The relationship between cross-understanding and team performance as mediated through implicit coordination

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Introduction

Organization and teams' researchers have struggled to explain the inconsistency in the group diversity, group information-processing and cognition literature. Conflicting findings in the research suggest that underlying mechanisms could explain the relationship between team composition, group cognition, and performance. One possible explanation is the concept of cross-understanding (CU), or the extent to which a group's members possess insights into the features of other members' mental representations of the group's task and task situation, which has been linked to improved coordination leading to better task performance (Huber & Lewis, 2010). It is also proposed that implicit coordination (IC), or the ability of teams to act in concert by predicting the needs of the task and the team members and adjusting behaviors accordingly without the need for overt communication, will mediate the relationship between team situation models and team performance (Rico et al., 2008). Taken together, there is strong theoretical evidence that cross-understanding will improve team performance by facilitating stronger implicit coordination among members.

Methods

Longitudinal data for the study were collected from 159 undergraduate and MBA students enrolled in a large Spanish university. Surveys were administered to each student over the course of the 14-week semester with a total of 15 variables measured on a 5-point Likert scale (only six were included in this analysis). Individual responses were aggregated to a team level for analysis. The independent variables, CU and IC, were measured at week 8 and week 13, respectively, making the data appropriate for mediation analysis. The dependent variable, team performance, was measured at the end of week 14 as the final grade of the team projects in percent.

Analysis & Results

All analysis of the data was performed in R (R Core Team, 2020). Initial exploratory analysis revealed that team performance was significantly correlated with CU ($p < .05$) and IC ($p < .05$). A multiple regression was run with CU and IC as predictors of team performance that resulted in both variables becoming insignificant at the .05 alpha level ($p < .1$ and $p = .16$, respectively). No concerns for multicollinearity were detected ($r = .42$) so a simple mediation analysis was run using the `mediation` package to explore possible interaction effects. Results yielded marginal support for full mediation at an alpha of .1 but not the .05 level with similar results after sensitivity analysis using bias-corrected bootstrap confidence intervals. At an alpha of .1, results indicated that CU is indirectly related to team performance through its relationship with IC. Team IC is expected to increase as CU increases ($a = .32$, $p = .016$), and increased IC was subsequently related to higher team performance ($b = 4.49$, $p = .028$). However, a 95% confidence interval based on 10,000 bootstrap samples indicated that the indirect effect ($ab = 0.95$, $p = .088$) was not entirely above zero (-0.07, 3.11). A Monte Carlo power analysis was run (using the Shiny app created by Schoemann et al., 2017) and results indicated that, given a sample size of $N = 33$, there is only a 28% probability of correctly rejecting the null hypothesis. To achieve a minimum power of .8 a sample size of $N = 88$ is needed.

Discussion

Results from this analysis, although marginally significant, do suggest a few key points: 1) Generally, results show marginal support for the mediating role of IC in the relationship between CU and team performance (however, further study with a larger sample size is warranted); 2) Increased attention to a priori power analysis in the study design phase may be prudent to ensure appropriate sample size and signal detectability; 3) Further analysis using structural equation modeling may reveal additional interaction effects with other variables; and 4) If future studies find significant mediating effects, then CU may explain discrepancies in the diversity literature where group heterogeneity is expected to result in negative outcomes but does not.