A Study of Teamwork Among Business Undergraduate Students

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ABSTRACT

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This study aimed to gain insight into undergraduate business students' acquisition of teamwork skills. The primary goal of the study was to explore the extent to which undergraduate students acquire teamwork skills through the experience of working in teams (exposure), and to explore if support provided by professors facilitate the acquisition of teamwork skills. The secondary goal of the study was to investigate whether teamwork strategies (defined as conscious efforts used to acquire a skill before it is automatic; Afflerbach et al., 2008) mediate links between exposure and skills, and support and skills. Hypotheses were tested using data from several samples of students at different stages of the undergraduate business degree, using both archival (N = 3582) and survey data (N=894). Results demonstrated that exposure can promote the acquisition of teamwork skills, but alone, it may not be optimal. Rather, when professors offer support in the form of 'Willingness to Intervene and Explain Expectations,' this tends to promote a higher procurement of teamwork skills. Interestingly, too much professor support, in the form of 'Interim Feedback', seems to hinder skill growth, and this may reflect 'over-scaffolding' that is detrimental to learning. These findings can provide advice to professors about the types of support that are most beneficial to students' acquisition of teamwork skills.

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INTRODUCTION

The ultimate goal of business schools is to prepare students for the complex business world they seek to enter upon graduation. The programs are designed to provide students with the opportunity to acquire the knowledge and fine-tune the skills necessary to succeed. These skills go beyond the well-defined technical curriculum, and include soft skills, such as forming and maintaining interpersonal relationships, developing objectivity, and improving crisis management (Bhavnani & Aldridge, 2000). Working in groups can promote the acquisition of these interdisciplinary skills; it can foster social learning and promote the acquisition of skills that are transferable to the workplace, such as negotiating with peers, developing social relationships (e.g., networking), and oftentimes emergent leadership roles (Fearon et al., 2012). At the same time, many students report a lack of satisfaction when they are placed in groups to complete projects (Colbeck et al., 2000) and this suggests that something about the experience of learning in groups may be lacking.

One possible explanation is that although many students may know what being a good team member entails (in terms of their conceptual knowledge; "knowing what;" Kierin, 1993), they are lacking in knowledge about the strategies, skills, and rules that are required to execute those ideals. In other words, they are missing some procedural knowledge, the "knowing how" to be an effective team member (Byrnes, 1992). This procedural knowledge includes following predefined steps that are meant to produce a desired result (Hallet, Nunes & Bryant, 2010) and a common way to obtain it is via simulation (e.g., practicing the skill or using the skill in context); this is the idea behind encouraging group work at the undergraduate level – it is supposed to "simulate" the experience of teamwork in the "real world."

In general, research has indicated that learners have increased knowledge, skills and satisfaction when simulations are used to learn procedural skills (Nestel, Groom, Elkeland-Husebo, O'Donnell, 2011). In the context of teamwork skills, one question that has received some research attention is how students perceive the influence of participating in problem-solving groups on the development of skills that would be useful for their chosen careers (Colbeck et al., 2000). However, the question of whether simply **exposing** students to group work is sufficient to promote their use of appropriate teamwork strategies and the acquisition of crucial teamwork skills has not been fully answered, and questions remain about the extent to which more directive professor support are necessary. Research that addresses these questions would be insightful and practical in terms of adjusting the way professors support students in order to facilitate the acquisition of teamwork strategies and skills, and the purpose of this study is to explore these questions. We seek to explore the relationship between students' exposure to teamwork, their teamwork strategies, the gaining of their teamwork skills and the role of teachers' support for teamwork (e.g., feedback and interventions), over time.

THE IMPORTANCE OF TEAMWORK SKILLS FOR ORGANIZATIONS

Companies in today's modern world frequently implement "teams" as the prevailing workplace structure (Berry, 2011; Buckenmyer, 2000). In this thesis, I draw on Kozlowski and Bell's (2003) definition of teams because it is suitable for various contexts, including both organizations and academia. Kozlowski and Bell (2003) defined teams as being composed of two or more members that share one or more common goals, which are relevant to the organization (e.g., the University and its students and professors in an

academic context). They have interdependent tasks and, through this task interdependence, teams interact to maintain and manage boundaries that are limited to, and influenced by, the broader organizational entity(s) in which they function (Kozlowski & Bell, 2003). The rationale for implementing teamwork in organizations is that when members of a group have varying skill-sets and experience, it can have a positive impact on performance (Campion et al, 1993).

Unfortunately, many employers complain that recent college graduates lack the teamwork skills needed to be successful in these complex structures (Loughton, 2014). In order to improve this situation, the AACSB (Association to Advance Collegiate Schools of Business) has adopted standards for accreditation that necessitate the encouragement of collaboration and cooperation among students (Standard 13) and that foster both group and individual dynamics (Standard 15). So as to meet these accreditation standards, and ultimately prepare business students for the largely team-oriented business world they will face upon graduation (Kozlowski & Bell, 2003), many business schools, including JMSB, have adjusted the structure of class evaluations and projects to include group work.

The group work dynamic in the academic setting attempts to emulate that of the team-project dynamic in the business world, where multiple perspectives and expertise are necessary, and multiple tasks must be appropriately delegated. In an educational context, a group project is defined as "a graded assignment requiring students to work collaboratively across multiple class periods and involving some time outside the normal class meeting" (Ettington & Camp, 2002, p. 357). The goal of requiring students to participate in group work is to enable students to acquire the skills and knowledge needed to become better group members for teamwork related tasks on the job. Given that undergraduates enter

their programs with varying levels of teamwork skills due to their varying backgrounds, the idea of the AACSB requirements is that the undergraduate business program will enable *all* students to develop a strong foundation of teamwork skills regardless of their previous experience, and this will enable them to succeed in organizations once they graduate.

WHAT SKILLS ARE NECESSARY FOR EFFECTIVE 'TEAM WORKERS'?

Generally speaking, skills are defined as "an acquired ability to perform well; proficiency" (Afflerbach, Pearson & Paris, 2008, p. 365). One is said to have acquired a skill, when it becomes a routine habit, and the activities are "less mindful and more automatic" (Afflerbach et al, 2008, p. 366). Much research on teams in both organizations and academia has attempted to identify the skills necessary to perform well on a team (e.g., Buckenmeyer, 2000; Kozlowski & Bell, 2003; Zaccaro & DiRosa, 2012). It is commonly agreed that in addition to task-specific skills (e.g., a team of engineers all need engineering skills), working with others also requires teamwork skills (Bhavnani & Aldridge, 2000; O'Neill, Goffin & Gellatly, 2012). These teamwork skills are distinct from task work skills insofar as they are contextual in nature. This means that they "support the social, psychological, and organizational context in which the work is performed" (Stevens & Campion, 1999, p. 208) and they can be transferred from one task to another. The transformation of a group of individuals into effective team members that perform efficiently and successfully as a team requires the development of these generic team competencies (Goldstein & Ford, 2002).

According to seminal work by Stevens and Campion (1994; 1999), there are two broad categories of teamwork skills: interpersonal KSAs (Knowledge Skills and Abilities) and self-management KSAs. Interpersonal KSAs include conflict resolution, collaborative problem solving and communication. They include the capacity to encourage positive interpersonal behaviors and discourage negative team conflict, by being able to identify and resolve hindrances with corrective actions, as well as the ability to communicate openly and give constructive feedback (Stevens & Campion, 1999). All of these skills promote positive interpersonal exchanges, which are crucial in team settings. Self Management KSAs include goal setting, performance management, and planning and coordination (Stevens & Campion, 1999). Oftentimes in team-based work situations, team members need to perform these basic supervisory duties, which include establishing goals that are accepted by the team, coordinating and synchronizing tasks amongst members, and ensuring that there is an even distribution of work (Stevens & Campion, 1999).

More recently, Strom and Strom (2011) reviewed research on small group dynamics, cooperative learning and personal evaluation methods, and they highlighted five clusters of teamwork skills that are adapted to an educational context. Specifically, their research emphasizes the need for students to (1) attend to teamwork, which includes attendance at meetings and punctuality, staying focused on tasks, and doing one's fair share (2) seek and share information, which includes asking questions to improve group understanding, helping peers by reviewing, and admitting when in doubt (3) communicate with teammates, which involves sharing experiences, ideas or opinions, listening to others and respecting their views, as well as recognizing contributions of others (4) think critically and creatively, which includes thinking carefully before reaching conclusions,

using logic to challenge group working methods, and offering new ways to look at problems and finally (5) get along with teammates, which refers to willingness to accept constructive criticism, and accepting compromise as a way to handle conflict and expressing a positive attitude about the group's success. Considering this, as well as Stevens and Campion's (1994) classification of teamwork skills, it is clear that teamwork skills are a multidimensional concept. In my research, I will try to capture all the relevant teamwork skills of interest for the academic context.

EXPOSURE TO TEAMWORK AND EXPERIENTIAL LEARNING THEORY

A central tenet of learning theories is that individuals can learn by experience (Kolb & Kolb, 2012). That is to say, the more exposure one gets to a particular task or experience, the better his/her performance at the task typically becomes (Reagans, Argote & Brooks, 2005). Experiential Learning Theory (ELT) defines learning as "the process whereby knowledge is created through the transformation of experience" (Kolb & Kolb, 2012, p. 44). The ELT describes the process of learning as the result of a learner touching 'four bases' (i.e., experiencing, reflecting, thinking and acting), but primarily emphasizes the key role that experience plays in acquiring skills and knowledge (Kolb, Boyatzis & Mainemelis, 2001). Through experience, we are presented with choices, and over time, we develop a preferred way of acting due to the associated outcomes (Kolb, Boyatzis & Mainemelis, 2001). This is true for a variety of artistic, musical, educational or athletic activities, including driving a car, playing an instrument, swimming, or ice-skating.

Like these other skills, many subscribe to the belief that 'practice-makes-perfect' when it comes to teamwork. Through exposure to collaborative, teamwork structures in

various undergraduate classes, the underlying idea is that students will *learn* the associated skills, and thus become more prepared for the team structure that is prevalent in today's organizations (Greenan, Humphreys, & McIlveen, 1997; Jassawalla, Sashitta & Sashittal, 2009). Indeed, there is some evidence that repeated exposure to teamwork contexts can translate into students being more efficient at task delegation and conflict resolution, and better at communicating with other team members (Reagans et al., 2005), skills which fit under the umbrella of the interpersonal and self-management KSAs previously mentioned. Numerous studies have relied on samples of students describing their own experiences with group work, through interviews or questionnaires, in order to draw conclusions as to the skills that students identify as being necessary to have a positive group experience/outcome, and what skills they feel are being developed because of their groupwork experiences (Bhavnani & Aldridge, 2000; Chiriac, 2014; Colbeck et al, 2000). These studies aimed to uncover what aspects of experiencing group work promote the development of the teamwork KSAs necessary for teamwork success.

Results of these studies support the notion that some teamwork skills can be learned from experience. For example, students with previous group experience self-reported having a more developed skill of interdependence than those who had little or no prior group experiences (Colbeck et al., 2000). Also, students who had group experience, a mix of students from different disciplines, representative of true cross-functional team environments, self-reported more tolerance to diverse perspectives, good communication between disciplines, ability to share leadership roles, an openness to adapt personal goals to meet team goals, and an acknowledgment that teams are capable of making better decisions than individuals (Bhavnani & Aldridge, 2000). The "learning by doing"

approach to student teams resulted in higher retention of information, development of critical reasoning skills, and stronger interpersonal and social skills than conventional lecture-style methods (Hansen, 2006). Fearon et al. (2012) found that working in groups fosters skills such as negotiating with peers, as well as the development of positive social relationships. Most recently, Chiriac (2014) reported that 97% of students responded that working in a group facilitated academic learning and collaborative abilities. Overall, recent research has indicated an increase in both interpersonal (e.g. tolerance for diverse perspectives) and self-management (e.g. critical reasoning skills) related skills for students who have more group experience.

The above-mentioned data are promising, but they often rely on students' reactions to teamwork experiences (e.g., their satisfaction with working on a team project) and no studies (to my knowledge) have followed students over time to compare students with different amounts of group work experience in terms of the actual teamwork skills they seem to have, or how the level of these skills may change over time. A primary goal of my study is to provide a more direct test of whether students' teamwork skills are improving simply with more exposure to teamwork.

SCAFFOLDING: THE INTEGRAL ROLE OF TEACHER SUPPORT

Notwithstanding the evidence above that students can (and do) become more effective team members simply by exposure to teamwork contexts, there is also evidence that this "laissez-faire" approach may not be optimal and may inadvertently allow students to gain unwanted skills, such as how to become effective loafers (Jassawalla et al., 2009). As noted by O'Neill (2015), without a proper framework and an opportunity to practice

and receive feedback and pointers on specific behaviors, learning and acquiring effective teamwork knowledge and skills is simply left to trial and error, and assigning team projects with little guidance can often leave students to simply 'sink or swim' (Vik, 2001). Perhaps not surprisingly, students report that this type of learning experience is not ideal and could be enhanced if the curriculum provided them with specific guidance about collaborating (Colbeck et al., 2000). Amongst all the complaints that students make, the most common seems to be their laments about social loafers, who are not as fruitful in contributing, yet oftentimes, still receive the same grade (Jassawalla, et al., 2009). In fact, it is the number one reason why students dislike group projects (Aggarwal & O'Brien, 2008).

I wondered if there was a better approach that could be applied to teaching teamwork skills. By looking at the education literature, I was able to draw on Vygotsky's (1978) socio-development theory and the notion of scaffolding, which highlights the importance of "guided instruction" during the learning process, as an alternative approach. Scaffolding is most commonly thought of as the support placed around new buildings in order for workers to have access to the structure as it emerges from the ground (Hammond & Gibbons, 2005). Once the building is able to support itself, the scaffolds are removed. This concrete idea has been applied metaphorically in terms of a teacher's need to "provide temporary supporting structures to assist learners to develop new understandings, new concepts, and new abilities" (Hammond & Gibbons, 2005, p. 8). This metaphor resonates with the educational context, as it highlights a teacher's role to intervene successfully in students' learning (Hammond & Gibbons, 2005; Van Der Stuyf, 2002). According to Wood, Bruner & Ross (1976; as cited in Puntambekar & Hubscher, 2005), there are six types of support that a teacher can provide. These are (1) peaking a student's interest, (2)

reducing the margin of error by simplifying the task, (3) maintaining direction, (4) drawing attention to critical features of a the task, (5) controlling frustration and (6) highlighting ideal solution paths. The use of these interventions, at least theoretically, allows students to gain new skills in order to enhance their abilities and work more effectively and more independently, so that the teacher can eventually withdraw his/her support (Van Der Stuyf, 2002).

Related to the idea of scaffolding is "the zone of proximal development". This term refers to "the distance between what children can do by themselves [the 'mastery level'] and the next learning [the 'instructional level'] that they can be helped to achieve with competent assistance" (Raymond, 2000, p. 176). Using the terminology of Vygotsky's socio-developmental theory (1978), the existing evidence on the acquisition of teamwork skills seems to suggest that the approach of learning simply by exposure allows students to reach only the 'mastery level'. With support from the 'More Knowledgeable Other' (MKO or competent assistance; Vygotsky, 1978), in this case, the professor, however, students can be guided through the zone of proximal development, in order to reach the "instructional level" (Van Der Stuyf, 2002). This would make students more effective 'team workers', through the application of more efficient strategies that lead to the acquisition of more effective (i.e., automatic and effortless) skills.

Vygotsky's (1978) theory has been applied primarily to understand children's development of cognition, but it seems reasonable to suggest that the foundations on which is it based will also apply to understanding the development of teamwork skills for young adults at the undergraduate level, as in both contexts, guidance by an MKO can serve as bridge to get the learners to the next level. This is in line with Vik (2001), who suggested

that if students receive more support on how to troubleshoot team project problems, and more feedback and suggestions on how to set teams up, then it could maximize the likelihood of success.

