Communication in Effective and Ineffective Teams:

A Longitudinal Study Investigating Team Members' Task and Socio-Emotional Verbal Behaviours

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Table of Contents

List of Figures

List of Tables

List of Appendices

Abstract

This study aims to contribute to a better understanding of communication differences in effective and ineffective teams. It investigates task and socio-emotional verbal behaviours over time and its relationship to team effectiveness and team members' self-perceived member viability. The author used an aural observational method to examine verbal communication of three teams. Participants were post-graduate students formed into teams, working on a complex and dynamic task over a project duration of five days in a classroom setting. Spoken interaction was audio recorded and analysed using Bales' (1950) Interaction Process Analysis (IPA). Three questionnaires were developed, mainly by combining existing measurement instruments from communication and small group research, measuring team effectiveness and member viability.

The analysis of selected team meetings with IPA displayed interesting task and socio-emotional communication differences in effective and ineffective teams. These differences were more visible in socio-emotional interaction than in task-related interaction. Observed interaction patterns changed over time, although communication behaviours were more stable in the effective teams. Findings indicate that a consistently high level of positive socio-emotional communication in combination with a consistently low level of negative socio-emotional interaction seem to facilitate team effectiveness, while a high level of negative socio-emotional interaction or constantly changing socio-emotional behaviour seems to inhibit team effectiveness. It seems to suggest that communication behaviours impact upon team effectiveness and member viability. When communication behaviours could be described as task focused with a consistent level of positive reactions, outweighing negative reactions, effectiveness and member viability can increase. Opposite behaviours, shifting from task to interpersonal issues in combination with negative reactions outweighing positive reactions can lead to low levels of perceived member viability and a lack of effectiveness.

The results lead to the suggestion that communication behaviours and member viability, particularly cohesion and willingness to continue as a member of this team, seem to be indicators for a team's "well-being" and impact upon its effectiveness. These factors seem to be especially visible at the beginning and the temporal midpoint of a project. During these two periods, monitoring of the team process is recommended, either self-managed or with support from outside the team in order to prevent communication problems impacting on team effectiveness.

Introduction

In many organisations, employees work together in structures commonly known as teams.[1] Organisations utilise teams for a number of reasons (e.g., greater output, quality enhancements, cost reductions, or better decisions) and give them a range of labels depending on factors such as the members comprising the team (e.g., managers, frontline workers) or what the team is supposed to achieve (e.g., to make decisions, develop a new product, deliver a service). Some of the many types of teams found in organisations include top management teams (Hambrick, 1987), cross-functional teams (Mankin, Cohen, & Bikson, 1996), self-managing work teams (Cohen, Ledford, & Spreitzer, 1996; Kirkman & Shapiro, 1997; Orsburn, Moran, Musselwhite, & Zenger, 1990), international task forces (McDermott, Brawley, & Waite, 1998) and virtual teams (Hiltz, Johnson, & Turoff, 1986; Lumsden & Lumsden, 2004).

Despite investing heavily in teams, many organisations appear far from satisfied with their decision to become team-based (Dumaine, 1994). This is mainly due to the overall effectiveness of their teams and how their effectiveness tends to vary. At one end of the continuum, teams can be high performing and produce outputs beyond the capabilities of its individual members. At the other end, however, they can fail dismally. Outputs, for example, are not produced on time or in some instances, not at all. Further, when outputs are delivered, they can be of such a poor quality, the reputation of the organisation and the team members are effected. In the worst case scenario, these poor quality outputs can result in the loss of life (such as the case with the Challenger shuttle disaster; see Hirokawa, Gouran, & Martz, 1988).

In an attempt to help organisations, efforts have been made by many researchers to understand team effectiveness. While these efforts have generated a good understanding of what makes a team effective, there are still many areas that are yet to be fully understood. One such area concerns the relational side of teams and the role that verbal behaviour plays in a team's ability to operate effectively. In particular, there has been still little research conducted where socio-emotional verbal communication has been observed throughout the course of a team's life span and how these

[1] In the team work literature the terms group and team are used interchangeably. Research literature sometimes makes a more sharp distinction between the terms group and team, dependent on the behaviours of the members, the characteristics of the setting (e.g., field or laboratory) and the characteristics of the task (e.g., real or not real or experimental task). In the literature used for this study, authors often use these two words synonymously and it is not possible for the author to presume in each case on what definition the use of the word is based. Therefore, the terms 'group' and 'team' are sometimes used interchangeably throughout this study.

behaviours relate to team effectiveness and member viability. The aim of this thesis is to conduct such research and therefore help to contribute to a better understanding of team effectiveness.

The Research Project

As an overview, this thesis conducted a study where verbal communication (task, positive and negative socio-emotional behaviour) of team members was examined in-depth. These types of verbal behaviours were examined in both effective and ineffective teams who completed a complex and dynamic task over a 5-day period. This task required teams to deliver a tender on the fifth and final day of the project comprising a presentation and accompanying documentation. Verbal communication of team members was examined during several team meetings over the course of the project. This communication was audio recorded and analysed using Bales' (1950) Interaction Process Analysis (IPA). Also as part of this study, team members completed two questionnaires—a Daily and Post-Project Questionnaire. The Daily Questionnaire, administered to team members at the end of days 1 to 4 of the project, was designed to measure member viability. The Post-Project Questionnaire, administered to team members after the completion of their task (on day 5), measured member viability and self-perceived performance on a number of dimensions. These same dimensions were also contained in a questionnaire that was administered to a third party who evaluated each team's tender. Teams in this study were comprised of full and part-time working professionals attending a post-graduate workshop on Project Management.

As mentioned above, communication in teams is the main focus of this study. Many authors have suggested that communication is an important component of team effectiveness (Bales, 1999; McGrath, 1984; West, 2004). This is because communication is a key element of the team process enabling team members to interact with each other. Through communication, people are able to exchange information, develop ideas, make decisions and solve problems. It also enables them to build interpersonal relationships and provide each other with encouragement and support. As suggested by Fisher (1974) "communication is the crux of the task and social dimensions of all groups" (p. VII). Tyson (1989) describes team communication as the essence of a team's existence: "For a group to come into existence, organise itself, and develop into an effective team requires above all else good communication between members" (p. 77). Rather than trying to look at all different types of communication (e.g., verbal, non-verbal, written) this study concentrated on verbal communication. This aspect of

communication was examined as it gives insight into the team process and how this contributes to team effectiveness. This is because what takes places in teams is often revealed through the verbal communication of its members. It is also important to help understand the development of teams over time.

This study will examine task *and* socio-emotional verbal communication. While a number of studies examined task *or* socio-emotional communication in teams, only a few of them have examined both of them in relationship to each other (e.g., Beck & Fisch, 2000). Some studies, for example, have only looked primarily at task related verbal communication (e.g., Hirokawa, 1980; Stempfle & Badke-Schaub, 2002) whereas others have placed more emphasis on the relational side of team communication (e.g., Mayer, 1998; Polley, 1987). The trouble with these approaches is that by focusing on one part of verbal communication only, they are often unable to develop a full understanding of how verbal communication influences team effectiveness.

