



Are balanced groups better? Belbin roles in collaborative learning groups [☆]



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ABSTRACT

In a sample of 459 students organized in 84 groups this study tests the impact of group role balance on teamwork quality and three performance indicators in collaborative learning groups (group cognitive complexity, perceived performance and objective performance). The results show that group role balance positively predicts group performance in preliminary phases of the group project but not in later phases. Moreover, group role balance positively predicts group cognitive complexity and is negatively related to teamwork quality. The results hold only when role balance is conceptualized as a configural property of groups instead of a sum of individual roles. The findings of the study have implications for the design of collaborative learning groups.

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1. Introduction

Modern organizations use groups to perform a variety of complex tasks (Tannenbaum, Mathieu, Salas, & Cohen, 2012), therefore, next to job-related knowledge and expertise, teamwork skills become important elements in personnel selection across a variety of organizational fields (Burch & Anderson, 2004; O'Neil, Allerd, & Baker, 1997; Stevens & Campion, 1999; Zedeck & Goldstein, 2000). As a consequence, educational programs extensively use collaborative learning to help students develop teamwork skills (Curşeu, Janssen, & Raab, 2012) and acquire specific curricular knowledge (Curşeu, 2011; Haugwitz, Nesbit, & Sandmann, 2010; McCune & Entwistle, 2011). It becomes therefore important to identify group design features that increase the effectiveness of individual and collaborative learning in student groups (Curşeu & Pluut, 2013).

One of the most extensively used design tool for groups is based on the group role preferences described by Meredith Belbin (1981). Group role preferences are defined as group members' predispositions to

adopt specific patterns of behavior in interpersonal interactions and these stable individual differences can configure in various ways within groups (Belbin, 1981). The way in which individual role preferences combine within groups is a configural group property (Klein & Kozlowski, 2000) that impacts on group dynamics and effectiveness. One of the major claims of Belbin's role theory is that balanced groups (in which all nine roles are present) perform better than unbalanced groups, in which existing roles are duplicating each other (Belbin, 1981). Although the claim of balanced groups is being extensively used in organizational consultancy, the empirical evidence supporting its validity is not conclusive (Blenkinsop & Maddison, 2007; Jackson, 2002; Partington & Harris, 1999; Senior, 1997; van de Water, Ahaus, & Rozier, 2008). The aim of the current paper is to test the role balance claim in an educational setting given that there is evidence that Belbin's group role theory can be applied to non-managerial personnel as well (Fisher, Hunter, & Macrosson, 1998). A comprehensive approach is being employed in which various group balance indices are used to predict a wide array of outcomes in collaborative learning groups: teamwork quality, group cognitive complexity, and group performance, across time.

2. Theoretical underpinnings

Apart from their functional role (prescribed through design), group members have the tendency to display particular behavioral patterns in interpersonal interactions that influence the progress of the group towards specific task achievement. These stable individual differences are captured by the group role preferences (Belbin, 1981). The roots of group roles were considered to lie in a person's generic personality traits

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and mental abilities (Aritzeta, Swailes, & Senior, 2005; Belbin, 1981) as well as the structure of environment (Arroba & Wedgwood-Oppenheim, 1994; Fisher & Macrosson, 1995; Yuwei & Tang, 1997). In the context of a 9-year research project developed by Belbin, behavioral observations as well as personality and mental abilities of group members were recorded and used to develop a taxonomy of group role preferences. Matching of these measurements resulted in the identification of eight group roles: the coordinator (CO – co-ordinates and controls the activities of the group), the resource-investigator (RI-extrovert, makes outside contacts and develops ideas), the teamworker (TW-person oriented, communicates well with the others), the plant (PL – creative and imaginative), the monitor-evaluator (ME – prudent and analytical), the implementer (IM – practical and task-oriented), the completer-finisher (CF – attentive to details, finishes things), and the shaper (SH – dynamic and challenging). Later on, a ninth role was added to this taxonomy, the specialist (SP – with high technical skills and in-depth knowledge for the task) (see Belbin, 1981, 2009 for an extensive overview).

One of the most important claims in Belbin's work is that balanced groups (with regard to their members' role preferences) have superior performance than unbalanced groups. In other words, it is useful to have members that possess particular strengths without duplicating the ones already present in the group (Belbin, 1981; van de Water, van de Water, & Bukman, 2007). A perfectly balanced group would be a group in which all nine roles are present in a high or very high level while a perfectly unbalanced group would be one in which all the group members report the same individual role preference. The concept of role balance is therefore a configural property of groups (Klein & Kozłowski, 2000), and the configuration of roles are expected to be predictive for group dynamics and performance (Belbin, 1981). According to the Input-Process-Output model of group effectiveness (Ilgen, Hollenbeck, Johnson, & Jundt, 2005), group role configurations can be considered inputs that predict the group processes and the quality of interpersonal interactions, which in turn influence group performance. However, the results of the studies investigating the impact of group role balance on performance are not conclusive. While some studies identified little or no relation between the two (Blenkinsop & Maddison, 2007; Jackson, 2002; Partington & Harris, 1999; Senior, 1997; van de Water et al., 2008), some others found evidence for group balance as a valid predictor of group performance (Higgss, Plewnia, & Ploch, 2005; Prichard & Stanton, 1999).

