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Testing Belbin's team role theory of effective groups

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Abstract *Belbin's Team-Role Theory is extensively used as a counselling and team development tool by organisations and management consultancies in the UK. However, there is little empirical support for his work, largely because there has been scant research. This study sought to redress this situation by testing Belbin's proposal that teams in which a wide range of team-roles are represented perform better than those where there is an imbalance of roles because certain roles are over-represented. The task performance of six teams of four individuals identified as shapers by the Team-Role Self-Perception Inventory (Belbin, 1981), was compared with that of six mixed teams of four individuals; one co-ordinator, one plant, one completer finisher, and one team worker. It was found that consistent with Belbin's proposal the "mixed" teams performed better than teams consisting of shapers alone. Some possible explanations and implications of the findings are discussed.*

Introduction

The effectiveness of teams varies greatly, and considerable research has been devoted to seeking the formula for success. This paper is concerned with one particular element, that of role theory, which has sought to determine whether or not there are certain roles that people characteristically perform in teams and how these relate to team performance. Research in this area suggests that teams can operate most effectively if the right combinations of roles are present. Certainly the members of a team must have the requisite technical skills and abilities to do the job, but what of other factors such as personality, attitudes, and task process and maintenance skills?

With respect to task process and maintenance skills, Torrington *et al.*, (1985), have suggested that for effective team functioning both task-oriented, and social/emotional oriented behaviours are necessary. Task-oriented behaviours are those which concentrate on getting things done, such as seeking information or proposing solutions. Social/emotional-oriented behaviours are those which maintain team processes, for example, by building on and supporting other peoples views, or releasing tension. In contrast, there are other behaviours that are disruptive to completing the task or maintaining a positive social/emotional environment, such as shutting others out, or blocking suggestions. Consistent with this view, Bales (1950), found that teams needed both goal-directed members, and other members to ensure harmony within the team.

Other early work in this area by Benne and Sheats (1948; cited in Adair, 1986) led to the development of a role behaviour classification scheme which described 12 task and seven group maintenance roles operative in group

performance. Their research focused on small discussion groups whose task was to select, define and solve common problems. From their observations they identified a number of task roles related to functions of facilitating and coordinating these group problem-solving activities. For example, the proposed role of “initiator-contributor”, referred to a person who suggested new ideas to the group, such as new ways of solving or approaching problems. The maintenance roles they identified related to those behaviours that promoted group-centred attitudes. For example, the role of “encourager” referred to a person who praised, agreed and accepted the contributions of others. They proposed that for successful group functioning all of these roles needed to be performed.

Although never directly referenced, the research of Benne and Sheats appears to have inspired the more recent development of Belbin's team-role theory. He took the further step of making a link between the team roles necessary for effective team functioning and preferred behaviours (Belbin, 1981, 1993 and Belbin *et al.*, 1976). Belbin proposed that while the types of behaviour that people engage in are infinite, the range of useful behaviours that make an effective contribution to team performance is finite. He grouped these behaviours into eight clusters, each of which described a pattern of behaviour characteristic of the way in which one team member interacted with another, to which he applied the term “team role”.

Belbin (1981) contended that these team roles were vital to effective team performance and identified five principles underlying such performance:

- (1) Each team member contributes towards achieving the team's objectives by performing both a functional role (determined by their professional and/or technical knowledge), and a team role (determined by their characteristic pattern of team interaction).
- (2) The team needs an optimal balance in both functional and team roles which is dependent on the goals and tasks that the team faces.
- (3) The effectiveness of a team will be promoted by the extent to which members correctly recognise and adjust themselves to the relative strengths within the team, both in expertise and ability to engage in specific team roles.
- (4) Personal qualities fit members for some team roles while limiting the likelihood that they can perform others.
- (5) A team can deploy its technical resources to best advantage only when it has the requisite range of team roles to ensure sufficient teamwork.

