

**Level of Group Cohesion and the Implementation of a Group Agreement: The
Moderating Role of Attitude Towards Collaboration**

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Abstract

Collaborative learning is one of the most successful concepts in social and educational psychology (Johnson & Johnson, 2009). During our research we explore a group agreement as a tool to enhance the effects of collaborative learning. We conducted a quasi-experimental study in which we compared two convenience samples, collected amongst psychology bachelor students, who worked in groups based on their common superordinate topic choice. The first sample ($N = 57$) was collected by a bachelor student group, who investigated collaborative learning, in 2021/2022 while the second sample ($N = 67$) was collected by the current research team in the academic year of 2022/2023. Using survey data, we investigated whether the implementation of a group agreement for the second sample had a significant positive effect on perceived levels of group cohesion between the two samples. Furthermore, we investigated a possible moderation effect of attitude towards collaboration on the relationship between the group agreement and perceived levels of group cohesion. An independent samples t-test and a moderation analysis using the SPSS Process macro showed that our hypotheses were not supported. Finally, we conclude that although our expectations were not supported, group agreement is a high-potential tool to be applied in the educational context and suggest further research.

Keywords: collaborative learning, group agreement, group cohesion, attitude towards collaboration

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“The widespread and increasing use of cooperative learning is one of the great success stories of social and educational psychology.” (Johnson & Johnson, 2009, p. 365).

Cooperative learning, an approach towards teaching and learning is built on the social interdependence theory, and one of the most effective learning strategies (Johnson & Johnson, 2009). Group members learn interdependently in order to accomplish a common goal (Kozlowski & Ilgen, 2006), while also improving one's own and the other group members' learning (Johnson & Johnson, 1999), engagement, and motivation (Reeve, 2012). Multiple meta-analyses were conducted (e.g., Chen et al., 2018; Kyndt et al., 2014; van Leeuwen & Janssen, 2019; Rohrbeck et al., 2003; Roseth, et al., 2008) leading to the conclusion that students who learn in small groups indeed show an increase in their academic success compared to students who learn individually. Studies conducted by Gaudet (2010) further support these findings.

Given the increased use of collaboration in academic programs as a learning strategy students need to switch between differently composed groups regularly. As such the establishment of group cohesion, as one strong determinant of effective collaboration, is a challenge students encounter very often. According to Evans & Jarvis (1980) group cohesion has been a contributing factor in various group processes, including the attainment of the group goals (Evans & Jarvis, 1980; Kozlowski & Ilgen, 2006), productivity (Goodacre, 1953; Lodahl and Porter, 1961; Thomas, 1957), group stability (Kozlowski & Ilgen, 2006), and overall effective collaboration (Johnson & Johnson, 2009; Mendo-Lázaro et al., 2017). Therefore, it would be useful to investigate how students could ensure high levels of group cohesion in the initial stages of group building.

While research has succeeded to build large and comprehensive models of how to increase the success of collaboration (Garrison, 2009) it has largely failed to build practical

and feasible tools to ensure effective collaboration in the initial stages of group building (Bravo et al., 2018; Evans & Jarvis, 1980). With the current study we address this gap by investigating the effectiveness of a group agreement to be utilized as such a tool (Bravo et al., 2018). A group agreement is an agreement that entails the group's purpose, behavioral norms, roles and responsibilities, communication standards, and performance expectations. All group members are involved in the process of devising the group agreement, of which the aim is to find a common understanding of the before listed topics (Hampton & El-Mallakh, 2017). In our study, we aim to investigate the relationship between group agreement and group cohesion in groups of students working together to write their bachelor thesis in psychology. These bachelor thesis groups are based on superordinate bachelor thesis topics and collective data collection, however each student individually developed their research question and submits an individual research paper. We will be comparing two samples, one where the students had to work together as usual, this was collected in the academic year, 2021/2022, and the second sample where the students were additionally provided with a group agreement, this was done for the bachelor thesis groups of the academic year of 2022/2023. Furthermore, research has consistently shown the impact of individual differences on group performance (Johnson & Johnson, 2009). Thus, attitude towards collaboration as one boundary condition would increase our understanding of the strength of the relationship between group agreement and group cohesion. In line with this, the study's goal is to examine attitude towards collaboration as a moderating variable to the relationship between group agreement and group cohesion. In sum, our study's goal is to examine whether the completion of a group agreement at the start of a group project, increases the level of perceived group cohesion. Furthermore, we investigate whether this relationship is strengthened with group members' increasing levels of attitude towards collaboration.