The lack of converging results can be attributed to several factors. First, in most of the studies there is no control for group size and gender diversity although previous research reports gender differences regarding group role preferences (Anderson & Sleaf, 2004). Next to the gender issue, some of the group balance indices are also sensitive to the group size (van de Water et al., 2007). Therefore, gender and group size should be accounted for when analyzing the relation between balance and performance. Second, little specifications were given with respect to how group role balance can be computed. Therefore, there is little overlap in the formulas currently used in computing group role balance. Group balance was computed by taking into account the behavioral or environmental focus of the roles (Higgss et al., 2005), the weights of the top three roles an individual in a group has (the so-called primary, secondary and tertiary roles) (van de Water et al., 2008) or how much the group deviates from an ideally balanced group (Partington & Harris, 1999). The different assumptions underlying group balance formulas could stand as an explanation for the non-conclusive results for the group balance-group performance relation. Finally, most of the studies used just one group outcome indicator, which often differed across studies. For instance, performance was measured in terms of group processes such as group organization and communication (Blenkinsop & Maddison, 2007; Prichard & Stanton, 1999) subjective reports of managers (Higgss et al., 2005) or group success in simulation games (Partington & Harris, 1999; van de Water et al., 2008).

In the current study the concept of group role balance and its impact on performance is being reconsidered in order to tackle the limits

described above. Therefore, the impact of group role balance on group dynamics and outcomes is tested by using several balance indices (which rely on different assumptions) as well as a variety of group dynamics and performance indicators (group processes, group cognitive complexity, perceived and actual group performance).

3. The impact of group role balance on teamwork quality

Teamwork quality (TWQ) is a multidimensional construct that reflects the quality of interpersonal interactions inside the group. It consists of several dimensions that reflect both group processes (communication, coordination and planning) and group emergent states (cohesion, perceived performance and potency) (Curşeu & Pluut, 2013; Curşeu, Schalk, & Schrujjer, 2010; Hoegl & Gemuenden, 2001).

Teamwork expertise and synergistic interactions within groups in educational settings have several advantages. First, organizations are often employing groups and teamwork as a flexible way of organizing work and therefore are looking for candidates that already acquired teamwork skills during their educational trajectory (Chen, Donahue, & Klimoski, 2004). Thus, teamwork expertise increases workforce readiness given that students develop during their studies specific teamwork knowledge, skills and abilities. Second, when groups manage to develop synergistic interactions (good teamwork quality) they generate complex group-level knowledge structures (Curşeu & Pluut, 2013) as well as increased group performance (in innovative projects) and at an individual level are able to learn more (in terms of knowledge and skills) and be more satisfied with their work (Hoegl & Gemuenden, 2001).

Given the benefits of teamwork quality, substantial effort was devoted to investigate how the quality of interpersonal interactions within groups can be improved in educational settings (Chen et al., 2004; Curşeu & Pluut, 2013; Curşeu et al., 2012). Solutions such as the development of university courses in which students specifically learn about teamwork (e.g. The Psychology of Working in Groups and in Teams) (Chen et al., 2004) or personality student-group interventions in which group members learn about each other's personalities and how to manage individual differences (Clinebell & Stecher, 2003) were proposed.

A more straightforward group design solution is the use of design principles that generate the most effective group configurations. However, the simple placement of students in groups does not always guarantee the development of teamwork skills (Hansen, 2006; Johnson & Johnson, 1990). Student groups often experience unclear goals, mismanagement, conflicts or unequal participation (Cox & Bobrowski, 2000; McCorkle et al., 1999; McKendall, 2000; Rau & Heyl, 1990). The aim of the current study is to investigate whether composing groups by using the role balance assumption leads to better group interactions and thus higher teamwork quality.

According to Belbin roles theory, group role balance, as a configural group property should have a positive impact on teamwork quality. A crucial role here is played by social roles such as coordinator and teamworker. Due to their association with the extraversion dimension of personality (Davies & Kanaki, 2006), such roles facilitate communication and coordination processes inside the group. The compromising style of conflict management (Aritzeta et al., 2005) associated with these roles also buffers emergent relationship conflicts and leads to positive emergent states such as group cohesion. The resource-investigator, characterized by over-optimism not only contributes to the group's belief in their own strengths but, also helps in collecting and bridging among different ideas, including those of introverted group members (e.g. plants or specialists).

Effective teamwork requires a balance between task related and interpersonal knowledge as research on shared mental models argues that members of effective groups need to share both task related as well as teamwork related knowledge (Cannon-Bowers & Salas, 2001). The convergence of teamwork and taskwork mental models is conducive to effective teamwork processes which in turn impact on group performance (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Moreover, meta-analytical evidence also suggests that shared

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