The eight different team roles that Belbin identified were plant, resource investigator, chairman, shaper, monitor evaluator, team worker, company worker, and completer-finisher. More recent versions of his theory have seen the names for the roles of chairman and company worker changed to coordinator, and implementer, respectively, although the profile of both roles has remained the same. In addition, a ninth role has been added, that of the

specialist, a person whose role is to provide the professional expertise necessary in certain “real life” settings. Belbin went on to make predictions as to how various combinations of these roles would influence team performance, and found a fair correspondence was obtained between his predicted and actual outcomes.

Although there is a considerable descriptive account of this work in Belbin’s book *Management Teams: Why they Succeed or Fail* (1981), there has been little published empirical data of their findings other than a brief article printed in 1976, which included a scatterplot of rank order predictions and actual results of 22 teams (Belbin *et al.*, 1976). Subsequent calculations have computed the rank order correlation as +0.55, which is statistically significant at the 1 per cent level (Dulewicz, 1995). However, despite the relative absence of empirical validation of his theory, Belbin’s ideas have been widely used by many commercial organisations, and management consultancies, in both training, and actual team building and development.

In the light of its extensive usage, this study sought to test part of Belbin’s theory in order to provide empirical support for his descriptive account. The crux of team role theory hinges on the “role balance” hypothesis (tenet 2 and 5 of Belbin’s theory). The role balance hypothesis states that teams containing more of the roles will perform any given task more effectively than teams containing fewer roles. Senior (1997), has found some evidence for the link that Belbin makes between team role balance and team performance. This study looked at existing teams in UK organisations, and predicted the performances of those teams based on their team-role balance, and the team’s key stage of activity. She found a significant positive correlation between these predictions and actual team outcomes.

In contrast to the work by Senior, the present study sought to investigate the role balance hypothesis in a more controlled fashion. Teams were specifically created to test the role balance hypothesis in so much that people were grouped together solely on the basis of their team-role profile. Therefore this study more closely replicates some of Belbin’s original work. To achieve this the performance of two different team-role compositions were compared, one in which the role mix was balanced, and one which consisted of members all with the same role type. The choice for the latter was drawn from observations made by Belbin in his descriptive account.

Belbin proposed that of all the team roles, shapers were potentially the most disruptive role in the group. Shapers are characterised by a pattern of highly-strung, outgoing, and dynamic behaviour. On a positive note they showed drive and readiness to challenge complacency and ineffectiveness. However, they also showed a proneness to provocation, irritation and impatience. Belbin found that teams of shapers showed high work rates and were quick to explore all possible avenues of approach. However, they seldom liked working together and in spite of a great deal of positive goal-directed activity, they displayed high levels of in-fighting which led to poor results. In contrast, the more balanced composition of mixed teams did not experience this difficulty. It was

therefore hypothesised that the mixed teams would show superior performance on a management business game than teams made up solely of shapers (the “role-balance” hypothesis).

Method

Design

The aim of this study was to determine if differences in team-role composition effected team performance at a management game in consensus decision making. To achieve this a between-subjects design was used. The independent variable was the composition of the team, either mixed team roles or all shapers. There were seven dependent variables. The first was the total score for the assessment task. The remaining six were task process measures taken during completion of the game. Four of these measures were gathered in an attempt to determine whether certain behaviours, thought to be associated with effective team performance (Benne, 1948; cited in Adair, 1986), and proposed by Belbin to be associated with certain team roles, were more likely to occur in mixed teams where the team role they were associated with was represented, than in shaper teams where the team role was absent.

To this end the following behaviours were selected:

- (1) Summarising information, a behaviour associated with the organisational skills of the co-ordinator.
- (2) Generating ideas, a behaviour associated with the creative skills of the plant.
- (3) Planning proposals to complete the task, a behaviour associated with the planning skills of the completer finisher.
- (4) Building on others’ ideas, a behaviour associated with the process maintenance skills of the team worker.

It was also sought to ascertain whether those behaviours Belbin proposed to be associated with the shaper role were more likely to occur in the all-shaper teams, and less likely to occur in the mixed teams where this role was absent. Therefore two further behaviours were considered:

- (5) The total number of interactions between the team members.
- (6) The number of consensus decisions reached during completion of the task. The former behaviour was used as a measure of the drive and enthusiasm of four shapers combined into one team. The latter behaviour was used in an attempt to assess the level of in-fighting within shaper teams.