Theoretical Background

Group Cohesion

Group cohesion is an essential concept when looking at factors contributing to successful cooperative learning (Al-Rawi, 2008). Cohesion entails the perceived level of pride, task commitment and interpersonal linking by members (Paulus et al., 2011; Paulus et al., 2012) since all members are interlinked and affected by each other's actions (Bowler & Brass, 2006; Chen, Tang, & Wang, 2009). Furthermore, group cohesion defines the stability of the group, which means that if group cohesion is perceived as low, the group dynamics are rather unstable and the group is more likely to break apart or not be able to work together in order to reach the group goal. In comparison a group with high group cohesion has a high level of task commitment leading to a higher level of effectiveness of the group (Kozlowski & Ilgen, 2006).

Literature has pointed towards the importance of group cohesion for effective group work on multiple occasions. That is, according to Garrison (2009) and León et al. (2017) group work, or collaborative learning, entails beside other factors interdependence, group climate, social skills, task design, and group cohesion. Specifically, group cohesion is one essential element that provides an environment necessary for effective group learning, as shown by research on community of inquiry (COI) (Garrison, 2009). Consequently, group cohesion as one prerequisite of effective cooperative learning seems to be critical to encourage groups to work together by sharing the responsibility for achieving a common goal (León-del-Barco et al., 2018). The findings regarding the role of group cohesion in COI theory (Gibbons, 2009) are specifically relevant for the current study as they are rooted in the educational context, thus being aligned with the setting of our study. Furthermore, the importance of group cohesion in the study of both collaborative learning and the educational research field is highlighted. Given the importance of group cohesion for cooperative learning and this study's focus on how cooperative learning can be improved in its initial stages we investigate how group cohesion can be increased in the early stages of group work.

Group Agreement and Group Cohesion

A commonly used tool for group learning is a written form of commitment to the group, also known as a group agreement, which has been used in praxis extensively but still lacks in scholarly attention (Courtright, et al., 2017). Group agreements are a form of contract, designed by the group members, stating the common group goals, methods of communication, policies and procedures, roles and responsibilities, schedules and behavioral norms, e.g., cooperation (Hampton & El-Mallakh, 2017). Its purpose is for group members to be able to hold each other directly accountable which has been shown to be especially useful for resolving and preventing internal conflict (Hampton & El-Mallakh, 2017). Additionally, research has shown that another advantage of a group agreement is that they improve group performance and decrease students' perceived level of anxiety due to social loafing by other group members (Schwering, 2015; Tornwall et al., 2021).

According to Byrd & Luthy (2010), by implementing the use of a group agreement, the group automatically establishes a set of rules which, when adopted, result in group norms. In turn, group norms can then be used by group members to predict how other group members will behave. Hence, they are used as guidelines and a framework for any decision-making processes within the group as well as keeping track of the groups process over time. As a result, a group agreement can act as the foundation of a group's cohesiveness. Sharing norms and values increases the sense of belonging amongst the group members, which leads to an increase in group cohesion (Johnson & Johnson, 2009; Kenneth & Rick, 1990). Furthermore, group norms inspire helping behaviors amongst group members, which leads to an increase in cooperation, which in turn leads to an improvement of collaboration amongst the members (Byrd & Luthy, 2010). McDowell et al. (2011) support these findings in their research on groupwork quality showing that higher levels of group cohesion were observed for groups in which a group agreement was implemented at the beginning stages compared to no implementation. Hence, the implementation of a group agreement should lead to an increase of perceived group cohesiveness amongst the bachelor thesis group members.

The Moderating Role of Attitude towards Collaboration

Prior research has indicated that effective collaboration and its predecessors are consistently influenced by group member characteristics such as personality and attitudes (Bravo et al., 2018; Tseng & Yeh, 2013). Consequently, to develop a thorough understanding of the predictive strength of a group agreement on group cohesion, we investigate the existence of boundary conditions. More specifically, we examine attitude towards collaboration as a potential boundary condition given its apparent impact on collaborative working. That is, despite its advantages, collaboration is not always received positively by students (Mendo-Lázaro et al., 2017), since an individual's attitude towards collaboration determines a student's evaluation of collaborative learning and in turn their behavior within the group. According to Gardner and Korth (1998), attitude toward collaboration is defined as the individual will to continue working with groups. Furthermore, Ruiz Ulloa & Adams (2004) found that peoples' attitude towards collaboration forms from prior experience with collaborative working.

