European Journal of Social Sciences
ISSN 1450-2267 Vol. 35 No 3 November, 2012, pp.411-430

http://www.europeanjournalofsocialsciences.com

The Impact of Team Composition and Interpersonal Communication on Perceived Team Performance – A Case Study

Michèle Pisani
Université Panthéon-Assas, Paris II
E-mail: michele.steffen@csl.lu
Tel: +352 621 244338

Abstract

The aim of the present study was to evaluate the relative contribution of interpersonal communication, as measured with Bienvenu's (1971, 1976) Interpersonal Communication Inventory (ICI), and team role balance, as evaluated using Belbin's (2010a, 2010b) team role model, in explaining perceived performance differences between two teams. It was hypothesised that a lower performance (LP) team would display lower interpersonal communication scores than a high performance (HP) team, and that the HP team would be more balanced in terms of team roles. These initial hypotheses could not be confirmed. However, the data allowed us to make suggestions as to possible alternative factors explaining the observed performance differences between both teams and imply that Belbin's team role model might need to be reconsidered. Some of the factors likely to explain the differences in perceived team performance were work experience, leader legitimacy and gender. Despite the small sample size, these suggestions indicate research paths that should be explored in further studies.

Keywords: Perceived performance, team roles, communication (ICI), work experience, gender

1. Introduction

Teams are a very popular form of work organisation and are often associated with better performance than individual work. It is frequently assumed that a team performs better than the sum of the personal contributions generated by individuals, were they to work in an individualistic manner. This assumption of the superiority of team work is however not supported by all empirical evidence (Allen & Hecht, 2004; Kishida et al., 2012) and team performance depends on many factors like leadership style (Aubé & Rousseau, 2009), within group interactions (Kishida et al., 2012), communication, team composition (Belbin, 2010a, 2010b) and many others.

2. Previous Research

Team performance can be defined as the accordance of a team's achievements with the goals that were initially set by the organisation and is, according to Aubé and Rousseau (2009), the main criterion for determining efficacy.

According to Watzlawick, Beavin and Jackson (1972), communication is the indispensible condition of human nature and humans are constantly communicating, each action being a type of communication and therefore affecting the receiver. Intuitively, it seems therefore obvious that communication is a necessary premise to successful team work, or at least what seems certain is that a lack of communication will prevent team work from being successful. As per Aubé and Rousseau (2009) the quality of group experience is crucial to the effectiveness of the team. The quality of group experience being based amongst others on the interpersonal ambience, this suggests that good communication skills are essential if a team is to productively work together.

According to Meredith Belbin (2010a) a team can only function effectively if the characteristics of the people it is made up of are complementary. This means that in many cases individuals who are very similar tend to enter into competition with respect to those tasks they do best, which can lead to conflict that is likely unconstructive and prevents the group from performing at its best. The importance of team constitution has also been supported by Sommerville and Dalziel (1998) in a study on team building and team role preponderance in different student populations. Since different stages of a project benefit from different abilities (Senior, 1997) it is obvious that a mix of various abilities within a team is the most profitable (Belbin, 2010a).

According to Belbin (2010a) and as a results of his research on team composition a team can only function effectively if the profiles it is made up of are complementary. This means that each individual in a team takes up a specific role with its associated strengths, which then compensate for the weaknesses of fellow team members.

The nine team roles described by Belbin (2010a, 2010b) can be classed according to orientation or focus. Fisher, Hunter and Macrosson (1998) using multidimensional scaling showed two major categories underlying Belbin's team roles. Hence each of the team roles could be classed into either a task category or a relationship category. The authors furthermore suggest that people whose team roles fall into the same category are going to be less productive when working together than those whose respective team roles fall into a different category. This means that a task person will work most productively with a relationship person, but less so with another task person and vice versa.

In the same line Belbin defined team role orientations but instead of two he cites three orientations, which are: Action, Thought and Person and focus on those respective aspects of team work. Which team role orientation corresponds to which team role can be seen in Table 1 below.

Table 1: Summary of strengths, weaknesses and team role orientation for each team role (Belbin, 2010a).

Strengths, weaknesses and team role orientation for each team role.			
Team role	**Strengths**	**Weaknesses**	**Orientation**
Plant (PL)	Creative	Neglects practical considerations.	Thought
Resource Investigator (RI)	Enthusiastic and communicative. Explores resources outside the group.	Tends to lose interest once initial enthusiasm has passed.	Person
Co-ordinator (CO)	Mature, calm. Delegates well.	Delegates personal work.	Person
Shaper (SH)	Challenging, driven.	Tends to provoke others. Easily frustrated.	Action
Monitor-Evaluator (ME)	Detached and objective. A good judge.	Sceptical, lacks ability to inspire others.	Thought
Teamworker (TW)	Co-operative.	Indecisive. Easily influenced.	Person
Implementer (IMP)	Disciplined. Turns ideas into action.	Inflexible. Too conservative.	Action
Complter-Finisher (CF)	Conscientious. Sticks to deadlines.	Perfectionism.	Action
Specialist (SP)	Expert in his field. Self-starting.	Does not have an overall view.	Thought

The description of team roles suggests that the perfect team would need to be constituted by nine complementary roles, each contributing their own characteristics to the group dynamic and making up for characteristics less present with the other team members. In reality however, teams with exactly nine members are rare and even rarer are teams composed of 9 members with complementary team roles. Hence, Belbin has investigated the issue of group size and found that smaller teams can function very well (Belbin, 2010b).

What is important is that a team member's skills and strengths contribute to fulfilling a need and do not duplicate the characteristics already represented through other members. At Henley Management College, where Belbin and his team conducted most of their research on team roles, teams with more than one Plant (PL) performed no better than teams with no PL at all. Similar observations were made for teams with certain other duplicate team roles, for instance, several Shapers (SH) within a team will also enter into competition, which, considering the SH profile, can lead to conflictual situations, impeding performance. Hence, when two or more people have the same primary team role, it can be beneficial for the team balance if only one sticks to their primary team role and those who have strong secondary team roles focus on these.

Belbin (2010b) also showed that large teams, of 10 or 11 members might be too large for everyone to have their say but can function very well with one chairman or dominating team member leading the rest of the team. However, when a team needs to get together for brain storming or to decide on certain aspects with relation to its purpose teams of 10 or 11 are too large. The same is the case with teams of eight or nine members. While teams of nine members seem like the obvious choice in view of the fact that there are nine team roles, the disadvantage of such teams is that there are usually only a few team members who take the forefront. Another few are occupied performing their tasks while the rest are bored and therefore tend to become discontented (Belbin, 2010b). This suggests that smaller teams might be the better choice. In line with this Belbin did indeed show that teams of five or six performed best. Teams of seven, despite having one more team member available tended to perform no better or even worse than teams of six or five. Teams of six, if well balanced, can potentially offer a wide range of skills necessary for the team to progress, and this team size also seems the more adequate when the aim was to solve a complex problem (Belbin, 2010b).

Two criticisms can be held against Belbin's findings. The first is that they are based on Management games and not on real-life empirical data. The impact of team size therefore still needs to be replicated in a real life setting. The second criticism was raised by Furnham, Steele and Pendelton (1993) who explored the psychometric properties of Belbin's self-perception inventory (SPI) and concluded that neither the internal reliability nor the factor structure of the inventory suggest that the instrument would have predictive validity. Furnham et al.'s approach was however refuted by Belbin (1993) who argued that the SPI cannot be judged like any personality trait questionnaire since it evaluates behaviours, which are quite different from traits and also depend on situational factors.

