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Personality and group performance: The importance of personality composition and work tasks

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ABSTRACT

We examine whether group members' Big Five personality composition (variability, minimum, and maximum) affects the group's performance. We employed an experimental design where participants were paid based on their performance in two different group-based experimental tasks: an additive task (where group performance is based on the sum of efforts of all group members) and a conjunctive task (where group performance is based on the performance of the weakest group member). Results indicate that variability in extraversion is positively related to group performance on the additive task but not on the conjunctive task. Conversely, neuroticism maximum score is negatively related to group performance on the conjunctive task but not on the additive task.

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1. Introduction

General mental ability (GMA) is one of the strongest predictors of employee job performance ($r = .51$) but using personality inventories, particularly assessments of conscientiousness, may add incremental validity to this prediction ($r = .60$; Schmidt & Hunter, 1998). The use of personality assessments in employee selection is guided by the underlying organizational objective to select high-performing employees (Goffin et al., 2011). Among the different personality inventories, the "Big Five"—conscientiousness, agreeableness, neuroticism, openness to experience, and extraversion—has been widely adopted in research and practice. Research evidence indicates that the Big Five are consistently related to individual performance (Barrick & Mount, 1991, 2006). For instance, on average, employees high in conscientiousness demonstrate superior job performance across a range of jobs (Barrick & Mount, 2006).

Yet a key limitation of this body of work is that it has largely been conducted at the individual level of analysis. In organizations, work is increasingly structured in teams, and ensuring effective team performance—beyond simply individual performance—is critical. Concomitantly, there is an increasing need to identify effective strategies to develop groups (Klimoski & Zukin, 1999). These concerns have prompted scholars to question the relevance of findings from individual-level personality research for groups,

and hence they have suggested investigating the role of personality traits at the group-level (LePine, Buckman, Crawford, & Methot, 2011; Prewett, Walvoord, Stilson, Rossi, & Brannick, 2009). The primary emphasis of our study is at this group-level of analysis to understand the role of personality in influencing group performance.

Group performance can be influenced by the group's personality composition (i.e., the similarity or differences of group members' personality traits; i.e., *internal factors*; Bradley, Klotz, Postlethwaite, & Brown, 2013). In addition to the mean (average) level of a personality trait in the group other compositional effects, such as the minimum, maximum, and the variance of personality traits, can also influence group performance. For example, a high level of extraversion will be a predictor of individual performance in tasks that require social interaction; however, having a group of employees who are all high on extraversion might be detrimental to group performance because such groups may perform better at brainstorming tasks (where extraverted employees are inherently comfortable in putting forth their ideas) but not as well at tasks that require quick decision making and task focus (Barry & Stewart, 1997). The effect of personality composition on group performance is likely dependent also on task characteristics; i.e., *external factors*. For additive tasks (i.e., tasks where group performance is based on the sum of efforts of all group members; Steiner, 1972), variability of personality traits will be related to group performance because different levels of personality traits may be associated with unique skills (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007; LePine et al., 2011). Conversely, in conjunctive tasks (i.e., tasks

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where performance is based on the group's weakest member; Steiner, 1972) the *minimum* score of some personality traits will be related to group performance. Thus, scholars have recommended examining the role of task characteristics (Barrick, Stewart, Neubert, & Mount, 1998; Bell, 2007) to better inform the group personality composition – group performance relationship.

Overall, although existing research has revealed that the personality composition within a group is associated with the group's performance, the specific compositional effects are not well understood (Anderson, 2009; van Vianen & De Dreu, 2001). Drawing on this incomplete examination of internal and external factors, we investigate the relationship between group level personality, task characteristics, and group performance. Our study aims to contribute to both research and practice by investigating whether there is an “effective” combination of personalities in groups, and whether the “effective” personality composition is dependent on the characteristics of the task.

1.1. Group personality composition

Similarity-attraction theory (Byrne, 1971) supports the argument that employees in groups composed of members with similar personality traits are more likely to experience higher well-being because members are attracted to the similarities that they see in each other. However, it is likely that it is not the heterogeneity or homogeneity of the group that matters, but rather the variability of the personality trait in a group and its mean level (Homan et al., 2008). For example, a group that is composed of employees who are all highly conscientious might outperform a group in which all members are very low on the trait of conscientiousness (although both groups will have the same similarity scores). That is, the group's personality composition can result in a supplementary fit, (i.e., higher mean level of a personality trait is associated with higher group performance) or a complementary fit (i.e., group members possessing a specific level of a personality trait may benefit the team by filling a competency gap in the group; Humphrey et al., 2007; LePine et al., 2011). Thus, the operationalization of the group's personality composition is critical for estimating its effect on group performance.

