Research Article

Students' Attitudes Toward Cooperative Learning in Online Classes

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Abstract

Active learning approaches allow students to excel at course material at higher cognitive levels. One of these strategies is cooperative learning, where students learn in small groups. This approach fosters retention, motivation, and critical thinking. In addition, using research-based teaching strategies where students can work hands-on on real-world problems improves learning outcomes. A fair amount of learning takes place online, which leads to the question of how research-based group projects can be included successfully in an online environment. This research aims to answer this question by studying undergraduate online students. The main objective is to shed light on students' attitudes toward cooperative learning in online education. The main contribution is to highlight how a research-based group project can be incorporated in a fully online delivered course and how it is received by students. Key findings are that the majority of students agree that such an activity is a good opportunity to practice working in teams for future jobs. In particular women and those who hold a positive attitude toward group projects were most likely to view the research-based group project as good preparation.

1 Introduction

Active learning is an approach to instruction where students "do things" and think about what they have done, engaging in material in different ways than just lecture (Felder and Brent 1994). When instructors use strategies in the classroom that enable students to create learning outcomes themselves, they foster active learning. Looking at Bloom's taxonomy, when students master important class material being actively engaged, they are achieving higher cognitive levels of learning; interactive learning strategies are key for this (Salemi 2012). When employing active learning strategies, students talk and listen to each other, and get to read, write, and reflect on what they have studied (Paul and Elder 2019). The strategies encourage student engagement with the concepts being taught, leading to positive outcomes (Salemi 2012). Active learning fosters increased retention, enables transfer of new knowledge, increases motivation, and improves critical thinking and interpersonal skills (Espey 2007). It caters to students with different learning styles, enabling them to learn successfully due to the diverse set of teaching strategies employed during active learning (Salemi 2012).

As put by Chickering and Ehrmann (1996, p. 3), *"Learning is not a spectator sport. Students do not learn much sitting in class listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write reflectively about it, relate it to past experiences, and apply it to their daily lives."* This is one of the main focal points of interactive learning strategies (Salemi 2012). There are many different active learning techniques, such as class discussion, role-playing, case studies, simulations, problem-based learning, and cooperative learning exercises. Cooperative learning exercises are defined as using small groups in instruction, enabling students to work together so that they can maximize learning for themselves and others (Smith 1996). Incorporating group projects in classes allows for positive interdependence, individual accountability,

equal participation, and simultaneous interaction. When implemented, cooperative learning leads to academic achievement; students learn significantly more, remember what they studied longer, and develop better critical thinking skills. Furthermore, students are more motivated, and their retention is improved. Students have also been found to make more connections with others, develop more self-esteem, and build life skills with cooperative learning (McGoldrick 2012).

Given that a considerable percentage of instruction takes place online (Welding 2022),[1] the question arises how can group projects be successfully implemented in an online learning environment. Hence, this research aims to investigate students' attitudes toward cooperative learning when it is included in a class that is offered online. Specifically, students' attitudes toward a group project that requires collaborating with others online throughout the semester is studied.

The research objective is to gain a better understanding of how students perceive research-based group projects in an online setting. To achieve this objective, I study undergraduate student attitudes toward conducting research projects in groups when the facilitation of the course is online. The following main research question is addressed: *What are students' attitudes toward cooperative learning in an online course?* The remainder of the paper discusses previous literature and provides an overview of the course and group projects in the course. Next, the methodological background is described before empirical results are presented. The final section provides concluding remarks.

While interactive teaching methods are key for student learning, research-based teaching strategies better engage students, and maximize their learning and successful course completion (Boyer Commission on Educating Undergraduates in the Research University 1998; Amaratunga and Senaratne 2009). Hence, this research focuses on a course where a research-based group project was offered, namely AGB 456 – Food Product Innovation and Development. In this course students go through the process of coming up with a new product idea and then testing it for feasibility in the market by means of a consumer survey. Afterward, they analyze the data and present their findings. Such hands-on learning offers a way to apply theoretical concepts, so student learning is enhanced through active inclusion in research (Bransford, Brown, and Cocking 2004). There is general agreement that interactive, research-based approaches enhance students' learning of theoretical foundations (Boyer Commission on Educating Undergraduates in the Research University 1998). This research contributes to knowledge related to teaching and learning by considering students' perspective of cooperative learning as it relates to research-based teaching, and sheds light on cooperative, research-based learning in an online environment. More specifically, the contribution of this research is to investigate students' attitudes toward the inclusion of a group project in a 400-level online class in an agribusiness program over the course of multiple semesters.

2 Background Information
2.1 Relevant Literature
The literature provides support for different types of active learning (see Prince 2004 for a review). Among others, benefits include student engagement, remembering more content, promoting achievement, developing enhanced problem-solving skills, and critical thinking. Cooperative learning in particular increases academic achievement and self-esteem, enhances social support, and improves interpersonal relationships (Prince 2004). Specifically, group projects have been shown to be beneficial to students. For example, Tanner (2013) pointed out that small groups in the classroom can enhance the feeling of collaboration, inclusion, and community, and reduce negative feelings toward whole-group conversations. Espey (2018a) found in a study with 650 students from five courses that students felt greater improvement with regards to their critical thinking skills when in a course with team-based

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[1] In 2020, 74 percent of college students took at least one online class, 15 percent primarily attended online colleges, and almost three million attended college completely online according to data from the National Center for Education Statistics (Welding 2022).

learning. In their courses, team-based learning was used to increase engagement and interaction. The findings were particularly strong in comparison to lecture-based courses. Espey (2018b) investigated which team characteristics affect outcomes for the team and the individual when using team-based learning. Among others, grade point average and the amount of female team members positively affected team performance. Furthermore, individual performance of female team members was positively related to the level of team cooperation. Individual success was significantly related to gender diversity and individual effect of team activities.

When it comes to the relationship between engagement in a group activity and academic performance, Espey (2022) found that those students who are more actively involved in the group work (as reflected in their peer evaluations) scored higher by 2–3 percentage points more on their final exam, taking into account class level, gender, and grade point average.

Brown et al. (2019a) analyzed students' attitudes toward group work by comparing an authentic, business-oriented approach to a traditional approach when building teams. They found that the business-oriented approach was preferred by students who thought that the forming of the groups, as well as grading and scheduling of meetings, was improved in this approach. However, the authors did not use an online class. In fact, Picault (2021) pointed out that an online format is challenging for having students form their own groups as compared to establishing groups randomly. Hence, in this research, groups were formed randomly.

Despite all the benefits that group work has in courses, students are often opposed to group projects (Felder and Brent 1994; Caspersz, Wu, and Skene 2003), and may have negative attitudes about their use as evidenced by Gottschall and Garcia-Bayonas (2008). The negative connotation toward the method of instruction is concerning because research has demonstrated that a positive attitude toward the instructional method makes students more receptive and successful in the class (Brown et al. 2019b). It is therefore of interest to investigate students' attitudes toward group projects in online courses. Since research on students' attitudes toward group work in online agribusiness classes is still limited, this article contributes to the literature by surveying students in an online class over the course of four semesters with regards to their attitudes on working in groups.

2.2 The Course: AGB 456 – Food Product Innovation and Development

This research is implemented in AGB 456 – Food Product Innovation and Development, a course that explores food product development and innovation with special emphasis on primary data collection to test market success when developing new products. Each week, the group project ties into the theory covered in the lecture material. This setup is similar to Picault (2021) who designed a course where a team project covered real-life examples related to theory.

Specifically, this course stresses that market research essentials need to be understood and implemented by actors in the food industry for successful product development and innovation. To address this, relevant theoretical constructs in consumer behavior research, background on methods of data collection, basics of multivariate statistical analysis, and business ratios to measure success of product innovations are introduced in the course. At the end of the course, students should be able to recall the essentials of market research and discuss the importance of consumer behavior with regard to product development and innovation in the food industry. They should be able to collect their own data to make successful decisions on product development and innovation. This means that, they learn to design and conduct market research with their own project to analyze whether a new product could be successful in the food and agribusiness sector. They are taught to evaluate and judge the suitability of data collection and analytical methods for making market-driven managerial decisions on product development and innovation in the food industry.

Table 1: Grading Criteria.