While both task and socio-emotional verbal communication will be examined in this study, more emphasis will be placed on the socio-emotional side of verbal communication. This is because many authors in the literature have suggested that socio-emotional types of behaviours are related to the overall performance of the team (e.g., Bales, 1970; Cupach & Spitzberg, 1994; Keyton, 1999b). To explore this area in more detail, this study will examine two types of socio-emotional behaviour—positive and negative. These two types of communication have been chosen, because they are able to capture a number of communication behaviours that have been suggested to inhibit or facilitate team effectiveness. These include the likes of members disagreeing, showing tension and interrupting each other on the negative or unfriendly dimension, and members agreeing, showing satisfaction and releasing tension on the positive or friendly dimension.

As mentioned earlier, this study examined teams over a 5-day period. A multi-day project was selected because it allows verbal communication to be captured over an extended period of time. It was also selected because many of the previous studies examining verbal communication and its relationship to team effectiveness have been conducted in short-term laboratory settings and often found it difficult to examine verbal communication and its development over time. This study could therefore be seen as an attempt to extend these short-term laboratory studies and take time into consideration when examining the relationship between verbal communication and team effectiveness.

Teams in this study worked on a task that can be described as complex and dynamic. These task characteristics were chosen because they require high levels of communication between team members. This decision was based on Hirokawa's (1990) suggestion that verbal communication is more important when the task can be described as complex. According to Hirokawa (1990), when the task is simple (e.g., simple task structure, low requirements of information, or low demand of evaluation), the performance of the group is more dependent upon input factors. When the task is complex (e.g., complex task structure, high requirements of information, high demand of evaluation, or no constant prevailing conditions), the performance of the group is more dependent upon process factors. This is because team members are more dependent upon the exchange of information and knowledge to achieve a satisfying outcome.

The analysis of verbal communication in effective and ineffective teams focused on team meetings. In particular, the first meeting of each day over the duration of the workshop (days 1 to 4 = teams working on task, day 5 = teams presenting tender) has been analysed. Team meetings have been chosen as the focus of this study because this is where team members come together, discuss their work and make decisions. This decision to select the first meeting of each day was based on a number of authors who have suggested that the first meeting is important for the team as it sets direction for the team's activities (Gersick, 1988; Hackman & Wageman, 2005).

In this study, verbal communication was analysed at multiple points during the course of the project (at 4 points from days 1 to 4). This approach was chosen because it was expected that team communication would change over time. This expectations was based on a number of authors in the literature who have suggested that teams change over time and this is shown through the behaviours of its members (Gersick, 1988; Tuckman, 1965; Tuckman & Jensen, 1977; Wheelan, Davidson, & Tilin, 2003).

Verbal communication was analysed in this study using Bales' (1950) IPA. This method has been selected for a number of reasons. First, the definitions of many of the IPA categories overlap with communication behaviours expected in effective and ineffective teams. In particular, it comprises twelve categories in the areas of task and socio-emotional communication. Within the socio-emotional categories (six in number), three capture positive and three capture negative socio-emotional communication activities. Second, the system, which is composed of only twelve categories, is

comprehensive. In addition, Bales' book *Interaction Process Analysis: A Method for the Study of Small Groups* laid a comprehensive groundwork for a researcher to be able to become familiar with this method. Third, the method is well established and has been used by many researchers over the last few decades (Bell, 2001; DeGrada, Kruglanski, Mannetti, & Pierro, 1999; Hiltz *et al*., 1986; Pagliari & Grimshaw, 2002; Wish, D'Andrade, & Goodnow, 1980). Finally, this method offers an approach to analysing verbal communication at a micro-level by categorising each verbal act.

Questionnaire data measuring member viability and self-perceived performance were collected in order to achieve a more comprehensive picture of the team communication and its relation to team effectiveness. This decision was based on a number of authors who have suggested that more research needs to be conducted incorporating participants' perceptions in team studies (Broome & Fulbright, 1995; Wittenbaum *et al*., 2004). It was decided to measure member viability because it seems to be a significant component of team effectiveness (Hackman, 1987; Sundstrom, De Meuse, & Futrell, 1990) and one that has received little research attention in the team work literature to date. It was also measured in a self-report method because viability resides in each individual team member. Team members were asked to rate their tender components because it was of interest to examine how members viewed their own performance. A third party was also asked to evaluate the teams' tenders to have an external source rate the level of each team's performance. This decision was based on Sundstrom's (1999) comment that "effectiveness starts with meeting the performance expectations of those who receive, use or review the team's output" (p. 9). This rating was also used to determine which teams in this study would be classified as effective and ineffective.

Teams in this study were comprised of full and part-time working professionals attending a post-graduate workshop. This setting was selected for a number of reasons. First, task and external conditions were able to be held constant. Second, it is an attempt to move away from laboratory-based research where teams work on short-term tasks with little intrinsic meaning. In this project, team members were motivated to participate fully in the task because this project was marked and therefore influenced their grade for the subject. Third, teams had a fixed time line (five days to complete the project), which is difficult to find in industry. Finally, as this workshop was held in an intense block mode format, this project required participants to work on the project for considerable periods of time and would therefore require high amounts of verbal interaction.

To summarise, in response to a number of observations made in the team work literature, a study was undertaken that attempts to examine the task and socio-emotional verbal behaviours spoken by team members. These behaviours were audio recorded over a number of team meetings and analysed using an established coding system—Bales' (1950) IPA. The viability of team members was also measured over the teams' life and was compared to the patterns of verbal behaviours analysed.

Chapter 1
Literature Review

1.1 Chapter Introduction

In this chapter, literature and research relevant to teams, team effectiveness and team communication will be reviewed. First, the topic of teams in organisations is discussed. Second, the effectiveness of teams will be examined. Third, some examples of methods used to investigate team communication will then be presented. Finally, the concept of member viability and its relationship to the team performance will be discussed. This chapter will then conclude with a summary of the reviewed literature.

1.2 Teams in organisations

In many organisations today, employees work together in small groups commonly referred to as teams.[2] Such teams are found at all organisational levels (from the "shop floor to the executive suite," Cohen & Bailey, 1997), and come under a variety of names. These include top management teams (Hambrick, 1987), cross-functional teams (Mankin *et al.*, 1996), self-managing work teams (Cohen *et al.*, 1996; Kirkman & Shapiro, 1997; Orsburn *et al.*, 1990), international task forces (McDermott *et al.*, 1998) and virtual teams (Hiltz *et al.*, 1986; Lumsden & Lumsden, 2004).

Organisations appear to use teams for a number of positive benefits. At one level, these benefits are viewed as fulfilling specific aims such as sharing information (Goodman, 1986), corralling expertise and pushing decision making down to lower levels (Donnellon, 1996), and improving productivity, product quality, and labour-management relations (Bettenhausen, 1991). At a broader level, however, their purpose can be seen as a means for organisations to address complex problems (McDermott *et*

[2] While many definitions of teams exist (Katzenback & Smith, 1993; Larson & LaFasto, 1989; Mohrman, Cohen, & Mohrman, 1995), this thesis will adopt the one proposed by Cohen and Bailey (1997):

> A team is a collection of individuals who are interdependent in their task, who share responsibilities for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit of the corporation), and who manage their relationship across boundaries (p. 241).

