method implemented with the test data and then a subset of the study data. The entire study data set was then coded by two researchers. The agreement rate of the different categories was between .88 and .99, and Cohen's Kappa was between .60 and .96. All disagreements were discussed by both researchers.

Deep approach to learning

Thirteen questions were related to students' approach to learning. These questions were all closed-ended and students were asked to answer them on a 7-point Likert scale of agreement. In this study, the approach to learning refers to how students cognitively engage in their learning tasks. Motivation is not included in this construct. Since *deep approach to learning* can be viewed as an ideal towards which students should tend in their university training, we constructed a scale for this single dimension, based on four subscales with a total of thirteen items ($\omega = .87$). One subscale measures the *integrative approach* ($\omega = .78$); it is composed of five items, including three items from the questionnaires of Biggs et al. (2001) and Entwistle et al. (2013). Another subscale

measures the *reflective approach* ($\omega = .70$); it is composed of four items also taken from the questionnaires of Biggs et al. (2001) and Entwistle et al. (2013). Two additional subscales were created in this study to incorporate the social dimension of the approach to learning. The first, *interactions-with-peers approach* ($\omega = .61$), measures students' tendency to interact with peers to learn deeply, and is based on two items. The second, *interactions-with-teachers approach* ($\omega = .75$), measures their tendency to interact with teachers to learn in depth, and is also based on two items.

Motivation

Twenty-eight questions were related to students' motivation. All these questions were also closed-ended and students were asked to answer them on a 7-point Likert scale of agreement. Motivation was measured by means of the Vallerand et al. (1989) scale, in line with SDT. This scale was adapted to the university context. It is based on seven subscales, each composed of four items answering a common general question, giving a total of twenty-eight items: *intrinsic motivation to know* ($\omega = .84$), *to stimulation* ($\omega = .84$), *to accomplishment* ($\omega = .84$), *identified extrinsic motivation* ($\omega = .75$), *introjected extrinsic motivation* ($\omega = .86$), *external extrinsic motivation* ($\omega = .79$), and *amotivation* ($\omega = .85$).

According to SDT, these different forms of motivation are distributed on a self-determination continuum, that is, some are more self-determined and others more controlled. According to a conventional separation line on this continuum (Ratelle et al., 2007), we can distinguish the *self-determined motivation* scale, composed of the items of intrinsic motivation to know, to stimulation, and to accomplishment, and identified extrinsic motivation ($\omega = .92$), and the *controlled motivation* scale, composed of the items of introjected and external extrinsic motivation ($\omega = .87$).

Results

Students' beliefs about group work

Overall, the students in this study had a positive perception of the gains of group work for learning knowledge and developing a range of skills (problem solving, communication, critical thinking, autonomy and working with others). 95% of students agreed (slightly to strongly) with the claim that group work promotes such learning. The mean of the learning gains scale is 5.80 (SD = .95) (for all descriptive statistics, see Table S4 in the Supplemental materials).

Before responding to this claim, which mentions a set of possible advantages (those usually identified in the research literature), the students themselves had to describe the 'benefits' and 'constraints' that they spontaneously assigned to group work. In their free responses, the benefits put forward could be classified into four dimensions: Cognition (group work promotes cognitive processes for task completion and/or learning), Skills (group work develops skills), Social connections (group work develops social connections) and Efficiency (group work makes you more efficient). For each dimension, the categories of benefits, with their frequency of occurrence, are described in Table 1. Those most frequently mentioned are: sharing views and knowledge, developing cooperation and listening skills, preparation for the profession, mutual support and social cohesion.

Table 1. Students' beliefs about the benefits of group work ($N = 172$).