The tendency of many leaders to build the team surrounding them by recruiting people similar to them can be detrimental in that people with very similar profiles can mutually hinder each other. Consequently, a team which is composed of very competent but very similar people is often less effective than a team constituted of less competent people whose team roles are complementary. A potent example of teams with highly competent individuals where the performance does not live up to the expectations grown by the profile of the individual members are Apollo teams (Belbin, 2010a). People in such teams, despite their above average intelligence, tend to waste their time in unconstructive discussions, attempting to persuade their fellow group members to adopt their point of view. Such groups have difficulties taking decisions and tend not to take into account their colleagues actions. In addition these groups are extremely difficult to manage. This example clearly illustrates how important it is to watch the composition of a team and to not simply satisfy oneself with putting together individuals without taking into account their personal characteristics. The term 'personal' in this context does not simply refer to personality but is rather used in a way as to exclude purely

academic considerations like the level of qualifications, which can be (but not necessarily) quite disconnected from the characteristics referred to by Belbin's team roles.

According to Senior (1997) the need for different team roles arises especially as at different stages of a project different team role characteristics become important. Using a model built on the fit between the project stage and team roles as well as average representation of team roles in each group, performance could be predicted fairly accurately. Senior's (1997) study thus supports Belbin's theory according to which the more balanced a team is the more likely it is to exhibit high performance, since all stages of a project can then be completed to satisfaction.

The Interpersonal Communication Inventory (ICI) developed by Millard. J. Bienvenu (Bienvenu, 1971; Bienvenu and Stewart, 1976) measures interpersonal communication and more specifically the individual's characteristics as well as his/her style of communication. The ICI (Bienvenu, 1971) was developed in 1971 and based on previous research in the field of marital, parent-child and intragroup communication. The current version which was submitted to a factor analysis by Bienvenu and Stewart (1976) contains only 40 items, which reflect 11 dimensions of interpersonal communication: self-disclosure, awareness, evaluation and acceptance of feedback, self-expression, attention, coping with feelings, clarity, avoidance, dominance, handling differences and perceived acceptance.

If one were to exclusively take into account Belbin's theory, a team composed by complementary profiles would most likely function perfectly well. However, people with different team roles are also likely to communicate in different ways, also depending on how introverted or extraverted they are. Hence, a Resource Investigator, who is generally very communicative, is likely to be extraverted while a Specialist, who is normally more task oriented, could be more introverted. Those two types of people are unlikely to communicate in the same way and this can lead to misinterpretations and misunderstandings. For instance people with an 'action' orientation in their team role profile certainly communicate in a different manner from those with a 'person orientation' profile.

One would assume that teams made of people who communicate well work well together and would therefore display better performance. One can also assume that team composition in Belbin's sense would have an impact on performance. An assumption resulting from these premises would be that a highly performing team would very likely be composed of individuals with complementary team roles whilst at the same time being good communicators.

It is therefore interesting to compare a well performing team with a weaker performing team and measure the relative impact of team roles and interpersonal communication patterns on perceived performance.

3. Hypotheses

On the basis of this review, the following hypotheses were made:

H1: The high performance team (HP) is composed of complementary team roles.

H2: The lower performance team (LP) is composed of unbalanced team roles.

H3: Interpersonal communication within the HP team is of good quality.

H4: Interpersonal communication within the LP team is of bad quality.

These hypotheses lead to the following ones:

H5: The HP team is composed of complementary team roles and shows high quality communication patterns.

H6: The LP team is composed of unbalanced team roles and shows low quality communication patterns.

Finally, we suggest that:

H7: Resource Investigators show higher ICI scores than the other team roles.

4. Research Method

4.1. The Company

The company from which the studied sample stems is an international airfreight cargo company with its headquarters in a small European country. The company has more than 85 offices in over 50 countries and its network covers about 90 destinations worldwide. In 2011, the company counted 1564 employees worldwide, of which 1187 were occupied in the headquarters. Total income was 1.867 million US Dollars.

4.2. Teams

Upon request the Human Resources Manager (HRM) chose two teams, one of which she judged to be highly performing (HP) and one which she judged to have lower performance (LP). Both teams stem from the same big team, which was the general training team. In December 2010, the split of the general team into more specialised teams was instigated. The process of splitting the teams took approximately a year as the members of the 'to be formed' teams had to be trained for the specific training needs they would have to cover and so they would become independent in their use of the SAP database. The teams born from this split are the 1) corporate training team and the 2) maintenance training team.

The corporate training team was designated as the LP team as its performance had recently dropped. This team comprises 5 team members (4 female, 1 male; mean age: 37.8 years; mean number of years of post-primary education: 8.60 years), has had no manager since the split and is therefore less supervised. According to the HRM the team members take things a bit too easily, lack drive and give the impression that they do not take their work seriously.

The maintenance training team was designated as the HP team and comprises 7 team members (2 female, 5 male; mean age: 45.43; mean number of years of post-primary education: 8.57 years). This team does have a supervisor and its performance is judged by the HRM to be very good and to have significantly improved since the split.

4.3. Instruments

The tools used were the Interpersonal Communication Inventory (ICI) by Millard J. Bienvenu (1971) and Belbin's Self Perception Inventory (SPI) (2010a; Belbin Associates©, 2012).

4.3.1. Belbin's Self-Perception Inventory (SPI)

The SPI evaluates participants' team roles in order of behavioural preference. The SPI's current version is a 70 item inventory that is divided into 7 sets of statements, each set comprising 10 statements, from which the participant has to chose those that best represent his/her behaviour. For each set of 10 statements the participant needs to assign a total of 10 points and distribute them in order of preference between the individual statements.

Taken together the scores generated this way determine the strength of representation of each team role in that particular participant. The output is in percentages, and the team roles are assigned with the highest percentage corresponding to the first and strongest team role, the second highest percentage to the second team role aso. Team roles reaching a percentage above 65% are considered preferred team roles and correspond to those behaviour patterns that the person naturally adopts. Percentages between 25 and 64% are called manageable team roles and correspond to team role behaviours that the person can adopt if he/ she is required to. Finally, team roles scoring less than 25% are considered least preferred team roles and do not fit well with the participant's personality. Such behaviours will therefore generally not be used and those team roles should ideally be avoided.

4.3.2. Interpersonal Communication Inventory (ICI)

The ICI is a self-inventory that was developed in 1971 by Millard J. Bienvenu. The current version (Bienvenu & Stewart, 1976; Gordon, 2004) consists of 40 items and subjects are required to respond to each question by checking one of three possible responses: "Yes (usually)", "No (seldom)" and "Sometimes". The response to each item is scored from zero (0) to three (3), and the scores are then added up to give a total score, the higher the score the better the communication skills. The range of possible marks varies from "0" to "120", a higher score representing better communication skills.

4.4. Procedure

Each team member had to first fill in a Personal Information sheet, where they were asked to indicate a name, their current post and highest level of education achieved.

SPI's were administered on a computer using the username and password provided by Belbin Associates 2012. For the ICI, paper copies were used. Team members of both teams were called down one by one - into a quiet office reserved for testing on both days - and filled in the ICI in pencil and paper and the Belbin online SPI's (© BELBIN ASSOCIATES 2000-2007). The running order of the tests was counterbalanced so that any order effects with relation to the sequence in which the ICI and the Belbin would be passed could be excluded.

4.5. Data Analysis

Data were analysed using XLSTAT software Version 2012.2.01 (http://www.xlstat.com) for MS Office Excel. Parametric tests could not be performed since the data sets are too small. Hence, the analyses performed are mostly descriptive and qualitative in nature.

4.5.1. Interpersonal Communication Inventory (ICI)

First, the ICI scores for individuals from both teams were generated and compared. As the two teams were of different size, total ICI scores per team could not be compared. Therefore, average ICI scores per team as well as the distribution of ICI scores within each team were compiled and then compared.

