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Demographic Faultlines and Team Cohesion on Team Performance

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Abstract

This research examines team faultlines and their potential impact on team performance. Faultlines are defined as hypothetical dividing lines that split a group or team into two or more subgroups based on one or more individual attributes (e.g., gender and ethnicity). Investigations explored the possibility that team cohesion (i.e., team members' attraction and commitment to their team) would moderate the relationship between faultlines and team performance. Participants (n = 867) completed The Task and Social Cohesion Questionnaire during one of two academic years (2013-14; 2014-15). Faultline strength was calculated for each team using two approaches, Thatcher's Fau and Meyer's Average Silhouette. It was hypothesized that faultline strength would be significantly negatively correlated to team performance, and team cohesion would be significantly positively correlated to team performance. Pearson correlational analyses revealed that both faultline measures (Thatcher's Fau (r = -.06); Meyer's ASW (r = .002)), social cohesion (r = .06) and task cohesion (r = .10) were not significantly correlated to team performance. It was also hypothesized that cohesion would moderate the relation between faultline strength and team performance, such that faultlines would have a less negative effect at high levels of cohesion. Moderated hierarchical multiple regression analyses revealed that all interaction terms were nonsignificant, although the interaction term between Thatcher's Fau and task cohesion was trending towards significance (ΔR^2 = .016).

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Demographic Faultlines and Team Cohesion on Team Performance

Effective teamwork is pertinent to the success and longevity of the numerous industries and organizations that rely on team-based work structures (Devine et al., 1999.) Understanding team effectiveness is essential to industrial organizational psychologists, business owners and ultimately anyone impacted by teamwork. Despite the popularity of research in this area, findings regarding what makes a team effective have been inconclusive (LePine et al., 2008). To improve the effectiveness of teams, researchers must continue to expand their knowledge base through contributing to the literature on this subject.

Diversity

Researchers have explored many factors with the potential to impact team performance, one of which is team diversity. Diversity is defined as the differences between team members that may lead to the perception of being different (van Knippenberg & Schippers, 2007). In recent years, there has been a noticeable change in workforce demographics, with an increase in diverse demographic variables. This is significant to acknowledge as changes in workforce demographics translate into team composition alterations. Changes in team composition have led researcher to investigate the impact of diversity on team processes and performance. While researchers have been studying this relationship for over five decades, however several meta-analyses have indicated inconclusive results (Bell et al., 2011; Guillaaume et al., 2012; van Dijk et al., 2012). Ultimately this means that a consistent relationship between diversity and team performance has yet to be identified, although it should be noted that results seem to be dependent on mediating and moderating processes, such as context (Meyer & Glenz, 2013). In response to these findings, traditional approaches to understanding diversity are considered to be

unsuitable in the context of teams. In 1998, Lau and Murnighan sought to improve the research on diversity and team composition by introducing a concept called *team faultlines*.

Faultlines

Faultlines are hypothetical dividing lines that split a group or team into two or more subgroups based on one or more individual attributes. Faultlines are typically described as resulting from the alignment of multiple demographic differences such as race, sex, nationality, or age (Thatcher & Patel, 2012). Basic diversity measures have not been as meaningful as they consider each attribute independently, thus, do not consider the diverse alignment of the various attributes (Thatcher & Patel, 2011). Consequently, the faultline approach allows researchers to understand the impact of subgroup strength on the team dynamic. It captures the alignment of various group attributes and their cumulative effect(s) on group outcomes (Thatcher & Patel, 2012).