At the undergraduate level, there is currently a spectrum of mindsets and protocols in regards to how schools and professors achieve the goal of teaching students teamwork skills and promoting the transfer of this knowledge to new situations. This spectrum ranges from the 'laissez faire' approach in which group work is required but with little intervention from the curriculum or professor (the learning by doing approach described above) to a very hands-on-approach that involves teacher and curricular intervention and support to ensure the teamwork experience is optimally beneficial (the scaffolding approach described above). The variance in these approaches may stem in part from confusion regarding the distinction between cooperative vs. collaborative learning (Chiriac, 2014). Cooperative learning occurs when groups of students are responsible for completing a task, but where members are not necessarily engaged with one another (i.e., they are working **in** a group); in contrast, collaborative learning occurs when group tasks necessitate interaction, collaboration, and the use of each other's competencies (i.e., they are working **as** a group; Chiriac, 2014). Without being mindful of the difference, professors may assign group work with the goal of promoting collaborative learning, but they may instead enable only cooperative learning, particularly if they do not provide adequate support or when projects are not designed with sufficient interdependence. Indeed, past research has affirmed that many professors assign team projects with little to no support for the team process (Colbeck, Campbell & Bjorklund, 2000; Holmer, 2001).

Under these conditions, sub-optimal learning of teamwork skills may occur, in other words, simply the 'mastery level' will be attained.

Considering this, it may be that whether or not students actually gain all the teamwork skills that they can is contingent on whether or not they have been given adequate support, or scaffolding, from the professor. Learning theorists have asserted that a positive transfer of knowledge is most likely to occur when the right teamwork climate is provided (Ettington & Camp, 2002) and there are many ways in which professors can create this climate for their students. This is another avenue my study seeks to explore, as the literature has acknowledged that there is a challenge in "identifying effective tools, instruments, and techniques that instructors can readily apply to support students' soft skills development" (O'Neill, 2015, p. 2).

TEAMWORK STRATEGIES: THE MECHANISM THROUGH WHICH TEAMWORK SKILLS ARE ACQUIRED

The teamwork skills described above are necessary tools in the metaphorical toolbox for students; in this thesis, I am concerned with how students learn these skills. As mentioned above, a skill can be deemed to have been "acquired" when the activities involved in it progress from being effortful and deliberate to being mindless and automatic (Afflerbach et al, 2008), and researchers have argued that the way for individuals to achieve this proficiency (in an educational context) is through the use of strategies. Strategies are defined as systematic and "consciously adapted […] to improve one's performance in learning" (Afflerbach et al., 2008, p. 365). Using the example of a child learning to read (Afflerbach et al., 2008), strategies include sounding out the word, skipping unknown words in order to gather contextual information from the rest of a

sentence that will provide a hint, or looking at the pictures to prime the child for what may be written. These strategies all help a child learn to read, but they are effortful, and precede the acquisition of the actual skill of reading, like fluency and speed, which would be marked by simply reading the sentence without any hindrances or hesitation. Essentially, Afflerbach et al. (2008) argue, and I agree, that the use of strategies precedes the acquisition of skills, as strategies are mindful and deliberate approaches that allow the task to be accomplished before the skill is actually 'acquired', which again, would be marked by the approach being natural and unforced (Afflerbach et al., 2008).

There are countless strategies that can be examined as being helpful to the acquisition of teamwork skills. I chose to focus on strategies that are aligned with Gersick's (1988) Punctuated Equilibrium Model, based on the nature of the work that student teams complete, how they are known to complete those projects, and the natural progression in the lifecycle of student teams. These strategies, which have been demonstrated to advance team progress and avoid problematic obstacles, include monitoring time, adjusting activity levels as time progresses, delegating tasks, and establishing clear norms as to what is expected of group members (Gersick, 1988). Teamwork scholars have also identified individual co-regulatory and self-regulatory strategies that are salient in teamwork and can influence team performance. For example, a recent study of student teams by Ainsworth (2016) demonstrated the importance of the strategies of sharing research and knowledge, offering feedback in the form of constructive criticism, and demonstrating moral responsibility by respecting established management processes and communication procedures. In both cases, these strategies align well with the notion of interpersonal and self-management KSAs discussed earlier.

Consistent with Afflerbach et al. (2008), I argue here that teamwork strategies are the mechanism through which teamwork skills are acquired. As explained in more detail below, I propose that exposure to teamwork contexts allows students to try different teamwork strategies, which facilitates the acquisition of teamwork skills to a certain degree. On the other hand, teacher support can introduce students to strategies they may have never considered, which may be a more optimal way to facilitate the process, and should lead to the use of more/better teamwork strategies.

THE CURRENT STUDY

This study aims to gain insight into undergraduate students' acquisition of teamwork skills over the course of obtaining their undergraduate business degrees. Past research has demonstrated the importance of the 'learning by doing' approach, but it has also shown that simple exposure to group work can fall short by potentially allowing students to pick up bad teamwork habits. It may also neglect to introduce students to different strategies and approaches that can facilitate the automization of teamwork skills, which would allow for students and their groups to be more successful both in the short term, for academic contexts, and in the long-term, for organizational contexts. The primary goal of this study is to explore the extent to which business students acquire teamwork skills through the experience of working in teams, and to explore the relationship between support provided by professors and teamwork skills. The secondary goal of the study is to investigate whether strategies mediate the relations between exposure with skills, and support with skills, and whether support and/or exposure allows students to develop more

effective teamwork strategies than students who receive minimal scaffolding and/or minimal exposure.

According to Johnson and Johnson's extensive cooperative learning literature (1999, 2002), research on cooperative learning in educational team settings would be enhanced if researchers attempted to understand *why* the learning experiences were or were not successful. I aim to empirically link support by professors to students' use of strategies, and level of teamwork skills. I outline the rationale for each hypothesis next.

The link between exposure and teamwork skills

Generally speaking, research has supported the idea that the more exposure one gets to a particular task or experience, the more proficient they become at the task (Reagans, Argote & Brooks, 2005). More specifically, as described earlier, students with previous group experience self-reported a more developed skill of interdependence (Colbeck et al., 2000), and more openness to varying perspectives, and an increased ability to compromise their personal goals in order to achieve the goals of the group (Bhavnani & Aldridge, 2000). In terms of the "learning by doing" approach, some studies have found that repeated exposure to teamwork contexts can translate into students becoming more efficient at task delegation and conflict resolution, and communicating better with other team members (Reagans et al., 2005). These skills fit under the multidimensional concept that is 'teamwork skills'. Based on this and consistent with Experiential Learning Theory (Kolb & Kolb, 2012), I propose the following hypothesis:

H1: Students with more exposure to group projects will have more teamwork skills than those with less exposure.

The link between teacher support and teamwork skills

Based on Vygotsky's framework of socio-cultural theory, I argue that teacher support can make the difference between students attaining the superior 'instructional level', as opposed to reaching only the suboptimal 'mastery level', which is characteristic of the teamwork skills acquired due simply to exposure. I am suggesting that the MKO (professor) can provide support in order to guide students to a *higher* level of teamwork skills. Ellis, Bell, Ployhart, Hollenbeck and Ilgen's study of teams (2005) support the idea that targeted training on team skills, similar to 'scaffolding', does in fact lead to better team skills. Other past research into this issue, however, has typically simply asked students to reflect on various group work contexts, and comment on what helped and hindered their acquisition of teamwork skills and strategies (Bhavnani & Aldridge, 2000; Bonanno, Jones & English, 1998; Colbeck et al., 2000; Hansen, 2006; Holmer, 2001; Siciliano, 2001). It has not actually measured students' skills to determine if a link exists between support in place, strategies used and skills acquired. Some kinds of professor support that have been identified in this past research include constraints on the size of the group, the structure of the assignment, and the instructor's approach to handling 'slackers' (Colbeck et al., 2000). Past research has not (to my knowledge), compared teamwork skills and strategies used by students that had professor support to those of students without support. One goal of my study is to make this comparison.

It is worth noting that, much like teamwork strategies and skills, teacher support for teamwork is multidimensional. For example, teachers may offer technical support to help get a project done or they may offer interpersonal support to smooth out interpersonal

difficulties. The introduction of these supports can allow students to develop a higher level of teamwork skills than if these supports were not in place.

Based on this, I hypothesize that professor support from teachers will be positively related to the teamwork skills of interest.

H2: Students who report getting more teamwork related professor support will score higher in teamwork skills than students who report getting less/no support from professors.

The mediating role of teamwork strategies

Strategies are conscious efforts used to acquire a skill, before the approach is automatic and effortless (Afflerbach et al., 2008). Through exposure to teamwork contexts, students will gain strategies to make the teamwork experience more successful. As ELT theory postulates, through experience, we are presented with choices, and over time, we develop a preferred way of acting due to the associated outcomes (Kolb, Boyatzis & Mainemelis, 2001). In other words, students develop what they deem to be effective strategies in order to accomplish tasks based on whether the outcomes of using those strategies are desirable or not. Research has indicated that repeated exposure to teamwork can allow students to gain skills (Greenan, Humphreys, & McIlveen, 1997; Jassawalla, Sashitta & Sashittal, 2009), and I argue that these skills are acquired through students' implementation of teamwork strategies, which may be repeated over time. However, these strategies will tend to be based on trial-and-error, and as a result could be hit or miss, or even counterproductive to developing teamwork skills, such as picking up strategies on how to be an effective loafer. Essentially through exposure to the teamwork contexts, students attempt to develop approaches that work for completing projects; when they hit upon a strategy or strategies that work(s), they may repeat them, and this can lead to the

development of some teamwork skills. Contrarily, when the strategies used are ineffective (as will often happen), students likely will not repeat them in future classes and, more importantly, the acquisition of teamwork skills will overall be weaker.

H3: Teamwork Strategies mediate the relations between exposure to teamwork and teamwork skills.

On the other hand, if professors provide support, I am hypothesizing that students will have better/more teamwork strategies, leading to better/more teamwork skills. The introduction of support by professors can allow students to develop and implement strategies that they may not have previously used. Support allows students to develop strategies that are more methodical and are known to work, as opposed to strategies that evolve from trial-and-error. These kinds of support might include actions such as urging students to establish goals, monitor time, handle conflict, and coordinate activities, all of which are fundamental to be an effective team. These scaffolds are put in place not to spoon-feed the students, but to guide them into identifying important aspects of teamwork relevant for team success. The support essentially aids students by giving them various pointers to allow the teamwork process to run more smoothly, efficiently, and effectively. By using these teacher-supported strategies, students are able to take a more systematic approach to improve their learning, and ultimately acquire the teamwork skills of interest (Afflerbach et al., 2008). I argue that the more frequent and diverse the support provided by professors, the more appropriate teamwork strategies students will implement and the higher level of skills students will acquire.

H4: Teamwork strategies mediate the relations between support from professors and teamwork skills.

METHODOLOGY

PROFESSOR SURVEY

Sample and Procedure for Professor Survey: Prior to collecting my data from the target sample of current and recent graduates of an undergraduate business program, I surveyed current professors of that program to determine the kinds of support they typically provide to their students for projects that are completed in teams.

Dr. Tracy Hecht sent out a short recruitment email, along with a link to the online survey, to 79 professors and associate professors at JMSB. Forty-six professors completed the short survey (response rate of 58%). Twenty-two respondents were female and 20 were male and 4 respondents did not provide response to all questions soliciting demographic information. All of the departments of JMSB were included in the sample. Eighteen of the professors belonged to the department of Management, 9 professors were from Marketing, 7 professors responded from the department of Supply Chain and Business Technology Management, 5 professors from Accounting and 3 professors from Finance. Thirty-five percent of the sample ranged in age between 41 and 55 years old, whereas 33% ranged in age from 25 to 40, and 24% were 56 years old and over. Just over 25% of the sample had between 0-5 years teaching experience, or 20+ years teaching experience, and the rest of the sample fell in between.

The short survey asked about use of Professor Support and of the Peer Evaluation System (PES). Professors were asked to select the kinds of support they typically provide for their undergraduate students during teamwork projects from a list of 15 choices, and were invited to add to the list provided. This information was used so as to properly reflect support with which students are familiar and actually encountering at JMSB, therefore

giving us more accurate selections for the questions regarding Professor Support in the student survey. Professors were also asked 6 questions about the PES, including whether they use the PES for their undergraduate classes, and if so, for what purpose, and whether or not they provide constraints or encouragement when using the PES.

RESULTS OF PROFESSOR SURVEY

Although the professor survey was primarily geared at generating a true-to-life list of the kinds of support that JMSB professors provide to their students (to be used for the student survey), the results were informative in their own right. The final measure of professor support in the student survey was generated from a combination of the choices that I had brainstormed, as well as the additional ideas proposed by the professors that I had not presented, but that they reported doing for their undergraduate students. The frequencies of all responses are indicated in parentheses in the Appendix C: Professor Support. The most frequent types of support were providing feedback at various intervals throughout the teamwork project, reminding students when deadlines were approaching, offering to intervene in the event of problems arising in the group, and giving students class time to work on group projects. The least common were assigning one group member to be team leader, as well as assigning teams based on information about who is in the class and their skills. Fifteen additional kinds of supports were suggested by professors in their survey responses, and these suggestions were combined accordingly to finish the measure of professor support.

With respect to the PES, the results indicated that 63% of professors used the PES for their undergraduate classes. Thirty-seven percent of professors have students follow the

instructions in the system. In terms of the use of the PES, 41% adjust group project grades according to feedback obtained from the PES. Twenty-four percent of professors use the information from the PES system to increase grades for students that did more than their fair share of work and 20% use the information to reduce grades for students who reportedly did not pull their weight. Three percent of professors indicated that if there was ambiguity in the PES ratings about how one or more students performed, they would give everyone in the group the same grade without adjustment, whereas 20% of professors would base their evaluation on what the majority of raters say.

STUDENT SURVEY

Sample for Student Survey: Recruitment emails, with a link to an on-line survey, were sent by Dr. Tracy Hecht over the period of two weeks, starting on February 14, 2017, to 8370 current undergraduate and 1613 recent graduates from the undergraduate program at JMSB. Fifty-four emails bounced back. Each student was sent one recruitment email, as well as one reminder email one week before I closed the survey (March 13, 2017). In the email, I incentivized the taking of the survey by informing potential participants that they would receive a $5 Tim Hortons E-Gift card if they were to complete the survey. I had 1481 participants that answered the survey (to various degrees, for an overall response rate of 15%); 58.4% were female and 38.9% were male (2.7% did not respond to various demographic questions). Of the total number of respondents, 79.5% were current students, and 17.8% were graduated students. The participants represented all of the various departments at JMSB: 29.25% from Accounting, 26% from Finance 13.7%, 17% from Management, from Marketing, 10% from Supply Chain & Business Technology

Management, and 4% did not answer this question. Please note that all the tables in regards to the loadings, and results are located following this section, starting on page 42, while the Appendix is located at the end, starting on page 90).

I filtered the data to focus on participants who provided us with a substantial amount of high quality data. Firstly, I did so by only considering the data of participants who completed a sufficient portion of the survey. Specifically, I included participants who, in addition to completing demographic information, answered questions in the 'Teamwork Exposure' section. This is also the sample that I deemed eligible to receive the five-dollar compensation (Tim Horton's E-Gift card), as they provided us with a minimal amount of useable data. Secondly, I filtered the data using the answer to the question *In your honest opinion should we use your data in our analyses for this study?* Logically the data of respondents who answered 'no' were not used. Thirdly, I used two 'carelessness questions' as indicators of the quality of the information respondents provided. The first carelessness question asked students to *select '2-some difficulty'* on the 5-point scale. The second carelessness question asked students to *select 25-'sometimes'* on a sliding scale. Since this question used a sliding scale, I allowed a range of '20 to 30' to be considered acceptable, seeing that some participants may have been using a cellphone or tablet and would have a hard time selecting the exact value. In order for the student to be deemed 'not careless', students had to have answered **at least** one of the carelessness questions correctly (in addition to having said "use my data"). If not, their data were not used. There were 900 participants who met these criteria. Six participants were deleted for not completing whole sections in the middle of the survey (i.e. the entire exposure section, or the entire strategies section) leaving us with 894 participants in the final sample.