Short definitions of these variables are:

- *Interactions.* Any verbal communication connected with the performance of the task made by one team member to another or towards the team as a whole.

- *Failures to reach consensus.* The failure of all four members of the team to agree on the rank position of any given item in the assessment task.
- *Planning proposals.* Verbally identifying the key objectives and fine details that need to be accomplished in order to complete the task.
- *Information summarises.* Taking the salient points of a discussion, and verbally documenting them to the other members of the team by restating the current position of progress.
- *Building on ideas.* Taking an idea presented by another team member and supporting and/or developing that idea to the next level.
- *Ideas generated.* Verbally proposing ideas aimed at solving the task.

Participants

From 178 applicants, a total of 48 participants took part in the full study, of whom 33 were male and 15 were female. All were unpaid volunteers who were attending a management recruitment assessment day. They were all University graduates, whose ages ranged from 23 years to 45 years (mean= 28.41; SD= 5.65).

Materials

Participants completed both the Belbin Team-Role Self Perception Inventory (BTRSPI) (Belbin, 1981), in order to assess their team role type, and the Critical Reasoning Verbal Evaluation (Bawtree *et al.*, 1991), to assess an individual's verbal ability and logical evaluation of argument.

Procedure

Prior to participation, each person completed a Critical Reasoning Verbal Evaluation. Belbin found that the most significant predictor of poor team results was uniformly low scoring on the measures of mental ability. Therefore only those who achieved a score of at least average mental ability, as assessed by comparison to a composite group of graduates, were formed into groups for further assessment.

Each participant was asked to complete the BTRSPI to determine their primary team role on the basis of which those individuals whose profiles were consistent with those required for the study were formed into groups. A total of 12 groups of four people were created such that six teams were made up of four shapers, while the remaining six groups were mixed each containing one co-ordinator, one plant, one completer-finisher, and one team worker.

The composition of the mixed teams was based on Belbin's proposal that the eight team roles could be considered as four pairs: two team leaders, (shaper and co-ordinator), two creative thinkers, (plant and monitor evaluator), two company workers (implementor and completer finisher), and two negotiators (resource investigator and team worker). On the basis of this taxonomy, each team was created of four individuals, one from each of the four pairs. Shapers were excluded from the mixed teams in order to provide a greater contrast to

the all-shaper teams, thus by exclusion selecting the co-ordinator from the team leader pair. A plant was chosen to represent the creative thinkers, a completer finisher to represent the company workers, and a team worker to represent the negotiators. Having been selected into teams, the participants were then asked to carry out the assessment task – “Lost at Sea” (Nemiroff and Passmore, 1975), a management task in consensus decision making.

Each team was video-taped during the group ranking stage of the task in order to allow for measures of certain group dynamics to be made. These measures were independently rated according to the definitions previously outlined. On completion, all participants were fully debriefed about the study and given their team role profile as proposed from the BTRSPI.

Data analysis

The video-tapes were coded by two independent observers in accordance with the dependent variables outlined in the design. This data was subsequently analysed using the Mann-Whitney U-test to look for differences between mixed and shaper teams.

Results

Assessment task score

For each group the team consensus ranking was compared with the survival experts' ranking, and the differences in the ranking for each item was calculated. The absolute values for these differences were summed, giving a total score for the task for each team such that the lower the score the greater the level of agreement with the expert. The median scores for both the mixed and the shaper teams were calculated and are represented in Figure 1.

From the graph it can be seen that the median total score for the mixed teams (median = 36.5) was lower than that of the shaper teams (median = 46.5), thus indicating the former teams' superior performance on the assessment task.