Consider a data set that includes two hypothetical teams: team A is composed of 3 Asian males, and 3 Caucasian females, while team B is composed of 2 Asian males, 1 Asian female, 1 Caucasian male, and 2 Caucasian females. According to traditional diversity measures, both teams are equal in diversity given that both teams have a total of 3 males, 3 females, 3 people of Asian descent, and 3 who are Caucasian. However, when faultlines are considered, teams A and B are not equally impacted by diversity. All of the males in team A are Asian and all of the females are Caucasian, thus team A has two discrete subgroups with strong similarities. The subgroups in team B are not as strong because the alignment of the diversity is less distinct. Consequently, the faultlines are consequently stronger for team A because the subgroups within that team are more demographically homogenous than the subgroups within the other team. This example illustrates the value in using faultline measures to understand the impact of diversity on

teams. Unsurprisingly, faultlines have generated more meaningful relationships with team outcomes compared with diversity measures (Meyer & Glenz, 2013).

Calculating Faultlines. The current study requires the calculation of faultline strength for each participating team. Many methods of calculation have been put forth in an attempt to numerically quantify faultline strength. Meyer and Glenz (2013) reviewed the advantages and disadvantages of eight known faultline measures. They also developed a new measure to account for the perceived downfalls of the other measures, and was introduced in the same article.

Thatcher's Fau is one of the measures reviewed in the article. It was developed by Thatcher in 2003 and is one of the more well-known and influential faultline measures (Meyer & Glenz, 2013). Thatcher's Fau provides a numeric value to diversity faultline strength by calculating the portion of total variance explained by the subgroup membership. A shortcoming of Thatcher's Fau is that the formula limits itself to only two subgroups (Meyer & Glenz, 2013). However, there are many cases where only two subgroups exist and these can result in intense dynamics that are particularly interesting to research (Lau & Murnighan, 1998). It is important to use caution when using Thatcher's Fau because many groups contain more than two faultlines and this method is not suitable for all groups.

Meyer's Average Silhouette Width Faultline Clustering (i.e., Meyer's Average Silhouette) approach attempts to calculate faultline strength without the limitations perceived in the other methods. This measure uses a similar clustering approach to Thatcher's Fau by grouping team members into subgroups. However, Meyer's Average Silhouette is able to account for teams with more than two subgroups as well. The current study will calculate faultlines with both approaches to take advantage of the strengths found in each.

Theoretical Framework. Team faultlines impact team dynamics and consequently their performance outcomes. This effect can be understood by the following theories: self-categorization theory, optimal distinctiveness theory, and distance theory (Thatcher & Patel, 2011).

Self-categorization theory suggests that the salience of social categorization is contingent on their comparative fit, their normative fit, and their cognitive accessibility. Comparative fit is the extent to which observed similarities and differences between people or their actions are perceived as correlating with social categories (Turner et al., 1987). This means that if subgroups exist within a team, people from different subgroups are more likely to perceive each other as different from themselves. Stated differently, the stronger the faultline, the stronger the effect. Thus, comparative fit may lead to negative relationships between people in different subgroups and increase levels of conflict (van Knippenberg et al., 2004).

Optimal distinctiveness theory argues that individuals are dually motivated to be both similar and unique (Meyer & Glenz, 2013). This means that if subgroups exist within a team, people from the same subgroup will increase in similarity, and people from different subgroups will differentiate themselves from one another. As the subgroups become more distinct, more conflict will arise, resulting in decreased team performance (van Knippenberg et al., 2004).

Distance theory suggests that team members in one subgroup will experience psychological distance from the members of other subgroups (Brewer et al., 1993). This means that if subgroups exist within a team, people from different subgroups may not connect with one another. This may stem from the fact that their different backgrounds and values have caused them to approach tasks differently, and subsequently conflict is likely to arise. Additionally, the stronger the faultline, the more difficult it becomes to share ideas with members of another

subgroup, which in turn leads to lower levels of communication and cohesion (Meyer & Glenz, 2013).

Team Performance. It is commonly believed that diversity, with respect to any number of variables (e.g., gender, ethnicity, personality) is a positive attribute. The 'idea' of diversity creates an appealing image of different people with different backgrounds, experience and viewpoints, coming together and sharing ideas; however, in reality this ideal does not always hold true. The alignment of diversity can create strong faultlines in teams resulting in poor team dynamics and performance outcomes. Empirical evidence supports the ideas presented in self-categorization theory, optimal distinctiveness theory and distance theory.