Dimension	**Type of benefit**	**Percentage of students** (and number in brackets)	
Cognition (group work promotes cognitive	**Sharing** (sharing views, sharing knowledge, learning from others)	43% (74)	56% (96)

processes for task completion and/or learning)	**Co-construction** (co-construct, cooperate to achieve the task, think together, come up with ideas together, coordinate several ideas)	13% (22)	
	Debate (debate, confront ideas)	6% (11)	
	Understanding (better understanding, deeper understanding, spotting errors)	6% (11)	
Skills (group work helps to develop skills)	**Cooperation skills** (learning to cooperate, learning to collaborate, learning to better organise teamwork, learning to work in groups, learning to help each other)	26% (44)	52% (89)
	Listening skills (learning to listen, being open-minded, learning to communicate with others)	17% (30)	
	Preparation for the profession (preparation for the teaching profession, in particular for group work in the classroom or for teamwork between teachers)	17% (30)	
	Openness to difference (getting used to working with different people, being more tolerant, knowing how to accept different ideas, knowing how to adapt to others)	5% (9)	
	Methodological skills (learning working methods, learning to manage working time)	4% (7)	

Social ties (group work develops social ties)	**Mutual aid** (helping each other, providing social support for learning)	15% (26)	27% (46)
	Cohesion (developing group cohesion, team spirit, integration, solidarity, getting to better know each other)	15% (25)	
Efficiency (working in a group allows for greater efficiency)	**Efficiency** (being more efficient in performing the task, dividing the work efficiently, saving time, being more productive, doing a better job)	6% (11)	6% (11)

In the students' free responses, the constraints of group work put forward could be classified into three dimensions: Social constraints (group work raises social difficulties), Organisational constraints (group work raises organisational difficulties) and Inequalities (group members' involvement is unequal). For each dimension, the categories of constraints, with their frequency of occurrence, are described in Table 2. Those most frequently mentioned are: having to agree, unequal involvement or motivation of group members, lack of cohesion, difficulties in organising the work and difficulties in meeting outside of courses.

Table 2. Students' beliefs about the constraints of group work ($N = 172$).

Dimension	Type of constraint	Percentage of students (and number in brackets)	
Social constraints (group work raises social difficulties)	**Having to agree** (agreeing on ideas, compromising, having to listen to each other, accepting different points of view)	32% (55)	50% (86)
	Lack of cohesion (lack of cohesion, difficulties in understanding each other or in communicating, tensions, lack of mutual support)	22% (38)	
Organisational constraints (group work raises organisational difficulties)	**Work organisation** (difficulties in dividing tasks, organising)	19% (33)	38% (66)
	Meeting (difficulties in meeting to work together, linked to availability, schedules and distance working)	17% (30)	
	Different methods (difficulties linked to different working methods and rhythms)	6% (11)	
Inequalities (the group members' involvement is unequal)	**Inequalities** (less involvement or work of some, lack of motivation of some, difficulty in distributing work fairly)	28% (49)	28% (49)

Students' reluctant attitude towards group work

Most students in this study had a positive attitude towards group work. Only 22% of the students stated that they were reluctant (i.e., slightly to very reluctant) towards this way

of working. The mean score on this question was 2.82 (SD = 1.81) on a scale from 1 (not at all reluctant) to 7 (very reluctant).

To understand the origin of the reluctance or absence of reluctance, we analysed the links between the degree of reluctance and the different beliefs on group work described above. The correlation analyses, as well as the other statistical analyses presented below, were performed by means of JASP software (Version 0.14.1). As expected, the degree of reluctance is negatively correlated with the perception of the learning gains as predefined in the questionnaire (Spearman's $\rho = -.451$, $p < .001$). Besides, the correlations between the degree of reluctance and the different categories of benefits and constraints identified in the free responses are all non-significant with one exception (Table 3): the degree of reluctance is positively correlated with the idea that group work faces organisational constraints ($\rho = .163$, $p = .033$).

Table 3. Spearman's correlations between the degree of reluctance and the different beliefs on group work ($N = 172$).