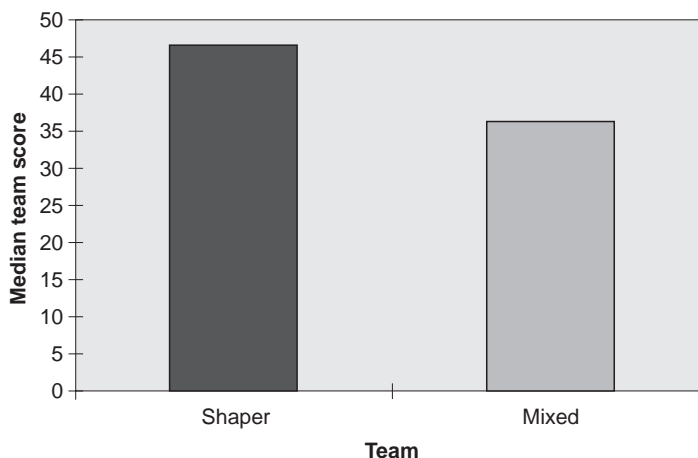


Figure 1.
Median team score for
the assessment task for
both shaper teams and
mixed teams

A Mann-Whitney test performed on the data found that this difference was significant ($U=2.50$; $p<0.05$). This finding supported the role balance hypothesis, that teams in which a number of different team roles were represented would perform better than teams where only the shaper team role was represented.

Team process measures

The video-tape of each teams' performance at the assessment task was rated in order to collect information on six team process measures as outlined in the introduction. Inter-observer reliability checks confirmed that there was a statistically significant level of agreement ($r = 0.775$; $p < 0.01$). The information gathered on the team process measures are summarised in Table I.

The number of observations of any given process measure made by each team member were added together to give a total number of observations for the team for that measure. From these the medians for each task process measure were calculated for both team types.

Total number of interactions

The median number of interactions for both the mixed and the shaper teams was calculated. The median for the shaper teams (median = 357.5) was higher than that for the mixed teams (median = 301.5), suggesting a higher number of interactions in the shaper team's performance of the task (see Figure 2). A Mann-Whitney test found that this difference was significant ($U= 3.0$; $p<0.05$).

Number of decisions reached without consensus

The median number of decisions reached without consensus for both the mixed and the shaper teams was calculated. The median for the shaper teams (median = 4) was higher than that for the mixed teams (median = 1), thus suggesting that shaper teams were less likely to fully agree on the decisions which the team took as a whole (see Figure 3). In addition, a Mann-Whitney test found that this difference was very significant ($U= 1.0$; $p<0.01$).

	No. of interaction	No. of failures to consensus	No. of planning proposals	No. of info. summaries	No. of builds on other ideas	No. of ideas generated
Median for Shaper Team N=6	357.5	4	3	4.5	10.5	36.5
Median for Mixed Team N=6	301.5	1	6	11	15	32
Significant Difference	Yes	Yes	Yes	No	No	No
	U=3.0 p<0.05	U=1.0 p<0.01	U=0.0 p<0.01	U=7.50	U=10.0	U=8.0

Table I. Summary of medians and Mann-Whitney tests on team process measures for both shaper teams and mixed teams

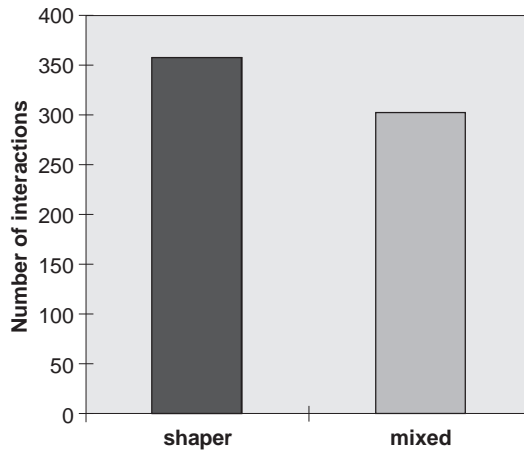


Figure 2.
Median number of
observed team
interactions for both
mixed and shaper teams