4.5.2. Belbin Self-Perception Inventory (SPI)

SPI reports as well as team reports for the LP and HP teams were generated online by the Interplace software (Belbin Associates©, 2012). The presence of the different team roles within each team allowed us to evaluate the respective balance of team role distribution within the LP and HP teams. A qualitative and descriptive approach was taken to investigate the team members preferred team roles. In addition, the strength of representation of the team roles within each participant's profile was generated based on the percentages that determine whether a team role is preferred (above 65%), manageable (between 25 and 64%) or least preferred (below 25%). Strength of representation can illustrate the impact or lack of impact of secondary, tertiary and potentially the fourth team role on behaviour.

4.5.3. Relation between Belbin Team Role Representation and ICI Scores

The relation between ICI scores and team roles was analysed separately for each team with the help of contingency tables and graphs. Chi-square tests of association could not be used since due to the small size of the sample the assumptions were violated, for instance there were less than five counts per cell, which is the minimum needed for running a Chi-square test.

4.5.4. Post-hoc Analyses

After the initial analyses further factors that could potentially influence the results were taken into account. Factors that were analysed comprised age, level of education, gender and the team role of the team leader.

5. Results

5.1. Belbin's Self-Perception Inventories (SPI's) and Team Analysis

5.1.1. The Lower Performance Team (LP)

The LP team consists of 5 members. Hence not all of the nine possible team roles are present as primary roles. Since certain team roles are more prone to be found in leadership positions, team roles will be associated with level in hierarchy in Table 2. Team role orientation is shown as well, as in the case of one team member having to focus on a secondary team role this can be more easily done if the primary and the secondary team roles have the same team role orientation (thinking-, people- or action orientation).

Table 2: Team roles and their strength in percentages within the corporate training - LP team. Primary and secondary team roles for each team member are shown, as well as level in the hierarchy and the orientation of the respective team roles. CO = Co-ordinator, SP = Specialist, TW = Teamworker, RI = Resource Investigator, SH = Shaper, PL = Plant, ME = Monitor Evaluator, IMP = Implementer

Primary and secondary team roles in the LP team							
Team member	**Level in hierarchy (3 = highest, 1 = lowest)**	**Primary team role**	**Primary team role %**	**Primary Team role orientation**	**Secondary team role**	**Secondary team role %**	**Secondary Team role orientation**
CM	3	CO	95	People	PL	62	Thinking
LA	2	SP	99	Thinking	ME	82	Thinking
CFi	1	TW	90	People	IMP	89	Action
AK	1	RI	65	People	PL	62	Thinking
MG	1	SH	74	Action	SP	74	Thinking

It can be seen in Table 2 that there is a variety of primary team roles and that none is present more than once, which in terms of balance is ideal. This also implies that there is no direct need for a team member to give up on his/her primary team role to focus on his/her secondary team role. In terms of team composition the LP team looks well balanced and hypothesis H2 can not be confirmed.

The team roles that are not strongly represented are: Plant (PL) and Shaper (SH). The Resource Investigator (RI) team role, while being AK's primary team role reaches quite a low percentage of preference (65%) despite still falling within the category of preferred team roles. The Completer-Finisher (CF) is completely missing from the primary and secondary team roles in the LP team; it is however represented as a tertiary team role in two team members (LA and CFi) profiles (see Table 3). For LA, the CF team role is present with 76%, while for CFi, the CF team role is present with 81%. These percentages are higher than some team members' primary team role percentages and can therefore not be neglected. This implies that, despite the position as a tertiary team role in two team members, the CF role is relatively well represented within this team. However, according to Belbin (2010) only in some cases are people proficient at functioning in three team roles, so there might still be a shortage regarding the CF role.

Table 3: Team roles and their strength in percentages within the corporate training - LP team. Tertiary and fourth team roles for each team member are shown, as well as the orientation of the respective team roles. SH = Shaper, CF = Completer-Finisher, TW = Teamworker, PL = Plant, RI = Resources investigator, IMP = Implementer, SP = Specialist, ME = Monitor Evaluator

Third and fourth team roles in the LP team						
Team member	**Tertiary team role**	**Tertiary team role %**	**Team role orientation**	**Fourth team role**	**Fourth team role %**	**Team role orientation**
CM	SH	59	Action	RI	56	People
LA	CF	**76**	Action	IMP	51	Action
CFi	CF	**81**	Action	SP	80	Thinking

Table 3: Team roles and their strength in percentages within the corporate training - LP team. Tertiary and fourth team roles for each team member are shown, as well as the orientation of the respective team roles. SH = Shaper, CF = Completer-Finisher, TW = Teamworker, PL = Plant, RI = Resources investigator, IMP = Implementer, SP = Specialist, ME = Monitor Evaluator - continued

AK	TW	60	People	ME	60	Thinking
MG	PL	69	Thinking	IMP	66	Action

Team roles usually taking on leading roles within a team are Shapers (SH), Plants (PL) and Coordinators (CO). In line with this, CM, who is the assistant manager and takes over an informal leading role within the LP team, is a strong CO (95%) with PL as a secondary team role. The only other team member having a team role which tends to have leadership qualities is MG, whose primary team role is SH. However, MG is not a strong exemplar of a SH. This suggests that CM is indeed the right person to take over the leadership role within this team.

The team has three people oriented primary team roles, one action-oriented and one thinking oriented primary team role. This apparent lack of thinking-oriented primary team roles is counterbalanced by the large proportion of thinking-oriented profiles within the secondary team roles. Of the five team members, four have a thinking-oriented secondary team role. The lack of action-oriented team roles is partly compensated by the presence of an action-oriented profile, and more specifically a relatively strong (89%) IMP as a secondary team role.

5.1.2. The High Performance Team (HP)

The HP consists of 7 members. Hence not all possible team roles can be present as primary roles.

Table 4: Team roles and their strength of representation in percentages within the maintenance training - HP team. Primary and secondary team roles for each team member are shown, as well as level in hierarchy and the orientation of the respective team roles. SH = Shaper, CF = Completer-Finisher, TW = Teamworker, PL = Plant, RI = Resource Investigator, IMP = Implementer, SP = Specialist, ME = Monitor Evaluator

Primary and secondary team roles in the HP team							
Team member	**Level in hierarchy (3 = highest, 1 = lowest)**	**Primary team role**	**Primary team role %**	**Primary Team role orientation**	**Secondary team role**	**Secondary team role %**	**Secondary Team role orientation**
MA	3	RI	90	People	TW	75	People
TH	2	SP	90	Thinking	ME	68	Thinking
LB	1	RI	95	People	CF	91	Action
GC	1	IMP	99	Action	SP	80	Thinking
PdA	1	SP	90	Thinking	CF	76	Action
AM	1	SP	80	Thinking	TW	80	People
SN	1	CF	90	Action	SP	89	Thinking

Table 4 illustrates the redundancy of team roles within the HP team. Hence, two people have Resource Investigator (RI) as a primary team role, while three team members have Specialist (SP) as a primary team role. There is one Completer-Finisher (CF) and one Implementer (IMP). Despite the team being composed of seven members, only four team roles are present as primary team roles. These primary team roles are also quite strongly represented for all team members, which points to an important imbalance in team role distribution and potential for conflict. When taking into account both primary and secondary team roles, only six of the nine possible team roles are represented and the PL, the CO and the SH are completely absent. The Monitor Evaluator (ME) is weakly represented, as a secondary team role for TH.

The absence of certain team roles, leads us to also look at tertiary team roles. Tertiary and fourth team roles for the HP team members can be found in Table 5.