		ρ	p
Reluctance	Learning gains	–0.451	< .001
	Cognition	–0.121	0.115
	Skills	0.123	0.108
	Social ties	–0.007	0.923
	Efficiency	–0.053	0.487
	Social constraints	0.034	0.658
	Organisational constraints	0.163	0.033
	Inequalities	0.134	0.080

The influence of prior experience with group work

The students' prior experience of group work can also provide keys to understanding their beliefs about and attitudes towards this way of working. When asked how often they had worked in groups in high school, the students' responses were distributed across the

frequency scale from 1 (never) to 7 (very often), with a mean of 4.12 (SD = 1.78). The frequency of this experience in high school was found to be positively correlated with the perceived learning gains ($\rho = .197$, $p = .010$) and negatively correlated with reluctance to work in groups at university ($\rho = -.241$, $p = .001$). Furthermore, it was correlated with only one of the dimensions of interests and constraints identified in the free responses (Table 4), namely the Cognition dimension according to which group work promotes cognitive processes for task completion and/or learning ($\rho = .156$, $p = .041$).

Table 4. Spearman's correlations between, on the one hand, the frequency of prior experience with group work, and, on the other, the degree of reluctance and the different beliefs on group work ($N = 172$).

		ρ	p
Frequency	Reluctance	–0.241	0.001
	Learning gains	0.197	0.010
	Cognition	0.156	0.041
	Skills	–0.136	0.076
	Social ties	–0.051	0.507
	Efficiency	–0.006	0.937
	Social constraints	–0.016	0.840
	Organisational constraints	–0.119	0.120
	Inequalities	–0.028	0.711

To gain a better understanding of their experience in high school, they were asked whether they had worked in groups in the same way in high school as they had at university. The students' responses were distributed across the entire agreement scale from 1 to 7, with a mean of 3.87 (SD = 2.13). Students who responded that the group work was different (whether it was slightly or very different) were asked to describe these differences. In their free responses, the main differences were grouped into 5 categories which are described in Table 5. Some of these differences were described without positive or negative connotations, such as the fact that the teacher's guidance was stronger. Another part was described with a clear negative connotation, in particular the fact that

the group functioned less well in high school and the fact that the task to be performed by the group was more restricted.

Table 5. Differences in students' prior experience with group work ($N = 90$).

Differences in group work in high school	**Percentage of students** (and number in brackets)
Stronger teacher guidance (more teacher-guided, more structured, less autonomous work)	26% (23)
Poorer functioning of the group (less cohesion or mutual support, less understanding, less work division, more individualism, less organised, less listening, less joint reflection, less involvement, unequal work or involvement)	23% (21)
Less group work (less frequent group work or shorter periods of time)	21% (19)
Narrower task (mostly exercises, no research, no project, less reflection, less extensive topics, less work to be done)	21% (19)
Smaller groups (smaller groups, pairs)	9% (8)

The influence of motivation and approach to learning

The results show that the perceived learning gains of group work are positively correlated with all forms of motivation, whether they are rather self-determined or rather controlled. They are negatively correlated with amotivation. Similarly, they are positively correlated with all sub-dimensions of deep approach to learning except the one related to interactions with teachers (Table 6).

Table 6. Spearman's correlations between, on the one hand, the perceived learning gains of group work, and, on the other, motivation and deep approach to learning (N = 172).

		ρ	p
Learning gains	Self-determined motivation	0.488	< .001
	Controlled motivation	0.302	< .001
	Amotivation	–0.323	< .001
	Intrinsic motivation to know	0.544	< .001
	Intrinsic motivation to stimulation	0.362	< .001
	Intrinsic motivation to accomplishment	0.413	< .001
	Identified extrinsic motivation	0.179	.019
	Introjected extrinsic motivation	0.349	< .001
	External extrinsic motivation	0.392	< .001
	Deep approach to learning	0.464	< .001
	Integrative approach	0.427	< .001
	Reflective approach	0.525	< .001
	Interactions-with-peers approach	0.402	< .001
	Interactions-with-teachers approach	0.107	.163

To determine the respective weight of all these variables in predicting the perceived learning gains of group work, a backward linear regression was conducted. This regression was carried out starting with the full model which contains all subscales of motivation and deep approach to learning, then successively eliminating the least significant variable, namely with the highest *p*-value, until all remaining variables have a *p*-value less than .05. Backward analysis stopped with model 8 (*Adj.* R^2 = .365), which contains four variables among the eleven considered at the outset (Table 7). The most important variable is reflective approach to learning, followed by intrinsic motivation to learn. Two other variables have an influence, albeit lower and negative: the approach to learning relative to interactions with teachers and amotivation.