Contemporary literature has shown that a group's cohesiveness is specifically dependent on each individual group members attitude towards the collaboration (Bravo et al., 2018). For example, students who enjoy group work have a positive relationship with their fellow group members (Tseng & Yeh, 2013), which in turn is fundamental for group cohesiveness. Furthermore, a more positive attitude towards collaboration increases group members commitment to their group's rules, norms and expectations, and thus should enhance the positive effects of a group agreement on a group's cohesiveness. In other words, we presume that group members' attitude towards collaboration greatly influences the relationship between the group members as well as their individual commitment to working collaboratively, which in turn posits that a positive attitude towards collaboration should have a positive effect on the relationship between the group agreement and the perceived level of

cohesion. Consequently, attitude towards collaboration should act as a catalysator for the positive relationship between group agreement and group cohesion.

Current Study

The aim of this study is to increase the beneficial effects of cooperative learning (Johnson & Johnson, 2009) in an educational context, by adding a group agreement to the setting. To be more specific we will be investigating whether the distribution of the group agreement at the beginning of the collaboration, will lead to an increase of perceived group cohesion amongst group members. We then further aim to investigate the effects of the attitude towards collaboration of participants on the relationship between the group agreement and perceived level of group cohesion. In order to investigate the current study's research questions, we built upon the work of another bachelor thesis project that explored the topic of cooperative learning in the academic year of 2021/2022. That is, beyond assessing the relevant concepts in an identical way, in the study of this academic year 2022/2023 we employed the group agreement as a novel concept. As such, we will be comparing our results with the results collected during their study to see if the implementation of group agreements had an effect. See Figure 1 for an overview of the complete research model. Based on the literature discussed above we expect the following:

Hypothesis 1: When comparing the group that filled in the group agreement and the group that did not, the level of perceived group cohesion would be higher for the group that did fill in the group agreement than for the other group.

Hypothesis 2: Attitude towards collaboration moderates the difference between group with a group agreement compared to groups without a group agreement on levels of group cohesion, such that the differences in cohesion between the group with a group agreement and the group without a group agreement will be larger for students with higher attitudes towards collaboration.

Methods

Participants

The data for this study were collected at two different moments in time. All participants were third year psychology students at the University of Groningen working on their bachelor thesis at the time of data collection. Data from the first participant group were collected by a previous group of bachelor thesis students in the first semester of the academic year 2021-2022. This participant group did not make use of a group agreement, from now on this group will be referred to as the no-GA group. Data from a second participant group was collected by our bachelor thesis group, in the first semester of the academic year 2022-2023. The students in this cohort were all instructed to fill in a group agreement, from now on, they will be referred to as the GA group. In both cohorts, the sampling process can be described as convenience sampling.

From the no-Ga group ($N = 198$) 70 responses were recorded (response rate = 35.35%). After cleaning the data, the final sample for the no-GA group consisted of 57 participants. Within their thesis, students worked in groups of 5-6 members. The sample consisted of 46 female students, 11 male students and no students who identify as diverse. Their nationalities included Dutch ($N = 26$), German ($N = 22$), others ($N = 8$) and 1 without disclosure. The mean age was 22.33 years ($Min = 20$, $Max = 28$, $SD = 1.65$).

In the GA group there were 223 students ($N = 223$) who were doing their bachelor's thesis of which we recorded 84 respondents (response rate = 37.7 %). From these 84 participants we excluded 17, since they indicated that they did not fill in the questionnaire truthfully and two participants because they did not fill in the group agreement. As a result, the final sample for the GA group consisted of 67 participants. This sample included 60 female students, 7 male students and no students who identify as diverse. The age of the participants had a range from 20 to 32 with a mean age of 22,75 years ($Min = 20$, $Max = 32$, $SD = 2,75$) with nationalities including Dutch ($N = 38$), English ($N = 20$), and others ($N = 9$).

Procedure

Before sending out the survey, the questionnaire was approved by the Ethical Committee of Psychology (ECP) at the University of Groningen and the study was deemed appropriate for research. In order to collect responses for the academic year 2022-2023, the research group compiled an email that kindly asked fellow thesis students, who also started with their thesis in block 1a, to fill in the questionnaire and help this research endeavor. This email and link to the questionnaire were sent out by the faculty's secretary to all bachelor students who were working on their thesis at the time. Further attempts to acquire responses included sharing the QR code on social media platforms such as Instagram, handing out flyers in the lectures and personally contacting fellow students who were writing their thesis at the time. The responses were collected during the 10th and 11th weeks of the bachelor thesis project for both the GA and no-GA group, at which point the groups had all turned in their first draft for the introduction and partially already constructed a draft for their method sections.