Grading Criteria	Participation	Points Possible
Discussion Posts (Yellowdig)	8 @ 10 points	80
Weekly Assignments (1–7)	7 @ 45 points	315
Assignment 8/Final Report (Voice Thread) Group Assignment	1 @ 250 points	250
Team Contract Assignment	1 @ 35 points	35
Peer Evaluation	6 @ 10 points	60
Project Evaluation	1 @ 40 points	40
Midterm Exam	1 @ 110 points	110
Final Exam	1 @ 110 points	110
Total Points Possible		**1,000**

The primary student learning outcomes are critical thinking, communication, and discipline specific knowledge. The course includes Discussion Posts (Yellowdig, 8 percent of grade), Weekly Assignments (1–7, 31.5 percent of grade), Group Project: Assignment 8/Final Report (Voice Thread, 25 percent of grade), Team Contract Assignment (3.5 percent of grade), Peer Evaluations (6 percent of grade), Project Evaluation (4 percent of grade), Midterm Exam (11 percent of grade), and Final Exam (11 percent of grade; see Table 1 for an overview of the grading criteria). The group project assignment comprises 25 percent of the overall course grade, which compares to Picault (2021) who developed a Dynamic Learning model for online economics courses that included a team project component comprising 40 percent of the course grade. Though in AGB 456 the group project itself only counts for 25 percent, the peer evaluation accounts for 6 percent, the team contract assignment accounts for 3.5 percent, and the project evaluation accounts for 4 percent, all of which are directly or indirectly related to the group project. Hence the total weight of the group project is 38.5 percent of the final course grade.[2]

2.3 Group Project

The group project begins immediately in Week 1. Students are introduced to it by means of video tips for working in groups. They sign a team membership agreement that contains expectations, terms, and conditions for the group project. They fill out a group charter where they have to indicate which team member has which role in the group, such as CEO or lead developer, to hold them accountable, and they make themselves familiar with the corrective action plan. These documents are rooted in the literature where, for example, Tanner (2013) stressed that roles should be assigned to students in each group, so no one is left out. Picault (2021) mentioned that signing a team contract containing the rules set for each group is beneficial and described that students should be able to report negative behaviors of peers

[2] See Appendix 3 for the grading rubric of the group project.

without repercussions. For the latter, peer evaluations are used as part of the group project. These have to be submitted each week starting in the second week. In addition, the corrective action plan is put in place to allow groups to give warnings to inactive members.

Picault (2021) emphasized that having groups set up for an entire semester improves solidarity and socialization. This is adhered to in this course where students work consistently on the project for the whole semester. According to Tanner (2013), group sizes should be as small as possible, suggesting three to four students per group. Following this recommendation, most groups in this course have about four to five students.

The objective of the group project is to design and conduct a market research project to investigate whether a certain product development, i.e., product innovation will be successful in the food/agribusiness marketplace. The student groups work on the project throughout the semester, coming up with a new product they want to test in the market, developing a questionnaire, collecting data, analyzing data, and presenting their findings using VoiceThread. Students work on the project every week. A corresponding assignment is due to ensure that students are moving their project along rather than leaving it all for the end of the semester. In fact, students are encouraged to use the material from the weekly assignments to create their final presentation. See Appendix 1a as an example for this in Week 3 of the course and Appendix 1b for all group project instructions.

The product students choose to investigate must be from the food and agribusiness sector. They can come up with a new product themselves or investigate something already in the market. Examples are, Beyond Meat (vegan, plant-based meat substitutes), a Cuisine Coach App, Halo Top Ice Cream, a 3D Food Printer, Tru Fru (chocolate-covered, hyper-chilled, or hyper-dried fruit), Vita Boost Energy (energy vitamin tablets), Quiet Candy Packaging, Indoor Smokeless Food Smoker, Goodles (healthy mac and cheese), lab-grown meat, grab-n-go on-the-go meal replacement, super veg tortillas, no chill cookie dough, green paw raw dog food, plant-based dino nuggets, sushi burritos, and many more.

3 Methodological Background

3.1 Data Collection

To collect data on students' attitudes toward collaborative, research-based learning in an online environment, surveys were conducted in 2021 and 2022, during Spring A and Fall A in the online course AGB 456. Spring A and Fall A are 7.5-week courses that are taught in the first half of the spring and fall semesters. For example, in 2021, Spring was taught from 01/11/2021 to 03/02/2021 and Fall was taught from 08/19/2021 to 10/08/2021. This course is an asynchronous course. The study was considered exempt by the Internal Review Board (IRB) of a large university in the U.S. Southwest (IRB ID: STUDY00013094). Students received 25 points extra credit for their participation (total points in the course 1,000).

Data were collected using an online survey programmed in Qualtrics. Questions were asked about demographics (e.g., age, gender, and study major), and attitudes toward research-based group projects. In what follows, the survey instrument is briefly described with more detailed information provided in Appendix 2.

3.1.1 Sample Characteristics

As mentioned, data were collected from students in the online undergraduate class AGB 456 – Food Product Innovation and Development. Usually, in this class, a mix of students is enrolled. About 10 percent over the course of the study period were agribusiness majors, and the remaining 90 percent were students from across the university. A total of 182 students were enrolled in AGB 456 over the course of the four semesters during the study period. Of these, 11 students (6 percent) dropped the course. In Spring 2021, the sample consisted of 40 observations with a response rate of 73 percent. In

Fall 2021, the sample consisted of 34 observations with a response rate of 68 percent. In Spring 2022, the sample consisted of 30 observations with a response rate of 75 percent. In Fall 2022, the sample consisted of 32 observations with a response rate of 71 percent. The total number of observations is n = 136.

Sample characteristics can be found in Table 2. The majority of participants were female (59 percent) and on average 25 years old, ranging from 19 to 51 years. Average household size was three, and 14 percent had children they cared for. Five percent of respondents identified as African American and Asian, respectively. One percent identified as Native American. The majority identified as White (65 percent). Twenty-five percent indicated that they were Hispanic. In terms of employment, 36 percent were employed full-time, and 38 percent were employed part-time. Twenty-two percent of respondents indicated being a full-time student. For 93 percent of respondents, the United States is their home country, and 98 percent live in North America. Eighty-five percent speak English at home. Sixty-five percent are a business major, and 17 percent of the sample are an Honors student. All questions corresponding to these variables can be found in Appendix 2.

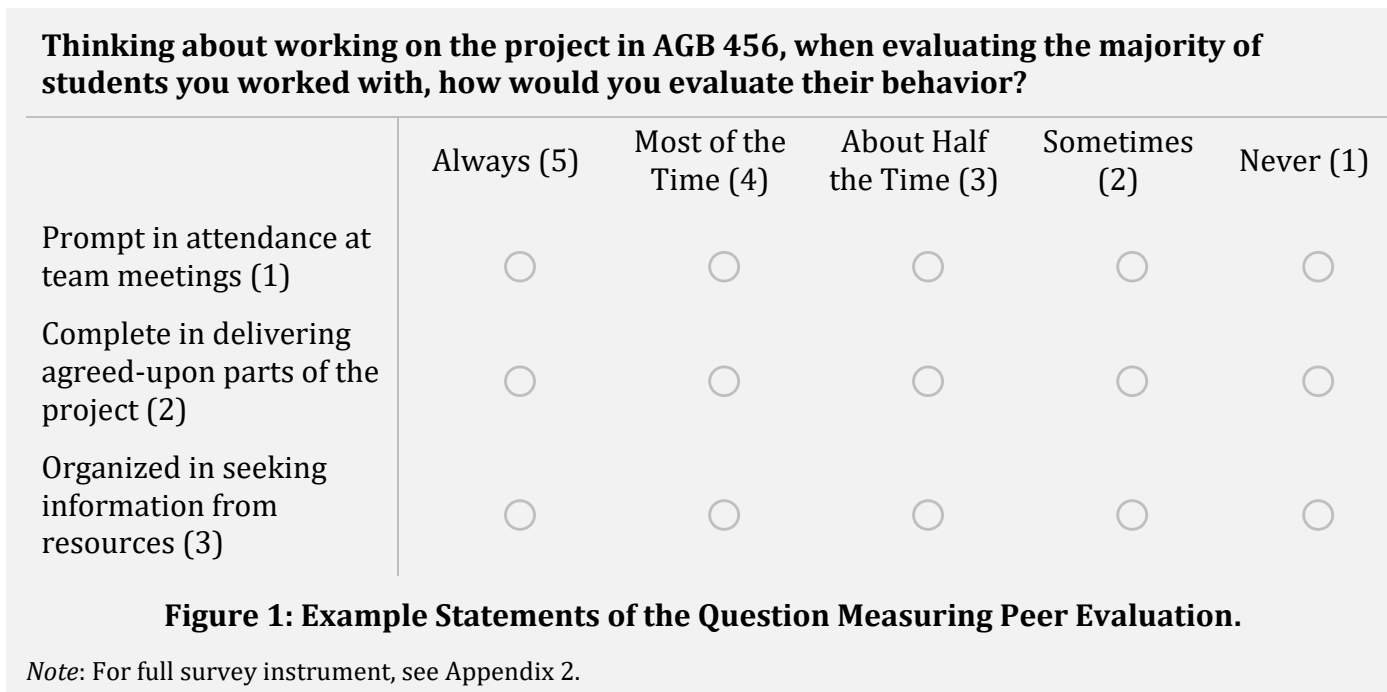**Table 2: Descriptive Statistics for Survey Respondents.**

Characteristic	U.S.[1]	Mean	Standard Deviation	Min	Max	N	Variable Description
Gender female	55%	59%	49%	0	1	133	B
Age in years	<18: 9% 18–24: 64% Over 24: 27%	24.62	5.85	19	51	135	C
Household size		3.20	1.68	1	10	133	C
Caring for children		14%	35%	0	1	136	B
African American	11%	5%	21%	0	1	130	B
Asian	6%	5%	22%	0	1	136	B
Native American	1%	1%	12%	0	1	136	B
White	42%	65%	48%	0	1	103	B
Hispanic	17%	25%	43%	0	1	132	B
Full-time employed		36%	48%	0	1	136	B
Part-time employed		38%	49%	0	1	136	B
Full-time student		22%	42%	0	1	136	B
U.S. is home country		93%	26%	0	1	136	B
Lives in North America		98%	15%	0	1	136	B
Speaks English at home		85%	36%	0	1	136	B
Business major		65%	48%	0	1	136	B
Honors student		17%	37%	0	1	132	B

Note: B = Binary variable equal to 1 for the characteristic, and 0 otherwise. C = Continuous variable.
[1]Undergraduate students enrolled in the United States (National Student Clearinghouse Research Center 2023)

3.1.2 Peer Evaluation

To understand how satisfied students were with the other members in their group, the question *"Thinking about working on the project in AGB 456. When evaluating the majority of students you worked with, how would you evaluate their behavior?"* was used. See Figure 1 for an example. Answers included items, such as "Prompt in attendance at team meetings," "Complete in delivering agreed-upon parts of the project," and "Organized in seeking information from resources." Answers were evaluated on a five-point scale from Never (1) to Always (5).