This definition is selected for two main reasons. First, it contains many of the defining characteristics outlined in other definitions (e.g., interdependency, identifiable membership, common goals). Second, it is based on the work of previous authors (e.g., Alderfer, 1977; Hackman, 1987) and could therefore be viewed as a synthesised definition.

al., 1998) and create the capability to deal with performance demands and opportunities presented by the changing business environment (Mohrman *et al.*, 1995). These and many other benefits are provided in Handy's (1981) comprehensive listing of the major purposes for why organisations use teams. These are as follows:

1. For the distribution of work. To bring together a set of skills, talents, responsibilities, and allocate to them their particular duties.
2. For the management and control of work. To allow work to be organized and controlled by appropriate individuals with responsibility for a certain range of work.
3. For problem-solving and decision-taking. To bring together a set of skills, talents and responsibilities so that the solution to any problem will have all available capacities applied to it.
4. For information processing. To pass on decisions or information to those who need to know.
5. For information and idea collection. To gather ideas, information or suggestions.
6. For testing and ratifying decisions. To test the validity of a decision taken outside the group, or to ratify such a decision.
7. For co-ordination and liaison. To co-ordinate problems and tasks between functions or divisions.
8. For increased commitment and involvement. To allow and encourage individuals to get involved in the plans and activities of the organization.
9. For negotiation or conflict resolution. To resolve a dispute or argument between levels, divisions or functions.
10. For inquest or inquiry into the past (pp. 155-156)

Teams do not only exist in organisations but also appear to be growing in popularity. Research, for example, confirms an increase in the number of work teams over the last 20 years. A series of surveys conducted in the United States of America asked Fortune 1000 companies whether they have self-managing work teams in their organisation. Responses showed that there is a strong growth of work teams. In 1987, 27% of the responding organisations said they have self-managing work teams in their workplaces, in 1990 this number rose to 47%, and in 1993 it was 68% (Lawler, Mohrman, & Ledford, 1992, 1995). This trend implies that team work is seen by many organisations as an effective strategy for organising work (Unsworth & West, 2000).

Some Teams are more Effective than Others

While case studies about promising and successful synergy effects in teams are often used to show how effective teams can be (e.g., Katzenback & Smith, 1993; Labich, 1996; Larson & LaFasto, 1989; Wellins, Byham, & Dixon, 1994), the reality indicates that effectiveness in teams is not a matter of course. Teams at times have been shown to be very ineffective (Hackman, 1990; Janis, 1982; Robbins & Finley, 2000).

Positive and negative experiences with teams in the workplace have resulted in an understanding that teams do not provide the general panacea that was originally expected. Gordon (1992) refers to a study indicating that over 80% of U.S. organisations with 100 or more employees are working with teams. He also mentions in the same article, that "some early signs of disenchantment already have begun to appear" (Gordon, 1992, p. 64). Managers and team leaders have begun to realise that the use of teams has to be considered carefully. Effectiveness, productivity and success through team work cannot be taken for granted. Research indicates potential effectiveness of team work is not necessarily realised. Steiner (1972), for example, argues that actual team productivity is less than its potential productivity, referring to his formula: Actual productivity = potential productivity – losses due to faulty processes. He suggests "process losses" in team work hinder the group from the best possible performance.

In practice, organisations have become aware that team work does not necessarily mean *successful* team work. As suggested by Dumaine (1994): "Yes, teams have troubles. They consume gallons of sweat and discouragement before yielding a penny of benefit. Companies make the investment only because they've realized that in a fast-moving, brutally competitive economy, the one thing sure to be harder than operating with teams is operating without them" (p. 94). Nowadays, organisations start to use teams when they expect to find a benefit from a team working on the task or problem instead of an individual. This is mostly the case when the task is complex or different skills and professional knowledge are necessary. Therefore, scholars and managers are highly interested in understanding why some teams achieve exemplary outcomes, whereas others fail. The essential aim of their endeavour is to make teams more effective and productive—in summary, successful.

1.3 Understanding the Effectiveness of Teams

The concept of team effectiveness is of central importance in the team work literature. It is examined by a number of authors (e.g., Guzzo & Salas, 1995; Hackman & Morris, 1975, 1983; Pescosolido, 2003; Syer & Connolly, 1996). Team effectiveness is discussed predominantly in the theoretical and research literature about work teams. In this section of the literature review, some of the more established approaches to work team effectiveness will be discussed. These approaches have been developed mainly as frameworks for research and as guides for practitioners.

The majority of authors consider performance outcomes to be the measure of team effectiveness. The performance outcome is mostly assessed through the acceptability of the person who receives the outcome. An outcome can be, for example, a product, service, information, discussion or event. Some authors suggest that team effectiveness includes something more than just the performance outcomes of a team, for example Hackman (1987) and Sundstrom and colleagues (Sundstrom, 1999; Sundstrom & Altman, 1989; Sundstrom *et al.*, 1990). They propose that the degree of member viability has to be considered as an important part of the overall team effectiveness. Sundstrom (1999), for example, defines team effectiveness as follows:

> Effectiveness starts with meeting the performance expectations of those who receive, use or review the team's output. This usually means meeting the expectations of a manager, customers inside or outside the organisation, and possibly others. Effectiveness also includes something more: meeting members' own expectations of satisfying work and working relationships in the team. As long as members' expectations and needs are met, the team retains its viability as a work unit" (Sundstrom, 1999, p. 9).

Member viability is understood as the degree of each team member's perception of the team and its task. Even though different definitions of member viability exist (e.g., Doenau, 1998; Sundstrom *et al.*, 1990; West, 2004), they are quite similar. Overall, member viability is defined as a combination of a number of different attitudes towards the task, other team members, and personal learning. These attitudes are, for example, satisfaction with process and outcomes, group cohesion, affect towards the group, and self-efficacy. It includes also team members' motivation to commit effort and ideas to achieving team goals as well as being a sufficiently satisfying experience that they want to continue working with the team or one like it. Sundstrom *et al.* (1990)

define team member viability as "members' satisfaction, participation, and willingness to continue working together. A more demanding definition might add cohesion, intermember coordination, mature communication and problem-solving, and clear norms and roles—all traditionally identified with team maturity" (p. 122).

Hackman's (1987) definition of work team effectiveness also includes not just the success of the team's short-term performance; it also comprises the long-term performance of the team members in the future. According to his definition of work team effectiveness, a work team that performs its task well but is not able or willing to work together in the future is not a truly effective team. He identifies three key outcomes of work team effectiveness: (a) productive output—the degree to which the group's output meets the standards of those that receive or use it; (b) capability to work interdependently—the degree to which the group's members are able to work together in the future; (c) growth and well-being—the degree to which the experience of being in the group improved the individual members through their own personal learning or development.

Most research distinguishes between input and process factors that can have an impact upon team effectiveness. Hackman and Morris (1975, 1983), for example, identified four main input factors in relation to team effectiveness. These input factors are: the individual (e.g., background, knowledge, skills, abilities, previous experiences, motions, motivation, needs), the group as a collective (e.g., hierarchy, group organisation, power), external conditions (e.g., organizational or environmental parameters) and the characteristic of the task (e.g., its simplicity or complexity). They suggest that an interdependent relationship exists between input, process and output, where input factors influence the output through the interaction process. The comprehensive input-process-output framework for analysing team effectiveness, shown in Figure 1.01, is adapted from McGrath (1964). This model is often used as a starting point for more complex models of team effectiveness. Authors use its differentiation between input, process, and output as a starting point to explore the interrelationship between these three elements.