When opening the link to the questionnaire, participants were first asked to read through topic relevant information and a detailed description of the study. Here the two principal investigators (dr. José Heesink and dr. Else Havik) were introduced and the research question "Which factors improve or impede the level of cooperation, cohesion and learning experience within a bachelor thesis group?" was presented. Subsequently, participants were informed what was required of them, the possible consequences of taking part in the research, confidentiality and finally contact information in case of question or concerns. In order to continue with the questionnaire, the participants then had to agree to the informed consent. Following the participants were asked to answer some demographical questions, i.e., age, gender. Subsequently came the questions regarding the concepts of interest, first the questions in line with perceived level of group cohesion and then the questions regarding attitude towards teamwork/collaboration. For the cohort using the group agreement (cohort

2022/2023), questions regarding the group agreement were added later in the survey.

Therefore, lastly the questions regarding the group agreement needed to be answered. At the end of the questionnaire, the participants were asked if they answered truthfully and given the head researcher contact information for any follow up questions they might have.

Materials

Group Agreement

The group agreement, which was added as an intervention, aims to make the process of collaborative learning more concrete. The content of the group agreement was derived from a template designed by Carnegie Mellon University (n.d.). Students were asked to answer statements in regards to their goals, the cooperation, the discussions/meetings, the communication and the policies and procedures. For example: "We share the following goals and expectations, and agree to these policies, procedures and consequences". The goals relate to the goals of the group and the group achievements. Collaboration focuses on working within the group itself, with the name on when and where group members expect to collaborate and how everyone can contribute to the collaboration. The discussions are about when, how often and in what way the group expects to meet. The communication aspect concerns the means and frequency of communication amongst group members. The last aspect, policies, and procedures, refers to rules that can be put in place to achieve the goals and expectations. The group agreement had to be completed and handed in by the group together shortly after the start of the bachelor's thesis project, on October 6th, 2022. A mail was sent out to all students starting their bachelor thesis project by the course coordinators briefly explain the aim of the group agreement. The group agreement itself was accessible through the university platform, Brightspace. For a complete template of the group agreement see Appendix C.

Questionnaire

The online questionnaire used in this study was created by bachelor thesis students from the Psychology department at the University of Groningen in 2021 (Jacobs, 2022). In addition to questions for general information, the questionnaire contains nine scales, namely; satisfaction with learning experience, perceived collaboration, well-being, teaching presence, positive interdependence, individual control, sense of belonging, attitude towards collaborative learning, attitude towards collaboration and physical presence. The questions for general information regarded demographics such as; gender, age, nationality, number of group members and gender composition of the Bachelor Thesis group. In order to prevent subclinical attention problems (Al-Salom & Miller, 2019), which may lead to nonserious answering behavior (Aust et al., 2012) and affect the validity of the online data collection, an attention and seriousness check were included within our survey. The questionnaire contained three attention checks throughout, to check for response patterns and the participants' general degree of attention. Beyond demographical data, attention-, and seriousness checks, the current study solely used data from the group cohesion and attitude towards collaboration scales.

Group Agreement. In order to gather information about how the students used and experienced the group agreement, eight questions were added to the questionnaire for the GA group. The questions were designed by two bachelor thesis groups, who were both working on this study together. One example item that measured students' evaluation of the GA was: "Do you think the contract is useful?". The answers to these questions were "yes" or "no", or on a 5-point Likert scale (1 = *disagree*; 5 = *agree*). The complete questionnaire can be found in Appendix C.

Group cohesion. Group cohesion was measured using ten statements, based on Chung et al.'s (2020) work group inclusion measures, for which the participants had to indicate on a scale from 1 (Disagree) to 5 (Agree) how much they agreed or disagreed with the statement. Out of these ten statements one was reverse coded. One example of these

statements is: "I belong in my bachelor thesis group." The complete questionnaire can be found in Appendix A. The ten items were averaged into a composite score ($\alpha = .86$).

Attitude towards collaboration. Attitude towards collaboration was measured based on Mendo-Lazaro et al.'s (2017) attitude towards teamwork/collaboration scale. The measurement consisted of 12 items using a scale from 1 (completely disagree) to 5 (completely agree). Out of these 12 items, two were reverse coded. Items included in the questionnaire were for example "The quality of the work improves when performed in a group.". The complete questionnaire can be found in Appendix B. The 12 items were averaged into a composite score ($\alpha = .80$).

Results

Reporting on the Manipulation

When looking at the difference between the GA group and the no-GA group, we first want to examine the manipulation that was added to the study this year. As mentioned earlier, when filling in the questionnaire the 67 participants of the GA group had to rate specific questions regarding the group agreement. On average the participants were quite neutral regarding how serious they took filling in the group agreement ($M= 3.37$, $SD=1.20$) as well as how useful they perceived the group agreement to be ($M=3.04$, $SD=1.34$). Furthermore, participants did not think that they were working better together as a group due to the group agreement ($M=2.16$, $SD=1.081$). Lastly, 98.5% of the participants completed the group agreement as a group, while 9% of the participants reported that there was at least one group member who did not comply with the group agreement.