Thinking about working on the project in AGB 456, when evaluating the majority of students you worked with, how would you evaluate their behavior?

	Always (5)	Most of the Time (4)	About Half the Time (3)	Sometimes (2)	Never (1)
Prompt in attendance at team meetings (1)	○	○	○	○	○
Complete in delivering agreed-upon parts of the project (2)	○	○	○	○	○
Organized in seeking information from resources (3)	○	○	○	○	○

Figure 1: Example Statements of the Question Measuring Peer Evaluation.

Note: For full survey instrument, see Appendix 2.

3.1.3 Workload Evaluation

In addition, it was evaluated how the students assessed themselves in terms of workload. The question was phrased, *"Imagine there are 100 points available for the whole team, how many points would you pay yourself for your share in percent. For instance, if a team has two members and each member is equally involved, your share would be 50%."*

3.1.4 Attitudes Toward Research-Based Group Projects

To measure attitudes toward research-based group projects, the following question was used: *"With regards to working in this particular group in AGB 456, what is your opinion on the following statements?"* Answers included, "Because of this group project: I learned more than in courses without a group project (1); I benefitted from the other students' skills and knowledge (2); I made new friends (3); … I had to take on more work than others (8)." See Figure 2 for an example. Agreement with these statements was evaluated on a Likert scale from Strongly disagree (1) to Strongly agree (5). These questions aimed to highlight different positive and negative attitudes toward group assignments as described, for example, by Buckenmyer (2000), Caspersz et al. (2003), and Pfaff and Huddleston (2003).

With regards to working in this particular group in AGB 456, what is your opinion on the following statements? Because of this group project:

	Strongly Agree (5)	Somewhat Agree (4)	Neither Agree nor Disagree (3)	Somewhat Disagree (2)	Strongly Disagree (1)
I learned more than in courses without a group project (1)	○	○	○	○	○
I benefitted from the other students' skills and knowledge (2)	○	○	○	○	○

Figure 2: Example Statements of the Question Measuring Attitudes Toward Group Projects.

Note: For full survey instrument, see Appendix 2.

3.1.5 General Attitudes and Knowledge Toward Research-Based Group Projects

General attitudes and knowledge regarding group projects was measured using a bipolar 7-point scale following Joiner (1998). See Figure 3 for an example. The items included in the scale test, for instance, whether group projects are a favorite activity and how much students like working on group projects, as well as whether they are familiar with them and have experience working in groups.

Check the boxes that best describe your attitudes and knowledge regarding group projects, i.e., group assignments in teaching in general. For instance, group work similar to the one you participated in, in AGB 456.

	1 (7)	2 (6)	3 (5)	4 (4)	5 (3)	6 (2)	7 (1)	
Group projects are my favorite activity	○	○	○	○	○	○	○	Group projects are my least favorite activity
I like working on group projects very much	○	○	○	○	○	○	○	I dislike working on group projects very much
I am very positive about working on group projects	○	○	○	○	○	○	○	I am very negative about working on group projects

Figure 3: Example of the Attitude and Knowledge Assessment.

Note: For full survey instrument, see Appendix 2.

3.1.6 Evaluating Whether the Group Project Is Good Practice Work

The goal of the group project is to prepare students for projects they might encounter when entering the work force, that is, during future jobs. To evaluate this, they were asked to indicate their agreement with the statement *"This was good practice work."* on a Likert scale from 1 = Strongly disagree to 5 = Strongly agree.

3.2 Data Analysis

3.2.1 Principal Component Analysis to Determine General Attitude and Knowledge Factors

In order to determine general attitudes and knowledge, exploratory factor analysis was applied to the scale by Joiner (1998) described above. The resulting factors were then included in further analysis. Specifically, principal component analysis with varimax as a rotational strategy was employed in Stata to identify the number of factors. Factor analysis combines highly correlated items into a factor where the factors are independent and unrelated from each other. This analysis allows one to identify a latent structure among variables. The reliability of the generated factors is measured using Cronbach's alpha for each factor, which should be greater than 0.5 in order to allow the factor to be included in the subsequent analysis (Kim and Mueller 1978; Hair et al. 1998).
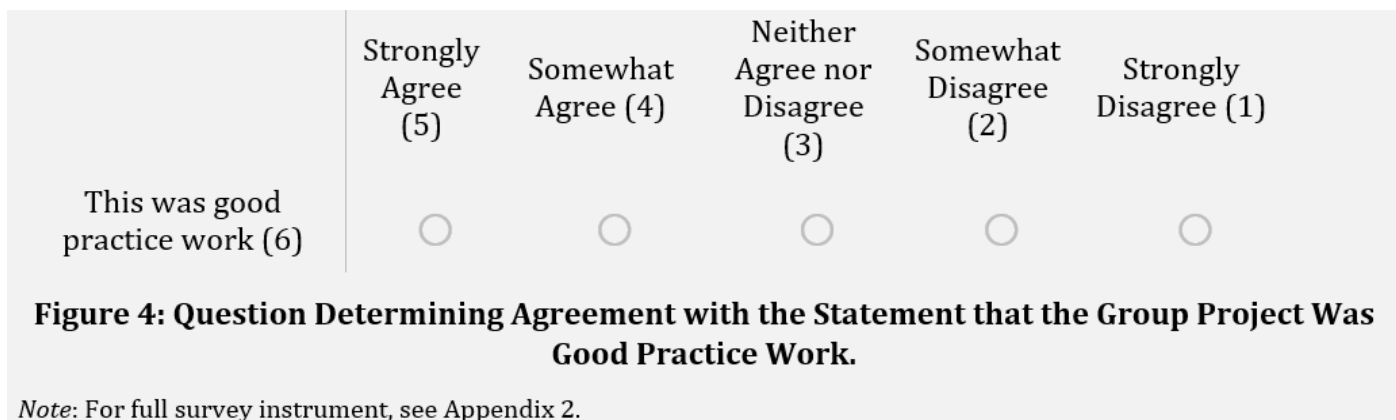
3.2.2 Analyzing Drivers of Student Attitudes Toward Group Projects

To analyze drivers of student attitudes toward group projects, a series of four models was estimated. Referring to Figure 1, the analysis starts by investigating what affects students' peer evaluations. To do so, the statements presented in the question serve as individual dependent variables (Figure 1 displays example statements). Since they were measured on a 5-point Likert scale that is ordinal in nature from (1) Never to (5) Always, ordered probit models with robust standard errors are used following Greene (2012, pp. 787–791). The independent variables included in the model are gender (female equal to 1, 0 = otherwise), race (White, African American, Asian, all binary variables equal to 1, 0 = otherwise), Hispanic (equal to 1, 0 = otherwise), and age in years (continuous variable).

Referring to Figure 2, drivers of attitudes toward the group project are analyzed. To do so, the statements presented in the question serve as individual dependent variables (Figure 2 displays example statements). Since they were measured on a 5-point Likert scale that is ordinal in nature from (1) Strongly disagree to (5) Strongly agree ordered probit models with robust standard errors are used following Greene (2012, pp. 787–791). The independent variables are again gender, race, ethnicity, and age, as described above.

Referring to Figure 3, drivers of general attitudes and knowledge toward research-based group projects are analyzed. Again, the statements presented in the question serve as individual dependent variables (Figure 3 displays example statements). Since they were measured on a 7-point Likert scale that is ordinal in nature, ordered probit models are used with robust standard errors following Greene (2012, pp. 787–791). The same independent variables, as described above, are included in the estimation.

The fourth model estimates determinants regarding the opinion that the group project was good practice work based on the question displayed in Figure 4. In addition to the independent variables described above, this model also included the following independent variables: *U.S.* equal to 1 if United States is the home country, zero otherwise. *English* equal to 1 if English is the main language at home, zero otherwise. *Comfortable* equal to 1 if participant is comfortable speaking English, zero otherwise. *Honors* equal to 1 if participant is an Honors student, zero otherwise. For this model, marginal effects were determined. All estimations were conducted in Stata 17.

	Strongly Agree (5)	Somewhat Agree (4)	Neither Agree nor Disagree (3)	Somewhat Disagree (2)	Strongly Disagree (1)
This was good practice work (6)	○	○	○	○	○

Figure 4: Question Determining Agreement with the Statement that the Group Project Was Good Practice Work.

Note: For full survey instrument, see Appendix 2.

4 Empirical Results

4.1 Group Member Evaluations

The success of working in groups, whether in-person or online, hinges on how well the group members collaborate (Espey 2018b). Table 3 presents results for peer evaluations of group members that show the students believed that most of their group members meet deadlines, complete deliverables, develop ideas constructively with others, and volunteer when tasks need to be accomplished. Dimensions to improve include the concern of quieter members being excluded, being prompt in attendance, demonstrating knowledge in the subject area, and making sure the workload is evenly distributed. Overall, based on the descriptive results, it can be concluded that the students were mainly satisfied with their group members.