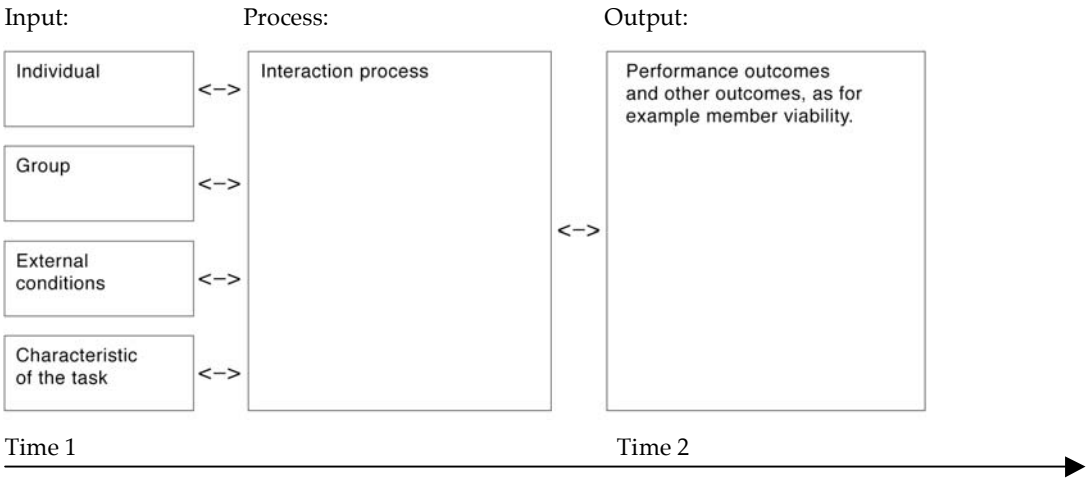


Figure 1.01: Input-process-output framework for analysing team effectiveness. Original Source: McGrath (1964).

1.3.1 Research Examining Input and Process Factors in Relation to Team Effectiveness

A number of authors have investigated factors that appear to facilitate or inhibit team effectiveness. Hirokawa and Keyton (1995), for example, analysed input and process factors that seem to inhibit team effectiveness. Data were gathered via open-ended questions about factors influencing team effectiveness. Participants were members of organisational work teams. The results revealed eight factors that inhibit team effectiveness:

1. Insufficient time
2. Information resources
3. Procedural conflict
4. Poor group leadership
5. Uninterested/unmotivated members
6. No organisational assistance
7. No financial compensation
8. Changing organisational expectations.

Asking the simple question "Why are some groups more effective than others?" Hirokawa *et al.* (2000) also studied input and process factors that can influence task group performance. Written narratives from participants about successful and unsuccessful team work experiences were used to identify factors inhibiting team

effectiveness. The results of the study revealed seven factors that influence group success and failure (Hirokawa *et al.*, 2000, p. 579):

1. relationships—those associated with interpersonal relationships among group members (e.g., "camaraderie," "close friendships," "cohesiveness," "supportive relationships," and "team unity");
2. group structure—those associated with the leadership, organization, roles, norms, and goals of the group (e.g., "common goals," "delegated responsibilities," "good leadership," "high standards," and "matched member skills to tasks");
3. group process—those associated with the procedures and activities of the group and its members (e.g., "efficiency," "highly organized," "coordinated effort," "effective strategy," …);
4. members' emotions—those associated with the feelings and motivations of group members (e.g., "fear," "enjoyment," "excitement," "pride," "trust," and "overconfidence");
5. group communication—those associated with the exchange of information and ideas among group members (e.g., "open discussion," "good listening," "all opinions heard," "equal participation and contributions" "feedback," and "positive communication");
6. member attributions—those associated with the knowledge and skills of group members (e.g. "commitment," "dedication," "superior skills," "ingenuity and creativity," "very knowledgeable," "lots of experience," and "hard working");
7. external forces—those associated with influences outside of and generally beyond the control of the group (e.g., "adversity," "bad luck," "destiny", "chance," "external agents," and "hostile management").

With reference to this thesis, three of these seven factors stand out to be particularly important for team effectiveness: (a) the quality of the relationships among team members (including cohesion); (b) the emotions felt by group members prior to, and during the team work process; and (c) the attributes of the group members. Hirokawa *et al.* (2000) describe relational quality between team members in relation to team effectiveness as follows:

> In the vast majority of stories, relational quality was not perceived to directly influence group success, but rather it was perceived to influence the actions, behaviours, and motivations necessary for group success (p. 584).

Badke-Schaub and Frankenberger (1999) examined the team work process in design teams and its relationship to team effectiveness. Their findings seem to indicate, that several non-technical factors impact upon team effectiveness. They suggest that the main non-technical factors for successful team work are team communication, quality of goal analysis, quality of solution search, availability of information and group climate.

Broome and Fulbright (1995) conducted a longitudinal study investigating input and process factors critical for the effectiveness of the group problem solving process. The research developed a model of barriers to group problem solving based upon participants' perceptions. Participants, mainly full-time professionals, were conducting a graduate course on small group facilitation. Part of this course was group problem-solving sessions. Within these sessions, participants generated statements about barriers and difficulties in the group process. Ideas were drawn predominantly from participants' previous experiences as group members. The result was a total of 490 generated statements about difficulties and barriers in the group problem solving process. Interactive management (IM) (Warfield, 1976, 1990), nominal group technique (NGT) (Delbecq, Van de Ven, & Gustafson, 1975) and interpretive structural modelling (ISM) (Warfield, 1990) were used with each group to develop a structured agenda of the data. As a result, ten categories including several sample barriers were built. These categories can be seen as factors inhibiting team effectiveness. A list of all categories is presented below. Four of these categories seem to support the notion that communication is crucial for team effectiveness (these categories are listed first).

1. Communication barriers (e.g., inability to find and use a common language among the group, inability to effectively listen to what others are saying, dominance in group by one person or faction)
2. Climate concerns (e.g., lack of supportiveness for open expression, lack of group identity or cohesiveness, lack of trust among group members)
3. Planning shortfalls (e.g., failure to define the focus of the group, inadequate planning of meeting strategy)
4. Process failures (e.g., failure to reach a consensus, lack of group participation, tendency to focus on solution before defining the problem)
5. Methodology deficiencies (e.g., lack of strong procedural guidelines, lack of legitimate strategy for problem solving)
6. Cultural diversity issues (e.g., existence of biases, prejudices, sexism, failure to take cultural differences into account)

7. Resource constraints (e.g., inadequate physical setting and necessary tools, lack of technical support)
8. Group composition inadequacies (e.g., failure to have participants with right level of authority at table, failure to include key actors)
9. Organizational cultural forces (e.g., pressure for immediate results, existence of rewards for not solving the problem)
10. Attitude problems (e.g., existence of negative and resistant attitudes, unwillingness to be flexible and compromising)
(list adapted from Broome & Fulbright, 1995, p. 30)

Fleming and Monda-Amaya (2001) investigated process variables critical for team effectiveness. The aim of their study was to identify a list of variables that seem to facilitate team effectiveness. Participants were team members described as "experts in teaming." Data were gathered through a survey comprising 109 items. Results indicate that six categories seem to be critical for team effectiveness (categories listed below). Within these results, team cohesion appeared to be one of the key factors affecting team effectiveness.