Table 7. Backward regression for the prediction of perceived learning gains of group work as a function of motivation and deep approach to learning ($N = 172$).

Model	*Adj. R²*	*F*	*p*	Outcome	Predictors	Stand. coef. β	*t*	*p*
1	0.359	9.70	< .001	Learning gains	Reflective approach	0.323	3.50	< .001
					Intrinsic motivation to know	0.289	2.75	0.007
					Interactions-with-teachers approach	–0.152	–2.06	0.041
					Amotivation	–0.141	–2.03	0.044
					Introjected extrinsic motivation	0.138	1.36	0.176
					Interactions-with-peers approach	0.125	1.64	0.102
					Intrinsic motivation to accomplishment	–0.103	–0.81	0.417
					Integrative approach	0.069	0.69	0.494
					Identified extrinsic motivation	–0.055	–0.64	0.521
					External extrinsic motivation	0.002	0.02	0.984
					Intrinsic motivation to stimulation	$9.56e^{-4}$	0.01	0.992
8	0.365	25.6	< .001	Learning gains	Reflective approach	0.409	5.35	< .001
					Intrinsic motivation to know	0.293	3.88	< .001
					Interactions-with-teachers approach	–0.134	–2.02	0.045
					Amotivation	–0.126	–2.00	0.047

The degree of student reluctance was positively correlated with amotivation ($\rho = .281$, $p < .001$) and negatively correlated with intrinsic motivation for knowledge ($\rho = –.189$, $p = .013$) and external extrinsic motivation ($\rho = –.153$, $p = .046$). No correlation was found with other forms of motivation. Similarly, no correlation was found with the approach to learning in its different sub-dimensions (Table 8).

Table 8. Spearman's correlations between, on the one hand, the degree of reluctance towards group work, and, on the other, motivation and approach to learning ($N = 172$).

		ρ	p
Reluctance	Self-determined motivation	–0.148	0.052
	Controlled motivation	0.021	0.786
	Amotivation	0.281	< .001
	Intrinsic motivation to know	–0.189	0.013
	Intrinsic motivation to stimulation	–0.146	0.056
	Intrinsic motivation to accomplishment	–0.071	0.353
	Identified extrinsic motivation	0.057	0.458
	Introjected extrinsic motivation	–0.005	0.952
	External extrinsic motivation	–0.153	0.046
	Deep approach to learning	–0.086	0.264
	Integrative approach	–0.121	0.115
	Reflective approach	–0.021	0.783
	Interactions-with-peers approach	–0.143	0.062
	Interactions-with-teachers approach	–0.007	0.925

Discussion

This study sheds new light on the beliefs and attitudes of first year university students concerning group work, and the links with their prior experience of this learning environment, their motivation for studying and their approach to learning. Regarding the question of their beliefs about group work (RQ1), it appears that the majority of the students had a positive perception of it in terms of knowledge learning and the development of a range of crosscutting skills, which is reflected in a high mean score on the perceived learning gains scale. This result is consistent with previous studies (Hammar Chiriac 2014; Lumpkin 2015).

The benefits and constraints of group work that students spontaneously mentioned largely overlap with those put forward by students in other studies. This is particularly true for the following two benefits: the possibility of sharing views and knowledge (Hammar Chiriac 2014; Lumpkin 2015) and the development of cooperation skills (Hammar Chiriac 2014). It also concerns the following three constraints: having to agree

or make compromises (Hammar Chiriac 2014), the fact that some group members are less involved than others (Peterson & Miller 2004; Phipps et al. 2001) and the lack of cohesion or negative climate in the group (Hammar Chiriac 2014). It is worth noting that the students in this study did not mention as benefits the learning of knowledge or the development of some crosscutting skills such as critical thinking, autonomy or reflexivity. To some extent, there is a gap between the benefits they spontaneously reported and those highlighted by the research on cooperative learning (Gillies 2004; Johnson & Johnson 2002; Kyndt et al. 2013; Schwarz & Baker 2017; Tolmie et al. 2010).