Halfhill, Nielson, Sundstrom, and Weilbaecher (2005) identified three methods to operationalize personality composition in groups. The most common method is to calculate the mean score of the group for a particular personality trait. This operationalization assumes both positivity (i.e., a positive relationship between the trait and organizational outcomes) and additivity (i.e., a greater proportion of employees with higher scores on a trait is generally better than a lower proportion of employees) of the personality trait, which is indicative of a supplementary fit. A second method is to assess the variability (i.e., variance or range) of individual personality traits in the group (Halfhill et al., 2005). An underlying assumption of this operationalization is that the variability in a personality trait is correlated with group performance, which is indicative of a complementary fit. A third method is to focus on minimum and/or maximum scores, which are especially appropriate to assess ceiling (e.g., the “best” performer determines the group's performance) and floor (e.g., the “worst” performer determines the group's performance) effects in groups. These different operationalizations of group personality composition hint at the possibility that the nature of the task itself may dictate the optimal composition of different personality traits in groups (van Vianen & De Dreu, 2001).

1.2. The importance of the task characteristics

We adopt Steiner (1972) classification of group tasks and focus on two distinct types of tasks—additive and conjunctive—that

groups typically work on. In additive tasks, each member shares some knowledge and skills with all group members; however, he or she may also have specific knowledge or skills that might benefit the entire group. In conjunctive tasks (e.g., an assembly line), tasks are interdependent, which influences group performance, and results in the group's weakest member having the largest effect on the group's output (Homan et al., 2008). We posit that the relationship between group personality composition and group performance varies based on the type of the task the group performs and specific personality traits.

For additive tasks, variability in extraversion will result in superior performance because differences in the members' personalities might be associated with unique skills that are required by the task. Highly extraverted employees tend to be friendly and energetic but are also more assertive and dominating (Prewett et al., 2009). If all members are high on extraversion the group is likely to have more problems in dividing up roles and completing specialized tasks and may experience more conflict on leadership issues (Barry & Stewart, 1997; Mohammed & Angell, 2003). Similarly, a group is composed of members who are low in extraversion may tend to be quiet and reserved. Therefore, if the group has both extraverted and introverted members (i.e., high variability), we expect the group's performance to be better because such a group would possess the optimal composition of extraversion for group functioning. Variability of extraversion will not influence group performance on conjunctive tasks because performance on interdependent tasks is unlikely to be related to the variance in extraversion as long as the task requires similar skills from all group members.

1.2.1. Hypothesis 1: variability in group extraversion score is positively related to group performance in additive tasks, but not in conjunctive tasks

In conjunctive tasks, interdependence between group members is brought forth whereby the group's weakest member (in a task-related skill or a personality trait) has a greater effect on the group's performance compared to other group members. Therefore in conjunctive tasks other personality traits (conscientiousness, neuroticism, and agreeableness) might be more critical.

Conscientious employees are dependable and responsible (Halfhill et al., 2005)—attributes that are positively related to job performance (Barrick & Mount, 2006). A group with members who are high on conscientiousness is therefore more likely to have higher group performance. Conversely, variability of conscientiousness levels within the group is not likely to contribute to group performance because having employees who are undependable and lazy are likely to negatively affect group performance (Barrick & Mount, 2006). Group performance in interdependent (conjunctive) tasks might be determined by the “weakest link”—the group member with the lowest conscientiousness score—because this member is the least motivated and least dependable. Because of the high interdependency within the group, such a low conscientious group member will drag down the group's performance more than his/her proportional contribution to the group and adversely affect group performance. Low conscientiousness employees, however, will not influence group performance on additive tasks because of the low levels of interdependence on those tasks.

1.2.2. Hypothesis 2: minimum score in group conscientiousness is positively related to group performance in conjunctive tasks, but not in additive tasks

Neuroticism, the tendency to feel negative emotions such as anxiety and frustration, is related to higher conflict and lower cohesion because highly neurotic employees are likely to be involved in more conflict generating behaviors (Bono, Boles, Judge, & Lauver, 2002; van Vianen & De Dreu, 2001). The adverse effects

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