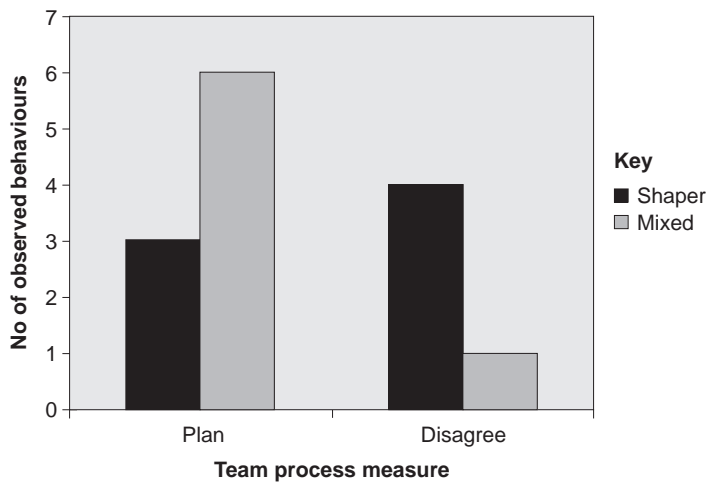


Figure 3.
Median number of
observed team failures
to reach consensus, and
observed planning
proposals for both
shaper teams and mixed
teams

Number of planning proposals

The median number of planning proposals for both the mixed and the shaper teams was calculated. The median for the shaper teams (median = 3) was lower than that for the mixed teams (median = 6), suggesting that shaper teams were less likely to plan their activities during the performance of the task (see Figure 3). In addition, a Mann-Whitney test found that this difference was very significant ($U = 0.00$; $p < 0.01$).

Number of information summaries

The median number of information summaries for the shaper teams (median = 4.5) was lower than that for the mixed teams (median = 11), suggesting a lower

number of attempts to summarise information during completion of the task by the shaper teams. However, this difference was not significant ($U=7.5; p=NS$).

Number of ideas generated

The median number of ideas generated for both the mixed and the shaper teams was calculated. The median for the shaper teams (median = 36.5) was higher than that for the mixed teams (median = 32), suggesting a greater tendency for shaper teams to generate ideas during performance of the task. However, a Mann-Whitney test found that this difference was not significant ($U=8.0; p=NS$).

Number of builds on others ideas

The median number of builds for both the mixed and the shaper teams was calculated. The median for the shaper teams (median=10.5) was lower than that for the mixed teams (median=15), however a Mann-Whitney test found that this difference was not significant ($U=10.0; p=NS$).

Summary of results

In summary mixed teams performed significantly better at a management game in consensus decision making than shaper teams. Shaper teams showed significantly higher interaction levels, and were significantly more likely to fail to reach consensus. Finally, mixed teams showed significantly higher levels of planning proposals than shaper-only teams

Discussion

Consistent with the hypothesis proposed in the introduction it was found that mixed teams, in which a variety of team roles were represented (except the shaper role for practical reasons), performed significantly better at a management game in consensus decision making than teams composed solely of individuals identified as shapers. Therefore, this study supports Belbin's "role-balance" hypothesis: teams balanced with respect to the team role composition of its members are more consistently successful than teams in which this balance is absent.

A consideration of the other findings in this study with respect to the task process measures may afford some understanding of the reasons for this difference in performance when considered in the context of Belbin's team-role theory. It was found that shaper teams showed higher levels of failure to reach consensus decisions during completion of the task, than mixed teams in which the role of shaper was absent. This finding is consistent with Belbin's proposition that shaper teams are prone to in-fighting. The high levels of failure to reach consensus on decisions in this study may have occurred because differences in opinion were not easily resolved. Interpreting this in terms of team-role theory and the poorer performance of shaper teams at completing the task, it is possible that the over-representation of the shaper-role in the all-shaper teams led to the lack of consensus in reaching decisions, which

in turn impaired team performance. This imbalance did not occur in the mixed teams, in which the levels of failure to reach consensus were lower and task performance significantly higher.