In 2012, Thatcher and Patel conducted a meta-analysis that considered 39 studies with a total of 24,388 individuals from 4,366 teams. The results demonstrated that group members wasted time attempting to mend the faultlines, resulting in a shift of focus away from group goals. The subgroups became competitive with one another and they suffered from a lack of communication (Thatcher & Patel, 2012). One of the studies included in the meta-analysis investigated student teams that possessed one or more demographic faultlines. The teams worked together to construct towers with various building materials, and group outcome was measured by the height of their tower. It was found that faultlines caused competitive coalitions, which lead to conflict and ultimately negatively impacted group outcomes (i.e., shorter towers; Jehn & Bezrukova, 2010). Overall, strong faultlines were correlated with poor performance, increased conflict, and decreased cohesion (Thatcher & Patel, 2012).

In response to the plethora of the negative outcomes of faultlines, it may be possible to counteract their impact in team dynamics. It has been suggested that subgroup polarization is moderated by strong group identity (Jehn & Bezrukova, 2010). In 2010, Rink and Jehn

articulated that faultlines are only powerful when team members value their subgroups more than they value the team as a whole. Hence, the impact of faultlines may be weakened when the team is valued more than the subgroups within the team. For example, team cohesion may help teams cope with strong demographic faultlines.

Team Cohesion

The current study explores the possibility that team cohesion moderates the impact of faultlines on team performance. Cohesion is generally defined as team members' attraction and commitment to their team, team members, and the team's task (Evans & Jarvis, 1980). Current researchers tend to agree that cohesion takes two forms: task cohesion and social cohesion. Task cohesion is a group's shared commitment or attraction to the group task or goal, as well as motivation to coordinate team efforts to achieve common work-related goals. Social cohesion is a shared linking or attraction to the group, emotional bonds of friendship, caring and closeness among group members, enjoyment of each other's company, or social time together (Castaño, Watts & Tekleab, 2013). The current study measures cohesion with *The Task and Social Cohesion Questionnaire,* which attempts to capture both components.

Team Performance. Previous research has shown that team cohesion often has a positive relationship with team performance. In 1985, Meising and Preble conducted a study using game simulation to assess group performance. It was found that both team and social cohesion were essential to achieving high team performance scores. In another study with engineering design groups, it was found that team cohesion was related to both student and instructor ratings of performance (Lent et al., 2006). Castaño and colleagues (2013) conducted a meta-analysis with 132 studies on cohesion and performance, and found that both task cohesion

and social cohesion were meaningfully related to team performance. Other meta-analyses have found similar results (e.g., Beal et al., 2003).

The Current Study

The current study explored the relations that exist between team performance, faultline strength, and team cohesion. In particular, the goal of this research was to determine whether team cohesion moderated the impact of faultlines on team performance.

Analyses were performed on archival data from both 2013-14 and 2014-15 academic years. First year engineering students at Western University take part in a group project for the duration of one school year. Faultline strength was calculated for each team using both Thatcher's Fau and Meyer's Average Silhouette, and was correlated with team performance. It was hypothesized that increasing faultline strength would result in significantly decreased team performance. The Task and Social Cohesion Questionnaire was completed by all team members after approximately seven months of working together, and these findings were correlated with team performance. It was hypothesized that team cohesion would have a significant positive correlation with team performance. It was hypothesized that faultline strength would be negatively related to team performance, and team cohesion would be positively related to team performance. It was also hypothesized that cohesion would moderate the relation between faultline strength and team performance, such that faultlines would have a less negative effect at high levels of cohesion. This expectation stemmed from the idea that cohesion counteracts the impact of faultlines (Rink & Jehn, 2010).