Table 5: Team roles and their strength of representation in percentages within the maintenance training - HP team. Tertiary and fourth team roles for each team member are shown, as well as the orientation of the respective team roles. SH = Shaper, CF = Completer-Finisher, TW = Teamworker, PL = Plant, RI = Resource Investigator, IMP = Implementer, SP = Specialist, ME = Monitor Evaluator, CO = Co-ordinator

Third and fourth team roles in the HP team						
Team member	**Tertiary team role**	**Tertiary team role %**	**Team role orientation**	**Fourth team role**	**Fourth team role %**	**Team role orientation**
MA	ME	68	Thinking	CO	66	People
TH	IMP	67	Action	CF	47	Action
LB	ME	60	Thinking	IMP	60	Action
GC	ME	77	Thinking	CF	47	Action
PdA	PL	69	Thinking	TW	68	People
AM	IMP	60	Action	CF	54	Action
SN	ME	60	Thinking	TW	52	People

It can be seen that one person (PdA) is a PL as a tertiary team role and that the percentage (69%) falls within the category of preferred team roles. PdA should therefore be encouraged to focus less on his primary and secondary team roles, which are already represented within the team and focus on his tertiary team role in order to add creativity to the team.

The CO profile is absent from the primary, secondary and tertiary team roles. However, MA's fourth team role is CO, but since this is only his fourth preference it is quite unlikely that he will use it predominantly. The ME, which is only weakly represented amongst the secondary team roles and absent from the primary ones, can be found four times amongst the tertiary team roles, twice as a preferred team role, in MA (68%) and in GC (77%). The properties characterising the ME like objective evaluation of different possibilities or propositions are therefore still present within the HP group.

The SH team role is represented in none of the four first roles and can therefore be considered to be completely absent or only very weakly represented within the HP team. SHs are the driving force within teams and make good leaders. The fact that this profile is lacking does however not seem problematic since the team is performing well under its current leader.

The HP team composition which is rather unbalanced leads us to reject hypothesis H1, according to which the well performing team would be composed of balanced team roles. None of the members of the HP group exhibit one of the team roles traditionally associated with leadership as a primary team role, like CO, PL or SH. Table 6 however shows that MA, who is the designated team leader has four preferred team roles (≥ 65%), three of them with a people-orientation and the fourth being associated with leadership qualities.

Table 6: The HP team leader's (MA) first four team roles, their strengths and their respective orientations. RI = Resource Investigator, TW = Teamworker, ME = Monitor Evaluator, CO = Co-ordinator.

The HP team leader's team roles							
Primary team role	**%**	**Secondary team role**	**%**	**Tertiary team role**	**%**	**Fourth team role**	**%**
RI	90	TW	75	ME	68	CO	66
People-orientation		People-orientation		Thinking-orientation		People-orientation	

With regards to team role orientation, the team has two people oriented -, two action-oriented - and three thinking oriented primary team roles. The orientation of the primary team roles is therefore

well distributed within the team. The same distribution of orientation profiles can be found when looking at secondary team roles.

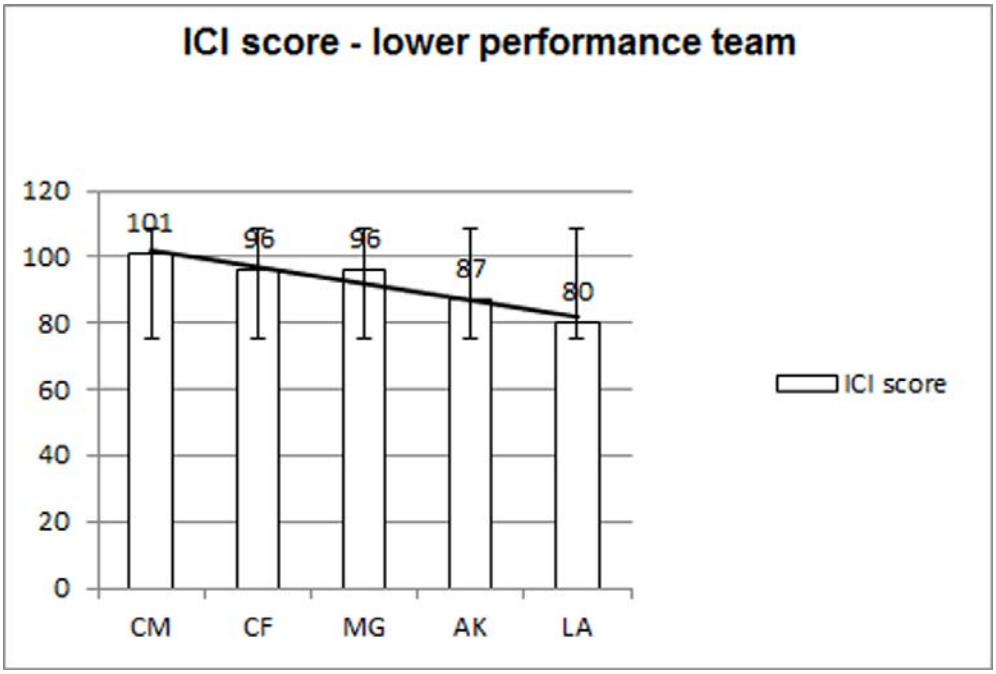
5.2. Interpersonal Communication Inventory (ICI)

5.2.1. The Lower Performance Team (LP)

Scores for the LP team vary between 80 and 101 (mean = 92, median = 96, StDev = 8.40). Scores significantly higher or lower than the team average were calculated by adding respectively subtracting 1,96 * StDev to/from the mean score in order to reach a 95% confidence interval (CI). With the 95% CI no participant from the LP team had a score significantly higher or lower than the rest of the team members (Figure 1). When taking a 68% confidence interval by subtracting respectively adding 1 * StDev from/to the mean score, one participant (CM) was found to have an ICI score (ICI = 101) above the group average and one participant (LA) was found to have an ICI score (ICI = 80) below the group average.

The low standard deviation suggests that the ICI scores within this team are closely distributed around the mean, and that the differences in scores do vary little between the LP team members.

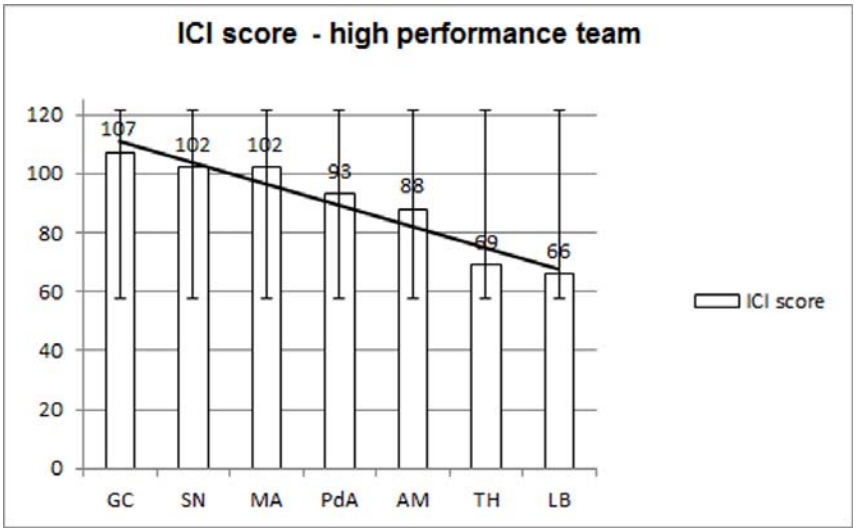
Figure 1: ICI scores for the members of the corporate training - LP team. The perpendicular bars indicate 1,96 standard deviations (CI = 95%) from the mean score. It can be seen from the graph that at this CI no participant significantly deviates from the group.



5.2.2. The High Performance Team (HP)

Scores for the HP team vary between 66 and 107 (mean = 89.57, median = 93, StDev = 16.36). With the 95% CI no participant from the HP team had a score significantly higher or lower than the rest of the team members (Figure 2). However, at a 68% CI one participant (GC) was found to have an ICI score (ICI = 107) above the group average and two participants (TH and LB) were found to have an ICI scores (ICI for LB = 66, ICI for TH = 69) below the group average.