Several sociodemographic factors were regressed on these evaluations. Ordered probit model estimation results are provided in Table 4. Coefficients and significance are displayed. It becomes evident from Table 4 that being female leads to evaluating peers more positively. Students being White and Hispanic are more likely to evaluate their peers as being good listeners, while Asian students are less likely to evaluate their peers as pulling their fair share and being knowledgeable.

4.2 Workload Evaluations

In addition, it was measured how the students assess themselves in terms of workload. Results in Table 5 show that students allocate themselves on average about 40 percent of the workload. Given that most groups have 4–5 members, this means that they consider their own workload above average. In addition, there are students who assess their own workload to be at 100 percent (the minimum ranging between 16 percent and 20 percent). While we do not know whether the perceivably uneven split is true or not, a misperceived workload can lead to discontent when working in groups (e.g., Felder and Brent 1994). This calls for solutions to address this issue to prevent potential dissatisfaction with cooperative teaching methods if uneven working loads result or are perceived.

4.3 Attitudes Toward Cooperative Learning

Not every student will be in favor of group projects (e.g., Buckenmyer 2000). Hence, it is important to understand what underlying reasons for this are. Results in Table 6 show that most students agree with the statement that they benefitted from each other (75 percent Somewhat or Strongly agree), and a slim majority agrees that they enjoyed the course more than a course without a group project (51 percent Somewhat or Strongly agree). More students agree with the statement that they would choose a course with a group project again in the future—compared to those who disagree with this statement (47 percent Somewhat or Strongly agree, 27 percent Somewhat or Strongly disagree); and the same holds for the statement that they believe they learned more than in courses without a group project (44 percent Somewhat or Strongly agree, 28 percent Somewhat or Strongly disagree).

Table 3: Peer Evaluation of Group Members (in %, *N* = 136).

Statement	Never	Some-times	About Half the Time	Most of the Time	Always
Meeting deadlines	2.94	2.21	3.68	15.44	75.74
Good listeners	1.47	5.88	8.09	25.74	58.82
Complete in delivering agreed-upon parts of project	2.21	7.35	5.15	27.94	57.35
Developing ideas constructively with others	3.68	7.35	5.88	25.74	57.35
Volunteering appropriately during team meetings when tasks need to be accomplished	3.68	7.35	7.35	27.21	54.41
Able to solve problems	2.94	5.88	5.15	32.35	53.68
Organized in seeking information from resources	3.68	3.68	11.76	28.68	52.21
Making helpful suggestions on ways of accomplishing projects	3.68	2.21	11.03	33.82	49.26
Pulling fair share with regard to overall workload	5.15	10.29	7.35	30.88	46.32
Demonstrating knowledge in the subject area	3.68	3.68	8.82	38.24	45.59
Prompt in attendance at team meetings	2.94	6.62	8.82	40.44	41.18
Seeking input from quieter team members	8.09	11.03	17.65	22.79	40.44

Note: Question: Thinking about working on the project in AGB 456, when evaluating the majority of students you worked with, how would you evaluate their behavior?

Another positive aspect of cooperative techniques was recognized by the students with 48 percent somewhat or strongly agreeing that group projects enable them to make friends. Something not to be underestimated given that online students may not have as many opportunities to connect to their fellow students as compared to in-person students (e.g., Burke 2022). A main criticism was again that the students felt they had to take on more work than others (41 percent Somewhat or Strongly agree), which suggests once more that finding a mechanism to divide the workload fairly is important to make group projects successful in the classroom. Finally, 37 percent strongly or somewhat agree with the statement "I wish I could have worked on this by myself." This is in line with findings by Caspersz et al. (2003). More in-depth analysis is required to understand why these students hold this attitude.

Hence, sociodemographic factors were regressed on the individual attitudes using ordered probit models as outlined in Section 3. Estimation results are provided in Table 7 for the estimated ordered probit models. Note, these are again individual ordered probit models where the attitudes (e.g., benefitted from others, made new friends) are the dependent variables, and the socio-demographics are the independent variables. Age is significant for multiple attitudinal statements. The older the student, the more likely they are to have negative attitudes toward group projects. Specifically, results indicate that an increase in age leads to disagreement with the statements "I enjoyed this course more than a course without a group project," "I would choose a course with a group project again," "I learned more than in courses without a group project," and agreement toward the statement "I wish I could have

Table 4: Effects of Socio-Demographics on Evaluation of Peers (N = 100).

Evaluation Criteria (Dependent Variables)	Independent Variables									
	Female	White	African American	Asian	Hispanic	Age	Prob > chi²	Wald chi²	Pseudo LL	R²
Meeting deadlines	0.528 * (0.283)	0.051 (0.376)	-0.270 (0.595)	-0.642 (0.603)	0.280 (0.385)	-0.032 (0.022)	0.046	12.80	-71.93	0.06
Good listeners	0.410 (0.262)	0.770 * (0.446)	0.893 (0.703)	-0.443 (0.494)	0.853 ** (0.433)	-0.014 (0.021)	0.000	29.38	-85.52	0.08
Complete in delivering agreed-upon parts of the project	0.927 *** (0.264)	0.116 (0.520)	0.358 (0.769)	-0.491 (0.630)	0.786 (0.494)	-0.003 (0.022)	0.001	23.54	-84.37	0.10
Developing ideas constructively with others	0.696 *** (0.251)	-0.240 (0.452)	0.016 (0.687)	-0.298 (0.662)	0.127 (0.415)	-0.002 (0.020)	0.217	8.30	-97.63	0.04
Volunteering appropriately during team meetings when tasks need to be accomplished	0.527 ** (0.243)	-0.254 (0.393)	0.049 (0.700)	-0.785 (0.596)	0.259 (0.351)	-0.018 (0.021)	0.125	9.98	-106.72	0.04
Able to solve problems	0.411 (0.256)	0.200 (0.443)	0.243 (0.653)	0.276 (0.575)	0.618 (0.415)	-0.022 (0.020)	0.543	5.00	-95.35	0.03
Organized in seeking information from resources	0.606 ** (0.247)	-0.169 (0.446)	0.092 (0.693)	-0.205 (0.599)	0.478 (0.423)	0.005 (0.020)	0.233	8.08	-106.39	0.05
Making helpful suggestions on ways of accomplishing projects	0.617 ** (0.243)	-0.260 (0.478)	-0.204 (0.684)	-0.684 (0.700)	0.141 (0.401)	-0.005 (0.021)	0.197	8.61	-96.48	0.05
Pulling fair share with regard to overall workload	0.598 ** (0.245)	-0.441 (0.398)	-0.301 (0.571)	-1.177 ** (0.508)	0.134 (0.355)	-0.034 (0.016)	0.001	22.91	-110.16	0.07
Demonstrating knowledge in the subject area	0.468 * (0.242)	-0.410 (0.489)	-0.386 0.652	-1.164 ** (0.574)	0.321 (0.427)	-0.025 (0.018)	0.001	23.21	-99.78	0.07
Prompt in attendance at team meetings	0.618 ** (0.254)	-0.672 (0.481)	-0.242 0.678	-0.523 (0.614)	-0.152 (0.437)	-0.019 (0.016)	0.137	9.72	-99.77	0.05
Seeking input from quieter team members	0.516 ** (0.236)	-0.136 (0.422)	0.144 (0.598)	-0.140 (0.483)	0.114 (0.423)	-0.006 (0.020)	0.430	5.94	-131.59	0.02

Note: p value < 0.1*; p value < 0.05**; p value < 0.01***. Standard errors in parentheses. LL = Likelihood. Socio-demographics were regressed individually on Attitude Statements.

Table 5: Evaluation of Workload (in %).

	Mean	SD	Min	Max
Spring 2021 (*N* = 40)	36	18	20	100
Fall 2021 (*N* = 34)	44	22	20	100
Spring 2022 (*N* = 30)	34	19	20	100
Fall 2022 (*N* = 32)	41	26	16	100
Overall (*N* = 136)	39	22	16	100

worked on this by myself." These results offer an interesting perspective toward attitudes regarding group projects where perceivably this form of instructing resonates more with younger students. Some significant effects are also found for being female and White.

4.4 General Attitudes and Knowledge Toward Group Projects

Next, general attitudes and knowledge regarding group projects was measured using a bipolar 7-point scale following Joiner (1998). Table 8 shows the mean and standard deviation. Students agree most with the statements that they are familiar with group projects and have a great deal of exposure and experience with group projects. However, they indicate that group projects are not their favorite activity, and not particularly desirable.