1. Team communication (e.g., team members have adequate listening time, team members have equal opportunities to speak, decisions are reached by consensus)
2. Team cohesion (e.g., members feel safe sharing ideas, the team has a trust among members)
3. Team goals (e.g., purpose of the team is clear)
4. Team roles and team membership (e.g., team members are committed to the team process)
5. Team logistic (e.g., progress is evaluated internally, by members)
6. Team outcomes (e.g., team makes modifications to the plan as needed) (list adapted from Fleming & Monda-Amaya, 2001, p. 168)

1.3.2 Communication as a key factor for team effectiveness

After examining literature and theory about effective and ineffective teams, it appears that neither the simple presence nor absence of certain input and process factors creates team effectiveness or team ineffectiveness. Rather, interaction among input and process factors facilitate team effectiveness or allows team ineffectiveness to develop. Research findings seem to suggest that work team effectiveness is impacted

predominantly by non-technical factors, such as communication and positive relationships between team members. Literature suggests further that a certain level of member viability, including cohesion, affect toward the group, and communication satisfaction facilitates team effectiveness.

The reviewed literature above indicates that the relational side of team communication impacts strongly upon process and outcomes (e.g., Hirokawa *et al*., 2000; Hirokawa & Keyton, 1995; Keyton, 1999a; Mayer, 1998; Stohl & Schell, 1991). The examination of team interaction seems to be important in order to understand team effectiveness. Verbal communication, as a part of interaction, seems to be a good way to capture interaction. To investigate team communication in relation to team effectiveness in more detail, research from the fields of small group research and communication was reviewed.

Hirokawa (1980) tested whether different communication patterns exist in effective and ineffective decision-making groups. Participants in this research were 92 undergraduate volunteers formed into 26 teams. Participants worked on a 20 minutes task in a laboratory setting. The task for his observation was the "NASA Moon Survival Task" (Hall & Watson, 1970). Hirokawa analysed the communication activities of the 4 most effective and the 4 most ineffective teams out of 26 teams who participated in the study. Hirokawa found "that members in both the effective and ineffective groups produced almost the same number of task-relevant statements and questions, procedural questions, and socio-emotional statements" (p. 320). Although differences in communication patterns were smaller than expected, his data revealed two communication differences in the effective and ineffective teams: (a) effective teams spend more time talking about the process of the project than ineffective teams, and (b) effective teams talk about important and relevant issues until agreement is reached before moving to another topic.

While Hirokawa's (1980) study makes a significant contribution in order to understand communication differences in effective and ineffective teams, a number of points are worth noting that could have influenced his findings. First, the length of the task was 20 minutes long and it is doubtful that teams are able to build expressive communication patterns within this time frame. Second, the "NASA Moon Survival Task" does not require interdependent team work to develop a successful solution, based on the fact that one individual team member in the group could come up with the "right solution" in order to perform this task successfully (Hirokawa discussed this

issue himself a few years later: see Hirokawa, 1990). Finally, his categories do not show differences between positive and negative socio-emotional behaviours and therefore differences in the friendly-unfriendly dimension are not revealed in his data. Hirokawa's (1980) categories focus on task-related communication activities and not on socio-emotional communication activities in effective and ineffective teams.

Mayer (1998) investigated interaction behaviours in work teams that lead to team effectiveness in the form of good decision-making. He gathered data through interviews and questionnaires from members in small organisational groups. Participants had to describe what interaction behaviours they perceived as affecting the quality and effectiveness of their team work. His findings indicated that three interaction behaviours can be identified to facilitate or inhibit team effectiveness: (a) participation of team members, (b) level of positive socio-emotional communication behaviours, and (c) level of negative socio-emotional communication behaviours.

Stohl and Schell (1991) investigated communication behaviours in work teams, in particular in dysfunctional or ineffective teams. They developed a communication-based model of small-group dysfunction, where it emerged out of communicative strategies people reported to use when confronted with a dysfunctional team. Data was drawn from narratives, discussions, anecdotal evidence and interviews based on team members' past experiences.

> In this model, the interplay between the focal actor and other group members mutually creates and evokes multiple inhibiting influences associated with interaction norms, authority relations, status distribution, and so on (Stohl & Schell, 1991, p. 90).

The model is based on the assumption that a problematic team member (who Stohl and Schell labelled the "farrago") can lead to confusion and dissatisfying communication for an entire team, and the team is not able to perform effectively. If other team members react to the problematic group member, negative interpersonal dynamics increase and end up supporting the behaviour of the problematic team member. According to Stohl and Schell (1991):

> Farrago, literally meaning mixed fodder for cattle, figuratively is used to describe a medley or a confused group. It was decided to call our focal actor a farrago because (a) interactions with this type of problematic person often result

> in confusion as to responsibilities, group tasks, decision-making procedures, and so on, and (b) these interactions cause the group itself to become confused (Stohl & Schell, 1991, p. 90).

According to Stohl and Schell (1991) the negative interpersonal dynamics of a confused group are revealed in an imbalance of socio-emotional interaction. As a consequence of an imbalance of socio-emotional communication behaviours, the activities of the group shift from task-related to interpersonal issues:

> The type of group we are talking about exhibits a specific constellation of dysfunctional processes: (a) decision-making procedures are often complicated and compromised as a result of preventive actions designed to avoid or accommodate one member; (b) issues are redefined against the backdrop of the member; (c) a great deal of energy is expended talking about the particular organizational member (whether or not he or she is present or directly involved in the decision-making process); (d) members become so worn out in dealing with issues related to this one member that they often fail to deal with task issues and priorities become confused; and (e) members often leave such meetings angry, depressed, or frustrated with both the individual and the group (Stohl & Schell, 1991, p. 92).

Based on Stohl and Schell's (1991) findings of dysfunctional teams, Keyton (1999a) analysed interaction behaviours in dysfunctional teams that can lead to ineffective team performance. Data were collected from questionnaires and interviews. Participants were professionals who had some previous experience as team members. Data were analysed using Polley's (1987) model of Group Field Dynamics (GFD), which measures three pairs of interaction activities: (a) dominant-submissive, (b) friendly-unfriendly, and (c) conventional-unconventional. Participants were asked to first rate themselves and then all other team members in one of their organisational group experiences. Examples of the 26 items were: (a) active, dominant, and talkative (on the dominant pole); (b) passive, submissive, and quiet (pole of submissive); (c) friendly, equalitarian (on the friendly pole); (d) unfriendly, cold, and uncaring (pole of unfriendly); (e) conforming and conventional (pole of conventional); and (f) nonconforming and change-oriented (unconventional pole). The other 20 items represent all possible permutations of the three-dimensional interaction space.

Findings in Keyton's (1999a) research discovered interaction patterns in dysfunctional teams as (a) confusing, especially on the friendly-unfriendly dimension of communication behaviours, and (b) team interaction stems from underlying emotions. Based upon her findings, Keyton (1999a) reconfigured Stohl and Schell's (1991) model of the farrago into a model of primary and secondary provokers. Her model suggests that every provoker in a group needs his or her counterpart(s) to develop and unfold communication behaviours that can have a negative effect upon the group and its dynamics. As suggested by Keyton (1999a):

> A group's dysfunction is caused by the primary provoker's confusing behavior. Behaving at one anchor of a behavioral dimension and then at the other, the primary provoker pulls other group members into a web of confusing communication, causing them to become secondary provokers (p. 491).

Keyton's (1999a) results confirm Stohl and Schell's (1991) assumption that constantly changing, and therefore not predictable, communication behaviours confuse the team and entails dysfunctional team interaction. As she reports in the following quotation, the significant communication difference between effective and ineffective teams seems to be the friendly-unfriendly dimension of interpersonal behaviour.