Method

Participants

The participants in this study were 910 undergraduate students enrolled in an engineering introductory design class at The University of Western Ontario and who worked in small project

teams each consisting of 4-5 students. The final sample included 867 participants (81% male, 19% female) after removing those who did not disclose their gender or ethnicity, as well as those who did not answer a majority of the task and social cohesion items. Participant removal was essential because faultline calculations require gender and ethnicity, and team cohesion scores may have skewed by including incomplete questionnaires. Each team (n = 213) worked closely together during one academic year to complete three major projects. This study used archival data that was collected during both 2013-14 and 2014-15 academic years. Participants received course credit for participating in the study; participation was voluntary.

The mean age for participants was 18.72 years, with ages ranging from 16-36 years (16 participants did not report their age). With respect to ethnicity, the participants identified themselves as Caucasian (n = 532, 61%), Asian (n = 143, 16.5%), Arabic or East Indian (n = 96, 11%), South East Asian (n = 27, 3%), Black (n = 10, 1%), or Native American (n = 4, 0.5%), and the remaining participants selected "Other" (n = 55, 6%).

Materials

Task and Social Cohesion Questionnaire (see Appendix A). This measure was administered to assess the cohesiveness of each team. It was developed for this study because the questionnaires found in the literature are not designed to assess both the task and social aspects of cohesion in work teams. The most widely used cohesion measure, The Group Environment Questionnaire (Carron, Widmeyer & Brawley, 1985), was not appropriate for the current study because it focuses on the individual instead of the team; additionally, the items cater to sports teams and were not inclusive of the study sample. The Task and Social Cohesion Questionnaire consisted of 8 task cohesion items and 8 social cohesion items that were answered on a 7-point Likert scale ranging from 1 (*completely disagree*) – 7 (*completely agree*). A sample item that

reflects task cohesion was, “Team members put their personal goals ahead of team goals.” A sample item that reflects social cohesion was, “Relationships in our team are pleasant and relaxed.” Scale scores were averaged across each team’s members to create team-level measures of both task and social cohesion. Higher scores reflected higher levels of cohesion.

Procedure

Participants were assessed in the Thompson Engineering Building at The University of Western Ontario. In September of the two academic years involved in this research (2013-14; 2014-15), participants were randomly assigned to project teams that they worked with for one year. To begin, each participant received a letter of information (see Appendix B) and provided informed consent (see Appendix C). Next, they completed a demographic survey to report age, gender, and ethnicity. This demographic information allowed faultlines to be calculated using both Thatcher’s Fau and Meyer’s Average Silhouette approaches. Participants continued to work in their teams during class time for approximately seven months. Towards the end of each academic year, they completed the Task and Social Cohesion Questionnaire. After the projects were assessed, their final project grade was collected. These final grades were used in the present research as the measure of team performance.

Results

Pearson correlational analyses and moderated hierarchical multiple regression analyses were conducted using SPSS. Prior to running the moderate multiple regression analysis, the items were centered. The variable means, standard deviations, Cronbach’s alpha reliabilities (see diagonal), and intercorrelations are reported in Table 1.

Pearson correlations were calculated to investigate Hypothesis 1, which maintained that faultline strength would be significantly negatively related to team performance. It was found

Table 1

Variable Means, Standard Deviations, Intercorrelations and Cronbach's alphas

Variable	M	SD	1.	2.	3.	4.	5.
1. ASW	.51	.27					
2. Fau	.67	.27	.79**				
3. SC	5.25	.80	.13	.07	(.68)		
4. TC	5.27	.74	.11	.07	.82**	(.68)	
5. TP	84.63	8.68	.00	-.06	.06	.10	(.02)

** $p < .001$

Note. Cronbach's alpha reliabilities are reported in the diagonals. ASW = Meyer's ASW; Fau = Thatcher's Fau; SC = social cohesion; TC = task cohesion; TP = team performance

that neither Thatcher's Fau, $r(211) = -.06$, *ns*, nor Meyer's ASW, $r(211) = .002$, *ns*, measures of team faultline were significantly negatively correlated with team performance. Pearson correlations were calculated to investigate Hypothesis 2, which maintained that team cohesion would be significantly positively related to team performance. Both social cohesion, $r(211) = .06$, *ns*, and task cohesion, $r(211) = .10$, *ns*, were not significantly positively correlated with team performance.