Of the 894 respondents, 64.4% were female and 35.6% were male. The sample was comprised of 80.5% current students, (67% of whom were full time status and 14.5% were part time [19.5% did not answer this question]), and 19.5% of recent graduates. The average age of the useable sample was 23 years old (SD=4.12) and their average GPA was 3.02 (SD=0.56). Of the respondents, 30.4% were from Accounting, 25.1% from Finance, 19.2% from Marketing, 14.2% from Management, 10.4% from Supply Chain and Business Technology Management, and 0.7% had neglected to answer this question.

PROCEDURE

Data were gathered in two ways. First, I accessed archival data from the JMSB peer evaluation system (PES). Three years worth of data are available for the current rating system (2014-2015, 2015-2016, 2016-2017), and I used data from Fall 2014, Winter 2015, Fall 2015, Winter 2016, Fall 2016 and Winter 2017. The peer evaluation system provides ratings of students' teamwork skills made by their peers in the context of working on team-based class projects.

Second, I surveyed current JMSB students as well as recent graduates regarding their exposure to teamwork projects, their teamwork skills, the teamwork strategies they employ, and the teamwork support they had received from their professors. As mentioned before, in order to ensure good coverage of professor support, I gathered information from professors about support offered prior to surveying students. The student questionnaire was administered online via the Qualtrics platform. I was able to get support from relevant administrators to send a direct, targeted email to current undergraduate students and recent graduates, informing them about the study.

With students' consent, I was able to connect some data (for 516 participants) from the peer evaluation system to my survey through students' ID numbers. This allowed us to evaluate student progress on teamwork measures both over time (from 2014 to present), and cross-sectionally, by comparing students at different stages within their programs at the time of survey.

MEASURES

Teamwork Skills Teamwork skills were assessed in three ways.

Teamwork Skills – Self Ratings (2-dimensional) First, self-reports of teamwork skills were obtained through items from the 'Teamwork Skills Inventory' (Strom & Strom, 2011). Participants were asked to rate their ease in performing the 25 teamwork skill items (response scale ranging from 1- Extremely difficult to 5-Extremely easy, See Appendix A for specific items). As described below, four of the items were deleted after my preliminary analyses, leaving 21 items. The final list of items, as well as the deleted items, is available in the Appendix A. These 21 items loaded on two main factors, which I labeled as: *Respectful team behaviors* (7 items) and *Team task orientation* (14 items).

Teamwork Skills - PES Peer Ratings I obtained archival data from the PES system from Fall 2014 to Winter 2017 and connected the data to survey ratings (for those students who gave their permission) for some analyses. Data from the PES are organized so that each person who is rated has multiple lines of data, one for each peer who rated them in a course where the PES system was used. Each rater makes a rating on four teamwork skill areas: cooperation, conceptual contribution, practical contribution and work ethic. The response scale ranges from 1-*Strongly Disagree* to 7-*Strongly agree.* Further

explanation of how ratings from multiple raters were combined is in the 'Preliminary Analyses' section.

Teamwork Skills - PES Self-Ratings: Participants provided self-ratings on the four areas of the PES that they typically use to rate teammates, with the same definitions and explanations provided. The response scale for these 4 items ranged from 1-*Strongly Disagree* to 7-*Strongly agree*.

Professor Support Participants were asked to indicate the frequency with which they had received various teamwork related teacher support. As previously mentioned, the list of choices for kinds of support was compiled from the preliminary professor survey. I used an 11-point itemized response scale, ranging from, 0%- *In none of my classes* to 100%- *In all of my classes* for each support. There were 20 items for this measure. The final list of items, as well as items that ended up being deleted prior to final analyses is available in the Appendix C of the 'Appendix of Measures'. As described below, the items loaded on three dimensions, which I labeled as '*Interim Feedback'* (8 items)*, 'Willingness to Intervene and/or Explain Expectations'* (4 items)*,* and '*Guidance on Team Composition and Structure'* (8 items; See Table 2 for specific items).

Teamwork Strategies Teamwork strategies were assessed using 40 items that I developed based on the works of Ainsworth (2016) and Gersick (1998). The final list of items, as well as the deleted items is available in the Appendix E of the Appendix of Measures. I also used the skill items as a basis to formulate the 'Teamwork Strategies' items, keeping in mind that the items I devised should be descriptive of 'stepping-stones' to the items

described for the 'Teamwork Skills' construct. I aimed to have approximately two 'Strategy' items for each 'Skill' item; seeing that previous research has indicated that various strategies are typically used in order to acquire a skill (Afflerbach et al., 2008). Participants were asked to respond to these items on an 11-point itemized response scale, with indicators at every 10 percent, ranging from Never- 0% of the time to Always- 100% of the time. The items loaded on four dimensions, which I labeled as '*Organizational Strategies'* (16 items)*, 'Strategies to Express Dissent'* (5 items)*, 'Respectful Strategies'* (12 items)*, and 'Strategies to Attend to Meetings'* (7 items).

Teamwork Exposure at JMSB Participants were asked to indicate the frequency with which they had participated in five variations of teamwork during their experience at JMSB: 1 -A written term project, which was done in groups, 2 - A group assignment that is unrelated to a term project was done, 3 - There was a group presentation, 4 - There were in-class group activities, and 5 -There was a simulation project done in groups. I used an 11-point itemized response scale, with indicators at every 10 percent, ranging from, 0%- *In none of my classes* to 100%- *In all of my classes* for each type of teamwork exposure.

Teamwork exposure also had to be weighted to account for the number of courses the respondent had taken, seeing that if a student was exposed to teamwork in 100% of 5 courses, this should be not considered the same as exposure of 100% for a student who has taken 15 courses. This gave us a calculation of weighted exposure, which considered both the progress in the program in terms of classes taken, and the teamwork activities they had been assigned. Please note, I assigned 30 courses as the standard for graduated students (since 90 credits are necessary to graduate). I acknowledge that this is not necessarily

100% accurate, as students could have changed programs or chosen a program that requires more courses/credits, but I omitted to ask students about credits completed in the survey of students who had graduated. Thus, I used 30 courses as a standard because it is the minimum requirement (in terms of the standard 3 credits per course x 30 courses = 90 credits which is graduation requirement).

ADDITIONAL VARIABLES:

Conscientiousness. Conscientiousness was measured using a 10-item scale (Saucier, 1997; see Appendix F).

Grade Point Average (GPA) GPA was assessed with a single question asking students to select their GPA on a sliding scale ranging from 0.25 to 4.25. Participants who reported GPAs less than 1.5 were deemed to have given erroneous data because they would have been dismissed from the program. Nine participants were deleted from the analyses for having entered unrealistic GPAs based on this criterion (e.g. 0.25). There were two participants that were on the border (reporting GPAs of 1.26 and 1.43 respectively), and I decided to keep them just in case they made an error in clicking on the slider scale.

Exposure to Teamwork outside of JMSB Exposure to teamwork outside of JMSB was measured by asking respondents whether they had any volunteer experience, sports team experience or work experience that required them to work in teams. If so, I asked participants to respond how much teamwork experience they had in each case, with ratings made on a five-point scale (1-very little to 5-a lot). I added these three questions together to calculate a total measure of Teamwork Exposure Outside JMSB.

PRELIMINARY ANALYSES

Due to the fact that I included several new measures in the student survey, I did preliminary analyses before I tested the hypotheses. Nine-hundred participants from the sample fit the previously stated criteria for data analysis. Of those, 516 participants agreed to allow us to link their data with scores from the PES system, whereas 384 participants did not provide their student number or give their consent for us to connect their data from this survey with scores from the PES. Based on this, I divided the sample into two subsamples: 384 participants to run exploratory factor analyses of various scales, and 516 participants to run confirmatory factor analyses (CFAs). Upon further inspection of the data to prepare for CFA, I discovered that a few participants had left whole sections of the survey blank (i.e. the entire exposure section, or the entire strategies section), which would impede my CFA analysis, which does not allow for missing data. Six participants were identified from the 516, and were deleted for not completing whole sections in the middle of the survey leaving us with 894 participants in the final sample (and 500 for the CFAs).

I examined the skewness and the kurtosis of the data for each variable. Considering the nature of the questions (positive answers are desirable), I expected that my data might be negatively skewed and kurtotic. I was correct in thinking so, as all but 2 of my variables were negatively skewed, and 5 (of 12) were kurtotic, but I did not make any statistical transformations of the data. I examined my data to see if there were any multivariate outliers. There were 8 multivariate outliers, but given the large sample size I retained them in the final data file.

For the Exploratory Factor Analyses (EFAs) I used an oblique rotation, as I had expected that various dimensions of each construct would be related to each other. For

each construct, I first examined the scree plots for information about the number of factors, but I ultimately set the numbers for the EFAs based on the literature. I went through several iterations for the EFAs, mainly considering the item loadings (e.g., deleting items with loadings < .40 on all dimensions or items with cross-loadings) as well as whether the items seemed to lump together conceptually. I deleted items that failed to fit the apparent conceptual dimensions. More details are provided in the following sections. I note that Cronbach's alphas for all multi-item scales appear in Table 13.

Teamwork Skills: According to the eigenvalue > 1.0 criterion, the data seemed to load on six dimensions and the scree plot suggested two dimensions. Given that the scree plot was consistent with my expectations, I fixed the number of factors to 2. This resulted in a meaningful distribution of items per dimension. Four (of 25) items were deleted based on the criteria noted above. The final items and their loadings on the two factors are presented in Table 1, and were labeled 'Respectful Team Behaviors' and 'Team Task Orientation'.

Teamwork Strategies: According to the eigenvalue > 1.0 criterion, the data seemed to load on ten dimensions and according to the scree plot, the data seemed to load on three dimensions. Similar to the teamwork skills measure, I was expecting two dimensions; and I ran an EFA that fixed the number of factors to 2. This did not seem to divide the items into two cohesive conceptual categories. A three-factor solution was also hard to interpret. My last attempt was fixing the number of factors to 4, which resulted in a meaningful distribution of items per dimension. Seven items were deleted that did not seem to fit any dimension conceptually, or had cross-loadings (above .40) on every dimension. This left us with 40 items for the Teamwork Strategies measure. The list of items kept, and deleted, are in the Appendix of Measures (Appendix E). The final items and their loadings on the four

factors ('Organizational Strategies', 'Strategies to Express Dissent', 'Respectful Strategies' and 'Strategies to Attend to Meetings') are presented in Table 3.

Professor Support: According to the eigenvalue > 1.0 criterion, the data seemed to load on four dimensions and according to the scree plot, the data seemed to load on three dimensions. Based on the literature, my proposed model had two dimensions and I tried fixing the number of factors in the EFA to 2. This did not seem to divide the items into two cohesive conceptual categories. Thus, I attempted fixing the numbers of factors at 3 as suggested by the scree plot. This resulted in a good distribution of items per dimension. Three items (one per dimension) were deleted that did not seem to fit any dimension conceptually. This left us with 20 items for the professor support measure. The final items and their loadings on the three factors ('Interim Feedback', 'Willingness to Intervene/Explain Expectations', and 'Guidance on Team Composition and Structure') are presented in Table 2.

PES Data

I obtained archival data from the PES system from Fall 2014 to Winter 2017. The data are organized so that each person who is rated has multiple lines of data, one for each peer who rated them in a course where the PES system was used. The ratings are organized based on the student being rated, the peer who made the rating, and the course number in which the rating was made. Not all the courses at JMSB use the PES system, so the ratings are uneven and not every student is rated the same number of times or in the same number of courses.

In order to prepare the PES data to test the hypotheses, I had to filter the data for courses that would illustrate the 'before and after' effect. In order to do so, I chose COMM

222 and COMM 401 as the groups of comparison, because COMM 222 is taken early on in an undergraduate degree, whereas COMM 401 is taken later, more often near the end of the degree. Therefore, I filtered the data for 6 semesters (Fall 2014, 2015, 2016 and Winter 2014, 2015, 2016) to isolate students that were rated in COMM 222 and 401. The number of students rated in each of these courses across the 6 terms appears in Table 8. In order to generate a single score for each student (i.e., the student's Peer-Rated Teamwork Skills), I needed to aggregate data across these multiple raters.

I justified this aggregation by examining inter-rater agreement using the r_{WG} index (originally developed by James Demaree & Wolfe, 1984). By consulting the guidelines outlined in Appendix A of LeBreton & Senter (2008), I ran the syntax provided in order to calculate r_{WG} values for students rated in each of the 6 available terms. I examined agreement for uniform, moderate and highly skewed distributions, and I focused on results for r_{WG} _hs (highly skewed) because my data are highly skewed. Across all of the semesters (Winter 2014, Fall 2014, Winter 2015, Fall 2015, Winter 2016, Fall 2016), there was good agreement across raters (i.e., r_{WG} has values >0.70) in over 80% of the cases (and this is true across the three skew types). Based on these results, I deemed that it was justified to aggregate data from multiple peer raters and I calculated an average peer-rated score for teamwork skills for each student who was rated in COMM 222 or COMM 401 in the PES system (Table 5). I calculated this overall score per student by calculating the average of ratings made of each student by his/her teammates for the relevant class project (222 or 401) across the four areas measured in the PES (cooperation, conceptual contribution, practical contribution and work ethic).

At this point, I proceeded to conduct Confirmatory Factor Analyses (CFAs) based on the results of the EFAs. I conducted CFAs for each multi-dimensional construct separately first, followed by various measurement models that included all variables. Following the recommendation of Williams, Vandenberg, and Edwards (2009), I used parcels instead of individual items for all analyses involving structural equation modeling, as parcels are more likely to be normally distributed and result in a smaller covariance matrix, which makes it more likely to obtain good model fit. As proposed by Williams et. al. (2009), I placed the items that loaded the highest on the EFA with the items that loaded the lowest on the EFA, to balance out the strength of the parcels being formed.

CFA and SEM analyses were conducted using AMOS (V. 24). Because AMOS does not accept missing data, missing data were replaced prior to conducting the analyses. Replacements were done prior to parcel formation. As explained by Newman (2014) concerning data management in the case of missing values, it is best to make use of as much data as possible, even going so far as using only 1 item for a scale score to avoid deletion. I used this as my decision rule, but it is worth noting that for the complete file of 894 participants, roughly 1 item was replaced for 'Professor Support' per person. For 'Teamwork Strategies', 343 items were replaced in total (roughly 1 item per every third person), and 113 items were replaced for 'Teamwork Skills' (roughly 1 item per every ninth person). The missing items were sporadic, as there were no participants that left out a substantial amount of items from a specific construct, (the 6 participants that were previously mentioned to have left out whole sections had been deleted before this point).

I handled the missing values in the 'Professor Support' section by replacing the missing values with the average of the sample for the missing items. I used this approach

because I believe the teacher support provided is contextual, as opposed to personal; thus, it makes sense to assume that students who are part of the same cohort, at the same school, experienced similar amounts of support (since they more or less had the same professors) and the best guess for a missing data point is how other students in the same context responded to that item. For the 'Teamwork Skills' and 'Teamwork Strategies' sections, I used the average of the individual student to replace missing data for the respective student, rather than the sample item mean. I used this approach because I believe that the best guess as to a student's level of teamwork skills or strategies is how that student responded on average to other items assessing these variables.

I then tested multiple measurement models for each variable individually (i.e., teamwork skills, teamwork strategies, and professor support; see Table 6). I started with a one-factor baseline model in each case and compared this model to other multi-dimensional models. In each case, the hypothesized model (based on the EFA) was a good fit to the data and a better fit than other tested models.

Measurement Models

Having established a good fit for the structure of each individual multi-dimensional variable, I then proceeded to explore the measurement model for all variables combined. I tested multiple measurement models to determine the best fit. The baseline model was a single-factor model that had all parcels loading on a single latent variable (See Table 6). I compared this model to a model that had only 3 variables (i.e., skills, strategies, and support) and to the hypothesized 9-factor model. I repeated these analyses for ratings using the PES data with one, three, and eight factor models using PES self-ratings, and PES peer-ratings as the measures of teamwork skills instead of the two-variable measure of

'Team Task Orientation' and 'Respectful Teamwork Behaviors'. In all cases, the hypothesized multi-factor models were the best fit to the data.