Studies of role conflict in work groups provide some support for this proposal. Jackson and Schuler (1985; cited in Levine and Moreland, 1990) found that when a person began to play a particular role in a team, other members sometimes disagreed about how that role should be played or whether that person should play it. Where such conflicts arose there was increased tension in the group and decreased productivity. It is possible that in a team of dynamic and outgoing shapers, where all four team members are trying to perform the same role, role conflict develops leading to increased tension and reduced performance.

With respect to the number of interactions, it was found that shaper teams showed higher levels of interaction between its members than mixed teams where the role of shaper was absent. The high levels of interaction may be indicative of the expected high levels of the drive and enthusiasm of four shapers combined into one team. Alternatively, it may be an effect of the higher levels of failure to reach consensus in shaper teams as disagreements about the rankings of the items were more rigorously debated. How this may relate to poorer performance levels is not clear, but it is possible that greater time spent discussing the ranking of items early on in the task, forced quick and poorly-made decisions of other rankings later on in the task as time to complete became critical. This in turn may have impaired performance on these latter items thus lowering overall performance.

The only other statistically significant effect identified was that mixed teams showed higher levels of the task process skill of planning proposals to complete the task, than a team of shapers. In terms of team performance in general, the planning of a task contributes towards effective team functioning, leading to superior performance. Therefore the presence of this behaviour is consistent with the mixed team's greater success at completing the task in this study. When considered in terms of role theory the task process skill of making planning proposals is one associated, by Belbin, with the planning skills of a completer finisher. The finding of this study that this behaviour was shown at significantly higher levels in the groups where the role of completer finisher was present, than in the shaper teams in which this role was absent, lends this some support. However, it could be that rather than this measure being higher in mixed teams it should be viewed as being lower in the shaper teams. In this vein, lower levels of planning proposals in shaper teams could have been another effect of the higher levels of failures to reach consensus, which left less time for planning the task.

Unfortunately, the sample size for this study and the relatively low numbers of observed behaviours, did not allow for any statistical enquiry of how the process measures observed related to the individual members of each team. As a result, it was not possible to determine whether the behaviours observed were associated with an individual's team role profile rather than being associated

with the team as a whole. The business game used by Belbin extended over a period of one whole day as compared with the one used in this study in which the task had to be completed in only 20 minutes. Clearly, the greater time period used in Belbin's study would allow more time for specific behaviours to emerge.

In summary, these findings offer some support for Belbin's "role balance" hypothesis theory. Teams balanced with respect to team-role composition are more effective than teams of pure shapers, but the reasons for this are not completely clear from the results of this study. The task process behaviours that yielded significant differences between the two types of team suggest that higher levels of planning in the mixed teams, and greater number of interactions and lower levels of consensus within the shaper teams, may be related to the differences in performance. It was not possible, however, to determine whether any of the process measures were more likely to be displayed by any particular team role. Therefore even if the differences in performance did result from differences in these process measures, the findings of this study cannot provide unequivocal support for Belbin's view that specific individuals characteristically performed those tasks within their teams, although neither can they discount it.

Earlier research concerning the assessment of the BTRSPI, has cast some doubt on the validity and reliability of this instrument to act as a measure of role preference (Furnham *et al.*, 1993; Broucek and Randall, 1996). This may explain the lack of significant differences found between mixed and shaper teams with respect to some of the process measures. If the BTRSPI cannot reliably identify individuals that fit Belbin's various team roles, it is possible that people thus identified in this study, did not conform to the profile of behaviours they were expected to characteristically display, because they had been incorrectly classified.

There are still a number of unanswered questions relating to Belbin's theory. Given the extensive usage of his ideas further research is warranted. A number of issues need to be addressed.

Most fundamentally, further work is necessary to validate the team roles themselves, and to establish the reliability and validity of the BTRSPI to predict them. Does the inventory accurately identify a style of behaviour that an individual naturally displays when working as part of a team? This question is central to Belbin's work. If individuals do not behave as predicted by their team-role classification, then the notion of using this role to recruit them into teams and expecting them to naturally perform certain group maintenance or task functions, is invalid. Indeed the use of any such invalid technique could be regarded as a form of discrimination by individuals otherwise well-suited to a particular team. As previously mentioned, work already carried out in this area has questioned the BTRSPI's internal reliability based on factor analysis of the inventory's items and also criticism of its ipsative nature (Furnham *et al.*, 1993; Broucek and Randell, 1996). Other

research has sought to validate the roles from intercorrelations of the BPRSPI ratings with alternative self-assessment questionnaires. This has produced mixed support for team-role classification (Dulewicz, 1995).

