Working Together: How Useful is Personality in Contributing to Group Performance? [1]

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Group work is an integral part of many undergraduate courses. The implicit assumption is that two or more individuals working together create an effect greater than when each works on his or her own. When individuals form a group, they bring along their demographic variables, prior knowledge, beliefs, values, attitudes, and even personalities. This study focuses on the way individuals in a group pool together their personalities as resources contributing to group performance. I adopted an input-process-output model in order to understand the transformation of individual personalities into group resources through which to achieve group performance.

In this study, I assess how group members' personalities (inputs) combined together to influence their group interactions (process) and group performance (outcomes). To assess an individual's personality, I relied on NEO-FFI (Costa & McCrae, 1992) measuring five personality dimensions. Members' personalities are pooled together within each group to arrive at a group-level score for each personality dimension. To capture the interactions among members in achieving the group project, I developed a 17-item inventory capturing different domains of interactions (see Lizzio & Wilson, 2005). Again, individual members' perception of group dynamics are pooled to arrive at group-level scores. To provide objective measures of each group's performance, I relied on an independent research associate's rating of the final report, a mean class participation score, and a mean quiz results score. With this matrix of information, I address the following questions:

1. What is the pattern of relations between personality resources and group interactions?
2. What is the pattern of relations between personality resources and group performance?
3. Do personality resources exercise a direct or an indirect effect (via group interactions) on group performance?

METHOD

In the spring of 2007, 237 undergraduates (137 males and 100 females) enrolling in the course, Introduction to Personality and Social Psychology, were invited to participate in an Internet personality questionnaire at the beginning of the semester. Three months afterwards, they were asked to complete a written survey on the group learning experience. (All questionnaires were in Chinese.) These students comprised 38 groups.

All students completed the NEO-FFI assessing the Big Five personality dimensions:

[1] Please refer to Yik (2007) for the details of the study.

Neuroticism, Extraversion, Openness to Experience, Conscientiousness, and Agreeableness (Costa & McCrae, 1992). In each group, members' scores were averaged to arrive at five group-level personality scores.

Students also completed a battery of group interaction items capturing their perceptions of group interactions throughout the semester. Factor analysis of these items resulted in three factors: "Equity", "Shared Exchange", and "Task Focus". In addition, I measured students' perception of "learning effectiveness" in a group setting. In each group, members' scores were averaged to arrive at four group-level process scores.

I relied on three measures to measure each group's performance. The first was a research associate's rating of the final report. The associate had no prior knowledge of the group's personality or how the groups interacted. In this sense, this rating served as an objective judgment of group work. The second measure was the mean class participation score computed on the basis of members' individual scores. Class participation scores were determined by the quantities and quality of the questions raised in class, question sheets, and via emails. The last measure was the mean quiz results computed on the basis of members' two quiz results (both were in multiple choice questions).

RESULTS & DISCUSSION

Predicting Group Process

The intercorrelations between the five personality dimensions and four group process variables are provided in Table 1. Task Focus was related significantly to Openness to Experience and Conscientiousness; Learning Effectiveness to Conscientiousness. Both Equity and Shared Exchange were not related to personality.

To estimate the relative contribution of each personality dimension to each group process variable, I conducted stepwise multiple regressions, using the Task Focus and Learning Effectiveness separately as criterion variables, the five personality dimensions as predictor variables. Of the five personality variables, Conscientiousness was significantly related to Task Focus (beta = .45, $p < .01$), $R^2_{\text{adjusted}} = .18$, $F_{1, 36} = 9.31$, $p < .01$. Conscientiousness was also related to Learning Effectiveness (beta = .52, $p < .01$), $R^2_{\text{adjusted}} = .25$, $F_{1, 36} = 13.52$, $p < .01$. Groups composed of hard working and organized members tend to be more task-oriented and were very positive about the group learning experience.

Predicting Group Performance

The intercorrelations between personality dimensions and group performance variables are provided in Table 1. Openness to Experience and Conscientiousness were related significantly to group performance measures.

To estimate the relative contribution of each personality dimension to each group performance variable, I conducted stepwise multiple regressions, using the three performance variables separately as criterion variables, and the five personality dimensions as predictor variables. Of the five personality variables, Conscientiousness was significantly related to Class Participation (beta = .51, $p < .01$), $R^2_{\text{adjusted}} = .23$, $F_{1, 36} = 12.32$, $p < .01$; it was also significantly related to the Project Rating (beta = .42, $p < .01$), $R^2_{\text{adjusted}} = .15$, $F_{1, 36} = 7.75$, p

< .01. Finally, Openness to Experience was related to Quiz Results (beta = .52, $p < .01$), $R2_{adjusted} = .37$, $F_{1, 36} = 23.00$, $p < .01$. Groups composed of hard working and organized members are more involved in lectures and tend to excel in project work. Groups composed of intellectually curious members yield better exam results.