Following the measurement models, I examined various structural models to test my hypotheses, as described below. I note that I encountered a Heywood case (negative variance) on the 'Attention to Meetings' construct in the structural models. Following the recommendation of Chen, Bollen, Paxton, Curran and Kirby (2001), I first explored he identification of my models, which were not under identified. I then removed the multivariate outliers, which did not have any effect (I subsequently added their data back). I had a large sample; so small sample size is unlikely to be the cause in my case. Thus, I opted to examine the confidence interval of the offending parcel (one of Chen et al.'s recommended tests) and found that it included zero. Considering this, I set the negative variance to 0.01. This corrected the problem.

RESULTS

Hypothesis 1

Hypothesis 1 stated that students with more exposure to group projects in JMSB would have more teamwork skills than those with less exposure**.** This hypothesis was tested in several ways. First, I compared peer-ratings from the PES system within each term for students who were close to the beginning of their degrees (students taking COMM 222) to students who were close to the end of their degrees (students taking COMM 401), in order to ascertain if there were differences in students' level of skill cross-sectionally. This analysis was based on an assumption that students at the end of their programs have had more exposure to teamwork than students at the beginning of their programs. As noted in

Table 8, independent samples T-tests show that students with more exposure (i.e. students in COMM 401) have a higher mean PES score than students who are starting in the program (i.e. students in COMM 222) in 3/6 terms for which data were available, and are not significantly different in the other 3/6 terms.

Second, I compared peer-ratings from the PES system for students who completed COMM 222 in the 2014-2015-2016 academic years to the same students who later completed COMM 401 in the 2015-2016-2017 academic years, in order to ascertain if there were differences in students' level of skill longitudinally. Again, the assumption was that students at the end of their programs had more exposure to teams than those at the beginning. I first filtered all the students that took COMM 222 in 2014, 2015, 2016, in one file (N = 2191) and filtered all the students that took COMM 401 in 2014, 2015, 2016 in another file (N = 1286). There were 94 students that had taken the COMM 222 course twice during the abovementioned time period, and the same situation applied to 10 students regarding COMM 401. I deleted the later ratings for the students in the COMM 222 files, as they were from the later date, and since I were trying to capture the earliest ratings, the redo of the course was less meaningful. The opposite was true for the COMM 401 files, where I deleted the earlier ratings for the students who took the course twice, since I was trying to capture the latest ratings possible. I then merged the COMM 222 and COMM 401 files and there were 138 students for whom data were available for COMM 222 first and then COMM 401 later. The results of this paired samples T-test analysis provided limited support H1, as the mean for students completing 401 was only marginally higher than the mean for students completing 222 (see Table 8).

Third, correlations are another indication that JMSB exposure is related to skills. Exposure is positively related to task orientation skills but not respect (see Table 13).

Taken together, roughly half of the t-tests had significant results and exposure was positively correlated with one self-rated teamwork skill. Based on this, I would say that these analyses provide evidence to partially support H1.

Analytical Strategy

All remaining hypotheses were tested via structural equation models. I compared many nested models, including partially and fully mediated models (see Table 6 and Table 7) for all three teamwork skill ratings (i.e., self-ratings of skills, both 2-dimensional and global PES measure, and with peer ratings of skills from the PES system). These models included the JMSB team exposure (an observed variable) as a predictor of teamwork skills, both directly and indirectly (via strategies; see Table 7). I systematically tested each possibility starting with the 2-dimensional self-ratings of teamwork skills, going from fully mediated (most parsimonious) to partially mediated for both support and JMSB teamwork exposure (least parsimonious), until I found the best-fitting model. The best-fitting model was the model in which the relation between exposure and teamwork skills was fully mediated through strategies, whereas the relations between professor support and skills were partially mediated through Strategies (Model 22 and Figure 1). As shown in Table 7, Model 22 was a good fit to the data based on the CFI, GFI and RMSEA, and had the lowest AIC value (the AIC value is useful to compare non-nested models, such as Model 23 and Model 24). After determining that this model was the best fit, I added each of the additional variables individually to see if they would improve the model fit (i.e., conscientiousness, teamwork exposure outside JMSB and GPA). The models that included

any of the additional variables were significantly worse than Model 22 (see Table 6). Thus, Model 22 was retained as the best fitting model. At this point, I tested the fully and partially mediated models with PES ratings (both self and peer ratings).

The best fitting model when PES self-ratings are used as the measure of teamwork skills is Model 25 (Partially mediated for Exposure and fully mediated for Support; Table 7). However, Model 26 (Fully mediated for exposure and partially mediated for Support), is marginally better than Model 24 (Fully mediated for both exposure and support) and has a lower AIC value than Model 25. The best fitting model when PES peer-ratings are used is Model 30 (Fully mediated for exposure and partially mediated for Support; Table 7).

Overall, I accepted the model in which the relation between exposure and skills is fully mediated by strategies, and the relations between support and skills are partially mediated by strategies (Models 22, 26 and 32). This model demonstrated a good fit to the data based on the CFI, GFI, and RMSEA for all three measures of teamwork skills, was the best model based on the AIC in all three cases, and was better based on the chi-square difference test (although the improvement was only marginal for PES self-ratings)

Hypothesis 2

Hypothesis 2 stated that students who report getting more professor support would have higher teamwork skills than students who report getting less/no support from professors. This hypothesis was tested through the SEM models, with each professor support dimension ('Interim Feedback', 'Willingness to Intervene/Explain Expectations' and 'Guidance on team Composition and Structure') having a path drawn to each

teamwork skill dimension ('Respectful Team Behaviors', 'Team Task Orientation'); I also ran each model with the global skills measure from the PES system - both self and peer ratings. Fit indices for all models appear in Table 7. As noted above, the best fitting model included direct paths from professor support to teamwork skills, as well as mediated paths through teamwork strategies. Several patterns in the direct paths are worth noting. First, consistent with H2, 'Willingness to Intervene' is positively related to teamwork skills. Second, in contrast to H2, 'Interim Feedback' is negatively related to teamwork skills. Third, in contrast to H2, 'Guidance on Team Composition and Structure' generally does not have a significant relationship to teamwork skills. When this analysis was done with ratings based on items from the PES, I find that support is not related to PES self-ratings or PES peer-ratings. These results provide limited support for H2, primarily with respect to the positive relation between 'Willingness to Intervene and Explain Expectations' and self-ratings of teamwork skills on the 2-dimensional measure.

Hypothesis 3

Hypothesis 3 stated that teamwork strategies mediate the relation between exposure to teamwork and teamwork skills. This hypothesis was tested by including paths from exposure to each teamwork strategy ('Organizational Strategies', 'Strategies to Express Dissent', 'Respectful Strategies', 'Attention to Meetings'), and from each teamwork strategy to each teamwork skill ('Respectful Team Behavior', 'Team Task Orientation'; See Tables 9 and 11). Consistent with H3, JMSB teamwork exposure is positively related to 'Strategies to Express Dissent' only; in contrast to H3, exposure is negatively related to 'Respectful Teamwork Strategies', and it is not related to 'Organizational Strategies' or 'Attention to Meetings Strategies'. When considering JMSB exposure from the model with

PES self-ratings as the measure of skills (Model 26) and the model with PES peer ratings as the measure of skills (Model 30), relationships with both 'Organizational Strategies and 'Attention to Meetings' were significant and positive as hypothesized. Also, for PES self-ratings as the measure of skills (Model 26), the path was supported from exposure to 'Strategies to Express Dissent' as predicted.

Hypothesis 4

Hypothesis 4 stated that teamwork strategies mediate the relation between professor support and teamwork skills. This hypothesis was tested by including paths from each professor support to each teamwork strategy (see Table 11), and from each teamwork strategy to each teamwork skill (see Table 12). Consistent with H4, 'Willingness to Intervene' is positively related to teamwork strategies, when considering the models with the 2-dimensional measure of teamwork skills (self-rated; Model 22) and both PES self (Model 26) and peer ratings (Model 30). In contrast to H4, 'Interim Feedback' is negatively related to teamwork strategies for Model 22, Model 26 and Model 30. 'Guidance on Team Composition and Structure' is only significantly related to 'Strategies to Express Dissent' for Model 22, Model 26 and Model 30.

In terms of the relationship between teamwork strategies and teamwork skills, it is impossible to determine whether the strength/direction of the relationship is due to exposure or professor support, because I am relying on the total set of path estimates in the whole model to draw conclusions and my SEM analyses do not provide a direct assessment of each mediation effect. The pattern worth noting is that almost all teamwork strategies are negatively related to the teamwork skills measures. The exception is that

‘Strategies to Express Dissent’ did not have a significant relationship with ‘Team Task Orientation’.

When PES peer-ratings are used as a measure of teamwork skills, most observed relations are not significant, with the exception of the path from ‘Organizational Strategies’ to PES peer-ratings, which was marginally significant. When PES self-ratings was used as the measure of Teamwork Skills, 2 of the 4 strategies are significantly positively related (‘Organizational Strategies’ and ‘Respectful Strategies’) to PES self-ratings

Based on this, I concluded that the results show limited supported for H3, specifically with exposure being positively related to ‘Strategies to Express Dissent’. Also, there is limited support for H4, because ‘Willingness to Intervene and Explain Expectations’ (Professor Support) is positively related to teamwork strategies. However, teamwork strategies are, for the most part, negatively related to teamwork skills, with the exception of organizational strategies, which are positively related to self and peer ratings of skills based on the PES global measure, which overall is not consistent with my prediction.

Figure 1

Model of the Acquisition of Teamwork Skills

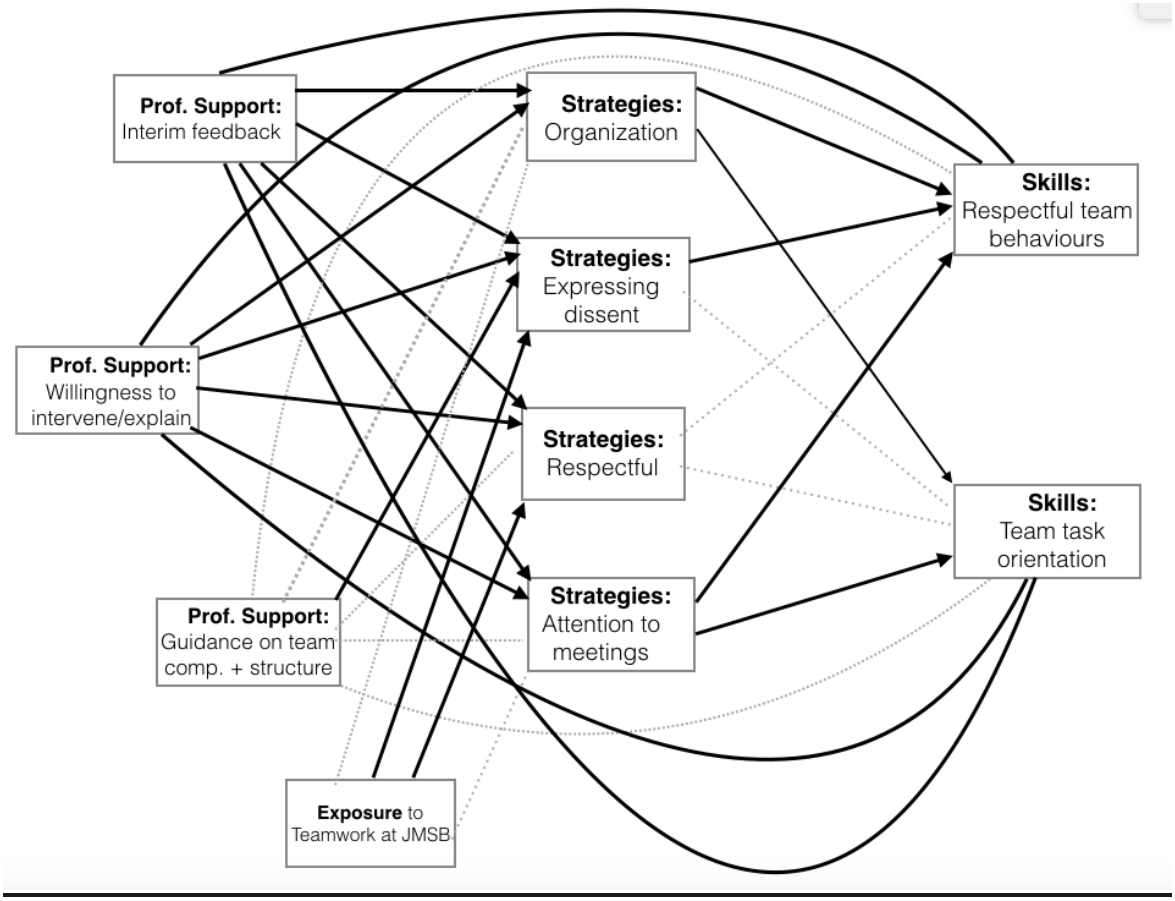

Table 1. *Loadings from Pattern Matrix for Teamwork Skills*[1]

	1	2
Team Task Orientation (TO)		
Use logic to challenge group thinking.	**0.78**	-0.20
Ask questions that help the team to understand the project.	**0.77**	-0.11
Persevere when a task becomes difficult.	**0.76**	-0.10
Speak clearly with acceptable vocabulary.	**0.65**	-0.08
Help by explaining or reviewing the project.	**0.64**	-0.08
Think carefully before reaching conclusions.	**0.61**	-0.02
Offer new ways of looking at problems.	**0.61**	0.12
Share my feelings, ideas, or opinions about the project.	**0.58**	0.09
Evaluate evidence for different opinions.	**0.56**	0.20
Combine and build on the ideas of others.	**0.55**	0.23
Fulfill my role in the group.	**0.54**	0.30
Stay focused on the task during group work.	**0.51**	0.11
Refer to reading materials and references during discussions.	**0.51**	0.12
Do my fair share of the work.	**0.46**	0.38
Respectful Team Behaviors (RB)		
Listen to everyone and respecting their views.	-0.07	**0.74**
Limit the length of my comments so others can talk.	-0.14	**0.65**
Recognize individual contributions of my team members.	0.16	**0.60**
Accept compromise to deal with conflict.	0.04	**0.59**
Attend team meetings.	0.04	**0.57**
Avoid using put-downs or blaming others when things are not going well.	0.15	**0.49**
Arrive on time for scheduled team meetings.	0.15	**0.40**

[1] *These items are taken from Strom and Strom (2011).*

Table 2. *Loadings from Pattern Matrix for Professor Support*

	1	2	3
Interim Feedback (IF)			
The professor offers midsession meetings to discuss the team project.	**0.80**	-0.11	-0.03
The professor requires students to submit a proposal to be graded before they proceed with their project.	**0.77**	-0.26	0.15
The professor requires students to submit parts of the project to be graded before the final project is submitted.	**0.71**	0.12	0.19
The professor schedules meetings with each group in the class to give them feedback and/or ensure that they are making smooth progress.	**0.61**	-0.35	-0.12
The professor gives students class time to work on group projects, and stays to answer questions.	**0.60**	-0.08	0.11
The professor provides feedback at various intervals throughout the teamwork project.	**0.56**	-0.04	0.27
The professor requires a peer evaluation part way through the team project.	**0.50**	-0.09	-0.10
The professor gives small graded group assignments.	**0.49**	-0.27	-0.04
Guidance on team Composition and Structure (GI)			
The professor formally assigns one group member to be the team leader.	-0.14	**-0.81**	-0.03
The professor assigns teams based on information about who is in the class and their skills.	0.14	**-0.80**	-0.16
The professor does an in-class activity in which students can discuss how they like to work, their time schedules etc. before they choose their team members.	0.23	**-0.59**	-0.08
The professor has teams draw up a Team Contract or Charter.	0.17	**-0.58**	0.03
The professor designs the project in such a way that students must work together to complete it, rather than allowing them to do individual parts that simply get put together at the end.	-0.07	**-0.54**	0.41
The professor gives students guidance about how to select team members.	0.04	**-0.50**	0.28
The professor asks students to submit a list of who did what on the team project.	0.12	**-0.48**	0.23
The professor discourages breaking the project into smaller sections and working on them independently.	0.05	**-0.44**	0.25