> The striking difference between dysfunctional and effective groups appears to rest on interaction evaluated by the friendly-unfriendly dimension. Participants in teams without primary provokers indicated no variation on this dimension. In contrast, participants from dysfunctional teams reported the friendly-unfriendly variation as common among the primary provokers (70% and 80%) in comparison with the 10% and 30% of whom self-reported (Keyton, 1999a, p. 510).

While Keyton's (1999a) findings contribute to a better understanding of communication behaviours in dysfunctional teams, one point seems worth noting. It is interesting that none of the participants in her research described himself or herself as "the primary provoker" and that participants described themselves mostly as very friendly team members.

Walz (1988) analysed conflict and uncertainty in team communication over time. She observed 17 team meetings of one team over an entire project's life cycle. Results suggest that conflict and disagreement among team members increases as they attempted to determine task requirements, decreased when they communicated the

determined requirements to users, and increased as they discussed how to fulfil the requirements. Findings revealed that conflict and disagreement between team members increased until the midpoint (until meeting 9), and then decreased over the last 8 meetings.

Olson *et al.* (1992) examined team communication in team meetings. Their study focused on task-related interaction activities in meetings. They analysed 10 meetings from four teams in two organisations. The meetings were videotaped, transcribed, and then analysed using a coding system that looked at participants' problem solving activities and process related activities (e.g., coordination and management of time). The study found some similar communication patterns across all four teams: 40% of the time was spend on discussions, with many swift transitions between ideas and their analysis; 30% of the time was used for summaries and walkthroughs; 20% of the time was used for coordination activities.

Sonnentag (2001) conducted a study comparing team members' performance in team meetings. She used an observational method to examine meeting participation of 60 professionals from 10 project teams. Performance of team members was analysed through communication process analysis. Data about team members' participation was also captured using questionnaires. Findings of this research project suggest that high performing team members participate more in the overall meeting process than moderate performing team members, especially in poorly structured meetings, but not when the meeting is highly structured. Her findings seem to assume that high performers show high adaptation within the process, and dependent upon task requirements and task constraints. As suggested by Sonnentag (2001):

> High performers are highly involved in cooperation processes and play a prominent role in team work settings. In addition, they do not show the same kind of participation across all situations. They contribute more to process regulation only in situations that ask for structure but not in situations that are highly structured in advance (p. 13).

Hirokawa (1990) identified task circumstances in which team communication can be expected to play a significant role in determining team effectiveness. He proposes that when the task is simple (in the form of simple task structure, low requirement of information, and low demand of evaluation), the performance of the group is strongly dependent on input factors. When the task is complex (in the form of complex task

structure, high requirement of information, high demand of evaluation) and dynamic, the performance of the group is strongly dependent on process factors. A task that would be described as complex can also include "having unclear goals, many goal-path mechanics, many goal-path obstacles, and low goal-path clarity" (Hirokawa & Orlitzky, 2001, p. 318). A dynamic task can comprise, for example, having no constant prevailing conditions and which may not result in any interim results (Badke-Schaub & Stempfle, 2001). Therefore, it is likely that the importance of team communication for team effectiveness is related to the complexity and dynamics of the task.

Research and theory about effective and ineffective teams seems to agree that verbal communication is crucial in facilitating or inhibiting team effectiveness, especially the interpersonal side of verbal communication. In conclusion, research investigating team communication in-depth also confirms that verbal communication, in particular socio-emotional communication impacts upon team effectiveness.

1.4 Methods to study team communication

Existing methods in small group research and communication provide different approaches to examine communication on a more micro level. This in-depth study of communication behaviours seems necessary to investigate the relationship between interaction and team effectiveness in more detail. Two main approaches exist to study team communication in-depth. The first one could be described as retrospective whereas the second could be called progressive. The retrospective research approach comprises surveys, interviews and narratives (e.g., Hirokawa *et al.*, 2000; Keyton, 1999a; Stohl & Schell, 1991). The progressive research approach focuses on observational methods, as for example, participant observation, non-participant observation and video analysis (e.g., Gersick, 1988; Hirokawa, 1980; Stempfle & Badke-Schaub, 2002). Some examples of both retrospective and progressive research approaches will now be discussed.

1.4.1 Examples of Research Methods to Analyse Communication

Retrospective data of team communication are mainly captured through interviews, questionnaires or narratives: Team members, team leaders or managers report about past team work experiences. Data can be gathered on a group level or for individuals in the group. Retrospective methods used to collect data of team communication are predominantly used to investigate the interpersonal climate in a group. In this context, research identifies communication as a verbal and visible form of relational dynamics. Gathering post-project information about team members' perceptions are used more often to investigate the socio-emotional side of communication instead of task-related communication activities.

One of the most popular methods to study the interpersonal climate in a group is SYMLOG, a "System for the multiple level observation of groups" developed by Bales and Cohen (1979). SYMLOG captures team members' perceptions of group interaction on three behavioural dimensions that represent the spectrum of a group member's interaction activities. Based on Bales' (1950) earlier work on IPA, he developed this highly complex model which describes the socio-emotional team communication in a three-dimensional space: (1) friendly-unfriendly, (2) dominant-submissive, and (3) instrumentally controlled-emotionally expressive. More recently Polley (1987) developed a method to examine group dynamics, called 'Group Field Dynamics' (GFD). This method is founded on SYMLOG (Bales & Cohen, 1979) and segregates socio-emotional communication behaviours into three pairs of activities: (a) dominant-submissive, (b) friendly-unfriendly, and (c) conventional-unconventional. Both, SYMLOG (Bales & Cohen, 1979) and GFD (Polley, 1987) gather information about the individual in a group as well as the group as a whole. Data can be analysed on a group level or on an individual level.

Most observational methods used to analyse communication distinguish between task-related and socio-emotional communication activities. In general, a task-related communication activity can be considered as any statement or question that is directly or indirectly related to the team's endeavour to develop or produce an outcome. A process-related communication activity can be considered as any statement or question that is concerned with the course of action of group functioning, participation, or use of time. A socio-emotional communication activity can be considered as any statement or question that appears to be an attempt to establish and maintain or prevent and hinder

cooperative interpersonal relationships, friendships, group cohesiveness or goodwill among group members.

Most of these methods work with a defined category system. Categories are defined depending on the research focus (e.g., the thinking process, problem solving process or decision-making process of a group). This approach divides verbal communication into communication acts.[3] A communication act will be considered, for example, utterance-by-utterance, theme-by-theme or minute-by-minute. Each communication act becomes assigned to a category for analysis, for example, occurrence, frequencies and transitions of the communication activities.

Hirokawa (1980), for example, developed a category system to analyse the decision-making process in work groups. His category system includes 26 categories to classify team communication activities. The main categories of his system are: task statement, task question, procedural statements, procedural questions and socio-emotional statements. His 26 categories do not distinguish between positive and negative socio-emotional interaction. With this category system, he investigated communication patterns in effective and ineffective decision-making teams.