Taken together, the personality dimensions of Conscientiousness and Openness to Experience were strongly predictive of both group process and group performance. Moreover, group process and group performance variables were also highly related to each other. As shown in Table 2, both Task Focus and Learning Effectiveness were significantly related to all three performance measures. Given the complex relations among the input, process, and output variables in this research setting, the next question is whether the relations between the inputs and outputs are mediated by the process variables.

Mediation Analysis

In this section, I assess whether group process variables mediated the effects of personality on group performance. More specifically, I tested the mediation effect of Task Focus and Learning Effectiveness respectively on the three regression models identified in the preceding section. To this end, I used Baron and Kenny's (1986) four-step procedure. First, I demonstrated (in the preceding section) a significant relation between the predictor and the outcome variables, namely Conscientiousness and Class Participation, Conscientiousness and Project Rating, Openness to Experience and Quiz Results. Second, I demonstrated the significant relations between the predictor and the two hypothesized mediators, viz. Task Focus and Learning Effectiveness (see Table 1). Third, I demonstrated that each mediator was related to the outcome variables (see Table 2). Fourth, I tested the mediation effects of Task Focus and Learning Effectiveness separately in the three regression models obtained in the preceding section.

To test the mediation effect of Task Focus, I regressed Class Participation on to Conscientiousness after controlling for the effect of Task Focus. The model was significant, $R^2_{adjusted} = .30$, $F_{2, 35} = 9.08$, $p < .01$, but Conscientiousness was significant ($R^2_{change} = .10$, $p < .05$). I also tested the mediation effect of Task Focus on the Openness to Experience–Quiz Results model. The model was significant, $R^2_{adjusted} = .51$, $F_{2, 35} = 20.25$, $p < .01$, but Openness was significant ($R^2_{change} = .22$, $p < .01$). Finally, I tested the mediation effect of Task Focus on the Conscientiousness–Project Rating model. The model was significant, $R^2_{adjusted} = .24$, $F_{2, 35} = 6.84$, $p < .01$, but Conscientiousness was no longer significant ($R^2_{change} = .05$, n.s.) indicating that Task Focus mediated the effect of Conscientiousness on Project Rating.

In parallel fashion, I tested the mediation effect of Learning Effectiveness on the three regression models. Learning Effectiveness mediated the effect of Conscientiousness on Project Rating only ($R^2_{change} = .07$, n.s.) but bore no mediating effect on the Conscientiousness–Class Participation ($R^2_{change} = .14$, $p < .01$) and Openness to Experience–Quiz Results ($R^2_{change} = .24$, $p < .01$) models.

CONCLUDING REMARKS

Using an input-process-output model as the landscape, I examined among 38 task-oriented groups of undergraduate students the transformation of individual personalities into resources

that are most helpful in achieving group performance. Members' personalities, when pooled together, make significant but differential impacts upon the group performance (adjusted variance explained ranged from 15% to 37%). The group personality exercises a direct impact upon Class Participation (Conscientiousness) and Quiz Results (Openness to Experience). Groups comprising of organized and hardworking members enhance class participation as a whole; those comprising of intellectually curious individuals enhance members' exam results as a whole. Interestingly, to excel in group work, not only do we need to pool together members' personalities, we also need to transform them into task-oriented forces, the result of which is an excellent collective piece of work.

REFERENCES

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Table 1

Intercorrelations among Personality, Process, and Performance Variables

Personality Variable	Process Variable				Performance Variable		
	Task Focus	Equity	Shared Exchange	Learning Effectiveness	Class Participation	Quiz Results	Project Rating
Neuroticism	–.03	–.20	–.15	–.14	.08	.11	.12
Extraversion	.14	.04	.12	.19	.10	.03	–.05
Openness to Experience	.32*	.22	.03	.30	.34*	.62**	.31
Agreeableness	.07	–.01	.10	.05	.00	.11	.01
Conscientiousness	.45**	.19	.15	.52**	.51**	.52**	.42**

Note. Results are based on 38 groups.
* $p < .05$
** $p < .01$

Table 2

Intercorrelations among Process and Performance Variables

Process Variable	Performance Variable		
	Class Participation	Quiz Results	Group Project
Task Focus	.49**	.56**	.48**
Equity	.21	.47**	.12
Shared Exchange	.26	.29	.15
Learning Effectiveness	.36*	.52**	.39*

Note. Results are based on 38 groups.
* $p < .05$
** $p < .01$