Willingness to Intervene and/or Explain Expectations (WI)	1	2	3
The professor mentions in class that s/he is willing to help when there are issues in the team.	-0.05	-0.23	**0.75**
The professor mentions that grades will be adjusted for students who do no pull their weight (as per the peer evaluations).	0.10	0.06	**0.65**
The professor provides elaborate guidelines for the team project.	0.15	-0.03	**0.62**
The professor writes on the course outline that s/he is willing to help groups that are having difficulties.	0.08	-0.13	**0.61**

Table 3. *Loadings from Pattern Matrix for Teamwork Strategies*

	1	2	3	4
Organizational Strategies (OA)				
I keep my information about the project well organized and easily accessible.	**0.68**	-0.13	0.13	0.03
I schedule time to work on my team projects.	**0.67**	-0.14	0.18	-0.05
I take note of the tasks I promise to complete.	**0.65**	-0.21	0.10	-0.02
I ask group members for help if I am struggling.	**0.63**	0.09	-0.1	0.05
I make a note when there is something I don't understand about the project so that I can remember to get clarification.	**0.62**	0.05	0.13	0.08
I organize a schedule of dates by which various group tasks should be accomplished.	**0.61**	0.15	0.20	-0.13
I ask the professor for clarification if something about a team project is unclear to me.	**0.60**	-0.04	-0.14	0.04
I monitor how much time if left before group project are due.	**0.59**	-0.13	0.14	0.06
I suggest dividing tasks on team projects so that everyone has an equal amount of work to do.	**0.56**	-0.07	-0.1	-0.01
I remind my team members about the passage of time during group projects.	**0.56**	0.23	0.03	0.04
I ask other to send me their work before to project is due so that I can look it over.	**0.52**	0.19	-0.12	0.04
I ask to hold a group meeting if I have doubts about how we should proceed.	**0.52**	0.17	-0.003	0.07
I do required readings so I can be prepared for meetings.	**0.51**	-0.03	0.30	0.08
I rely on multiple sources to prepare my parts of a team project.	**0.46**	-0.04	0.04	0.19
When I come across materials that may be useful to me or another team member, I save and/or print them.	**0.45**	-0.14	-0.03	0.33
I gather facts and data in case I need to support my suggestions.	**0.40**	-0.02	0.08	0.38
Strategies to Express Dissent (ED)				
I criticize people if they disagree with me.	-0.01	**0.73**	0.01	-0.09
I ignore the suggestions of my teammates.	-0.10	**0.69**	0.06	-0.20
If a team member and I disagree, I insist that they come around to my way of thinking.	0.07	**0.57**	0.07	-0.09
I tell other group members if the quality of their work is too low.	0.31	**0.52**	-0.25	0.19
I search for information that does no agree with my initial observations.	0.06	**0.39**	0.15	0.36

Strategies to Attend to Meetings (AM)	1	2	3	4
I set an alarm to ensure I am not late for meetings.	0.01	-0.003	**0.64**	0.07
I check my calendar and email daily to make sure I remember when meetings are going to take place.	0.33	-0.12	**0.54**	-0.08
I record in my schedule (e.g., phone or planner) when meetings are occurring.	0.30	-0.07	**0.52**	-0.04
I monitor how much I am speaking during group meetings.	-0.02	0.38	**0.43**	0.20
I prepare a list of points that I want to make before I come to a meeting.	0.22	0.26	**0.43**	0.26
I practice what I am going to say in the group meetings beforehand.	-0.11	0.34	**0.43**	0.21
I take notes during group meetings.	0.35	0.07	**0.32**	0.23
Respectful Strategies (AR)				
I practice taking different perspectives when problems arise.	0.08	-0.08	-0.01	**0.68**
When there is a conflict about something, I try to understand what others are trying to accomplish.	0.19	-0.10	-0.07	**0.67**
If two members have conflicting ideas, I search for a solution, rather than focusing on who caused the problem.	0.24	-0.04	-0.27	**0.56**
I adjust the words I use if I am speaking with someone who does not share my mother tongue.	-0.11	-0.02	0.16	**0.55**
When everyone wants to go one way, I try to reason out whether there could be another approach.	-0.03	0.31	-0.003	**0.55**
When I am frustrated, I take a break and come back to my work when my head is clear, rather than give up.	0.14	-0.03	-0.005	**0.47**
I think about how my ideas are connected to others' ideas.	0.25	-0.23	0.15	**0.45**
If I am unsatisfied with work submitted by my teammates, I give concrete suggestions to improve it, instead of criticizing.	0.30	0.06	-0.25	**0.45**
I limit texting and surfing the web during group meetings.	-0.10	-0.06	0.15	**0.45**
I wait for others to finish their point before I speak.	0.06	-0.40	0.19	**0.43**
I listen carefully to other people's ideas.	0.22	-0.40	0.14	**0.41**
I praise group members who are making positive contributions to the team.	0.34	-0.03	-0.08	**0.35**

Table 4. *Path weights from Model 22 (Partially mediated for Support and fully mediated for JMSB Exposure)*

Path	Estimate	P-Value
SUPPORT TO STRATEGIES		
Interim Feedback → Organizational Strategies	**-0.28**	**p<0.001**
Interim Feedback → Expressing Dissent	**-1.2**	**p<0.001**
Interim Feedback → Respectful Strategies	**-2.35**	**p<0.001**
Interim Feedback → Attention to Meetings	**-2.29**	**p<0.001**
Guidance on Team Composition & Structure → Organizational Strategies	-.04	0.24
Guidance on Team Composition & Structure → Expressing Dissent	**0.44**	**p<0.01**
Guidance on Team Composition & Structure → Respectful Strategies	-0.48	0.11
Guidance on Team Composition & Structure → Attention to Meetings	-0.09	0.765
Willingness to Intervene/Explain → Organizational Strategies	**4.93**	**p<0.001**
Willingness to Intervene/Explain → Expressing Dissent	**1.77**	**p<0.001**
Willingness to Intervene/Explain → Respectful Strategies	**4.38**	**p<0.001**
Willingness to Intervene/Explain → Attention to Meetings	**4.02**	**p<0.001**
SUPPORT TO SKILLS		
Interim Feedback → Team Task Orientation	**-0.24**	**p<0.001**
Interim Feedback → Respectful Team Behaviors	**-0.28**	**p<0.001**
Guidance on Team Composition & Structure → Team Task Orientation	-0.04	p=0.22
Guidance on Team Composition & Structure → Respectful Team Behaviors	-0.04	p=0.25
Willingness to Intervene/Explain → Team Task Orientation	**0.42**	**p<0.001**
Willingness to Intervene/Explain → Respectful Team Behaviors	**0.51**	**p<0.001**

Path	Estimate	P-Value
STATEGIES TO SKILLS		
Organizational Strategies → Team Task Orientation	**-0.03**	**p<0.01**
Organizational Strategies → Respectful Team Behaviors	**-0.05**	**p<0.001**
Expressing Dissent → Team Task Orientation	-0.001	p=0.61
Expressing Dissent → Respectful Team Behaviors	**-0.1**	**p<0.001**
Respectful Strategies → Team Task Orientation	**-0.02**	**p=0.009**
Respectful Strategies → Respectful Team Behaviors	-0.02	p=0.03
Attention to Meetings→ Team Task Orientation	**-0.02**	**p<0.001**
Attention to Meetings→ Respectful Team Behaviors	**-0.01**	**p<0.001**
EXPOSURE TO STRATEGIES		
Exposure to Teamwork at JMSB →Organizational Strategies	0.046	p=0.14
Exposure to Teamwork at JMSB → Expressing Dissent	**0.225**	**p=0.002**
Exposure to Teamwork at JMSB → Respectful Strategies	**-0.13**	**p<0.001**
Exposure to Teamwork at JMSB → Attention to Meetings	0.003	0.956

*Significant paths are **bolded.**

Table 5. *Inter-Rater Agreement*

Semester	Minimum-Maximum # of raters/person	Average Number of raters/students (222 and 401)	Standard Deviation (for number of raters)	Total Number of Students (COMM 222+ COMM 401)
Winter 2014	2-6	3.87	0.60	729
Fall 2014	2-5	4.02	0.70	429
Winter 2015	1-18	5.17	2.33	685
Fall 2015	2-5	3.87	0.57	297
Winter 2016	2-6	4.06	0.74	1038
Fall 2016	1-8	4.25	0.82	398

Table 6. *Measurement Models*

	Chi-square (df)	Delta Chi-Square (df)	GFI	CFI	RMSEA	AIC
INDIVIDUAL VARIABLES						
Skills						
One-Factor (Model 1)	194.96 (20)	-------	0.906	0.914	0.130	226.96
Two-Factor (Model 2)	77.54 (19)	117.42 (1) *** M2 vs. M1	0.964	0.971	0.077	111.54
Strategies						
One-Factor (Model 3)	519.16 (65)	-------	0.849	0.839	0.117	571.16
Three-Factor (Dissent and Respect together) (Model 4)	300.48 (62)	218.68(3) *** M4 vs. M3	0.915	0.915	0.087	358.48
Four-Factor (Model 5)	182.56 (59)	117.92(3) *** M5 vs. M4	0.949	0.956	0.064	246.56
Support						
One-Factor (Model 6)	196.10 (20)	-------	0.905	0.910	0.131	228.10
Three-Factor (Model 7)	74.80 (17)	121.30(3) *** M7 vs. M6	0.964	0.970	0.081	112.80
*ALL VARIABLES**						
One-Factor (Model 8)	7017.43(377)	-------	0.498	0.478	0.140	7133.43
Three-Factor (support, strategies, skills) (Model 9)	2383.42(350)	4634.01(47) *** M9 vs. M8	0.806	0.842	0.078	2505.42
Nine-Factor (Model 10)	886.18 (341)	1497.24(45) *** M10vsM9	0.934	0.957	0.042	1074.18

Note: * p < .05 ** p < .01 *** p < .001

*ALL VARIABLES**	Chi-square (df)	Delta Chi-Square (df)	GFI	CFI	RMSEA	AIC
One-Factor (with Conscientiousness; Model 11)	8128.85(464)	----------	0.489	0.462	0.136	8256.85
Four-Factor (support, strategies, skills, and conscientiousness) (Model 12)	3397.18(458)	4731.67(6) *** M12vsM11	0.762	0.794	0.085	3537.18
Ten-Factor (includes Conscientiousness) (Model 13)	1471.40 (419)	1925.78(39) *** M13vsM12	0.911	0.926	0.053	1689.40
**'JMSB Exposure' and 'GPA' are not included in the measurement models as they are measured by a single indicator and are modeled as observed variables in the structural models.*						
PES Ratings						
One-Factor (including PES self-ratings; Model 14)	3782.74(275)	-----	0.509	0.431	0.158	3882.74
Three-Factor (support, strategies and skills [PES self-rating of skill]; Model 15)	1841.48(272	1941.26(3) *** M15vsM14	.827	.854	.080	1947.48
Eight-Factor (including PES self-ratings; Model 16)	637.60(247)	3145.14(25) *** M16vsM15	.943	.964	.042	794.60
One-Factor (including PES peer-ratings; Model 17)	2849.30(275)	--------	.473	.363	.181	2949.30
Three-Factor (support, strategies and skills [PES peer-ratings]; Model 18)	803.08(272)	2046.22(3) *** M18vsM17	.795	.869	.083	909.08
Eight-Factor (including PES peer-ratings; Model 19)	468.86(247)	2380.44(25) *** M19vsM18	0.886	0.945	0.056	625.86

Table 7. *Structural Models*

	Chi-square (df)	Delta Chi-Square (df)	GFI	CFI	RMSEA	AIC
With Self-ratings of Teamwork Skills (2-dimensional)						
Fully mediated for both JMSB Exposure and Support (Model 20)	1351.41(379)	---------	0.909	0.924	0.054	1523.41
Partially mediated for JMSB Exposure and fully mediated for Support (Model 21)	1339.75 (377)	11.253(2) ** M21 vs. M20	0.909	0.925	0.053	1515.75
Partially mediated for Support and fully mediated for JMSB Exposure *** (Model 22)	***1081.77(374)***	***269.643(5)*** *** M22 vs. M20	***0.945***	***0.922***	***0.046***	***1263.77***
Partially mediated (includes direct paths to skills from JMSB Exposure and Support; Model 23)	1082.00(372)	0.23 (2) M23 vs. M22 257.747(5) *** M23 vs. M21	0.922	0.945	0.046	1268.00
With PES Self Ratings						
Fully mediated for both Exposure and Support; Model 24)	*815.35(277)*	-----	*0.931*	*0.951*	*0.047*	*963.35*
Partially mediated for Exposure and fully mediated for Support (Model 25)	812.66(276)	2.685(1) * M25 vs. M24	0.931	0.951	0.047	962.66

Partially mediated for Support and fully mediated for Exposure (Model 26)	**808.13(274)**	**7.219(3) p<0.075** M26 vs. M24	**0.931**	**0.951**	**0.047**	**962.13**
Partially mediated (includes direct paths to skills from Exposure and Support) (Model 27)	806.64(273)	1.491(1) M27 vs. M26 6.02(3) M27 vs. M25	0.931	0.951	0.047	962.64
With PES Peer Ratings						
Fully mediated for both Exposure and Support (Model 28)	545.43(277)	-----	0.875	0.934	0.058	693.53
Partially mediated for Exposure and fully mediated for Support (Model 29)	539.69(276)	5.736(1) p<0.025 M29 vs. M28	0.876	0.935	0.058	689.69
Partially mediated for Support and fully mediated for Exposure (Model 30)	***522.64(274)***	***17.055(2)*** *** M30 vs. M28	***0.880***	***0.939***	***0.056***	***676.64***
Partially mediated (includes direct paths to skills from Exposure and Support) (Model 31)	522.15(273)	0.49(1) M31 vs. M30 17.54(3) *** M31 vs. M29	0.880	0.939	0.056	678.15

Model 22 with Controls						
Model 22 plus direct path from GPA to both Teamwork skills (Model 32)	1382.97 (403)	301.20(29) *** M32 vs. M22	0.905	0.920	0.053	1568.97
Model 22 plus direct path from Conscientiousness to both Teamwork skills (Model 33)	1961.93(462)	880.16(88) *** M33 vs. M22	0.887	0.896	0.060	2159.93
Model 22 plus direct path from Exposure Outside JMSB to both Teamwork skills (Model 34)	1106.51(402)	24.74(28) M34 vs. M22	0.920	0.943	0.045	1294.51

Note. * p < .05 ** p < .01 *** p < .001

Table 8. *T-tests comparing students from COMM 222 to COMM 401*

	Mean COMM222 (SD)	Mean COMM401 (SD)	t-value (df)	p-value
Independent Samples T-test				
Winter 2014	6.39(0.94) N=374	6.44(0.82) N=355	-0.85(727)	0.40
Fall 2014	6.48 (0.82) N=124	6.47 (0.85) N=305	0.08(427)	0.94
Winter 2015	6.44(0.71) N=488	6.41(0.78) N=202	0.407(688)	0.68
Fall 2015	**6.08(1.11) N=261**	**6.53(0.63) N=36**	**-3.62(68.58)**	**p= 0.001**
Winter 2016	**6.38(0.81) N=819**	**6.68(0.66) N=219**	**-5.65(414.06)**	**p < .001**
Fall 2016	**6.34(0.82) N=220**	**6.64(0.70) N=179**	**-3.95(396.02)**	**p < .001**
Paired Samples T-test N=138	COMM 222 from 2014-2015-2016	COMM 401 from 2014-2015-2016		
	6.42(0.82)	6.57(0.78)	-1.80 (137)	p=0.075

Table 9. *Path Weights: Professor Support to Teamwork Skills*

H2: Students who report getting more ***Professor Support*** **will have higher** ***Teamwork Skills*** areas than students who report getting less/no support from professors.	***Respectful Team Behaviors*** *(Skills)*	***Team Task Orientation*** *(Skills)*	***PES Self-Ratings*** *(Skills)*	***PES Peer-Ratings*** *(Skills)*
Interim Feedback (Support)	H2a: Not supported, **Negative Path weight= -0. 284, p<0.001.**	H2b: Not supported, **Negative Path weight= -0.235, p<0.001.**	H2c: Not supported, not significant. Path weight: 0.088, p=0.122.	H2d: Not supported, not significant. Path weight: 0.129 p=0.113.
Willingness to Intervene/Explain Expectations (Support)	**H2e: Supported, Positive Path weight: 0.507, p<0.001.**	**H2f: Supported, Positive Path weight: 0.417, p<0.001.**	H2g: Not supported, not significant. Path weight: -0.169, p=0.085.	H2h: Not supported, not significant. Path weight: -0.161 p=0.137.
Guidance on team composition and structure (Support)	H2i: Not supported, not significant. Path weight: -0.040, p=0.254.	H2j: Not supported, not significant. Path weight: -0.036, p=0.221.	H2k: Not supported, not significant. Path weight: 0.018 p=0.239.	H2l: Not supported, not significant. Path weight: -0.026 p=0.374.