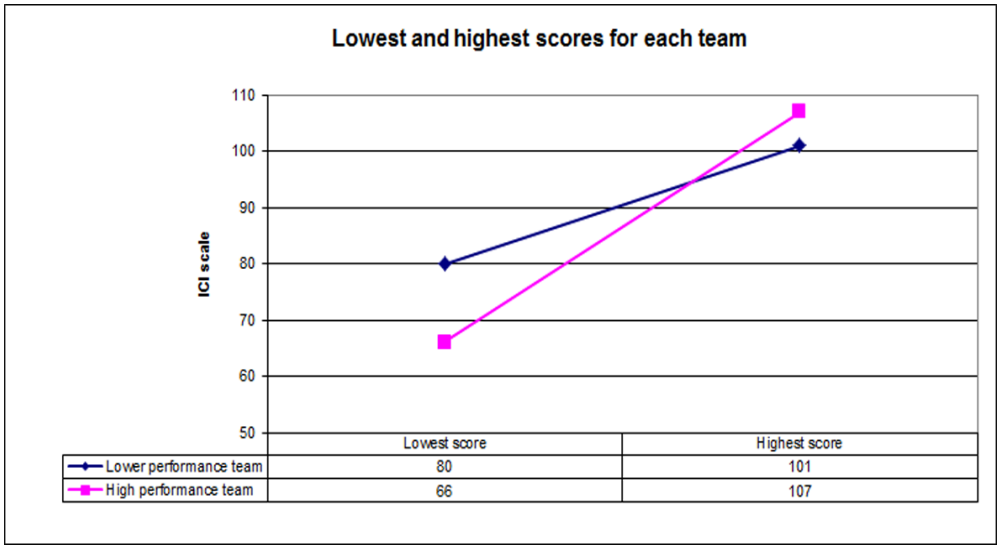
Figure 2: ICI scores for the members of the maintenance training - HP team. The perpendicular bars show 1,96 StDev (CI = 95%) from the mean score. It can be seen that at this CI no participant significantly deviates from the group average.



5.2.3. The High Versus the Lower Performance Team

The standard deviation for the HP team is nearly twice as large as that for the LP group. Hence the distribution of scores around the mean is much larger in the HP group (Figure 3). There is much more variability in ICI scores in the HP than in the LP group, which is exemplified by the value of the standard deviation but also by the difference in the extreme values of both groups.

Figure 3: High and low scores for both teams. The lowest score of the HP team is below the lowest score for the LP team and the highest score for the HP team is higher than the highest score in the LP team.



5.2.4. ICI in the Whole Sample

The comparison of the average ICI score between the LP (mean = 92) and the HP (mean = 89.57) team yields hardly any difference, especially in view of the large standard deviation of the whole sample (n=12; mean = 90.58; StDev =25.79). Hypotheses H3 and H4 can not be confirmed, as the average scores in both teams do not significantly differ.

5.2.5. ICI in the Reference Population

In Gordon (2004), means and standard deviations for a reference population of n=298 are indicated. Within the population, the mean ICI score for all age groups and both genders combined is 85.93 and the standard deviation is 19.05. On the basis of these reference data, when defining the norm as the mean +/- 1.96 StDev (CI = 95%), mean scores as well as individual scores lie well within the norm of the reference population.

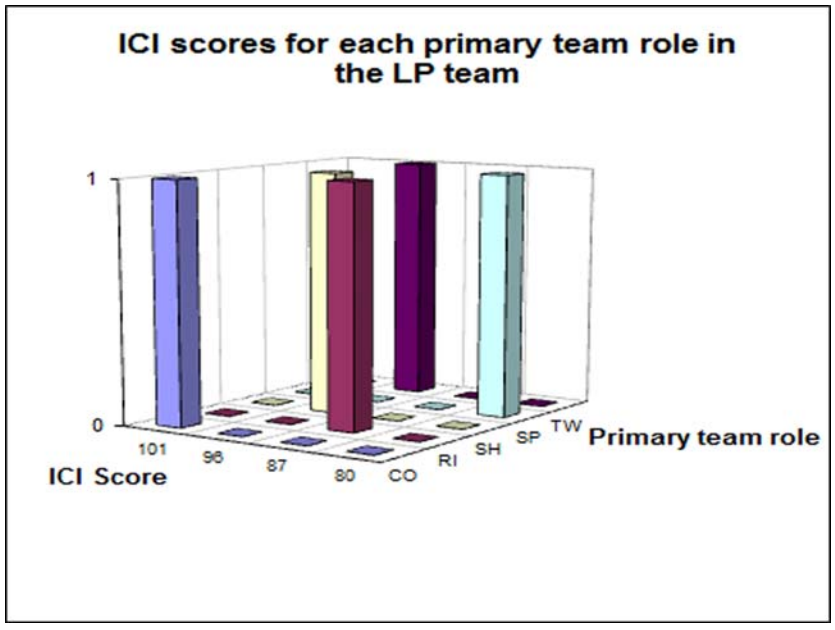
5.3. Linking Belbin Team Role Profiles with ICI Scores

Since hypotheses H5 and H6 depend on the previous hypotheses (H1, H2, H3, H4), which were all rejected as such, the current hypotheses can also be rejected.

The LP team has complementary team roles while the HP team has an unbalanced team composition in terms of team roles. As far as the ICI scores are concerned no significant differences (apart from the distribution of scores) between both teams can be observed.

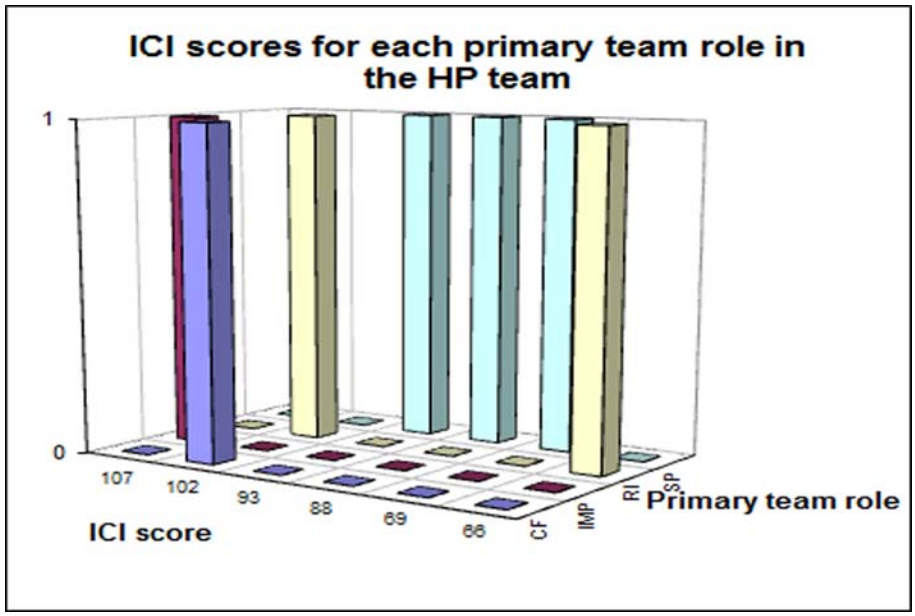
Figure 4 illustrates the data representing the ICI score associated with each team role present within the LP team. It suggests that there is no link between ICI scores and team roles. Even the RI, which would be expected to have a high ICI score only has an average ICI score in this sample. Hypothesis H7 according to which Resource Investigators show higher ICI scores than the other team roles is not verified within the LP team sample.

Figure 4: Contingency graph showing the ICI scores associated with each of the primary team roles present in the LP team.