Preliminary Analysis

Table 1 shows the descriptive statistics and correlations of group cohesion and attitude towards collaboration for the total sample and also for the no-GA group and GA group separately. The correlations for the aforementioned three groups showed a significant positive relationship between group cohesion and attitude towards collaboration (Total sample: $r = .62$

$p < .01$; no-GA group: $r = .65$, $p < .01$; GA group: $r = .58$, $p < .01$). Furthermore, the correlation analysis showed that there was no significant relationship between the demographic variables of age and group size with the study's variables of interest. As such, no control variables were identified.

Table 1*Descriptive Statistics and Correlations*

Cohort	Variable	N	Min	Max	M	SD	1.	2.	5.	6.	9.	10.
All	1.Gr cohesion	124	2.1	5.00	4.06	.61						
	2.Att t Collab	124	2.08	5.00	3.91	.52	.62**					
	3.Age	124	20	32	22.56	2.31	-.029	-.085				
	4.Group size	123	3	12	5.98	1.09	-.11	.095				
No GA	5.Gr cohesion	57	2.1	5.00	3.96	.65						
	6.Att t Collab	57	2.08	5.00	3.86	.59			.65**			
	7.Age	57	20	28	22.33	1.65			-.13	-.088		
	8.Group size	57	4	12	6.11	1.47			-.10	.15		
GA	9.Gr cohesion	67	2.6	5.00	4.12	.56						
	10.Att t Collab	67	2.75	4.58	3.96	.46					.58**	
	11.Age	67	20	32	22.75	2.75					.004	-.109
	12.Group size	66	3	6	5.86	.579					-.094	.007

Note. Gr cohesion = Perceived level of group cohesion; Att t Collab = Attitude towards

Collaboration.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Hypothesis Testing and Assumption Check

For the Analysis of all our data we used IBM SPSS Statistics version 28.0.1.0. To test Hypothesis 1, we conducted an independent samples t-test. We used group agreement as our independent variable (IV) and perceived level of group cohesion as our dependent variable (DV). In order to analyze the independent variable, we used a cohort variable differentiating the data of the GA group and no-GA groups. Before commencing the t-test we checked for the assumption of normality and homogeneity of variance. The P-P plot and the histograms, showed that the sample was normally distributed. Furthermore, the test for equality of means also showed that the assumption of homogeneity of variance was met. Thus, we deemed the use of the t-test to test our first hypothesis using this sample as appropriate.

Our first Hypothesis states that when comparing the group that filled in the group agreement and the group that did not, the level of perceived group cohesion would be higher for the group that did fill in the group agreement than for the no-GA group. The analysis showed that the mean was higher for the group that did sign a group agreement than the group that did not, as can be seen in Table 1, but the difference was not significant ($t(122) = 1.63, p = .053$). As such, Hypothesis 1 was not supported.

To test the moderation effect of hypothesis 2 we used the SPSS-macro “Process Modelling” (Model 1), version 4.2., by Andrew F. Hayes (2022). For hypothesis 2, additionally to group agreement (IV) and perceived level of group cohesion (DV), we used attitude towards collaboration as our moderating variable. In order to use Process Model 1, the assumption of homoscedasticity, linearity and multicollinearity had to be met. The scatterplot of the standardized residuals against group cohesion indicated that the assumption of homoscedasticity and linearity were met, along with the assumption of multicollinearity ($VIF = 1$). Therefore, all assumptions were met and the moderation analysis for our second hypothesis was deemed appropriate. For the following analysis, all relevant variables were centered.

The first model, with group agreement and attitude towards collaboration as predictors for perceived level of group cohesion, was significant and explained 39% of the variance ($R^2 = .39$, $F(2, 121) = 39.11$, $p < .001$). It was found that attitude towards collaboration was a significant predictor of group cohesion (see Table 2). When adding the interaction term of GA and attitude towards collaboration, the analysis yielded a model (Model 2), that did not show a significant difference in explained variance ($R^2\text{-change} = .00$, $p > .05$) compared to model 1. As such, the data did not provide evidence to support Hypothesis 2. Table 2 gives an overview of the results.

Table 2*Results Moderationanalysis*

	<i>B</i>	<i>SE B</i>	<i>t</i>	<i>p</i>	<i>R²</i>	<i>R² Change</i>	<i>F</i>	<i>Sig. F</i>
Model 1					.39		39.11	<.001
Constant	4	.063	63.06	<.001				
Group Agreement	.11	.086	1.23	.22				
Attitude tw Collaboration	.37	.043	8.6	<.001				
Model 2					.39	.00	25.86	<.001
Constant	3.999	.064	62.68	<.001				
Grouping Variable	.11	.087	1.23	.22				
Att t Collab	.71	.109	6.53	.00				
GA * Att t Collab	-.001	.17	-.003	.998				

Note. N = 124.