Table 10. *Path Weights: JMSB Exposure to Teamwork Strategies*

H3: Students who report getting more ***Teamwork Exposure* in JMSB will have higher *Teamwork Strategies*** than students who report getting less/no Exposure to Teamwork in JMSB.	***Organizational Strategies***	***Strategies to Express Dissent***	***Respectful Strategies***	***Attention to Meetings Strategies***
JMSB Exposure (From Model 22 with two-dimensional self-ratings of skills)	H3a: Not supported, not significant. Path weight: 0.046, p=0.14.	**H3b: Supported, Positive Path weight: 0.225, p= 0.002.**	H3c: Not supported, **Negative. Path weight: -0.13, p<0.001.**	H3d: Not supported, not significant. Path weight: 0.003, p=0.956.
JMSB Exposure (From Model 26 with PES self-ratings of skills)	**H3e: Supported, Positive. Path weight: 0.314, p<.001.**	**H3f: Supported, Positive Path weight: 0.336, p<.001**	H3g: Not supported, not significant. Path weight: 0.112, p=0.071.	**H3h: Supported, Positive. Path weight: 0.228, p=.001.**
JMSB Exposure (From Model 30 with PES peer-ratings of skills)	**H3i: Supported, Positive. Path weight: 0.345, p=0.011.**	H3j: Not Supported, not significant Path weight: 0.193, p= 0.240.	H3k: Not supported, not significant. Path weight: 0.222, p=0.061.	**H3l: Supported, Positive. Path weight: 0.256, p=.045.**

Table 11. *Path Weights: Professor Support to Teamwork Strategies*

H4: Students who report more ***Professor Support*** **will score higher in** ***Teamwork Strategies*** than students who report getting less/no Support.	***Organizational Strategies***	***Strategies to Express Dissent***	***Respectful Strategies***	***Attention to Meetings Strategies***
Interim Feedback (Support) From Model 22 with two-dimensional self-ratings of skills	Not supported, **Negative. Path weight= -2.809, p<0.001**	Not supported, **Negative. Path weight= -1.242, p<0.001**	Not supported, **Negative. Path weight= -2.288, p<0.001**	Not supported, **Negative. Path weight= -2.353, p<0.001**
Interim Feedback (Support) From Model 26 with PES self-ratings	Not supported, **Negative. Path weight= -2.800, p=0.001**	Not supported, **Negative. Path weight= -1.366, p<.001**	Not supported, **Negative. Path weight= -2.293, p<.001**	Not supported, **Negative. Path weight= -.2.248, p<.001.**
Interim Feedback (Support) From Model 30 with PES peer ratings	Not supported, **Negative. Path weight= -2.758, p=0.001**	Not supported, **Negative. Path weight= -1.069, p=0.010**	Not supported, **Negative. Path weight= -1.804, p=0.005**	Not supported, **Negative. Path weight= -1.860, p=0.004**
Willingness to Intervene/Explain Expectations (Support) From Model 22 (with two-dimensional self-ratings of skills)	**Supported, Positive Path weight = 4.928, p<0.001**	**Supported, Positive Path weight = 1.772, p<0.001**	**Supported, Positive Path weight = 4.384, p<0.001**	**Supported, Positive Path weight = 4.022, p<0.001**

	Organizational Strategies	*Strategies to Express Dissent*	*Respectful Strategies*	*Attention to Meetings Strategies*
Willingness to Intervene/Explain Expectations (Support) From Model 26 with PES self-ratings	**Supported, Positive Path weight = 4.953, p<0.001**	**Supported, Positive Path weight = 1.989, p<0.001**	**Supported, Positive Path weight = 4.298, p<0.001**	**Supported, Positive Path weight = 3.985, p<0.001**
Willingness to Intervene/Explain Expectations (Support) From Model 30 with PES peer ratings	**Supported, Positive Path weight = 3.766, p<0.001**	**Supported, Positive Path weight = 1.035, p=0.015**	**Supported, Positive Path weight = 2.891, p<0.001**	**Supported, Positive Path weight = 2.474, p<0.001**
Guidance on team composition and structure (Support) From Model 22 with two-dimensional self-ratings of skills	Not supported, not significant. Path weight= -0.399, p=0.243.	**Supported, Positive Path weight = 0.436, p<0.01**	Not supported, not significant. Path weight= -0.484, p=0.112.	Not supported, not significant. Path weight= -0.085, p=0.765.
Guidance on team composition and structure (Support) From Model 26 with PES self-ratings	Not supported, not significant. Path weight= -0.411, p=0.229.	**Supported, Positive Path weight = 0.460, p=0.005**	Not supported, not significant. Path weight= 0.475, p=0.110	Not supported, not significant. Path weight= -0.091, p=0.745
Guidance on team composition and structure (Support) From Model 30 with PES peer ratings	Not supported, not significant. Path weight= 0.645, p=0.209.	**Supported, Positive Path weight = 0.832, p=0.001**	Not supported, not significant. Path weight = 0.222, p=0.564.	Not supported, not significant. Path weight = 0.710, p=0.054.

Table 12. *Path Weights: Teamwork Strategies to Teamwork Skills*

Students who report getting more ***Organizational Strategies*** ***in JMSB*** **will have higher** ***Teamwork Skills*** than students who report getting less/no Exposure to Teamwork in JMSB.	***Respectful Team Behaviors*** *(Skills)*	***Team Task Orientation*** *(Skills)*	***PES Self-Ratings*** *(Skills)*	***PES Peer-Ratings*** *(Skills)*
Organizational Strategies	H4a: Not supported, **Negative, Path weight= -0.051, p<0.001.**	H4b: Not supported, **Negative Path weight= -0.030, p= 0.003.**	H4c: **Supported, Positive Path weight: 0.028, p=0.015.**	H4d: **Supported, marginally positive. Path weight: 0.039 p=0.050.**
Strategies to Express Dissent	H4e: Not supported, **Negative Path weight= -0.014, p<0.001**.	H4f: Not supported, not significant. Path weight= -0.001, p=0.608.	H4g: Not supported, not significant. Path weight: -0.003, p=0.380.	H4h: Not supported, not significant. Path weight: -0.006 p=0.241.
Respectful Strategies	H4i: Not Supported, **Negative Path weight= -0.016, p=0.009.**	H4j: Not supported, **Negative. Path weight= -0.016, p=0.031**.	H4k: **Supported, Positive Path weight: 0.036, p<0.001**	H4l: Not supported, not significant. Path weight: 0.004 p=0.826.

Table 13- *Correlation Matrix*

	MEAN	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1- SUPPORT VIA WILLINGNESS TO intervene/ EXPLAIN EXPECTATIONS	55.95	22.32	**.69**															
2- SUPPORT VIA INTERIM FEEDBACK	37.44	19.58	.52**	**.84**														
3- SUPPORT VIA GUIDANCE ON INPUTS	24.14	18.94	.43**	.64**	**.85**													
4- ORGANIZATIONAL STRATEGIES	75.78	14.94	.17**	.10**	.02	**.87**												
5- STRATEGIES TO EXPRESS DISSENT	31.64	16.87	.10**	.20**	.28**	.23**	**.54**											
6- MEETING STRATEGIES	60.56	19.15	.16**	.26**	.22**	.54**	.29**	**.70**										
7- RESPECTFUL STRATEGIES	77.30	13.25	.20**	.12**	.02	.70**	.15**	.50**	**.82**									
8- RESPECTFUL TEAMWORK SKILLS	4.23	0.54	.11**	.04	-.08*	.33**	-.15**	.19**	.38**	**.73**								
9-TASK ORIENTATION SKILLS	4.12	0.55	.08*	-.004	-.08*	.49**	.13**	.25**	.47**	.61**	**.89**							
10-PES PEER AVG	6.27	0.77	.14*	.20**	.13*	.02	-.05	.000	-.003	.05	-.001	**.95**						

	MEAN	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
11- PES SELF AVG	6.26	0.97	.05	-.06	-.08*	.29**	.004	.11**	.32**	.31**	.35**	.03	**.89**					
12- JMSB EXPOSURE	10.05	7.52	.15**	.22**	.12**	.18**	.16**	.15**	.09**	.05	.14**	.14*	.08*	----				
13-EXPOSURE OUTSIDE JMSB	8.30	3.48	.07*	.02	.04	.17**	.14**	.14**	.16**	.12**	.25**	.03	.10**	.06	----			
14- CONSCIENTIOUSNESS	84.67	11.34	.04	-.09**	-.18**	.49**	-.25**	.19**	.41**	.32**	.33**	-.05	.26**	.01	.07*	**.71**		
15-GPA	3.02	0.56	-.01	-.08*	-.09**	.08*	.03	-.04	.04	.03	.13**	-.04	.04	-.15**	.17**	.07*	----	
16-GENDER	0.64	0.48	-.08*	-.02	-.05	.13**	-.19**	.08*	.04	.04	-.05	.01	.001	.06	.07*	.17**	-.03	-----

Notes:
** : Correlation is significant at the 0.01 level (2-tailed).
*: Correlation is significant at the 0.05 level (2-tailed).
Bold: Cronbach's alpha
N values ranged from 870 to 894 for most variables due to missing data. PES peer values was smaller (n=287)
Gender is coded 0-Males 1-Females
Professor support scale was from 0%-in none of my classes to 100%- in all of my classes.
Teamwork strategies scale was from 0%-none of the time to 100%-all of the time.
Teamwork skills scale was from 1-extremely easy to 5-extremely difficult.
Teamwork exposure at JMSB scale was from 0%-in none of my classes to 100%- in all of my classes.
Exposure outside JMSB scale was 1-very little to 5-a lot.
PES peer and PES self ratings scale was 1-strongly disagree- to 7-strongly agree.
Conscientiousness scale from 0%-in none of the time to 100%-all of the time
JMSB exposure scale is 0-47 courses.
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DISCUSSION

The purpose of this study was to gain a better understanding of undergraduate students' acquisition of teamwork skills, and to determine whether exposure to teamwork in an undergraduate business program and/or professor support ameliorate the procurement of such skills. The study also aimed to establish whether the use of teamwork strategies facilitates the acquisition of teamwork skills. Overall, I found some evidence that exposure to teamwork is positively associated with teamwork skills. I also found that the professor support of 'Willingness to Intervene and Explain Expectations' is fundamental in improving teamwork skills, whereas providing 'Interim Feedback' and/or 'Guidance on Teamwork Composition and Structure' seem to work negatively towards the acquisition of teamwork skills, or not at all. In terms of the link between strategies and skills, I found that the use of more teamwork strategies is negatively related to respectful and task-oriented teamwork skills, which may be indicative of the fact that students who have less of those teamwork skills require the use of more interim strategies. Finally, the link between exposure to teamwork at JMSB and teamwork strategies is somewhat ambiguous, as it seemed to depend on which measure of teamwork skills was employed and who was rating those skills. I discuss these results in detail below. First, however, I discuss the dimensionality of the individual constructs explored in this research.

DIMENSIONALITY OF TEAMWORK SKILLS, TEAMWORK STRATEGIES AND PROFESSOR SUPPORT

The constructs explored in this study were multi-dimensional, including teamwork skills, teamwork strategies and professor support, and the dimensionality of these constructs is

worth noting. In this study, I used a scale developed by Strom and Strom (2011) to measure teamwork skills. In contrast to their results, however, the construct did not break down into five dimensions in my data. This possibly could have been due to differences in the characteristics of the samples. My study consisted of a multi-cultural sample of undergraduate students, whereas Strom and Strom had an affluent, primarily white sample of high school students. In contrast to Strom and Strom, and, much like the seminal work of Stevens and Campion (1994, 1999), the items used to measure teamwork skills loaded on two dimensions in my sample. More specifically, similar to the 'Interpersonal' skills dimensions described by Stevens and Campion, one of the dimensions I observed in the teamwork skills measure was 'Respectful Team Behaviors.' The second dimension identified in my data was 'Task Orientation Behaviors,' which has some similarities to the construct of 'Self-Management', as described by Stevens and Campion (1994), but it is not a complete overlap because the dimension observed here is more centered on the task as opposed to managing deadlines and checkpoints.

I also used two more general measures of teamwork skills based on items from the PES. It is important to mention how difficult it was to decide on a measure of teamwork skills for this study. Although 'teamwork skills' is well established as a concept and there are numerous measures of teamwork skills available in the literature, most measures have limited construct validity and different scales have different dimensionality. Looking at the correlations between the three scales that are supposed to be measuring teamwork skills exemplifies this (see Table 13). The correlation between PES peer-ratings and PES self-ratings were not significant ($r = 0.03$, $p = 0.259$), and the correlations between PES peer-ratings and both respectful and task orientation skills were not significant either ($r = 0.05$, p

= 0.239 and r = -0.001, p = 0.177, respectively). In contrast, the PES self-ratings were correlated with self-ratings of respectful teamwork skills (r = 0.31, p = 0.00) and task orientation skills (r = 0.35, p = 0.00), which indicate a rather low level of convergent validity. Thus, although the three measures should have theoretically been capturing the same construct of 'teamwork skills', it became clear after analyzing all the results that they may not in fact be capturing 'teamwork skills' in the same way. These differences are discussed in relation to the relevant hypotheses and it is possible that differences in measurement could have been the reason for some of the puzzling patterns seen in the results.

In regards to the teamwork strategies construct, I failed to come across a scale to measure this construct in my examination of previous literature. Thus, I based my measure on the work of Afflerbach et al. (2008), which suggested that strategies tend to be used until skills are gained, but in the context of learning how to read. According to Afflerbach and colleagues (2008), once skills are attained, strategies tend to stop being used. I therefore devised items to measure teamwork strategies by breaking the skill items into smaller steps, as the logic of Afflerbach et al. (2008) had suggested. For this reason, I had originally anticipated that five dimensions would be observed for teamwork strategies (consistent with the original work of Strom & Strom, 2011). Following analyses of my data, the scale I developed appears to consist of four dimensions: 'Organizational Strategies', 'Strategies to Express Dissent', 'Respectful Strategies' and 'Attention to Meetings Strategies'. 'Organizational Strategies' and 'Attention to Meetings Strategies' are positively related to both dimensions of skills. This makes sense as both of these strategy dimensions have some task-related and respect-related items that could touch on

both skill areas. 'Strategies to Express Dissent' was only significantly related to the 'Respectful Team Behaviors' skill, which also makes sense given that the way in which one expresses disagreement could certainly be done in a respectful or rude manner and it is not strongly related to getting tasks done. Oddly, 'Respectful Strategies' were not significantly related to either team-oriented or respectful skills measures. I believe this could be because the concept of *'Respect'* was also captured in the two constructs of 'Strategies to Express Dissent' and 'Attention to Meetings Strategies', and in the presence of those two dimensions, its relationship with the skills measures was rendered non-significant. 'Organizational Strategies' and 'Respectful Strategies' are also related to overall self-ratings of skills based on the PES items, but relations between strategies and PES peer-rated skills are, in general, not significant. Developing a scale of teamwork strategies adds to the knowledge base on teamwork strategies and this scale can hopefully be refined and further examined in future research, in order to determine the dimensionality of this construct and further explore its links with teamwork skills.