When looking at the HP team, no relation between ICI scores and Belbin profiles can be observed either. The three Specialists in the HP team have ICI scores that vary from 69 to 93, while the other two group members are within the norm of the group. This is illustrated in Figure 5. As for both RIs in the HP team the ICI scores vary from very low (LB has an ICI score of 66, while MA has an ICI score of 102). In light of these observations hypothesis H7 cannot be confirmed, since in the current sample RIs do not tend to have higher ICI scores than the other team roles. However, MA who has the highest ICI score also is a RI and TW, both team roles which are associated with good communication skills. One example supporting a hypothesis is obviously not enough to confirm H7, but can be considered encouraging and should be studied further on a larger sample.

Figure 5: Contingency graph showing the ICI scores associated with each of the primary team roles present in the HP team.



5.4. A Post-hoc Analysis: Age, Level of Education, Gender and Team Leader Properties

Since the only real differences between both teams were the balance in team role orientation and the distribution of ICI scores we looked at the group properties in order to determine whether other factors could explain the difference in performance between both groups.

5.4.1. Age

The difference between the means (mean age LP = 37.8, HP = 45.43), with relation to the standard deviation of 9.61 years in the whole sample, is not significant. The same can be said when taking into account the median (median age LP = 39, HP = 46) rather than the mean scores.

5.4.2. Level of Education

Differences in terms of the level of education between both teams are negligible when looking at the average years in post-primary education (mean education LP = 8.6, HP = 8.57). When looking at the median (median education LP = 9, HP = 10), the differences become more obvious, but are still not significant (StDev = 2.32).

5.4.3 Age by Level of Education

Despite the differences analysed not being significant, the higher mean and median age in the HP team combined with the lower median level of education in that same team, suggests that on average HP team members can look back on more years of work experience. While education certainly contributes to good performance, work experience is at least as important (Quinones, Ford & Teachout, 2006). If the supposition that HP team members have more work experience is correct, then this could be another factor contributing to explaining the increased performance of the HP team. This would however mean that there is an inverse relation between age and level of education. In order to evaluate whether there is a link between age and level of education a contingency table was generated.

Figure 6: Relationship between level of education and age in the whole sample.

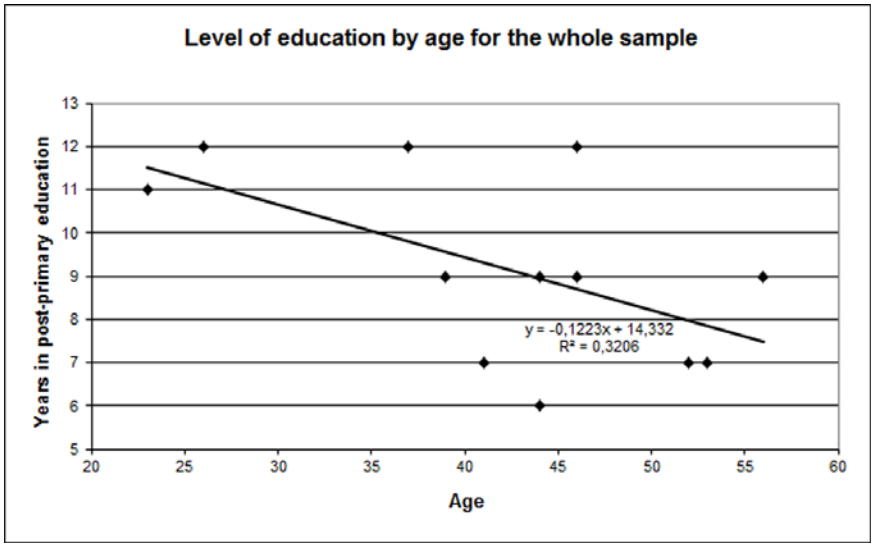


Figure 6 illustrates the data and suggests that there is indeed a linear relationship between both variables, suggesting that in the current sample low age is associated with more years of education while higher age implies less years in post-primary education. This inverse correlation between age and level of education is non-negligible as can be seen from the Pearson's correlation coefficient ($r = -0.566$, $r^2 = 0.321$).

5.4.4. Gender

Significant differences in the gender composition of both teams are observed. In the LP team there is one man (20%) and four women (80%), while in the HP group there are five men (71.43%) and two women (28.57%). Hence, the gender distribution is nearly inverted in both groups.

6. Discussion

6.1. Belbin's Self Perception Inventories (SPI's) and Team Analysis

6.1.1. The Lower Performance Team (LP)

The LP team is constituted by a variety of primary team roles none of which is present more than once. Each team member therefore has a different primary team role, which in terms of balance is ideal. This also implies that there is no direct need for a team member to give up on his/her primary team role to focus on his/her secondary team role. The main shortcoming of this team is the lack of a CF profile amongst primary and secondary team roles. Such a pattern, could lead to details being omitted and the finishing touches of a project being neglected, but since CF's are represented twice and quite strongly as a tertiary team role the impact of this shortcoming might be limited. However, it cannot be excluded that the lack of a CF could be partly responsible for the lower performance of this team, especially in light of the fact that only very few people do actually manage to function in their tertiary team role (Belbin, 2010b). However, taking into account team composition as a whole, the LP team could have been expected to perform relatively well.

As for the leader, CM's profile suggests that she is the right person to take over the leader position within this team. COs, which were originally referred to as Chairmen, have a strong dominance but are accepting of people. They are committed to reaching their objectives and delegate well. COs are calm, realistic and mature (Belbin, 2010) and therefore make good team leaders.

With regards to team role orientation, the fact that action-oriented team roles are the least represented within the primary and secondary team roles of the LP team could be one of the reasons for the lack of drive that the HRM reported.

In terms of team roles the LP group is well balanced relative to its size, which does not allow for the presence of all team roles as a primary role. However, as far as team role orientation is concerned the team is less well balanced, especially when looking at primary and secondary team roles, where action-oriented roles are only very weakly represented.

6.1.2. The High Performance Team (HP)

The HP team's composition is far less balanced, with team role redundancies and a notable lack of certain team roles such as the PL, CO and SH. The latter team roles are those generally associated with a certain drive and creativity, also constituting crucial characteristics of typical leader profiles. The absence of these team roles combined with the redundancy of the RI and SP team roles would suggest clashes leading to lower performance. SPs who tend to be individualistic and self starting would be expected to require a leader guiding them and channelling their activity in order for all of them to progress in the same direction. However, in light of the performance of the HP team the lack of a classical leadership profile combined with three SPs does not seem to cause a problem. One reason for this might be that the weaker communication skills of SPs might be counterbalanced by the RIs communicative nature. The latter, one of them being the team leader, might through their communicative nature offset any issues that could be caused by the SPs individualistic style and tendency to not communicate much outside of their field of expertise. We should at this stage mention that the opposite could also have happened, namely that the RIs and the SPs clash through reoccurring misunderstandings caused by their contradictory communication patterns.

The HP team leader, MA, while not displaying either of the team roles traditionally associated with leadership, does display a profile making him the most likely team leader. RIs, which is MA's primary team role, are people very apt at exploring resources outside of the group (Belbin, 2010a), they value innovation and creativity and are very good at communicating and picking up ideas. The team role analysis suggests that MA is indeed the best person within the HP team to manage the team and coordinate group effort (Interplace Team report by Belbin Associates®, 2012). While his first two team roles taken in isolation do not necessarily make him a natural team leader, the addition of the CO contributes to his team leader qualities. In addition, three (RI, TW and CO) of MA's preferred team roles are people-oriented, which makes him likely to interact well with his team. This Belbin SPI profile makes him a very good communicator, since both RI and TW team roles are renowned for communicating well. This proficiency with regards to interpersonal relationships is likely to facilitate working relationships with colleagues.