The data were then analyzed using exploratory factor analysis, that is, principal component analysis. Appendix Table A1 (Appendix 4) shows the rotated component matrix. The Kaiser-Meyer-Olkin (KMO) criterion is 0.85, which is considered to be meritorious.[3] The following two factors were found:

Factor 1 (F1): Knowledge regarding group projects. Factor 1 contains items related to knowledge, for example, that one is familiar with group projects and has a lot of experience and exposure to group projects. The Cronbach's alpha measures 0.9284, which is considered to be excellent.[4]

Table 6: Attitudes Toward Group Projects (in %, *N* = 136)

Attitudes	Strongly Disagree	Somewhat Disagree	Neither/Nor	Somewhat Agree	Strongly Agree
I benefitted from the other students' skills and knowledge	9	6	10	32	43
I enjoyed this course more than a course without a group project	14	12	23	30	21
I would choose a course with a group project again	13	14	26	28	19
I learned more than in courses without a group project	12	16	29	26	18
I made new friends	11	16	25	32	16
I had to take on more work than others	21	19	19	23	18
I wish I could have worked on this by myself	20	22	21	22	15

Note: Question: With regards to working in this particular group in AGB 456, what is your opinion on the following statements? Because of this group project:…

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[3] This is based on the KMO measures, which are defined as follows: 0.00 to 0.49 unacceptable; 0.50 to 0.59 miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79 middling; 0.80 to 0.89 meritorious; and 0.90 to 1.00 marvelous.
[4] Cronbach's alpha determines internal consistency as follows: ≥ 0.9 excellent, 0.9 to 0.8 good, 0.8 to 0.7 acceptable, 0.7 to 0.6 questionable, 0.6 to 0.5 poor, and lower than 0.5 unacceptable.

Table 7: Effects of Socio-Demographics on Attitudes Toward Group Projects (*N* = 100).

Attitudes (Dependent Variables)	Female		White	African American	Asian	Hispanic	Age		Prob > chi²	Wald chi²	Pseudo LL	R²
I benefitted from the other students' skills and knowledge	0.599 (0.245)	**	-0.274 (0.462)	-0.419 (0.631)	-0.466 (0.566)	0.452 (0.431)	-0.010 (0.020)		0.02	15.80	-121.50	0.05
I enjoyed this course more than a course without a group project	0.305 (0.235)		-0.464 (0.444)	0.251 (0.591)	0.318 (0.590)	0.213 (0.408)	-0.031 (0.016)	**	0.02	14.82	-146.02	0.04
I would choose a course with a group project again	-0.202 (0.2270		-0.364 (0.359)	0.519 (0.576)	-0.358 (0.523)	0.017 (0.349)	-0.039 (0.019)	**	0.09	11.02	-150.32	0.03
I learned more than in courses without a group project	0.180 (0.225)		-0.347 (0.383)	-0.223 (0.480)	0.024 (0.551)	0.227 (0.385)	-0.038 (0.017)	**	0.01	18.33	-146.57	0.03
I made new friends	0.166 (0.226)		-0.221 (0.387)	0.351 (0.640)	0.091 (0.496)	0.121 (0.353)	-0.013 (0.020)		0.67	4.04	-149.92	0.01
I had to take on more work than others	-0.340 (0.233)		0.260 (0.352)	0.039 (0.515)	0.809 (0.492)	-0.384 (0.378)	0.001 (0.016)		0.04	13.07	-153.28	0.03
I wish I could have worked on this by myself	-0.327 (0.233)		0.669 * (0.358)	-0.012 (0.506)	0.788 (0.597)	0.128 (0.334)	0.041 (0.018)	**	0.02	15.51	-153.31	0.04

Note: *p* value < 0.1*; *p* value < 0.05**. Standard errors in parentheses. LL = Likelihood. Socio-demographics were regressed individually on Attitude Statements.

Factor 2 (F2): Attitude regarding group projects. Factor 2 sums up the statements which express attitudes toward group projects, such as liking group projects and being positive about it. It also includes the opinions that group projects are excellent and desirable. The Cronbach's alpha measures 0.9458, which is also considered to be excellent.

demographics are the independent variables. Age has the most consistent statistically significant effect across models for the different statements assessed. The older the student, the more likely they are to have negative attitudes toward group projects. Specifically, results indicate that an increase in age leads to disagreement with the attitude statements, such as "I like working on group projects very much" and "I am very positive about working on group projects." The same holds for White students with the exception of "I am very positive about working on group projects." Female students more likely significantly disagree with the statements "Group projects are my favorite activity" and "Group projects are desirable," which is interesting given their rather positive evaluations in previous analyses. Hispanic students are significantly more likely to be familiar with group projects; although this model was insignificant.

4.5 Group Project as Practice Work
Given that the group project incorporates research-based teaching with the goal of preparing students for projects to be done in future jobs, it was of importance to evaluate this objective from their perspective. Four percent strongly disagree with this, and 5 percent somewhat disagree, while 10 percent indicated they neither agree nor disagree. The majority agreed that the project was good practice work, with 39 percent somewhat agreeing and 43 percent strongly agreeing (*M* = 4.12 and *SD* = 1.03). As Table 10 displays, there are differences again between the semesters, with students in spring agreeing with this statement more than those in fall semesters.

Table 8: Attitudes and Knowledge Toward Group Projects (*N* = 136).

Items	Mean	Standard Deviation
Group projects are my favorite activity/Group projects are my least favorite activity	3.49	1.79
I like working on group projects very much/I dislike working on group projects very much	4.01	1.81
I am very positive about working on group projects/I am very negative about working on group projects	4.73	1.56
Group projects are excellent/Group projects are poor	4.31	1.70
Group projects are desirable/Group projects are undesirable	4.00	1.76
I'm extremely familiar with working on group projects/I'm extremely unfamiliar with working on group projects	5.85	1.33
I have had a great deal of experience with working on group projects/I have had no experience with working on group projects	5.58	1.45
I have had a lot of exposure to group projects/I have had no exposure to group projects	5.68	1.47

Note: A bivariate scale with seven points was used. Seven indicates full agreement with left-hand side statements, one indicates full agreement with right-hand side statements. Question: Check the boxes that best describe your attitudes and knowledge regarding group projects, i.e., group assignments in teaching in general. For instance, group work similar to the one you participated in, in AGB 456.

To investigate this further, an ordered probit model with robust standard errors was used to analyze determinants of attitudes toward group projects being good practice work (see Table 11). Determinants in the model included socio-demographics, such as gender and age; being comfortable with speaking English; studying characteristics, such as being an Honors student; and employment. Results are reported in Table 11. In addition, Appendix Table A2 (Appendix 4) displays the average marginal effects (dy/dx) showing how the relationship between each independent variable and the change in probability of outcome changes as those variables change.

The results show that being female increases the likelihood to agree with the statement that group work is good practice work, that is, relevant for future jobs. The same holds for those who have a positive general attitude toward group projects. In fact, being female has the strongest impact on strongly agreeing that the group project was good practice work, followed by a generally positive attitude toward group projects. This suggests that motivating students to appreciate group projects and pointing out the positive aspects of it might have the biggest influence toward making group projects in online classes successful. However, being Asian decreases the likelihood to agree with this statement. Being Asian has the strongest negative relationship with strongly agreeing with group projects being good practice work.

In particular, being female will significantly increase the probability of choosing "Strongly agree" for the item that group projects are good practice work by 28 percent compared to being male. Compared to being a male, being female will decrease the probability of choosing "Strongly disagree, disagree, neither/nor, agree" for this item by 3 percent, 4.8 percent, 7.7 percent, and 12.6 percent, respectively. Being Asian will significantly increase the probability to choose "agree" by 13.4 percent compared to other ethnicity groups and will significantly decrease the probability to choose "Strongly agree" by 29.8 percent compared to other ethnicity groups.

Table 9: Effects of Socio-Demographics on Attitudes and Knowledge Toward Group Projects ($N = 100$).

Attitudes & Knowledge (Dependent Variables)	Independent Variables									
	Female	**White**	**African American**	**Asian**	**Hispanic**	**Age**	**Prob > chi²**	**Wald chi²**	**Pseudo LL**	**R²**
Group projects are my favorite activity	-0.620 *** (0.227)	-0.669 * (0.347)	0.575 (0.557)	-0.052 (0.524)	-0.017 (0.358)	-0.045 ** (0.018)	0.000	32.86	-172.63	0.06
I like working on group projects very much	-0.217 (0.232)	-0.613 * (0.348)	0.701 (0.639)	-0.084 (0.598)	0.047 (0.340)	-0.041 ** (0.019)	0.000	25.19	-176.57	0.04
I am very positive about working on group projects	-0.230 (0.233)	-0.469 (0.291)	0.680 (0.611)	-0.152 (0.512)	0.034 (0.283)	-0.036 * (0.021)	0.022	14.80	-173.85	0.03
Group projects are excellent	-0.284 (0.234)	-0.732 ** (0.314)	0.267 (0.578)	-0.319 (0.617)	0.003 (0.330)	-0.034 * (0.019)	0.001	22.03	-174.16	0.04
Group projects are desirable	-0.487 ** (0.233)	-0.559 * (0.324)	0.603 (0.586)	-0.444 (0.523)	-0.139 (0.326)	-0.037 ** (0.017)	0.000	25.20	-175.22	0.04
I'm extremely familiar with working on group projects	-0.031 (0.215)	0.226 (0.354)	0.709 (0.692)	0.414 (0.596)	0.678 ** (0.335)	-0.031 (0.019)	0.192	0.19	-136.26	0.03
I have had a great deal of experience with working on group projects	-0.216 (0.224)	0.102 (0.401)	0.896 (0.778)	-0.108 (0.535)	0.521 (0.388)	-0.011 (0.025)	0.497	5.38	-152.24	0.02
I have had a lot of exposure to group projects	-0.128 (0.214)	0.260 (0.344)	0.712 (0.682)	-0.139 (0.463)	0.353 (0.332)	-0.022 (0.022)	0.705	3.79	-152.07	0.01

Note: p value < 0.1*; p value < 0.05**. Standard errors in parentheses. LL = Likelihood. Socio-demographics were regressed individually on Attitudes/Knowledge Items.