Finally, for the professor support construct, I was again unable to uncover a measure of this construct in the existing literature. For this reason, I did a preliminary exploratory study that surveyed professors across undergraduate business disciplines. Using the results of the exploratory study, I was able to identify the kinds of support that students actually encounter in their classes at the educational institution where my study was done, and to provide them with true-to-life options in the student survey. I anticipated having two categories of professor support, but based on my data analyses, I concluded that there are three dimensions for this construct; professor support in the form of 'Interim

Feedback', 'Willingness to Intervene/Explain Expectations' and finally, 'Guidance on Team Composition and Structure' were observed.

DISCUSSION OF HYPOTHESES

THE LINK BETWEEN EXPOSURE AND TEAMWORK SKILLS.

H1 considered the relation between exposure to teamwork and teamwork skills, and stated that students with more exposure to group projects would have more teamwork skills. I predicted this based on Experiential Learning Theory (ELT), which as previously mentioned, describes learning as "the process whereby knowledge is created through the transformation of experience" (Kolb & Kolb, 2012, p. 44), and because past research has shown that students who have more teamwork experience have demonstrated more developed skills of interdependence (Colbeck et al., 2000). Also this hypothesis was formulated because 'the learning by doing' approach' has been shown to foster skills, such as negotiating with peers (Fearon et al., 2012), as well as facilitating academic learning and collaborative abilities (Chiriac, 2014).

The results of my study showed partial support for H1. Self-reported exposure is positively related to 'Team-Task Orientation Skills', and to both PES self and peer-ratings of overall teamwork skills, but is not significantly related to 'Respectful Team Behaviors' (for students surveyed in Winter, 2017). In the case of the paired samples T-test (including data for the period from 2014 to 2017) that compared students' overall PES peer-rated teamwork skills near the beginning of their undergraduate degree (COMM 222) to overall PES peer ratings of the same students when they were near completion (COMM 401), the improvement was only marginal. When comparing independent samples over six

semesters, half of the semesters showed no significant differences in teamwork skills between groups, whereas the other half showed significantly better teamwork skills scores for students who had more exposure (COMM 401) when compared to students who had less exposure (COMM 222).

The fact that students' acquisition of teamwork skills is somewhat marginal overall when looking solely at exposure is consistent with the idea of scaffolding as presented by Vygotsky (1978). According to Vygotsky's theory, the level of skills that students can attain with simple exposure is not comparable to the level of skills they can attain when they are given the right professor support. It is interesting that tests of independent samples prior to Winter 2015 are not significant, whereas similar tests after Fall 2015 are significant. It is worth noting that the institution where the study was done was undergoing a renewal of its AACSB accreditation during the mentioned years, and this resulted in an assessment and extension of the PES. The ability of students to work in groups effectively also was discussed in a May 2014 retreat of one of the larger departments at the institution. This resulted in an action plan being set in place in order to initiate students into (group) project management through a learning activity that was introduced in all sections of an introductory class that was required for all undergraduate business students as of Winter 2015. Considering this, one possible explanation of the results observed in the independent samples T-tests is that the planned action taken by the school to improve students' meeting of learning goals with respect to teamwork skills was successful in helping students to achieve that goal in the years following its introduction. It is also indicative of the potential usefulness of scaffolding, consistent with Vygotsky's theory.

THE LINK BETWEEN PROFESSOR SUPPORT AND TEAMWORK SKILLS

H2 stated that students who report getting more teamwork related professor support would have higher teamwork skills than students who report getting less/no support from professors (this is the direct relationship). The reasoning for this was that, as Vygotsky's (1978) framework of socio-cultural theory suggested, students should be able to attain superior levels when given the scaffolding (or support) by professors, than they would be able to achieve by themselves, simply due to exposure. This hypothesis was supported for the 'Willingness to Intervene' support, meaning that students who take courses with professors who offer to help when there are issues (in class and/or in the course outline), mention that grades will be adjusted for group members who do not pull their weight, and give detailed guidelines regarding project expectations have more teamwork skills than students who do not encounter this form of professor support. This was consistent with my logic, which was based on the literature I had reviewed.

In contrast, the professor support of 'Interim Feedback' was negatively related to teamwork skills and the professor support of 'Guidance on Team Composition and Structure' did not have a significant relation with teamwork skills. At first glance, this appeared contradictory to my hypothesis, but upon further investigation, I did find a logical explanation that may explain these findings. In an article that is also specific to an academic context, Daniel, Martin-Beltran, Peercy and Silverman (2016) discuss the adverse affects of over-scaffolding. Over-scaffolding occurs when students become passive rather than active in their learning because the teacher models too much (Daniel et al., 2016). This can lead to diminished pleasure in the inquiry process (Donnely, O'Reilly, & McGarr, 2012) and lost learning opportunities because the teachers are essentially telling

students what to write (Kibler, 2011). This stifles students' opportunities to grow and does not properly prepare them to attain their goals of building strategic competence (Donnely et al., 2012). Upon reflection, I suspect that the reason for the negative relation between 'Interim Feedback' and teamwork skills is due to over-scaffolding. The items that fall under this dimension are very teacher-guided. For example, 'Interim Feedback' consists of items that include grading parts of the project along the way, and providing feedback at intervals throughout the project. Similarly, 'Guidance on Team Composition and Structure' consisted of items that included asking students to submit a list of who did what on the project, and having professors assign teams based on information about students' skills. Perhaps, these kinds of "support" do little to actually support the acquisition of teamwork skills; rather, these two categories of teacher support seem to be characteristic of over-scaffolding, or scaffolding that would be appropriate for students at a lower level of study than a University setting.

Overall, the results of my study suggest that support does in fact lead to superior skills, but the effect is contingent on the type of support provided. The right support, such as 'Willingness to Intervene and Explain Expectations', can lead to positive results in terms of skill acquisition, whereas the wrong types of support, such as 'Interim Feedback' or 'Guidance on Team Composition and Structure', can actually be characteristic of over scaffolding and lead to negative, or lack of growth in terms of teamwork skills.

THE MEDIATING ROLE OF TEAMWORK STRATEGIES

H3 and H4 stated that teamwork strategies would mediate relations between exposure and skills (H3) and support and skills (H4). Embedded within these hypotheses, I expected that

both exposure and support would be positively related to strategies and strategies would be positively related to skills. These hypotheses were tested by comparing the fit of numerous structural models, for all three measures of teamwork skills, and the best fitting model included direct paths from professor support to teamwork skills, as well as mediated relations through teamwork strategies. Results for links between support and strategies were consistent in all three models. Both 'Interim Feedback' and 'Willingness to Intervene and Explain Expectations' had significant relations with 'Respectful Behaviors' and 'Team Task-Orientation' teamwork skills, as well as all four of the teamwork strategies measures. These kinds of support were not related to overall skill ratings using the PES measure (either self or peer-ratings). 'Guidance on Team Composition and Structure' did not have a direct relation with any of the teamwork skills measures, and only had a significant relation with 'Strategies to Express Dissent' Strategies. In the case of exposure, the final structural model was fully mediated with respect to exposure and the links between exposure and strategies varied highly depending on which measure and source of ratings was used for teamwork skills. Overall, this pattern of results is not completely consistent with what I had proposed and I turn now to a more detailed discussion of these results.

In the case of exposure and strategies, I observed a complicated pattern of results that differed depending on the skills measured and source of ratings that was used in the model. For Model 22, in which self-ratings of respectful and task-oriented teamwork skills are used, there is a positive relation between JMSB exposure and the 'Strategies to Express Dissent', as I would have hypothesized. I reasoned that this is probably because students who have more teamwork exposure in fact feel more confident, and entitled to express dissent. In contrast, exposure to teamwork at JMSB did not have a significant relationship

to 'Organizational Strategies' or 'Attention to Meetings' Strategies in the same model. However, when looking at Model 26, in which self-ratings of overall skills based on the PES is used, JMSB exposure has a positive and significant relationship to all teamwork strategies except 'Respectful Strategies' and, in Model 30, where peer-ratings of overall teamwork skills are used, JMSB teamwork exposure is positively related to 'Organizational Strategies' and 'Attention to Meetings' strategies. The one result that is opposite to original expectations is that JMSB exposure is negatively related to 'Respectful Strategies' in Model 22. This last result could possibly be attributable to the fact that students who experience numerous teamwork contexts may also experience more team members who are loafing or not adequately performing. If so, this may build up into a lower tolerance for this behavior and more expressions of dissatisfaction and conflict when encountering it as exposure to teamwork increases. If such expressions are disrespectful, it may explain this counter-intuitive finding. Overall, the inconsistencies in terms of observed relations between exposure and strategies are hard to explain, and could be due to the fact that the three teamwork skills measures, although all intended to capture the same construct, may not be doing so.

My interpretation of the overall pattern of results with respect to strategies is that students do not develop strategies on the way to skills through simple exposure. I think that professor support is required to show students interim steps before skill acquisition has occurred. This would be consistent with Vygotsky's (1978) framework, which suggests that students can only reach a certain level (of strategies in this case), without professor support. I speculate that the link between exposure and strategies is not significant in

several cases because exposure alone does not allow students to significantly improve on the way to acquiring skills, and professor support is key.

With respect to professor support and teamwork strategies, I expected that students who get more professor support should have more teamwork strategies than students reporting less or no support. This hypothesis, much like H2, was supported for the professor support of 'Willingness to Intervene', for all teamwork strategies. In other words, students who have professors that are ‘Willing to Intervene and Explain their Expectations’ tend to have more teamwork strategies all around. The opposite is true in regards to the professor support of 'Interim Feedback’. I believe this is probably attributable to over-scaffolding previously mentioned, which may not give students the autonomy to try even small steps on the way to acquiring skills. Finally, for students who experience professors that provide 'Guidance on Team Composition and Structure', there are more 'Strategies to Express Dissent' reported. All other teamwork strategies are not significantly impacted by this particular support. My interpretation of this is that students may feel more confident to express displeasure or dissatisfaction with their peers when the professor specifically guided them in the team composition process. Perhaps students feel more inclined to speak up about the shortcomings of others if they have had less control over their partners or the way their group was set-up. It is also possible that because of the teacher’s guidance/input in forming the group, students may feel less of camaraderie with other group members, and they may be less likely to accept others’ social loafing behaviors, and therefore may be more likely to voice dissent. It is not immediately obvious why guidance on inputs is not related to other teamwork strategies. Future research could explore this puzzling result.

With respect to links between strategies and skills, the observed relations were almost all negative in the case of respectful and task-oriented teamwork skills. At first blush, this seems to be in contrast to expectations. After contemplating these results further, however, I realized that my theoretical foundations ultimately did suggest just that. In theory, students who are using a lot of strategies are doing so because they do not yet have the skills, whereas students that do in fact have the skills no longer require use of such strategies. To clarify using Afflerbach et al.'s (2008) logic, students who know how to read no longer need to use the prompts of the pictures or resort to sounding out words. Those are strategies that are used by students who are not yet fluently reading. Similarly, in this context, students who have higher teamwork skills may use fewer teamwork strategies, thus explaining the negative relations observed between the two. Thus, it could be that skills are a precursor to strategies, rather than the other way around, as predicted. On the other hand, 'Organizational Strategies' are positively related to overall teamwork skill ratings based on the PES (for both self and peer ratings) and respectful strategies are positively related to self-ratings based on the PES overall measure. These inconsistencies result in generalizations about the relations between strategies and skills being difficult to make, and I would encourage future research to further explore these relations in order to have a more solid understanding of which comes first (strategies or skills), and why some relations are consistently negative, whereas others are positive.

OTHER POTENTIAL INFLUENCES ON TEAMWORK SKILLS

I initially thought that other factors might also influence students' levels of teamwork skills, including their general intelligence, their conscientiousness, and their other experiences working in teams outside JMSB. We tested various models that included these additional variables (using GPA as a proxy for intelligence), but it became evident when testing these models that they made the fit worse. For this reason, additional variables were ultimately not included in the final SEM models that were accepted. However, it is interesting to note that some of the additional variables were significantly correlated with the skills measures, but these relations do not seem to explain or negate the relations with professor support or exposure to teamwork at JMSB that were observed. For instance, exposure outside of JMSB and conscientiousness both correlated positively with respectful teamwork skills and task orientation skills. Also GPA was positively correlated with task orientation skills, but was not significantly correlated to respectful behavior skills. None of the additional variables were correlated with the overall skill measure of PES peer-ratings, but exposure outside of JMSB and conscientiousness were both positively correlated with PES self-ratings.

DIRECTIONS FOR FUTURE RESEARCH

This study can help guide much more research about teamwork skills, specifically in the undergraduate context. For example, there is a lot to uncover in regards to getting a better understanding of the relations between exposure and teamwork skills, as my results were somewhat ambiguous. Further examination of the link between exposure to teamwork and respectful strategies would also be interesting and helpful, as the current

study had some results that were counterintuitive, and finding out why more exposure led to less respectful strategies would be insightful. I speculated that this might have happened because students gain more confidence as they are exposed to more teams, and may therefore be more inclined to voice dissatisfaction. Future research could test this possibility. Also, researchers can develop the theory of learning by doing in the specific context of teamwork skills by applying my results to experiential learning theory (ELT), and developing further ideas about how teamwork skills are optimally gained not by simply doing, but rather by being guided appropriately.

Research could also aim to delve into the nature of the link between strategies and skills. I originally proposed that strategies lead to skills, but my results suggest that the level of skills that students have may predict the amount of strategies they use. Future research could explore the specific strategies that are used amongst students with various level of teamwork skills, in order to further reaffirm that strategies are in fact used less when one acquires more teamwork skills, and perhaps establish a pattern between types of strategies used as skills increase, and how this process unfolds overtime.

With respect to construct and measure development, future research could aim to explore the constructs of professor support and teamwork strategies. For example, a study could be performed to fine-tune the measure of teamwork strategies. It was not the primary focus of this study to develop a new measure, but I did find some preliminary evidence for the construct validity of the measure I developed. Future research could seek to provide more evidence. Also, the best way to measure teamwork skills could continue to be explored in future research, in order to have a valid measure of this very important and very researched construct.

In regards to professor support, I would encourage future research to search for other types of support that could be useful for undergraduate team contexts. With a broader list of possible types of support, professors could be provided with more suggestions as to what helps and hinders their students from gaining teamwork skills, so that they can support the students in the best possible ways. Research can also examine the impact of when support is introduced (e.g., at the beginning of the degree vs. at the end), and whether this has an impact on skill acquisition or strategy use. It could also explore whether or not a professor support of a specific type could be detrimental depending on the timing of when the support is introduced.

Future research can also examine the proposition that there is a curvilinear relation between professor support and teamwork skills to determine if this may be more reflective of the true relation between these variables. Future research could aim to determine what is too much support, what is too little, and where the balance in fact lies. Perhaps by further examining the dimension of 'Interim Feedback', we can better understand how this support is in fact more coddling than promoting growth as intended, and determine why this leads to a negative impact on skill acquisition. This may be accomplished by asking students for their opinions and/or examining teamwork skills for students who experience variations of 'Interim Feedback', in order to establish which exactly may be the culprit to the negative or non-existent impact on teamwork skills. This seems particularly important in light of the known positive effects of feedback. Although feedback can be used for improvements across many domains, and typically has many advantages (Kluger & DeNisi, 1996), future research should consider the specific relationship between feedback

and teamwork, as it seems as though specific forms or perhaps the frequency can in fact have adverse effects on team skill development.