Research may show that the inventory is not sensitive enough to identify an individual's team role. However, this does not discount the idea that such team roles do exist. Indeed, the fact that Dulewicz (1995) has provided some support for some of the roles, using other self-report measures lends some credence to their existence. Therefore research should also seek to determine whether the members of a given team actually display distinctly different behavioural styles during the performance of group activities, irrespective of those roles proposed by Belbin.

Another research question is whether there is any interaction between task type and the roles people play in groups. Is it realistic to expect that an individual's behavioural pattern will be consistent across all team activities regardless of the task that they are performing or the nature of the group to which they belong? This question is also critical to the role theory approach. Belbin advises managers that different combinations of roles are better suited to different tasks. If organisations form teams on the basis of role type then it must be confirmed whether an individual's pattern of behaviour is consistent across different activities.

In performing a task, team members need to reduce uncertainty about the task in terms of missing information, and also reduce equivocality and develop shared understanding (Daft and Lengel, 1986). Different task types will have varying levels of uncertainty and equivocality. In complex tasks these levels will be high. McGrath and Hollingshead (1994) proposed that effective performance will therefore depend on the "richness" of information, such as emotions, attitudes, etc., transferred between individual group members. Simple, low ambiguity tasks require no additional information beyond the acquisition of facts, and indeed any evaluative or emotional information may be a hindrance to effective performance. In contrast, complex, high ambiguity tasks where there are conflicting interpretations about the situation, do require additional information in order to resolve disagreements through the exchange of subjective views.

The consideration of role types from this perspective of task type would suggest that different behaviours may be required by team members depending on the task being carried out. Future research should seek to determine whether an individual's team role is task independent or whether team members vary their behaviour from task to task, dependent on the task demands. Does team member behaviour correlate more with those behaviours predicted by their team-role type, or with those behaviours assessed as being necessary for task completion on any specific task type?

An additional focus of future research on role theory lies in its use in the training arena. Belbin's role theory is widely used in training despite its lack of empirical validation. However its value in this environment may lie not in accurately identifying an individual's role profile, but rather as a transference

facilitation technique. The BPRSPI profile may act as a reference point from which an individual may critically examine the role which they play in the teams which they become a part of, and as such it may aid the transference of teamworking skills from the training environment into working practice. Essentially it may provide a framework from which people can:

- (1) become aware of the skills necessary for successful teamwork;
- (2) come to recognise that they may be better suited to performing some of these skills than others;
- (3) learn to recognise skills which are absent in teams which they meet, and recognise the impact of this on performance; and
- (4) through practice, override any natural tendency to behave in ways not conducive to successful teamworking.

The use of role theory to facilitate transference and thus improve the quality of team training needs to be further investigated.

Conclusions

Team working is an essential facet of any successful organisation. Although there is a good deal of use of self-perception inventories for identifying preferences for team roles within commercial and training environments, there has been little in the way of analytical research to critically assess the utility of such approaches. The development of a sound theory and good practice go hand-in-hand. Addressing the research questions identified above would ultimately lead to the development of more robust and rigorous methods for determining the structure and content of teams in UK commerce, as well as defining the usefulness of such an approach to the understanding of team dynamics. At present there seems to be a shortage of research in this particular area. The outcomes of these activities would therefore help to determine how team-role theory can be applied to many aspects of the team environment, from advancing the understanding of the dynamics of effective teamworking, to team building and the recruitment of team members, to team training and its transferability to the workplace. If teams are to be formed on the basis of team-role profiles, then the dynamics of the interaction of these roles with the environment, the task and experience need to be better understood.

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