5 Conclusion

In online courses, students may not have much opportunity to work together with other students (e.g., Burke 2022). Active learning techniques, such as working in groups, allow students to interact with other students, while excelling at course material at higher cognitive levels (e.g., Felder and Brent 1994; Prince 2004; Espey 2018a). Such strategies of cooperative learning improve retention, motivation, and critical thinking but most importantly foster relationships among peers and prepare students for what is to come in the workplace, where collaboration is common (Caspersz et al. 2003).

This study tested group projects in an online environment and gathered data from four classes to shed light on students' attitudes toward an online group project that is research-based. Findings for peer evaluations showed that students were overall content with the members of their groups, for example, with regards to meeting deadlines and completing deliverables. However, results show that it is perceived as challenging to include students who are not very outgoing in the group project. In addition, group members who are not prompt in attendance at meetings and do not carry their fair share of the workload can cause dissatisfaction. Students often perceived their own workload above average. Even if

Table 10: Attitude Toward Group Projects Being Good Practice Work (in %).

Semesters	General Disagreement	Strongly Disagree	Somewhat Disagree	Neither/Nor	Somewhat Agree	Strongly Agree	General Agreement
Spring 2021 (N = 40)	8	0	8	3	55	35	90
Fall 2021 (N = 34)	9	6	3	12	35	44	79
Spring 2022 (N = 30)	0	0	0	10	30	60	90
Fall 2022 (N = 32)	18	9	9	16	31	34	65
Overall (N = 136)	9	4	5	10	39	43	82

that was a misperception, this would likely lead to dissatisfaction with group projects. Hence, it might be worthwhile to address this issue to avoid potential dissatisfaction with cooperative teaching methods.

Underlying reasons of favoring group projects seem to be that one can benefit from other students, which leads to enjoying the course more, as well as believing more was learned in the course due to the group project. Making friends was also high on the list of positive aspects of group projects in online environments. This is valuable given that online students may have less opportunities to connect with other students compared to in-person students (Burke 2022). Nevertheless, the distribution of work does remain a barrier to including group projects successfully in courses, and this indicates that one needs to find ways to ensure that the workload is evenly distributed. Future research could analyze potential solutions for this in order to implement group projects successfully. Another challenge is to cater to those students who truly prefer to work on group project assignments on their own.

A specific investigation of attitudes and knowledge toward group projects showed that in general students are content with group projects and are highly familiar with the concept. This suggests that collaborative techniques are widely used, and overall are well-received even if certain aspects might lead to discontentment in some cases. The study considered group projects as preparation for future work. The majority of students agree that such activities are a good opportunity to practice. Female students and those who hold a generally positive attitude toward group projects are more likely to view these activities as a good practice. This indicates that students' attitudes are critical. Hence, future research could investigate how to motivate students to fully engage in group projects to make it successful as a learning tool.

This study has limitations. Given that the surveys were conducted at the end of the class, it is possible that students who were unsatisfied with the group project dropped the class and hence, did not fill out the surveys noting their dissatisfaction. If this was the case, the study could be suffering from so-called Survivor Bias. However, the amount of students who dropped the class is about 6 percent, and students usually dropped the class within the first two weeks of the semester, when the group project had just begun. Thus, it may be reasonable to assume that the group project only marginally affects the decision to drop the course. Hence, it is assumed that Survivor Bias is low. Nevertheless, when interpreting the results, it is advisable to keep in mind that Survivor Bias could have caused an overestimation of the benefits of the group project and underestimation of its cost.

Another limitation is that this study does not allow for comparison of the results to in-person group projects. In fact, this study set out to analyze attitudes toward group projects in an online setting. Nevertheless, it would be interesting to see how online students' attitudes compare to in-person

Table 11: Determinants of Attitudes Toward Group Projects Being Good Practice Work (N = 96).

	Coefficient Estimate	Standard Error	Z-value	
F1: Attitude toward group projects	0.719	0.157	4.59	***
F2: Knowledge re. group projects	0.089	0.123	0.73	
U.S. is home country	-0.332	0.648	-0.51	
English main language at home	-0.076	0.557	-0.14	
Comfortable speaking English	0.785	0.736	1.07	
Female	0.984	0.311	3.17	***
Age	0.005	0.02	0.25	
Full-time employed	0.191	0.341	0.56	
Part-time employed	0.126	0.338	0.37	
White	-0.411	0.444	-0.93	
African American	-0.34	0.702	-0.48	
Asian	-1.048	0.576	-1.82	*
Hispanic	0.298	0.452	0.66	
Business major	0.465	0.287	1.62	
Honors student	-0.394	0.413	-0.95	
Wald chi^2(15)	48.65			
Prob > chi^2	0.000			
Log Pseudo LL	-83.41			
Pseudo R^2	0.212			

Note: p value < 0.1*; p value < 0.01*** LL = Likelihood. Conducting a correlation analysis reveals that there is no concern regarding collinearity among the independent variables. In addition, it was tested whether effects would differ based on distance from the pandemic by including variables from Fall 2021, Spring 2022, and Fall 2022. However, none of these variables showed significant effects.

students' attitudes. Future research could address this by conducting a similar study in both in-person and online courses.

This course used random group building to form the teams for the group project. However, Brown et al. (2019b) showed that students want to be incorporated in creating their own groups. It would be interesting to explore this further for online formats, given that Picault (2021) mentioned that online environments make it more difficult to employ such efforts. The author's own experience points toward the importance of getting the groups started immediately in a 7.5-week course. Having students build their own groups could hinder this. Nevertheless, the promising findings by Brown et al. (2019b) toward satisfaction with group projects might warrant a trade-off between speedy, random group formation and student team building. In particular, Brown et al. (2019b) describe how they have the class choose team leaders first and then build the groups around the leaders. This would be interesting to explore in an online, asynchronous environment. Though challenging to transfer their mechanism to find the leaders, this could give a new perspective for students on group projects and the importance of being present in an online course from day one. Brown et al. (2019b) themselves propose solutions to incorporate their mechanism in distance learning. Most interesting is their suggestion of having the group leader recommend grades for their peers to the teacher. This suggestion seems worth exploring in future research on cooperative learning online.

Appendix 1a: Example of Course Structure Related to the Group Project Assignments

Constructs in Consumer Behavior Research

Welcome to Week 3: Theoretical Background on Relevant Constructs in Consumer Behavior Research

This week covers the theoretical underpinnings of consumer behavior research. When answering a research question—whether it's for academic purposes or for the industry—we need to know what "construct" we are dealing with. Do we want to know how consumers perceive a new product? Are we interested in their attitudes toward sustainability, in order to successfully develop a more sustainable product? In order to pick the right data collection methods to answer our research question (e.g., we can collect data on perception via free elicitation techniques), we have to understand the underlying theories.

This week's learning objectives:

1. Differentiate between attitude, perception, and evaluation.
2. Outline the difference between preferences and willingness to pay.
3. Categorize social relationships and networks.

Assignment 3

To research what consumers think about *ChocNoChub,* I need to decide what I want to know specifically. Do I want to know how they perceive the product, or do I want to know more about their attitudes or willingness to pay? What do you want to focus on to make sure your product will be successful?

- **Discuss in your group** which theoretical constructs (e.g., attitudes, perception) are most important for you when collecting data for Assignment #8.
- **Write** about 300–400 words explaining which constructs you want to research. Again, this is an **individual assignment,** but you can draw on your group discussions for content.
- **Submit** your work in MS Word or PDF format.
- **Check** the Course Schedule for due dates.

Appendix 1b: Group Project Instructions

The group assignments are presented as follows (note each week also contains an individual assignment).

Week 1 (Assignment 1)
In order to complete the group assignment (Assignment 8) in this class, your group needs to pick a recent innovation or product to be developed from the food/agribusiness. Note, this product does not have to exist, yet. In fact, if you come up with a brand new product that you wish was on the market, it will be more interesting for you to work on this assignment. In this first assignment, I want you to work with your group to decide on this product. I myself came up with "Fat-Free Chocolate that tastes delicious" I'll call it ChocNoChub.

Meet with your group and pick a study product that you want to use for your Assignment 8. Provide a short description of why you chose this product. Note, this product does not have to be your "final choice." This assignment is meant to get you started.

For me, ChocNoChub would be the perfect product, because then I could eat chocolate all day long without worrying about the calories. However, that might not be true for all consumers. For example, health-conscious consumers could worry about why it tastes so good without fat. Therefore, I would need a consumer survey to test whether this product would be successful in the market.

Please note, your product does not have to be a food product.

Submit your work in MS Word or PDF format.

In addition to the group assignment in the first week, each student has to upload their signed Team Contract, which is based on a discussion of the Team Membership Agreement and Group Charter in the group. Students decide who will serve in which capacity. For example, which group member will be the CEO, CTO, etc.; all roles are outlined in the document "Team Membership Agreement and Group Charter." Finally, they complete the Team Membership Agreement Terms and Conditions, which is meant to increase a feeling of responsibility to contribute to the group projects.