Regarding the question of their attitudes towards group work (RQ2), it appears that the majority of the students in the study had a positive attitude and did not declare to be reluctant. The study shows that the degree of reluctance is related to their beliefs about group work, and more specifically to a low perception of its learning gains and the idea that it faces organisational constraints.

This study also investigated the question of the influence of prior experience of group work (RQ3). According to the descriptions collected, their experience of group work in high school is generally less positive than at university (i.e., poorer functioning of the group and narrower task). However, the students who practised it more in high school better perceived the learning gains of group work at university. Conversely, the study shows that the degree of reluctance is greater for students who had less experience of group work in high school. These results are in line with those of a previous study (Gillies 2003) which shows that giving students regular opportunities to cooperate increases their involvement in group work.

In addition, this study provides new insights into the question of the links between, on the one hand, students' beliefs and attitudes towards group work and, on the other, their motivation for studying and their approach to learning (RQ4). It appears that the

main factor that determines the perceived learning gains of group work is reflective approach to learning. In other words, students whose approach is more based on metacognition and self-regulation of learning better perceive the interest of group work and the possibility of learning by cooperating with other students. This could mean that for these students, group work provides an opportunity to discuss and adapt methods for completing tasks and thereby learn better. This interpretation echoes previous studies (Järvelä et al. 2016; Kuhn et al. 2020) which suggest that learning in group work is enhanced by self-regulatory phases within the group and in particular by reflexive discussion between group members about what the group does.

According to this study, the perception of the learning gains of group work is also correlated, but negatively, with the approach to learning that focuses on interactions with teachers. This means that the more students seek to better learn through interactions with teachers, the less positive their perception of the learning gains of group work. In this respect, the study only yields correlations. It is possible that the causal link goes in both directions.

Finally, it was found that the reluctance of students to work in groups is related to a lack of motivation for studies and in particular for the knowledge taught, but is not related to their approach to learning. This result points to a profile of students who are both amotivated and reluctant to work in group. However, it does not mean that these students are more reluctant to group work than to other learning environments.

A limitation of the study is that it is restricted to a sample of university students in a single training context. To determine whether the results are generalizable, it would be appropriate to conduct studies in other training contexts. Moreover, the study focused on students' beliefs and attitudes towards group work at the very beginning of their training, when they are still shaped by their high school experience. It would be of interest

to study the evolution of these beliefs and attitudes during a training course that offers them regular practice in group work, as well as the evolution of the links with motivation and approach to learning. Does such a practice favour a synergy between, on the one hand, positive beliefs and attitudes towards group work, and on the other hand, self-determined motivation and deep approach to learning? Further research is needed in this regard.

Educational implications

These results suggest two avenues for teaching based on cooperative learning. Firstly, the gap between the benefits spontaneously associated by students with group work and the benefits highlighted by research is a point of concern for teachers. In particular, students seem to have little awareness that group work promotes knowledge learning and the development of critical thinking. Their concern about the unequal involvement of group members indicates that students focus strongly on task completion and perhaps less on the learning afforded by the underlying process. By discussing and clarifying with them the mechanisms of cooperative learning – such as socio-cognitive conflicts, argumentative discussions, mutual criticism or peer tutoring (Slavin, 1996) – teachers could foster more positive beliefs on group work and indirectly reduce possible reluctance.

Secondly, the link found between the perceived learning gains of group work and the reflective approach to learning suggests that group work is a learning environment conducive to collective self-regulations. Teachers could draw students' attention to the importance of these self-regulations in fostering learning. They could also structure the teaching (e.g., by means of times devoted to it and templates to fill) to engage them in discussions to collectively self-regulate their activities. More specifically, the challenge would be that reflective self-regulation (Zimmerman, 2013), on what they have done and

how they have done it, is not short-circuited by the worry of progressing as quickly as possible towards the completion of the task.

Disclosure statement and compliance with ethical rules

The authors report there are no competing interests to declare. Prior to completing the questionnaire administered in the study, all participants provided informed consent in compliance with the RGPD (EU) 2016/679 under the supervision of the DPO of the University of Montpellier

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