Discussion

Cooperative learning has been evolving for ages and improved constantly to be one of the most successful and strongest learning concepts (Johnson & Johnson, 1999). Garrison (2009) investigated the concept of cooperative learning in the educational setting and defined different elements used to build the COI, one of which is group cohesion. Our sample, and the one used in 2021/2022, both inspected bachelor students who work together on groups to fulfill their Bachelor Thesis projects. The aim of this study was to further build on the concept of cooperative learning and improve the learning experience by adding a group agreement.

In our research, we expected that the perceived level of group cohesion will be higher for a group that did fill in the group agreement than for a group that did not. Differing from preceding research (Byrd & Luthy, 2010; McDowell, et al., 2011), we did not find support for group agreement as a predictor for an increased level of group cohesion. One possible explanation for this non-significant finding could be that the group agreement we used was sent to the students via mail including only brief instructions. According to Fittipaldi (2020), in order for group agreements to be as effective as possible, it is necessary that students are shown what to include and how elaborate the answers should be. This can be done in form of a short training session or by providing an example of a completed group agreement for the students as a reference and to help understand the aim of this intervention. Another explanation stems from research that has shown that group agreements are not universally beneficial (Courtright, et al., 2017). That is, Courtright's et al. (2017) findings indicate that especially groups with low conscientiousness are to benefit from the implementation of a group agreement. Thus, our sample might have not fit this personality profile due to the participants being high in conscientiousness. Therefore, further research should account for personality differences when investigating the effectiveness of the group agreement intervention. Finally, given that our measurements took place early during the students' thesis project the groups possibly were not able to fully establish their group dynamics and norms

yet. As such, the effects of the group agreement on group cohesion might have not yet manifested. Consequently, the effect of the intervention potentially could not be fully captured by our study given the measurement timing. In line, the analysis does show an increase in the level of perceived group cohesion when comparing the GA group and the no-GA group. More specifically, when comparing the means between the GA group and the no-GA group, the mean of the GA group indicated an increased level of perceived group cohesion compared to the no-GA group. This shows that the intervention has promise to increase group cohesion amongst group members. Future research may need to adopt a longitudinal study design to capture the positive effects of the group agreement intervention on group cohesion.

Furthermore, the current paper investigated whether the relationship between group agreement and group cohesion is strengthened by attitude towards collaboration. More specifically, we expected that attitude towards collaboration will moderate the difference between groups with a group agreement compared to groups without a group agreement on levels of perceived group cohesion, such that the differences in cohesion between the groups with a group agreement and the groups without a group agreement will be larger for students with higher attitudes towards collaboration. However, attitude towards collaboration was not found to be a significant moderator of the relationship. This hypothesis was based on research conducted by Tseng & Yeh (2013) and Bravo et al (2019), who investigated a positive attitude towards collaboration as an antecedent of group cohesion. The setting of most research investigating cooperative learning entails groups working together towards a common goal. Accordingly, one possible explanation for the lack of significance of moderation of attitude towards collaboration on the relationship of the group agreement on participants perceived level of group cohesion, could be that our study entailed a setting in which students were working on the same superordinate topic but not necessarily towards a common goal. More specifically, bachelor thesis students did not have to work together in

order to achieve their individual goal to submit a research paper. Each student worked on their thesis individually and was graded individually. Their performance as a group member was not evaluated or graded in any way. Therefore, their behavior as a group member did not have any impact on their final thesis grade. Since, collaboration was limited within the process of writing the bachelor thesis, the attitude towards collaboration of the individual group members might not have had a significant impact on the level of perceived group cohesion.

Moreover, our analysis further supported the findings by Tseng & Yeh (2013) and Bravo et al. (2019) by showing a strong correlation between attitude towards collaboration and group cohesion across both samples. The results show that this relationship is significant above and beyond an intervention specifically designed to increase group cohesion. As such, its robustness as a predictor became evident. Consequently, the confidence in attitude towards collaboration as a potent predictor of group cohesion is further increased by this study (Bravo et al., 2019). Furthermore, this unpredicted positive relation of attitude towards collaboration on group cohesion, can inform the development of novel interventions or integration of the concept into existing tools. We advise future researchers to investigate how to increase attitude towards collaboration, in order to facilitate higher levels of perceived group cohesion. Gottschall and García-Bayonas (2008) results state that there is a difference in attitudes towards collaboration based on how serious students take a course and how well they wanted to perform. Furthermore, they also established that “free-riders” are especially harmful to attitudes towards collaboration, which has also been confirmed by further research (Pfaff & Huddleston, 2003). Taking these findings into account in order to improve attitude towards collaboration and consequently the level of group cohesion amongst the members, future research may focus on interventions that aim to avoid “free-riding” of individual group members.