1.4.1.1 Example of an Observational Research Method without Pre-Existing Categories

Gersick (1988) offers another approach to observational research where no pre-existing categories exist to analyse the communication during the group process. Her method can be described as inductive discourse analysis and is aiming to develop a better understanding of group development over time. Gersick described her approach as follows:

[3] In this research "verbal communication" or "verbal behaviour" is defined as spoken interaction. This wording is consistent with small group research literature, see for example Wheelan et al. (2003), who analysed data from audio taped team meetings. She used the term verbal behaviour, which is in similar lines with Norton (1976), who used this term for data collected in the same manner. Further research using the terminology verbal communication or verbal behaviour in the general sense of spoken interaction are for example Wheelan and McKeage (1993) or Wish et al. (1980). The terms "communication behaviour" or "interaction behaviour" are used primarily when data are drawn from observation or video-analysis of the group process (e.g., Bales, 1950; Hirokawa, 1980) but also to label communication data gathered in a combination of observation-based and retrospective methods (e.g., Sonnenwald, 1996). In the communication literature the term "verbal" is often understood as communication using any kind of words, either written or spoken, while nonverbal communication is for instance facial expressions or gestures (e.g., Hiltz *et al.*, 1986). Therefore the terms "spoken interaction" and "oral communication" are used predominantly in communication literature. It was decided to use the small group research terminology because this research intends to make primarily a contribution to small group research, even though relevant literature sources are drawn from communication and other fields.

> Instead of using a priori categories, I read transcripts repeatedly and used marginal notes to produce literal descriptions of what was said and done at each meeting that were much like detailed minutes. [Following a search for milestones in the group communication] I identified ideas and decisions that gave the product its basic shape or that would be the fundamental choices in a decision tree if the finished product were to be diagrammed.… I searched the complete string of each team's meetings to identify substantive themes of discussion and patterns of group behavior that persisted across meetings and to see when those themes and patterns ceased or changed (pp. 14 -15).

1.4.1.2 Example of an Observational Research Method with Pre-Existing Categories

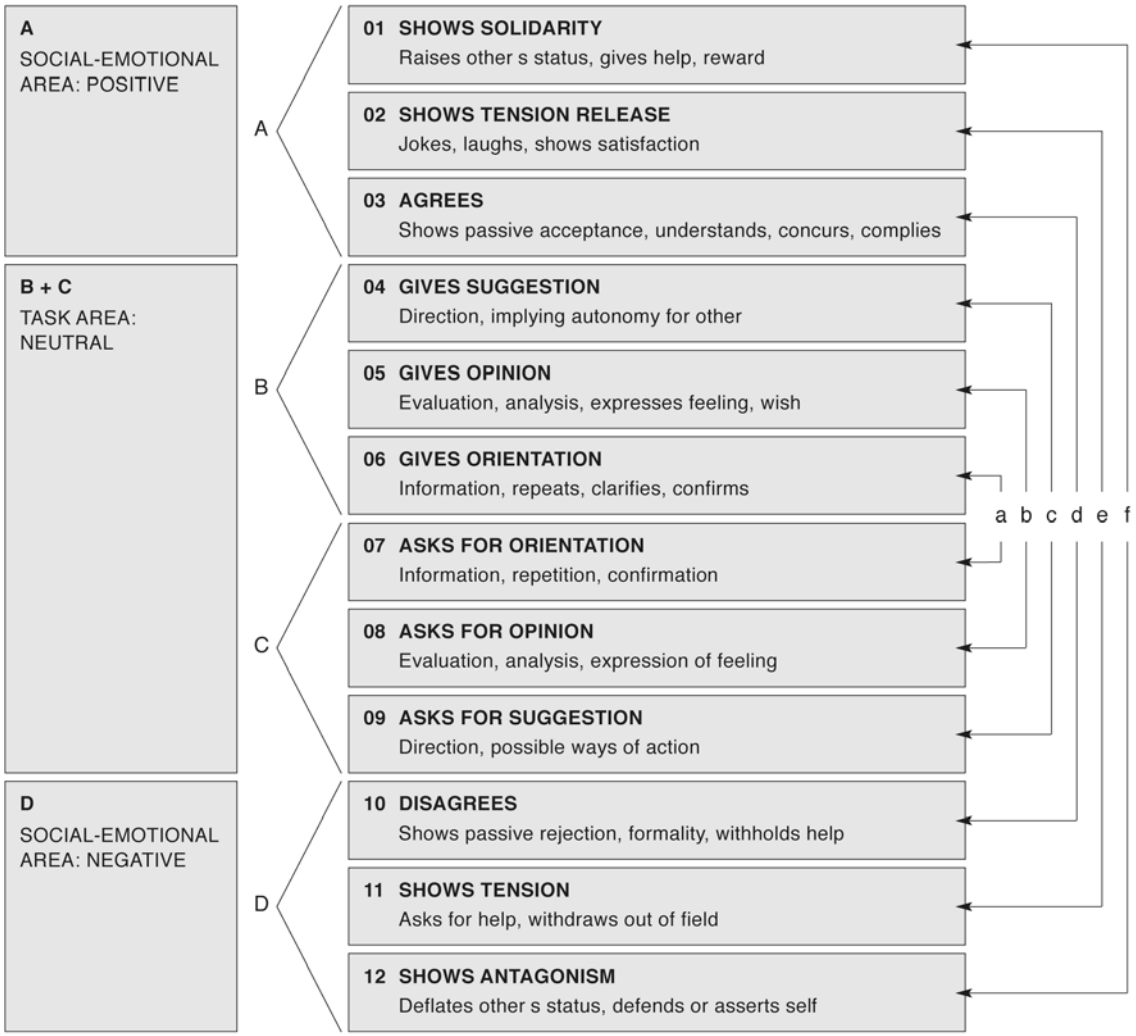
Interaction Process Analysis (IPA) is a generic method used to analyse interaction in small groups developed by Robert F. Bales (1950). It is one of the first and most frequently used systems to examine group dynamics through interaction in small groups. IPA is based on the assumption that process activities are captured in the group's interaction, and it enables researchers to identify and examine task and socio-emotional communication activities in groups.[4]

In the late 1940's, Robert F. Bales and his colleagues at Harvard University developed a model for recording and analysing the interactions between individuals in face-to-face communication. IPA was developed in the laboratory of the Department of Social Relations at Harvard University. Bales wanted to observe social interaction in real time. He and his colleagues started with 87 categories of behaviour and they were able to narrow them down to 12 categories. These 12 categories build the core of IPA; they represent the major activities in the group interaction process. Bales organised the categories in a model showing the relationship of the categories to each other (see Figure 1.02). The IPA system has become one of the most popular observational methods to study the interaction process of small groups. Scholars who have found IPA to be particularly useful in classifying group interaction include Brown (1988), Hare (1976) and McGrath (1984). It is still frequently used in small group research (e.g., Bell, 2001; DeGrada *et al*., 1999; Hawkins & Power, 1999; Hutson-Comeaux & Kelly,

[4] In Bales' (1950) original publication *Interaction Process Analysis: A Method for the Study of Small Groups*, he uses the term social-emotional. However, it is decided to use the term *socio*-emotional instead of *social*-emotional in this study, because the expression socio-emotional is more consistent with the current literature.

1996; Pagliari & Grimshaw, 2002). In summary, IPA is probably the most used method in analysing interaction processes in small groups.

IPA provides a systematic framework to analyse small group interaction. Verbal communication becomes divided into utterances. Each utterance becomes assigned to one of the 12 IPA categories, which can be seen in Figure 1.02. On the highest level, IPA divides group interaction into two domains—task-oriented interaction and socio-emotional interaction. Each domain comprises two areas. The task domain comprises the two areas of task-related questions (requests) and answers (responses), and the socio-emotional comprises positive and negative socio-emotional reactions. Each of the four areas includes three categories. Therefore, six of the twelve categories pertain to socio-emotional communication activities that are based on the interpersonal relationships within the group (IPA categories 1 to 3 and 10 to 12); and six categories relate to task activities that focus on the problem the group is trying to solve or the task it is trying to deliver (IPA categories 4 to 9).