Week 2 (Assignment 2)

In your group, finalize your choice of product and begin thinking about the questionnaire you could use to investigate whether your product would be successful in the marketplace. For example, what would consumers think about it?

You find an example questionnaire that I created for my *ChocNoChub* below. In my questionnaire I have chosen a mix of quantitative data collection methods because I want to know what a lot of people think about the product before I start producing. If people don't like it, I will have to revise my ideas.

To research what consumers think about *ChocNoChub,* I have decided to go with an online survey. I can easily put my questions online, for example using Qualtrics and then send the link to a lot of people. How will your group do the survey?

In order to choose your method for your own questionnaire, Assignment 2 asks you to do the following:

- **Discuss** the advantages and disadvantages of quantitative data collection methods regarding the questionnaire that you will have to create for this class.

- **Explain** whether you will use a face-to-face, phone, or online questionnaire. Argue about the advantages and disadvantages of the different methods.
- **Write** about 200–300 words. Note, this is an **individual assignment, I expect you to write the 200–300 words** by yourself, not in your group. However, you can use the group discussion for the content. I understand that the content will be similar; however, your wording should be individual.
- **Submit** your work in MS Word or PDF format.
- **Check** the Course Schedule for due dates.

Peer Evaluation 1 (*There is one in every week from Week 2 to Week 8.*)

This assignment is an opportunity to evaluate your group members. This helps me to understand if all members are equally involved. Please fill out the Excel evaluation sheet. Include yourself as a member. A self-evaluation helps me to also understand where potential misperception within a group might be. Please let me know if you have any questions. Also, if you would like me to reach out to a group member, let me know.

Week 3 (Assignment 3)

To research what consumers think about *ChocNoChub,* I need to decide what I want to know specifically. Do I want to know how they perceive the product, or do I want to know more about their attitudes or willingness to pay? What do you want to focus on to make sure your product will be successful?

- **Discuss in your group** which theoretical constructs (e.g., attitudes, perception) are most important for you when collecting data for Assignment #8.
- **Write** about 300–400 words explaining which constructs you want to research. Again, this is an **individual assignment,** but you can draw on your group discussions for content.
- **Submit** your work in MS Word or PDF format.

Week 4 (Assignment 4)

This assignment has two parts.

Part 1

In my questionnaire, among other techniques, I have used Likert scales and the free elicitation technique.

- **With your group, pick** some methods that we discussed in the course, and describe why you decide to use them to research (future) success of your study product.
- **Describe** the methods you want to use in your own words and explain how to use them. As before, this is an **individual assignment,** but you can draw on content from your group discussions.

Part 2

Below you can see the questionnaire I used for my project. You can download the Word document and use that as a template for your own.

For this assignment, **work in your group to create** the first draft of your questionnaire consisting of at least 20 questions, using some of the methods covered in class.

You can use the example questionnaire I created to get started with your own questionnaire.

- **Display** all your questions. Add how you will collect your data, for example, through an online survey. For this part, **each group member can submit the same.**
- **Submit** your work including Part 1 and Part 2 in one MS Word document.
- **Check** the Course Schedule for due dates.

Week 5 (Assignment 5)

Now it is time to interview people! Once you have collected your data, you will need to enter them, e.g., in Excel, so you can analyze them. That will allow you to find out if your product is going to be successful in the market.

For your assignment:

- **In your group: Finalize** your questionnaire.
- **Interview at least 15 individuals per group member.** For example, if you decide to collect your data online, you can use Google Forms or Survey Monkey. Please do a Google search for both in order to use the free version. If you use an online survey, feel free to post your link on Yellowdig or the discussion board. You can take the other groups' surveys.
- Here is information on how to create a Qualtrics account to program your survey in Qualtrics. When using Qualtrics, you will receive a link that you can email to participants. The data are then automatically collected in Qualtrics.
- **Enter** the data in Excel or SPSS (or another similar software). See examples for coding below.
- **Submit** the data file in XLS including a variable description (e.g., Gender: female = 1, male = 0). Even though you collect the data together, submit your own data file where you included the variable descriptions. That allows you to understand the data before you start working with it.

Note: Assignments 6 and 7 in Week 6 are unrelated to the group project.

Week 7 (Assignment 8)

Final Report Guidelines – This is a group project.

You will be using VoiceThread to submit this assignment. VoiceThread requires a microphone and webcam. To learn about VoiceThread and how to create a VoiceThread, view [Using VoiceThreadLinks to an external site](#).

[Access VoiceThread Here](#)

Step 1: Analyze the data that you collected with your questionnaire, using some of the methods covered in class. For example, perform and interpret the output from a cross tabulation. Add some figures and tables. This is a group project, so distribute the work evenly among you.

Step 2: Prepare a presentation of your process and results. To create your presentation, you can use all the material from previous assignments. The presentation should be about 20 slides. You may prepare figures and tables in the form of PowerPoint, Word, Tableau, Realtimeboards, or another compatible file format to generate the figures and tables. Because this is a group project, make sure everyone contributes to the presentation.

Step 3:

Part 1: **Use the VoiceThread video recorder** to prepare a presentation that covers each of the following, specific to your market research project:

- Title slide (1 slide)
- Outline of the presentation (1 slide)
- Introduction (1–3 slides)
- Theoretical background (1–3 slides)
- Methodological background (2–4 slides)
- Empirical results (sample description and descriptive statistics) (5–10 slides)
- Conclusions (1–3 slides)
- References (1 slide)
- Contribution of each member, state "who did what," **make sure you all contribute equally to your project** (1 slide)

Part 2: **SUBMIT** your video for grading by clicking the blue Submit Assignment button within VoiceThread.

- The final project should be made using VoiceThread, and should be 15–20 minutes long.
- References and citations should be listed at the end of the presentation.
- Not obeying the above guidelines will result in a penalty.
- Spelling and grammatical errors should be avoided as they signal a lack of precision and attention to detail.
- Late projects will be penalized one letter grade per day. You should anticipate that grading for this project will be demanding yet fair.

Appendix 2: Survey Questions (Coding in Parentheses)

Thinking about working on the project in AGB 456, when evaluating the majority of students you worked with, how would you evaluate their behavior?					
	Always (5)	Most of the Time (4)	About Half the Time (3)	Sometimes (2)	Never (1)
Prompt in attendance at team meetings (1)	○	○	○	○	○
Complete in delivering agreed-upon parts of the project (2)	○	○	○	○	○
Organized in seeking information from resources (3)	○	○	○	○	○
Volunteering appropriately during team meetings when tasks need to be accomplished (4)	○	○	○	○	○
Pulling fair share with regard to overall workload (5)	○	○	○	○	○
Developing ideas constructively with others (6)	○	○	○	○	○
Making helpful suggestions on ways of accomplishing projects (7)	○	○	○	○	○
Good listeners (8)	○	○	○	○	○
Seeking input from quieter team members (9)	○	○	○	○	○
Meeting deadlines (10)	○	○	○	○	○
Demonstrating knowledge in the subject area (11)	○	○	○	○	○
Able to solve problems (12)	○	○	○	○	○

Imagine there are 100 points available for the whole team, how many points would you pay yourself for your share in percent. For instance, if a team has two members and each member is equally involved, your share would be 50%.	
My share of the group work in % ()	

With regards to working in this particular group in AGB 456, what is your opinion on the following statements? Because of this group project:					
	Strongly Agree (5)	Somewhat Agree (4)	Neither Agree nor Disagree (3)	Somewhat Disagree (2)	Strongly Disagree (1)
I learned more than in courses without a group project (1)	○	○	○	○	○
I benefitted from the other students' skills and knowledge (2)	○	○	○	○	○
I made new friends (3)	○	○	○	○	○
I enjoyed this course more than a course without a group project (4)	○	○	○	○	○
I wish I could have worked on this by myself (5)	○	○	○	○	○
This was good practice work (6)	○	○	○	○	○
I would choose a course with a group project again (7)	○	○	○	○	○
I had to take on more work than others (8)	○	○	○	○	○

Check the boxes that best describe your attitudes and knowledge regarding group projects, i.e., group assignments in teaching in general. For instance, group work similar to the one you participated in, in AGB 456.

	1 (7)	2 (6)	3 (5)	4 (4)	5 (3)	6 (2)	7 (1)	
Group projects are my favorite activity	○	○	○	○	○	○	○	Group projects are my least favorite activity
I like working on group projects very much	○	○	○	○	○	○	○	I dislike working on group projects very much
I am very positive about working on group projects	○	○	○	○	○	○	○	I am very negative about working on group projects
Group projects are excellent	○	○	○	○	○	○	○	Group projects are poor
Group projects are desirable	○	○	○	○	○	○	○	Group projects are undesirable
I'm extremely familiar with working on group projects	○	○	○	○	○	○	○	I'm extremely unfamiliar with working on group projects
I have had a great deal of experience with working on group projects	○	○	○	○	○	○	○	I have had no experience with working on group projects
I have had a lot of exposure to group projects	○	○	○	○	○	○	○	I have had no exposure to group projects

What is your major?_____

Are you an Honors student?

○ Yes (1)

○ No (0)

What is your age in years? _____

How many people live in your household? A household means that you share resources like income and groceries. _____

What is your employment status?

○ Employed full-time (1)

○ Employed part-time (2)

○ Unemployed looking for work (3)

○ Unemployed not looking for work (4)

○ Retired (5)

○ Student (6)

○ Disabled (7)

Which best describes your gender? _____

Do you have children you care for?