Strengths and Limitations

The current study displays a multitude of strengths. The first strength of this study lies within its study design. Specifically, using a quasi-experimental design allows for more confidence in the predictive power and internal validity of our analyses' results, given the research team's control over the intervention. Furthermore, as the study was conducted in the field with a sample from the educational setting its generalizability to the intended setting of application can be assumed to be high. Since we used the same questionnaire as well as a similar sample (i.e., psychology bachelor students at the University of Groningen) to compare the no-Ga group to the GA group the data collected can be used for replication and comparison in future studies. Finally, another strength, which leads to further encouragement to continue this line of research is the study's practice-oriented nature. That is, we specifically examined a potential tool, the group agreement, to improve student's experience with cooperative learning thereby building a basis for future research to build upon.

As in regard to limitations, the current research suffered from following shortcomings. First, both the no-GA group and the GA group consist of a small sample size. As a result, the representativeness of the sample is to be questioned. Furthermore, the current study's most obvious strength also entails a limitation. That is, the quasi-experimental study design meant that participants were not randomly allocated between the group that filled in the group agreement and the group that did not. Therefore, the resulting sample holds the risk of selection bias. One such bias might be nonrandom variance in personality profiles. For example, students with higher levels of conscientiousness might have been more likely to participate in this study's survey as they understood it as part of the bachelor thesis trajectory. As aforementioned, research has shown that personality profiles and specifically conscientiousness may affect the effectiveness of the group agreement intervention (Courtright's et al., 2017). This concern is enhanced by the fact that filling in the questionnaire was voluntary for all bachelor thesis groups and the corresponding response

rates. It is likely that students who have a rather positive attitude towards collaboration, also filled in the questionnaire specific to this topic of collaboration. As a result, the sample is likely to entail more participants who have a positive attitude towards collaboration. Finally, given the little influence the research group had on the manipulation (i.e., the variance in the process of completing the group agreement) it was not possible to account for potentially confounding variables such as potential free riders amongst the group, previous experience with groupwork or general commitment to the project. To account for these limitations, future research should use an experimental design giving a specific focus to the effect team member characteristics may have on the effectiveness of the group agreement intervention.

Conclusion

Overall, our study neither supported the effectiveness of a group agreement to increase perceived level of group cohesion nor a positive moderation effect of attitudes towards collaboration on the relationship between the group agreement and perceived level of group cohesion. Nevertheless, we do not dismiss group agreements as an effective tool for the purpose of increasing group cohesion, since the data showed an increase between the GA group and the no-GA group. Moreover, we found a positive relationship between attitude towards collaboration and perceived levels of group cohesion. The current study adds upon applied research in the academic context by examining a specific intervention to improve student's experience in group work. Given our results we endorse further investigation into the implementation of the group agreement. Additionally, we recommend future research to further investigate how the relationship between attitude towards collaboration and levels of group cohesion can be utilized. Overall, the current study shows the complexity of cooperative learning and points towards the need for further applied research in the educational setting.