PRACTICAL IMPLICATIONS

There are practical implications of this study from the perspective of both professors and students. For professors, the applications of my results include recommendations to professors to adjust the amount and the type of support they provide undergraduates in order to facilitate their acquisition of teamwork skills. Based on this study, I would recommend that professors focus more on providing support that is characteristic of 'Willingness to Intervene and Explain Expectations', as this appears to be the most helpful in promoting teamwork skills, and promoting the use of teamwork strategies. Furthermore, I would recommend avoiding over-scaffolding, which was seen in the items of the support category for 'Interim Feedback.' Despite the seemingly involved and positive characteristics of this approach, my results suggest that these kinds of support may have adverse effects on teamwork skills. Business schools could help train professors accordingly on which areas of support are key, and which to avoid, so that professors are equipped with the knowledge and know-how to promote the development of the teamwork skills that the workforce so values.

From the perspective of students, my results may provide advice to students about which support they should seek and request from their professors. My results also suggest that students use the respectful and organizational strategies mentioned, as these strategies tended to reflect positively on their PES self-ratings. If students learn about teamwork strategies, this can aid them in gaining teamwork skills. This can help students become

more self-aware, as they reflect on the strategies they use and how they are progressing in terms of transferring the use of strategies to ultimately becoming better team workers as they work through their undergraduate degrees. Students should also aim to be independent learners in the sense of not expecting too much support from their professors, as it could ultimately hinder their skill acquisition. Instead they should use their feedback thoughtfully, rely on their teammates appropriately, and not expect constant reassurance from their professors.

STRENGTHS AND LIMITATIONS

There were numerous strengths of this study worth mentioning. Firstly, I conducted two studies, one with a sample of students and one with a sample of professors. It is notable that there was a large sample for the undergraduate survey, and an impressive response rate for the professor survey. Secondly, I was rigorous in terms of the analyses, using various analyses, including structural equation modeling. I also had multiple sources of data for teamwork skills, which is the dependent variable. Specifically, I captured teamwork skills using archival data from the PES, as well as self-ratings on the PES items, and self-ratings on a larger, multi-dimensional teamwork skills measure (Strom & Strom, 2011). This allowed for me to triangulate some results for this construct, which increased my confidence in the consistent results I observed, but it also raised numerous questions in cases where results were not in agreement, both in terms of the substance of the results and the validity of the measures.

In terms of measurement, one limitation was that I had to make some assumptions when calculating the exposure measure, which may have led to some inaccuracies for that

key variable. Specifically, I assumed that all courses completed were worth 3 credits, based on the fact that **most** courses do count for three credits, but this did not account for the fact that some students may have been taking six credit courses. Also, I assumed that all graduated students had completed 90 credits, but this may not have been accurate, as some students switch majors, or take courses/stages worth more credits, which may in fact have given them more or less exposure to teamwork contexts than I assigned them the weighted exposure measure. This could be a problem, as it would have led to some inaccuracies in the exposure measure for the portion of the sample that had graduated.

I also had to develop new scales to measure strategies and these measures were not developed as rigorously as they could have been; thus, there is limited evidence of their construct validity. The same is true for the measure of professor support. Although that measure was based on my first study, it would have been ideal to test it separately and more thoroughly with several samples to demonstrate its construct validity. As previously mentioned, the inconsistencies in the results for teamwork skills may also point to limitations in the measurement of this construct. For this reason, I cannot be sure that I in fact fully captured the construct of teamwork skills. This clearly impacts the central goal of my research, and it would be helpful if future research is able to establish a valid measure of teamwork skills that holds up across contexts.

Another limitation of the study was that it is less that ideal to test mediation hypotheses with cross-sectional data (Maxwell & Cole, 2007). Due to this aspect of the study design, I cannot make any causal conclusions based on correlational data. Related to this, I considered that there could be an alternative explanation to the negative relationship between 'Interim Feedback' and teamwork skills, which could be that professors are

adjusting the amount of support they provide to students based on the level of the students they are teaching (1st year courses like COMM 222 versus last year courses like COMM 401). I tested this possibility by doing an ANOVA of support by level for the participants, only to find no significant differences between the professor support provided. This further solidified and supported the conclusions I had drawn, however, I cannot rule out all alternative explanations of my results given the study design. One last limitation related to the analyses is that the SEM models do not provide an assessment of the effect size for individual relations or meditational effects, and it is hard to know how much each path is contributing to the overall pattern of effects that were observed.

CONCLUSION

This research was conducted in order to establish whether or not simply exposing students to teamwork contexts actually promotes the development of teamwork skills, and whether the addition of specific guidance from professors can enhance this process. There are several important take-aways from this study, and many avenues for future research to explore. Overall, this study demonstrated that exposure can promote the acquisition of teamwork skills, but on its own, it may not be optimal. Rather, when professors offer support in the form of 'Willingness to Intervene,' this tends to promote a higher procurement of teamwork skills. Interestingly, too much professor support in the form of 'Interim Feedback' seems to hinder growth in the area of teamwork skills, and this may reflect 'over-scaffolding' that is detrimental to learning at the undergraduate level. The relationship between teamwork strategies and teamwork skills proved to be complex, as it became unclear whether a certain level of skills meant that students used fewer strategies,

or that using more strategies over time led to the development of skills, which meant fewer strategies were necessary. There is still a lot of research that can be done in order to better establish the measures of teamwork skills, teamwork strategies and professor support. I encourage researchers to explore the suggested areas, understand some of the counterintuitive or ambiguous results from this study, and hope that the results are helpful both practically and theoretically as described.

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APPENDIX OF MEASURES

APPENDIX A

TEAMWORK SKILLS (Strom & Strom, 2011)

Response scale used:

1- Extremely difficulty

2- Somewhat difficult

3- Neither easy nor difficult

4- Somewhat easy

5- Extremely easy

Attends to Teamwork

1. Shows acceptable attendance for meetings.
2. Arrives on time for schedules team meetings
3. Stays focused on the task during group work.
4. Fulfills individual role assigned by the group.
5. Does fair share of work expected of everyone.

Seeks and Shares Information

~~6. Admits uncertainty about what to do.***~~

7. Asks questions that help understand lessons.
8. Helps by explaining or reviewing lessons.

~~9. Brings reading materials for the group. ****~~

10. Refers to reading materials during discussions.

Communicates with Teammates

11. Shares feelings, ideas, or opinions.
12. Speaks clearly with acceptable vocabulary.
13. Limits length of comments so others can talk.
14. Listens to everyone and respects their views.

15. Recognizes individual contributions.

Thinks Critically and Creatively

16. Evaluates evidence for different opinions.
17. Uses logic to challenge group thinking.
18. Thinks carefully before reaching conclusions.
19. Combines and builds on the ideas of others.
20. Offers new ways of looking at problems.

Gets Along in the Team

~~21. Takes criticism in a friendly way. **~~
22. Avoids using put-downs or blaming others.
23. Accepts compromise to deal with conflict.
24. Keeps trying when a task becomes difficult.
~~25. Expresses hope about group success. *~~

*DELETED- Express hope about group success. (item loaded on the first dimension, but did not fit the 1st dimension conceptually)
**DELETED-Take criticism in a friendly way. (loading of <0.4 on both dimensions)
***DELETED- Admit I am not sure what to do. (loading of <0.4 on both dimensions)
****DELETED-Bring reading materials for the group that related to the project. (loading of <0.4 on both dimensions)

APPENDIX B

Peer Evaluation System (PES) Items

Note that the four items (Cooperation, Conceptual Contribution, Practical Contribution and Work Ethic) are defined for students using the list of descriptors that is provided for each, but students do not rate the sub-items. This information is provided simply to define each category for the students. The response scale is from 1-strongly disagree to 7-strongly agree.

1. Cooperation

Defined as: Actively participating in meetings, communicating within the group, cooperating within the group, assisting teammates when needed and volunteering for tasks

2. Conceptual Contribution

Defined as: Researching and gathering information, quality of individual contribution, suggesting ideas, trying ideas together, identifying difficulties and identifying workable approaches

3. Practical Contribution

Defined as: Writing of the report(s), Reviewing others' report(s) or sections, providing constructive feedback on the report(s) or the presentation, contributing to the organization of the work, contributing to the preparation of presentation(s) (if appropriate)

4. Work Ethic

Displaying a positive attitude, respecting team members, respecting commitments, respecting deadlines, respecting ideas, arriving on time for group meetings, attending scheduled meetings

APPENDIX C

PROFESSOR SUPPORT

Response scale used: 0%-None of my classes to 100%-All of my classes.

NOTE: Percentages in parentheses correspond to the frequencies that Professors reported using such support for their undergraduate classes from the Professor Survey.

Interim Feedback (IF)

1. The professor offers midsession meetings to discuss the team project.
2. The professor requires students to submit a proposal to be graded before they proceed with their project. (7.26%)
3. The professor requires students to submit parts of the project to be graded before the final project is submitted. (5.13%)
4. The professor schedules meetings with each group in the class to give them feedback and/or ensure that they are making smooth progress. (5.13%)
5. The professor gives students class time to work on group projects, and stays to answer questions. (9.83%)
6. The professor provides feedback at various intervals throughout the teamwork project. (12.39%)
7. The professor requires a peer evaluation part way through the team project.
8. The professor gives small graded group assignments. (3.42%)

Guidance on team inputs (GI)

9. The professor formally assigns one group member to be the team leader. (1.28%)
10. The professor assigns teams based on information about who is in the class and their skills. (1.28%)
11. The professor does an in-class activity in which students can discuss how they like to work, their time schedules etc. before they choose their team members.
12. The professor has teams draw up a Team Contract or Charter. (3.42%)

13. The professor designs the project in such a way that students must work together to complete it, rather than allowing them to do individual parts that simply get put together at the end. (4.7%)
14. The professor gives students guidance about how to select team members. (7.69%)
15. The professor asks students to submit a list of who did what on the team project.
16. The professor discourages breaking the project into smaller sections and working on them independently.
17. ~~The professor reminds students when deadlines for group projects are upcoming and/or how much time if left before group assignments need to be submitted.***~~

Willingness to Intervene and/or Explain Expectations (WI)

18. The professor mentions in class that s/he is willing to help when there are issues in the team. (11.97%)
19. The professor mentions that grades will be adjusted for students who do no pull their weight (as per the peer evaluations).
20. The professor provides elaborate guidelines for the team project.
21. The professor writes on the course outline that s/he is willing to help groups that are having difficulties. (3.85%)
22. ~~The professor offers to be added to online communications pertaining to the group project (eg. Copied to group emails, added to Facebook groups).*~~
23. ~~The professor limits the number of students per group to 4 or fewer.**~~

*DELETED-The professor offers to be added to online communications pertaining to the group project (eg. Copied to group emails, added to Facebook groups). (This item could've fit conceptually under more than one dimension WI &IF)

**DELETED- The professor limits the number of students per group to 4 or fewer. (this item loaded on the third dimension (WI) but did not fit conceptually), (6.41%)

***DELETED-The professor reminds students when deadlines for group projects are upcoming and/or how much time if left before group assignments need to be submitted. (this item loaded on the second dimension (GI) but did not fit conceptually). (16.24%)

APPENDIX D

TEAMWORK EXPOSURE

Response scale used: 0%-None of my classes to 100%-All of my classes.

1. A written term project was done in groups.
2. A group assignment that is unrelated to a term project was done.
3. There was a group presentation.
4. There were in-class group activities.
5. There was a simulation project done in group.

TEAMWORK STRATEGIES

Response scale used: 0%-None of the time to 100%-100% of the time.

Organizational Strategies (OA)

1. I keep my information about the project well organized and easily accessible.
2. I schedule time to work on my team projects.
3. I take note of the tasks I promise to complete.
4. I ask group members for help if I am struggling.
5. I make a note when there is something I don't understand about the project so that I can remember to get clarification.
6. I organize a schedule of dates by which various group tasks should be accomplished.
7. I ask the professor for clarification if something about a team project is unclear to me.
8. I monitor how much time if left before group project are due.
9. I suggest dividing tasks on team projects so that everyone has an equal amount of work to do.
10. I remind my team members about the passage of time during group projects.
11. I ask other to send me their work before to project is due so that I can look it over.
12. I ask to hold a group meeting if I have doubts about how we should proceed.
13. I do required readings so I can be prepared for meetings.
14. I rely on multiple sources to prepare my parts of a team project.
15. When I come across materials that may be useful to me or another team member, I save and/or print them.
16. I gather facts and data in case I need to support my suggestions.
17. ~~I praise my teammates when I like their work.~~
18. ~~I have a folder for each group project to keep my materials for each project in one place.~~
19. ~~The day before the meeting, I communicate with group members to confirm that the meeting is still on and when/where it will take place.~~
20. ~~I suggest that we assign roles within the group (e.g., team leader, editor, etc.)~~

Strategies to Express Dissent (ED)

21. I criticize people if they disagree with me.
22. I ignore the suggestions of my teammates.
23. If a team member and I disagree, I insist that they come around to my way of thinking.
24. I tell other group members if the quality of their work is too low.
25. I search for information that does no agree with my initial observations.
26. ~~I ask the professor to intervene if there is a problem with the group, rather than retreating from the problem.~~
27. ~~I, myself, examine the sources that other team members bring to the project.~~

Strategies to Attend to Meetings (AM)

28. I set an alarm to ensure I am not late for meetings.
29. I check my calendar and email daily to make sure I remember when meetings are going to take place.
30. I record in my schedule (e.g., phone or planner) when meetings are occurring.
31. I monitor how much I am speaking during group meetings.
32. I prepare a list of points that I want to make before I come to a meeting.
33. I practice what I am going to say in the group meetings beforehand.
34. I take notes during group meetings.

Respectful Strategies (AR)

35. I practice taking different perspectives when problems arise.
36. When there is a conflict about something, I try to understand what others are trying to accomplish.
37. If two members have conflicting ideas, I search for a solution, rather than focusing on who caused the problem.
38. I adjust the words I use if I am speaking with someone who does not share my mother tongue.

39. When everyone wants to go one way, I try to reason out whether there could be another approach.
40. When I am frustrated, I take a break and come back to my work when my head is clear, rather than give up.
41. I think about how my ideas are connected to others' ideas.
42. If I am unsatisfied with work submitted by my teammates, I give concrete suggestions to improve it, instead of criticizing.
43. I limit texting and surfing the web during group meetings.
44. I wait for others to finish their point before I speak.
45. I listen carefully to other people's ideas.
46. I praise group members who are making positive contributions to the team.
47. ~~I voice my confidence in my group to other group members~~

DELETED- I praise my teammates when I like their work. (this item loaded on the first dimension (OA) but did not fit conceptually),

DELETED- I have a folder for each group project to keep my materials for each project in one place. (loading of <0.4 on all dimensions)

DELETED- The day before the meeting, I communicate with group members to confirm that the meeting is still on and when/where it will take place. (loading of <0.4 on all dimensions)

DELETED-I suggest that we assign roles within the group (e.g., team leader, editor, etc.) (loading of <0.4 on all dimensions)

DELETED- I ask the professor to intervene if there is a problem with the group, rather than retreating from the problem. (loading of <0.4 on all dimensions)

DELETED-I, myself, examine the sources that other team members bring to the project. (loading of <0.4 on all dimensions)

DELETED- I voice my confidence in my group to other group members

APPENDIX F

CONSCIENTIOUSNESS

(from IPIP Scale of Conscientiousness – Measuring the 7 Factors from Saucier 1997)

Response scale used: 0%-None of the time to 100%-100% of the time.

Do things by the book

Try to follow the rules

Believe laws should be strictly enforced

Pay attention to details

Like order

Act wild and crazy (R)

Break rules (R)

Jump into things without thinking (R)

Do things in a halfway manner (R)

Do crazy things (R)

APPENDIX G

OUTCOME IMPORTANCE (Harrison, Price, Gavin & Florey, 2002)

How important is getting an 'A' on a project? (1-not important 7-very important scale)

How important is it for you to do well on a project (1-not important 7-very important scale)

Modification used for survey:

Thinking about team projects at school, please tell us how important it is for you to get an 'A'? (1-not important 7-very important scale)

Still thinking about team projects at school, please tell us how important it is for you to ensure that you avoid getting a bad grade?