Moderated Regression Analyses

Moderated multiple regression analyses were used to assess Hypothesis 3, which maintained that cohesion would moderate the relation between faultline strength and team performance, such that faultlines would have a less negative effect at high levels of cohesion. Analyses investigated whether both social cohesion and task cohesion moderated the impact of both Meyer's ASW and Thatcher's Fau on team performance.

The first analysis examined Thatcher's Fau and social cohesion. Block 1 revealed that Thatcher's Fau did not significantly add to the prediction of team performance, $\beta = -.07$, $t(212) = -.95$, *ns*, and neither did social cohesion, $\beta = .07$, $t(212) = .98$, *ns*. In Block 2, the product term representing the interaction between Thatcher's Fau and social cohesion was introduced. The interaction term was nonsignificant, $\Delta R^2 = .000$, $\beta = .02$, $t(212) = .25$, *ns*.

The second analysis examined Thatcher's Fau and task cohesion. Block 1 revealed that Thatcher's Fau did not significantly add to the prediction of team performance, $\beta = -.07$, $t(212) = -.99$, *ns*, and neither did task cohesion, $\beta = .10$, $t(212) = 1.45$, *ns*. In Block 2, the product term representing the interaction between Thatcher's Fau and task cohesion was introduced. The interaction term was nonsignificant, $\Delta R^2 = .002$, $\beta = -.05$, $t(212) = -.74$, *ns*.

The next analysis examined Meyer's ASW and social cohesion. Block 1 revealed that Meyer's ASW did not significantly add to the prediction of team performance, $\beta = -.01$, $t(212) = -.09$, *ns*, and neither did social cohesion, $\beta = .06$, $t(212) = .91$, *ns*. In Block 2, the product term representing the interaction between Meyer's ASW and social cohesion was introduced. The interaction term was nonsignificant, $\Delta R^2 = .001$, $\beta = -.03$, $t(212) = -.39$, *ns*.

The final analysis examined Meyer's ASW and task cohesion. Block 1 revealed that Meyer's ASW did not significantly add to the prediction of team performance, $\beta = -.01$, $t(212) = -.12$, *ns*, and neither did task cohesion, $\beta = .10$, $t(212) = 1.39$, *ns*. In Block 2, the product term representing the interaction between Meyer's ASW and task cohesion was introduced. The interaction term, although nonsignificant, was trending towards significance, $\Delta R^2 = .016$, $\beta = -.13$, $t(212) = -1.84$, $p = .07$. The results of this analysis are displayed in Table 2. To demonstrate this trending relationship, a simple slopes analysis was conducted (see Figure 1). A simple slopes analysis investigated the relation between Meyer's ASW and task cohesion, with both variables at low levels (i.e., one standard deviation below their respective means) and at high levels (i.e. one standard deviation above their respective means). Changes in team performance were not detected between teams with low and high faultline strength when cohesion was low, $t(209) = 1.24$, *ns*. Similarly, changes in team performance were not detected between teams with low and high faultline strength when cohesion was high, $t(209) = -1.46$, *ns*. Teams with low faultline strength displayed lower team performance when cohesion was at low levels, and higher team performance when cohesion was at high levels, $t(209) = 2.3$, $p = .02$. However, when teams had strong faultlines, their team performance was relatively similar between high and low levels of cohesiveness, which does not support Hypothesis 3, $t(209) = -.37$, *ns*.