The three types of possible orientations (action, person and thinking) are represented to a similar extent. This balance in team role orientation within the HP team could potentially compensate for the imbalance observed when looking at team role distribution, and might contribute to explaining the good performance of this team despite the imbalance in team roles per se.

When looking at primary team roles the HP team looks very unbalanced. With three SPs, two RIs, one IMP and one CF, there is a lot of redundancy amongst primary team roles and only four of the nine possible team roles are represented. According to Belbin (2010a) such teams are very likely to engage in conflict as identical team roles tend to compete. Tasks and individual responsibilities hence need to be clearly defined, so as to make sure team members do not interfere with each others tasks and work together harmoniously. However, when looking at profile orientation, the HP team seems very balanced. The good performance of the HP team might lead one to tentatively suggest that team role orientation plays a non-negligible role in determining team performance above and beyond team roles as such.

6.1.3. Team Size in the Lower and High Performance Teams

The research Belbin led at Henley (Belbin, 2010a) suggests that certain team sizes generally lead to better performance. The ideal team size would be five or six, while teams of seven tend to perform worse. This would imply that, based exclusively on team size, the LP team (5 members) could be expected to perform better than the HP team (7 members). This is however not the case. Hence other explanations for the difference in performance need to be considered.

6.2. Interpersonal Communication Inventory (ICI)

Comparison of both groups shows that the distribution of ICI scores is larger within the HP team than within the LP team. The HP team has better as well as worse communicators than the LP team. There is no significant difference in the average ICI scores between both teams. Hence, the quality of communication within both teams based on the results of the self-administered ICI is similar. The ICI scores obtained in this sample are unlikely to explain the difference in performance between both teams.

6.3. Age, Level of Education, Gender and Team Leader Properties

6.3.1. Age

The observed age differences as such do not require further interpretation at this stage since, while being relatively large, they can not be considered to differ significantly. We have no evidence supporting the idea that the higher average age of the HP team members could explain their increased performance relative to the LP team.

6.3.2. Level of Education

The LP team displays a marginally higher level of education than the HP team. These results contradict what common sense would suggest, namely that a higher level of education would lead to better performance. In this context Apollo teams (Belbin, 2010a) come to mind. Such teams often perform worse than teams made up of less intelligent individuals. This could be one of the reasons for the lower performance of the LP team. If indeed the LP team was constituted of several very intelligent individuals, these could block each other by unconstructive debate, trying to impose their own point of view and trying to prove why it is better than the other person's. However, to infer intelligence purely on the basis of the years of post-primary education is rather restrictive. In order to evaluate this hypothesis other - more specific - measures of intelligence or cognitive ability would be needed. Furthermore, the level of hierarchy in which the more educated individuals stand with relation to each other might impact the likelihood of an Apollo-like situation arising.

Both teams comprise two people with 11-12 years of post-primary education (*top-educated* people). The difference between both teams lies not in the number of *top educated people*, but rather in the hierarchical relation between those people within each of the teams. In the HP team one of the *top educated* people is the team leader. This might counteract potential acts of resistance from the other *top-educated* person. In the LP team, both *top-educated* team members are at a different level in the hierarchy but neither is the team leader (and there is no official team leader either), so competition might be more likely to arise.

We suggest that in the LP team any competition between *top educated* individuals would be more disturbing to the collaboration of team members since the team is a) smaller and b) none of the *top educated* team members are in the leading role. The HP team on the other hand is a) larger, so any tension between two team members might be diffused and b) one of the top educated team members is also the team leader, which might make it less likely that his opinions would be argued against.

6.3.3. Age by Level of Education

The higher age and lower level of education of the HP team members, which was supported by a relatively strong inverse correlation between both variables, led us to assume that the HP team members are likely to have more work experience. This is based on the hypothesis that the more experience one has in performing a task the more automatized and routine it becomes and the less cognitive energy is needed to perform the work (Hayes, 2000), hence freeing up space for other tasks. Furthermore, prior work experience can lead to improved performance through the acquisition of experience allowing team members to deal with a variety of different situations. What should have been investigated in more depth are the years of work experience, since we here imply, based on the data recorded, that this might be an explanatory variable for the differences in team performance. What should not be forgotten in this frame is the potential importance of the type of prior work experience which is also a factor that was not directly investigated in this study.

6.3.4. Gender

The HP team has a large majority of male team members, while in the LP team the female team members predominate. Whether the differences in gender distribution contribute to explaining the perceived performance difference remains to be seen and needs to be replicated. While the presence of women in a team generally improves collaboration (Bear & Woolley, 2011) the evidence concerning the effect of gender on performance is mitigated. Since other factors like team size, team role orientation, ICI score distribution and variance in the level of education between both teams vary as well it is difficult to conclude from such a small sample that the differences in performance could be due to gender.

Another difference between the teams in this sample is the team leader's gender. While we have no evidence suggesting the leader's gender might impact performance, previous research has described differences in leadership styles between men and women. According to Eagly and Johnson (1990) men's leadership style tends to be more domineering and based on giving orders while women focus more on the interpersonal and tend to be more participative. The authors do however refrain from stating which style is better but cite a study by Wood (1987) according to which women's leadership style is more beneficial in some circumstances while men's is better in others.

In addition, here the leader's gender is representative for the majority presence of one gender within each group. Hence the HP team, whose leader is a man also comprises a higher proportion of men, while the opposite is the case for the LP team.

It would seem that not only the team leader's gender is important but also the relative proportion of males and females within the team. In accordance with Kishida et al.'s (2012) findings the male to female ratio is higher in their high performance team than in their low performance team and brain activation in the amygdala and lateral prefrontal cortex does indeed vary between both groups. Kishida et al.'s data do however not allow the inference of a direct link between cerebral activity and gender. It should be noted at this stage that the suggested link between gender and performance could be due to emotional or situational factors and one should under no circumstances conclude that one gender would always be more competent than the other. This is however a factor that would need to be controlled for in further studies on team performance.

6.3.5. The Team Leader

The importance of the team leader was not taken into account when designing the study. It is however not to be neglected when studying team performance, since his/her behaviour patterns have a non-negligible impact on team performance (Aubé & Rousseau, 2004). Wager, Fieldman & Hussey (2003) have even shown that supervisor behaviour can have physiological effects on employees, by increasing blood pressure. The authors conclude that the supervisor's interaction style can impact their employees' psychological and physical well-being, which in turn can impact on their performance. A further factor possibly impacting on team performance could be the legitimacy of the leader. In this

respect Peck and Dickinson (2010) have underlined the importance of the team leader's legitimacy. The HP team has an official team leader, while in the LP team the leader is more informal. Despite both leaders being the best person within their team to take on this role, the legitimacy of the HP team leader might be an advantage compared to the informal leadership of the LP team leader. In line with this observation Henry and Stevens (1999) suggest that teams with a designated leader perform better than those with several or no leader at all.

7. Concluding Remarks

The aim of the present study was to investigate whether differences in perceived performance between two teams within the same company could be explained with the help of variations in team role balance or in interpersonal communication skills. Neither of those factors was shown to explain the performance differences reported by the HRM. However, other factors were found to act as potential explanatory variables for the divergence between the two teams.

Our results suggest that the balance of team role orientations within a team seems more important than team roles per se. This finding suggests that Belbin team roles as they are currently being used might need to be reconsidered. More emphasis might need to be put on the three orientations, namely, thinking-, action- and person-orientation in constructing teams that are to perform well. While the importance of team role orientations in the productivity of dyads has already been underlined by Senior et al. (1998) no findings suggesting the preponderance of team role orientations above and beyond team roles in explaining performance have so far been reported. It would therefore be of importance to replicate these findings.

Another potential explanatory variable for the differences in performance between both teams, which is proposed, are the years of work experience that the person has gained prior to the current study. This was implied on the basis of an inverse relationship between age and level of education, which suggests that on average the HP team members have more years of work experience than the LP team members.