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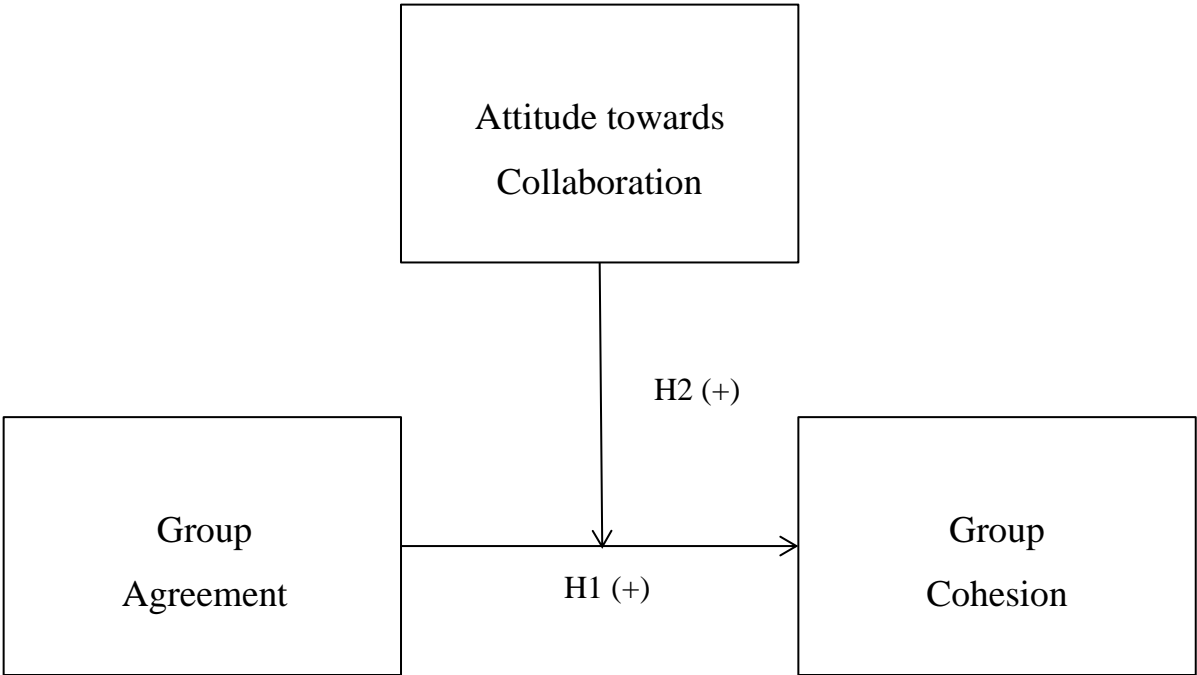
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Figure 1.

Proposed Model of Group Agreement, Attitude towards Collaboration and Group Cohesion



Note. H1, H2 refer to the Hypotheses whereas (+) a positive effect.

Appendix A**Questionnaire: Group Cohesion**

Q11

Please indicate to what extent the following statements apply to you

1. I don't feel like I belong in my bachelor thesis group
2. I feel that people support me in my group
3. I can bring aspects of myself to this group that others in the group don't have in common with me
4. People in my group listen to me even when my views are dissimilar
5. Whilst in meetings, I am comfortable expressing opinions that diverge from my group

Q12

Please indicate to what extent the following statements apply to you

1. I am treated as a valued member of my bachelor thesis group (1)
1. I belong in my bachelor thesis group (2)
1. I am connected to my bachelor thesis group (3)
1. I believe that my bachelor thesis group is where I am meant to be (4)
1. I feel that people really care about me in my bachelor thesis group (5)

(1 = Disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree)

Appendix B**Questionnaire: Attitude towards Teamwork/ Collaboration**

Q36

Please indicate to what extent the following statements apply to you

1. Working in a group increases my interest and motivation for the topics covered
2. The quality of the work improves when performed in a group
3. My grades improve when I work in a group
4. Teamwork is important for my training
5. Teamwork seems a waste of time to me*
6. I learn more when working alone than in a team*
7. I feel useful and appreciated by my group members
8. I feel comfortable working with my classmates on team activities
9. Teamwork favors friendly relations
10. I am confident that my group members will fulfill their share of the work
11. Teamwork helps me to know my classmates better
12. Consensus among the team members helps to make better decisions

1 (completely disagree) to 5 (completely agree)

Appendix C**Questionnaire: Group Agreement**

Q38

Please indicate to what extent the following statements apply to you

1. Did you fill in the group agreement?

Possible answer: Yes/No

2. Did you fill in the group agreement with your other group members?

Possible Answer: Yes/No

3. I think the contract is useful.

Possible answers: 1 = Disagree, 2 =somewhat disagree, 3 = neither agree nor disagree,

4 = somewhat agree, 5 = agree

4. I think the contract is useful.

Possible answers: 1 = Disagree, 2 =somewhat disagree, 3 = neither agree nor disagree,

4 = somewhat agree, 5 = agree

5. I think we are working better together as a group because of the group agreement.

Possible answers: 1 = Disagree, 2 =somewhat disagree, 3 = neither agree nor disagree,

4 = somewhat agree, 5 = agree

6. Are there any group members who have not complied with the contract?

Possible answers: Yes/No.

Appendix D
Group Agreement

Group nr: _____

Date: _____

We share the following goals and expectations, and agree to these policies, procedures, and consequences.

GOALS: What are our team goals for this project? What do we want to accomplish by working together as a group?

COOPERATION: How do you prefer to work together as a group? How and on what kind of tasks do you want to cooperate? How can everyone contribute to this?

MEETINGS: How frequent do we expect to meet as a group without our supervisor, how do we organize these meetings (agenda setting, note taking etc)

COMMUNICATION: How and how frequent do we expect to communicate (e.g. use of Whatsapp group, Google drive, email)

POLICIES & PROCEDURES: What rules can we agree on to help us meet our goals and expectations?