Table 2

Summary of the Moderated Regression Analysis for Meyer's ASW and Task Cohesion

Block	Variable	$\beta_{Block\ 1}$	$\beta_{Block\ 2}$	Overall R^2	ΔR^2
1	ASW	-.01	-.01		
	TASK COHESION	.10	.10	.01	
2	ASW x TASK COHESION		-.125	.03	.02

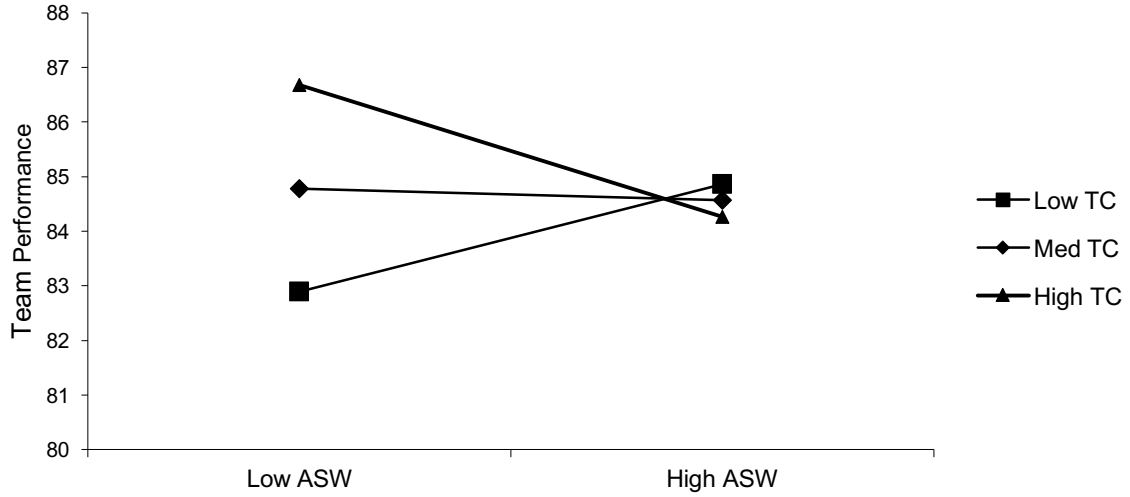

Figure 1. Graph of the interaction between Meyer's ASW and task cohesion when predicting team performance.

Discussion

This study investigated the relations between team performance, faultline strength, and team cohesion. This research also explored the idea that cohesion may lessen the impact that faultlines have on team performance. Thus, the aim was to contribute to the growing body of literature on faultlines and provide insights regarding their impact on team performance.

Hypothesis 1 predicted that with increasing faultline strength, team performance would be lower. Analyses revealed that faultline strength was uncorrelated with team performance. This contradicted the notion that strong subgroups have a negative impact on group dynamics and, thus, also contradicted predictions made by self-categorization theory, optimal distinctiveness theory and distance theory (Thatcher & Patel, 2011). Additionally, these findings opposed previous empirical evidence that suggest strong faultlines in teams result in poor performance outcomes (Jehn & Bezrukova, 2010; Thatcher & Patel, 2012). Alternatively, these findings are consistent with much of the inconclusive previous literature on diversity. Meta-analytic research on the relationship between demographic diversity variables and team performance shows little evidence of positive effects; indeed, overall, non-significant effects have been reported (Bell et al., 2011; Guillaaume et al., 2012; van Dijk et al., 2012). Faultlines describe demographically-delineated subgroups and, as such, are based on the variation (diversity) associated with the demographic variables in question. Thus, although the predicted negative relationship between faultlines and performance was not demonstrated, this finding is consistent with diversity-performance research. Also, given the typically weak effects exerted by demographic diversity variables (including gender and ethnicity used in the present study), it may be that effects on performance will only be observed in samples with very strong faultlines.