The legitimacy of the team leader is a further factor that could influence team performance (Peck & Dickinson, 2010). In addition to legitimacy as such, the perceived legitimacy of the team leader could have been studied. While perceived legitimacy is not independent of legitimacy per se there can however be discrepancies between the perception of a phenomenon and the phenomenon in itself. It could therefore have been interesting to ask the participants how they perceive their team leader. This could have been done with the help of observer SPI's, where the team members use the Belbin SPIs to describe their leader's behaviour.

Finally, there is a large gender imbalance between both teams, with regards to team composition and with regards to the team leader. Differences might therefore partly be explained by either gender of team members, the gender of the team leader or an interaction between both.

This study indicates a few factors that could explain performance and it is very likely that neither of those on their own can explain the differences between the teams investigated but that there is an interplay of several factors causing the variation in performance reported by the HRM.

As far as the relation between the Resource Investigator and interpersonal communication is concerned, no relation could be established here.

At this stage we would like to note that the major limitation of this study is that team performance was estimated on the basis of the HRM's intuition and that objective criteria were missing. However, even Senior (1997) mentioned that objective criteria for measuring performance are not always available and that in the literature little agreement exists over which criteria can be used.

The main conclusion of this study is that performance is not an entity influenced by a finite number of factors. In fact, even established tools asserting to allow for the composition of highly performing teams, by following specific rules of team composition, like Belbin's SPI, look simplistic in light of the current findings. Belbin's view of team composition might be too restrictive in the sense

that the larger categories of team role orientations combined with the demographic characteristics of team members might explain more of the variance in performance than team roles per se.

References

[1] Allen, N.J., Hecht, T.D., (2004). 'The 'romance of teams': Toward an understanding of its psychological underpinnings and implications.' *Journal of Occupational and Organizational Psychology,* Vol. 77, p.439-461. doi: 10.1348/0963179042596469

[2] Aubé, C., Rousseau, V. (2009). 'Des équipes de travail efficaces. Ce qu'il faut faire et ne pas faire.' *Gestion,* Vol. 34, No. 2, p. 60-67.

[3] Bear, J.B., Wooley, A.W., (2011). 'The role of gender in team collaboration and performance.' *Interdisciplinary Science Reviews,* Vol.36, No.2, p. 146-153. Doi : 10.1179/030801811X13013181961473

[4] Belbin, M., (1993). A reply to Belbin Team-Role Self-Perception Inventory by Furnham, Steele and Pendelton. *Journal of Occupational and Organizational Psychology*, 66, p. 259-260.

[5] Belbin, M. (2012). 'Building the perfect team'. Retrieved January 8, 2012 from the Belbin Associates 2007-2010 website: *http://www.belbin.com/rte.asp?id=35*

[6] Belbin, M. (2010a). *Management teams. Why they succeed or fail.* 3rd. Edition. Elsevier Butterworth-Heinemann, Oxford.

[7] Belbin, M. (2010b). *Team roles at work*. 2nd Edition. Elsevier Butterworth-Heinemann, Oxford.

[8] Belbin, (2011). 'Method, Reliability & Validity, Statistics & Research: A Comprehensive Review of Belbin Team Roles.' Retrieved April 1, 2012 from the Belbin Associates 2012 website *http://www.belbin.com/content/page/5596/A%20Comprehensive%20Review.pdf*

[9] Bienvenu, M.J., (1971). 'An interpersonal communication inventory.' *The Journal of communication*, Vol. 21, p. 381-388.

[10] Bienvenu, M.J., Stewart, D. W., (1976). 'Dimensions of interpersonal communication.' *The Journal of Psychology*, n° 93, p. 105-111.

[11] Chedotel, F., (2004). 'Avoir le sentiment de faire partie d'une équipe: de l'identification à la cooperation.' *M@n@gement,* Vol. 7, No. 3, p.161-193.

[12] Eagly, A.H., Johnson,B.T. (1990). 'Gender and Leadership style: a meta-analysis.' *Psychological Bulletin,* Vol. 108, No.2, p.233-256.

[13] Fisher, S.G., Hunter, T.A., Macrosson, W.D.K., (1998). 'The structure of Belbin's team roles.' *Journal of Occupational and Organizational Psychology,* 71, p. 283-288.

[14] Furnham, A., Steel, H., Pendelton, D., (1993). 'A psychometric assessment of the Belbin Team-Role Self-Perception Inventory.' *Journal of Occupational and Organizational Psychology*, 66, p. 245-257. doi: 10.1111/j.2044-8325.1993.tb00535.x

[15] Gordon, J., (2004). *Pfeiffer's classic activities for interpersonal communication : the most enduring, effective, and valuable training activities for improving interpersonal communication.* Pfeiffer, a Wiley imprint, San Francisco, CA.

[16] Hayes, N,. (2000). *Foundations of Psychology: An introductory text*. 3rd Edition. Cengage Leraning.

[17] Henry, S.M., Stevens, K.T., (1999). 'Using Belbin's leadership role to improve team effectiveness: An empirical investigation.' *The Journal of Systems and Software*, 44, p. 241-250. doi: 10.1016/S0164-1212(98)10060-2

[18] Kishida, K.T., Yang, D., Quartz, K.H., Quartz, S.R., Montague, P.R., (2012). 'Implicit signals in small group settings and their impact on the expression of cognitive capacity and associated brain responses.' *Philosophical Transactions of the Royal Society B*, 367, p. 704-716. doi : 10.1098/rstb.2011.0267

[19] OCDE (2011). *Regards sur l'éducation 2011 : Les indicateurs de l'OCDE,* Éditions OCDE.

[20] Quinones, M.A., Ford, J.K., Teachout, M.S., (2006). 'The relationship between work experience and job performance: a conceptual and meta-analytic review.' *Personnel Psychology,* Vol. 48 (4), p. 887-910. doi: 10.1111/j.1744-6570.1995.tb01785.x

[21] Peck, E., Dickinson, H., (2010). 'Pursuing legitimacy: Conceptualising and developing leaders' performances.' *Leadership &Organization Development Journal*, Vol. 31(7), p.630-642. doi: 10.1108/01437731011079664

[22] Pfeiffer, J.W., Jones, J.E. (Ed.), (1987). *The 1974 Annual Handbook for Group Facilitators*. CA: University Associates, San Diego In UNIVERSITY Associates, Inc.

[23] Scheer, A-W., (2000). *Unternehmen gründen ist nicht schwer… Chapter VII Leadership – Nobody's perfect & Träumen*, Springer, p. 133-137.

[24] Senior, B., (1997). 'Team roles and team performance: Is there really a link?' *Journal of Occupational and Organizational Psychology*, 70, p. 241-258. doi: 10.1111/j.2044-8325.1997.tb00646.x

[25] Sommerville, J., Dalziel, S., (1998). 'Project teambuilding – the applicability of Belbin's team-role self-perception inventory.' *International Journal of Project Management,* Vol. 16, No. 3, p.165-171. doi: 10.1016/S0263-7863(97)00054-9

[26] University Associates, Inc. (1987). Instrumentation Kit Communication2. Retrieved January 8, 2012, from Kansas State University website: *http://www.housing.k-state.edu/cms/CMSEngine/FCKeditor/UserFiles/File/RAMA%20Forms/resources/Conflict%20Mediation/COMMUNICATION2.pdf.*

[27] Wager, N., Fieldman, G., Hussey, T. (2003). 'The effect on ambulatory blood pressure of working under favourably and unfavourably perceived supervisors.' *Occupational Environmental Medicine*, 60, p. 468-474. doi:10.1136/oem.60.7.468

[28] Watzlawick, P., Beavin, J.H., Jackson, D.D., (1972). *Une logique de la communication.* Paris. Editions du Seuil.