○ Yes, all the time (1)

○ Yes, some of the time (2)

○ No (0)

Is the U.S. your home country?

○ Yes (1)

○ No (0)

What is the main language that is spoken at your home? _____

How comfortable are you speaking English?

○ Extremely comfortable (1)

○ Moderately comfortable (2)

○ Slightly comfortable (3)

○ Neither comfortable nor uncomfortable (4)

○ Slightly uncomfortable (5)

○ Moderately uncomfortable (6)

○ Extremely uncomfortable (7)

How do you identify yourself in terms of race and ethnicity? _____

Which continent do you live in?

○ Asia (1)

○ Africa (2)

○ North America (3)

○ South America (4)

○ Antarctica (5)

○ Europe (6)

○ Australia (7)

Appendix 3: Rubric for Group Project

Criteria	Ratings					Pts
This criterion is linked to a Learning Outcome Organization (15%)	**37.5 pts Exemplary (Far Exceeds Standard)** Ideas are arranged logically and are clearly linked. Writing flows smoothly, and reader can follow reasoning.	**33.33 pts Above Average (Exceeds Standard)** Ideas are arranged logically and are linked. Most writing flows smoothly, and reader can follow reasoning.	**24.99 pts Adequate (Meets Standard)** Ideas are arranged logically, but may not be clearly linked and/or writing may leave some gaps in reasoning.	**16.67 pts Needs Improvement (Below Standard)** Ideas may not be arranged logically and/or may not be clearly linked and/or writing may leave gaps in reasoning.	**0 pts No Credit** Did not submit assignment or submitted late.	37.5 pts
This criterion is linked to a Learning Outcome Content (25%)	**62.5 pts Exemplary (Far Exceeds Standard)** Submission included creative and insightful analysis and included detailed explanation of the study of the product. Submission addresses an organized set of ideas consistent with the given guidelines. Submission is consistent with the research of an innovative product.	**50 pts Above Average (Exceeds Standard)** Submission is sufficiently conveyed, but lacks creative analysis and/or the submission is inadequately motivated and/or is not consistent with the given guidelines.	**37.5 pts Adequate (Meets Standard)** Submission is underdeveloped or insufficiently conveyed and/or is inconsistent with the given guidelines.	**25 pts Needs Improvement (Below Standard)** Submission is haphazardly conceived, underdeveloped, and/or inconsistent with the rest of the plan.	**0 pts No Credit** Did not submit assignment or submitted late.	62.5 pts

Criteria	Ratings					Pts
This criterion is linked to a Learning Outcome Development (25%)	**62.5 pts Exemplary (Far Exceeds Standard)** Main points well developed with high quality and quantity support. Reveals high degree of critical thinking. All components are thoroughly discussed with supporting evidence and other materials provided.	**50 pts Above Average (Exceeds Standard)** Main points well developed with quality supporting details and quantity. Critical thinking is weaved into points. May be missing an obvious important factor specific to the research of the product.	**37.5 pts Adequate (Meets Standard)** Main points are present with limited detail and development. Some critical thinking is present. May be missing explanation and/or the product is poorly analyzed.	**25 pts Needs Improvement (Below Standard)** Main points lack detailed development. Ideas are vague with little evidence of critical thinking.	**0 pts No Credit** Did not submit assignment or submitted late.	62.5 pts
This criterion is linked to a Learning Outcome Strength of Evidence (15%)	**37.5 pts Exemplary (Far Exceeds Standard)** Submission is well-supported by evidence (e.g., published research, published or group-administered surveys), and anecdotal or suggestive evidence, as needed. Uses properly formatted citations, when applicable.	**33.33 pts Above Average (Exceeds Standard)** Submission was generally well-supported, but lacked evidence in parts. Complete and properly formatted citations are generally present, when applicable.	**25.01 pts Adequate (Meets Standard)** Submission lacked crucial evidence. The provided evidence was weak or inappropriate. Occasional and/or incomplete references are provided, when applicable.	**16.67 pts Needs Improvement (Below Standard)** Submission contains a minimal amount of useful evidence. References may not be provided and/or are incomplete, when applicable.	**0 pts No Credit** Did not submit assignment or submitted late.	37.5 pts

Criteria	Ratings					Pts
This criterion is linked to a Learning Outcome Grammar, Spelling, & Mechanics (10%)	**25 pts Exemplary (Far Exceeds Standard)** Writing utilizes proper spelling and grammar, and follows formatting instructions when provided or demonstrates logical formatting for the assignment.	**16.66 pts Above Average (Exceeds Standard)** Writing utilizes proper spelling and grammar with few errors and follows appropriate formatting constructs.	**8.34 pts Adequate (Meets Standard)** Writing shows errors in spelling and/or grammar and/or formatting is inconsistent.	**4.16 pts Needs Improvement (Below Standard)** Writing shows numerous spelling and/or grammar errors and/or inconsistent formatting.	**0 pts No Credit** Did not submit assignment or submitted late.	25 pts
This criterion is linked to a Learning Outcome Style (10%)	**25 pts Exemplary (Far Exceeds Standard)** Shows outstanding style going beyond usual college level; rhetorical devices and tone used effectively; creative use of sentence structure and coordination.	**16.66 pts Above Average (Exceeds Standard)** Attains college level style; tone is appropriate and rhetorical devices are used to enhance content; sentence variety used effectively.	**8.34 pts Adequate (Meets Standard)** Approaches college level usage of some variety in sentence patterns, diction, and rhetorical devices.	**4.16 pts Needs Improvement (Below Standard)** Mostly in elementary form with little or no variety in sentence structure, diction, rhetorical devices, or emphasis.	**0 pts No Credit** Did not submit assignment or submitted late.	25 pts

Total Points: 250

Appendix 4: Supplementary Tables.

Table A1: Attitudes and Knowledge Rotated Factor Loadings Matrix (*N* = 136)		
KMO = 0.8484	**Factor F1 Attitude**	**Factor F2 Knowledge**
Cronbach's alpha	**0.9458**	**0.9284**
Group projects are my favorite activity	**0.9060**	0.1408
I like working on group projects very much	**0.9479**	0.0495
I am very positive about working on group projects	**0.8372**	0.0831
Group projects are excellent	**0.9224**	0.0337
Group projects are desirable	**0.9043**	0.0270
I'm extremely familiar with working on group projects	0.0462	**0.9179**
I have had a great deal of experience with working on group projects	0.0747	**0.9478**
I have had a lot of exposure to group projects	0.0660	**0.9347**

Table A2: Marginal Effects of Determinants of Attitudes Toward Group Projects Being Good Practice Work (*N* = 96)

	y = 1	y = 2	y = 3	y = 4	y = 5
F1: Attitude toward group projects	-0.023*	-0.035*	-0.056***	-0.092***	0.205***
F1: Attitude toward group projects (SE)	-0.012	-0.018	-0.019	-0.025	-0.036
F2: Knowledge re. group projects	-0.003	-0.004	-0.007	-0.011	0.026
F2: Knowledge re. group projects (SE)	-0.004	-0.006	-0.009	-0.016	-0.035
U.S. is home country	0.010	0.016	0.026	0.042	-0.095
U.S. is home country (SE)	-0.020	-0.035	-0.051	-0.083	-0.185
English main language at home	0.002	0.004	0.006	0.010	-0.022
English main language at home (SE)	-0.017	-0.026	-0.044	-0.072	-0.159
Comfortable speaking English	-0.024	-0.038	-0.061	-0.100	0.224
Comfortable speaking English (SE)	-0.026	-0.039	-0.061	-0.093	-0.207
Female	-0.030*	-0.048*	-0.077**	-0.126***	0.280***
Female (SE)	-0.017	-0.028	-0.031	-0.045	-0.081
Age	0.000	0.000	0.000	-0.001	0.001
Age (SE)	-0.001	-0.001	-0.002	-0.003	-0.006
Full-time employed	-0.006	-0.009	-0.015	-0.024	0.054
Full-time employed (SE)	-0.010	-0.017	-0.028	-0.043	-0.097
Part-time employed	-0.004	-0.006	-0.010	-0.016	0.036
Part-time employed (SE)	-0.010	-0.017	-0.027	-0.043	-0.096
White	0.012	0.020	0.032	0.053	-0.117
White (SE)	-0.014	-0.025	-0.038	-0.054	-0.125
African American	0.010	0.017	0.027	0.043	-0.097
African American (SE)	-0.021	-0.037	-0.055	-0.089	-0.199
Asian	0.032	0.051	0.082	0.134*	-0.298*
Asian (SE)	-0.023	-0.033	-0.053	-0.078	-0.160
Hispanic	-0.009	-0.015	-0.023	-0.038	0.085
Hispanic (SE)	-0.015	-0.023	-0.036	-0.057	-0.128
Business major	-0.014	-0.023	-0.036	-0.059	0.132
Business major (SE)	-0.011	-0.017	-0.024	-0.040	-0.081
Honors student	0.012	0.019	0.031	0.050	-0.112
Honors student (SE)	-0.014	-0.022	-0.032	-0.054	-0.117

Note: y1 = Strongly Disagree, y2 = Somewhat Disagree, y3 = Neither/Nor, y4 = Somewhat Agree, y5 = Strongly Agree. SE = Standard Error.

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