Hypothesis 2 predicted that with increasing team cohesion, team performance would be higher. It was found that team cohesion was uncorrelated with team performance. This is incongruent with the theory that cohesion has a positive relationship with team performance. Previous research studies also contradict the findings of the current study (e.g., Meising & Preble, 1985; Lent et al., 2006; Castaño et al., 2013; Beal et al., 2003), suggesting that the cohesion-performance relation may vary across contexts.

Hypothesis 3 stated that cohesion would moderate the relation between faultline strength and team performance, such that faultlines would have a less negative effect at high levels of cohesion. Analyses examined interactions between both faultline measures and both social and task cohesion. It was found that neither type of cohesion moderated the impact of faultlines on team performance, although it should be noted that task cohesion was trending towards significance in moderating the effect when faultlines were calculated using Meyer's ASW approach. Ultimately, findings from the current study did not support idea that the impact of faultlines on team performance may be weakened when the team is valued more than subgroups within the team (Jehn & Bezrukova, 2010; Rink & Jehn, 2010). Thus, strong faultlines appear to be resilient to team cohesion.

Interestingly, the interaction term between Meyer's ASW and task cohesion was the only interaction term trending towards significance. It is possible that task cohesion is more relevant in the 'fight' against faultlines. If strong faultlines are present, it may be very unlikely that a team would experience high social cohesion. Thus, it may be more realistic that task cohesion would combat faultlines simply because the two are more likely to occur simultaneously. If strong faultlines persist, but the team still values cohesion at the task level, team performance may not suffer as much.

In addition to these findings, the current study adds to the growing literature on faultline calculations. Both methods of calculation (Thatcher's Fau and Meyer's ASW) arrive at similar faultline values for this particular sample and they are strongly correlated, $t(209) = .79$, $p < .001$. It is also noted that although Meyer's ASW typically utilizes more than two variables to calculate faultlines, it was successful in utilizing only two variables.

The findings presented here have potential implications for the numerous industries and organizations that rely on team-based work structures. It is commonly believed that diverse teams are more effective because they involve different people with different backgrounds, experiences, and viewpoints, coming together and sharing ideas. It was predicted that this ideal would not hold true because the alignment of diversity can create strong faultlines in teams, resulting in poor team dynamics and performance outcomes. However, findings from the current study suggest that diversity may not impact team performance positively or negatively. Claims about the impact of team-level diversity on team performance may have been exaggerated. Industries and organizations should consider other variables (e.g., experience and qualifications) when structuring teams, rather than demographics.

Overall, this study provided relatively little evidence that faultlines, based on demographic variables, influenced team processes or team performance. Possibly, this may be due to the composition of the sample and the teams they comprised. Participants were undergraduate students, mostly in their first year of university; they all attended the same university and were enrolled in the engineering program. It is conceivable that participants were mainly progressive individuals who were raised with exposure to diversity. It is likely that this 'type' of person may not be fazed by either gender or ethnic differences, and thus it is unsurprising that strong faultlines had no effect. Additionally, the composition of the sample

may limit generalizability of the results to industries and organizations, as business teams were not directly measured.

Participants who did not report their gender or ethnicity, or did not complete the cohesion questionnaire, were removed from the dataset. If these data omissions were random, the results were likely unaffected. However, it is possible that the participants who did not report these variables had some reason to do so. A pattern found here may decrease reliability of the results. For example, if the team members who experienced conflict with other team members decided not to disclose information, their teams could have inaccurately high cohesion scores. Scores for those teams would not reflect a group with a strong faultline causing tension within the team. Although this is possible, there is no particular reason to believe such is the case.

Additionally, the items in the questionnaire were directed towards the team as a whole, without providing opportunity to address subgroups separately. Participant responses may reflect subgroup cohesiveness rather than cohesiveness amongst all group members. If this is the case, high scores may unintentionally coincide with teams that have strong faultlines. It might be useful in future research to examine the potential role that this might play.

The current results suggest that team faultlines do not always impact team performance. Additionally, neither type of cohesion appears to consistently lessen the impact of faultlines on team performance. Thus, it is recommended that future research investigates the impact of faultlines within a variety of samples, as well as other potential moderators of the relationship between faultlines and team performance.

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Appendix A

Task and Social Cohesion Questionnaire

Please respond to each question with respect to <u>your team</u>.

TASK COHESION	Completely Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Completely Agree
1. Our team is focused on the work we have to do.	1	2	3	4	5	6	7
2. We do **<u>not</u>** agree on what needs to be done.	1	2	3	4	5	6	7
3. Team members work together to meet goals and objectives.	1	2	3	4	5	6	7
4. Our team lacks unity when facing our goals and/or tasks.	1	2	3	4	5	6	7
5. We are committed to helping the team perform well.	1	2	3	4	5	6	7
6. Team members put their personal goals ahead of team goals.	1	2	3	4	5	6	7
7. Our team is determined to work together to optimize our performance.	1	2	3	4	5	6	7
8. Our team sticks together when our work gets tough.	1	2	3	4	5	6	7

SOCIAL COHESION	Completely Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Completely Agree
9. Members of our team do **<u>not</u>** get along with each other.	1	2	3	4	5	6	7
10. Relationships in our team are pleasant and relaxed.	1	2	3	4	5	6	7
11. We enjoy being a part of our group.	1	2	3	4	5	6	7
12. We treat each other in a friendly manner.	1	2	3	4	5	6	7
13. Our team does **<u>not</u>** want to spend more time together than we have to.	1	2	3	4	5	6	7
14. We do **<u>not</u>** enjoy socializing or spending time with each other.	1	2	3	4	5	6	7
15. Our team has a positive social atmosphere.	1	2	3	4	5	6	7
16. Members of our team feel like they ‘fit in’.	1	2	3	4	5	6	7

Appendix B

Understanding Engineering Project Teams

LETTER OF INFORMATION

Principal Investigator: Dr. Natalie Allen

Department of Psychology

Western University

As part of your ongoing participation in the present study, you will be asked to complete a series of 3 questionnaires regarding your ES1050 Project Team and your opinions about teams and group work in general and (in the 1st studio ES 1050 session) participate in a group exercise. The data collected will be confidential and accessed only by the principal investigator (Dr. Natalie Allen) and members of The TeamWork Lab in the Psychology Department at Western. As per an agreement between The TeamWork Lab and the Engineering Sciences 1050 professors, you can receive 2.0% toward your final ES 1050 course grade by participating in each phase of this research. However, your course instructor and teaching assistants WILL NOT be aware of your decision to participate, as surveys are collected directly by members of The TeamWork Lab, and your participation is recorded solely by the ES 1050 marks manager, not any individual professor. Further, as part of this project, The TeamWork Lab will be accessing group project grades with a view to examining whether particular team variables might be linked to team performance.

No known psychological or physical discomforts are associated with participating in this study. If at any time you feel that you do not want to continue your participation, you have the right to stop. Even after viewing this questionnaire, or any of the subsequent surveys, if you feel nervous or uncomfortable at any point, you may withdraw your participation. If you chose not to participate, please sit quietly while those that do participate complete their questionnaire. In the meantime, you can complete some course reading.

Finally, all participants will receive feedback explaining the purpose of the study at its conclusion. If you have any questions or concerns about the research, you are encouraged to contact Natalie Allen, the principal investigator (Social Science Centre, Room 8412, nallen@uwo.ca, 519-661-3013). If you have any questions about your rights as a research participant, you may contact the Director of the Office of Research Ethics at Western University (519) 661-3013.

Appendix C

Understanding Engineering Project Teams

CONSENT FORM

Primary Investigator: Dr. Natalie Allen

Department of Psychology

Western University

I have read the Letter of Information regarding this research project, have had the nature of the study explained to me, and I agree to participate. All questions have been answered to my satisfaction.

_____

Participant name (please print)

_____

Participant signature

_____

Date