A Positive Reactions
B Attempted Answers
C Questions
D Negative Reactions

a Problems of Communication
b Problems of Evaluation
c Problems of Control
d Problems of Decision
e Problems of Tension Reduction
f Problems of Reintegration

Figure 1.02: The IPA categories and their major relations. Source: Bales (1950, p. 9).

In 1950, Bales published IPA as a work manual. This work manual offers a detailed explanation of the method and how to prepare to use it. Chapters (such as "Description of the Method," "Theoretical Framework," "Training Observers," "Appraising Observer Reliability," "Analysis and Interpretation") enable researchers to develop an understanding for the method and how to use it. The manual also comprises a detailed

description of the twelve categories. Each category is described over several pages. Some excerpts from Bales' (1950) detailed explanations are presented in Table 1.03 to give a brief description of each category.

Table 1.03: Brief Summary of Bales' (1950) 12 IPA Categories

IPA CATEGORY 1: SHOWS SOLIDARITY, RAISES OTHER'S STATUS, GIVES HELP, REWARDS This category includes initial and responsive acts of active solidarity and affection like greeting, touching, treating someone to food or drink or some other symbol of solidarity, any expression of sympathy as well as initial and responsive status-raising acts like complimenting, congratulating, showing approval. Category 1 also includes reactions to categories 10-12 like behaviours in which the subject offers assistance, offers to undertake a job, offers his [her] services, offers to contribute time, energy, money or any other resource. Any act of interceding or mediating, conciliating or moderating in a difficult situation between two or more other (pp. 177-178).
IPA CATEGORY 2: SHOWS TENSION RELEASE, JOKES, LAUGHES, SHOWS SATISFACTION Category 2 contains spontaneous indications of relief like feeling better after a period of tension in form of cheerfulness, joy or happiness. Indications that the subject is thrilled, euphoric, making friendly jokes, trying to amuse or entertain, laughing, and smiling is included (p. 179).
IPA CATEGORY 3: AGREES, SHOWS PASSIVE ACCEPTANCE, UNDERSTANDS, CONCURS, COMPLIES Examples: "Yes, that's it.", "That's what I'll do." This category comprises indications that the subject complies with a request or suggestion, conforms with some direction, cooperates with an order, any sign of recognition, interest, responsiveness, giving signs of attention. In response to categorie 10 it includes admitting an error or some objection or disapproval, giving way, asking the other's pardon, benign, kind, tolerant, giving of approval of required work, as well as submissive, acquiescent, pliant, meek behaviour in respond to aggression directed toward him (pp. 179-181).
IPA CATEGORY 4: GIVES SUGGESTION, DIRECTION, IMPLYING AUTONOMY FOR OTHER Examples: "Suppose we set up the following situation …", "John, will you take the role of the foreman?" Category 4 summarises the process of cooperative action itself like acts which suggest concrete ways of attaining a desired goal, proposing a solution, suggesting what to do or how the situation is to be defined, direct attempts to guide other (pp. 181-182).
IPA CATEGORY 5: GIVES OPINION, EVALUATES, ANALYSIS, EXPRESSES FEELING, WISH, INTERPRETATION, REFLECTION This category includes acts leading to an understanding, such as introspection, reasoning, thinking, expression of understanding, feeling, elaboration, exploration, analysis, inference and evaluation (pp. 182-184).

table continues

Table 1.02: Continued

IPA CATEGORY 6: GIVES ORIENTATION, INFORMATION, REPEATS, CLARIFIES, GIVES OBJECTIVE STATEMENT Example "We have just 2 days left." Category 6 contains acts which are intended to secure or focus attention as well as acts to prevent or repair breaks in the flow of communication such as repeating, clarifying, explaining, summarizing, not with the purpose of carrying the argument further, but simply with the purpose of orientation. Including simply report, either spontaneously or in response to a question, account of private experience, statements about the nature of the situation (pp. 184-186).
IPA CATEGORY 7: ASKS FOR ORIENTATION, INFORMATION, REPETITION; CONFIRMATION Examples: "What?", "Where are we?", "I didn't quite understand you?" This category comprises acts, which indicate or express a lack of knowledge sufficient to support action, confusion, uncertainty, questions that require the giving of a factual answer (pp. 186-187).
IPA CATEGORY 8: ASKS FOR OPINION, EVALUATION, ANALYSIS, EXPRESSION OF FEELINGS Examples: "How do you feel today?", "I wonder how you feel about that?" Category 8 summarises questions aimed at the exploration of the other's feelings, values and intentions, questions which attempt to encourage a statement or reaction, questions or statements which seek an interpretation, hypothesis, diagnosis, or further analysis (pp. 187-188).
IPA CATEGORY 9: ASKS FOR SUGGESTION, DIRECTION, POSSIBLE WAYS OF ACTION Examples: "I wonder what we can do about this?", "I don't know what to do?" This category includes questions or requests, explicit or implicit, for suggestions as to how to proceed through the utilization of concrete ways and means to goals (p. 188).
IPA CATEGORY 10: DISAGREES, SHOWS PASSIVE REJECTION, FORMALITY, WITHHOLDS HELP Category 10 contains any indication of attitudes considered over-cool, frigid, unexpansive, unsmiling, any situation in which an emotional response would be expected, but the subject refuses it, passive forms of rejection, any indication that the subject is disinterested, formal, distant, reserved, undetermined member-to-member contacts, that is for example whispering while the main discussion is going on between others, mild degrees of disagreement, failing to pay attention, ignoring (pp. 188-190).
IPA CATEGORY 11: SHOWS TENSION, ASKS FOR HELP, WITHDRAWS OUT OF FIELD, FRUSTRATION This category covers all sorts of non-focal manifestations of impatience, indications that the subject feels strained, nervous, alarmed, concerned, anxious emotionality, verbal or motor expression of fear, worry, panic, frustration, dissatisfaction, disappointment, unhappiness. Requests for permission or help, which carry an undertone of emotionality, are included (pp. 190-193).

table continues

Table 1.02: Continued

IPA CATEGORY 12: SHOWS ANTAGONISM, DEFLATES OTHER'S STATUS, DEFENDS OR ASSERTS SELF, SARCASM, INTERRUPTION, GOSSIP Category 12 includes attempts to control, direct or supervise in a manner the observer interprets as arbitrary or autocratic, arbitrary attempts to lay down principles of conduct, standards, or laws, acts in which the subject prohibits the other from doing something, represses the other, gives warning, threats. Contains any response to an attempt at control in which the subject shows autonomy, is unwilling, disobliging, rejects, refuses, ignores directions, commands, demands or authoritative requests, is negativistic, stubborn, obstinate. On the milder side includes conspicuous attempts to override the other in conversation, interrupting the other, teasing, provoking, any act of gossip, any act in which the subject suppresses, conceals, hides, fails to mention, or justifies something which is considered discreditable, such as ignorance, any act in which the subject is self-assertive from a position which has the implication of lower status, in which he or she tries to impress the other with his or her importance, dramatizes himself, regards as exhibitionistic or showing diffuse aggression (pp. 193-195).

According to Bales (1950), the kind of small groups that can be studied with IPA is quite broad. Small groups can be diverse in composition, character, and purpose. Groups can be formed for different reasons; such as for group discussions, group therapy, counselling or training programs. Groups can be committees, work teams, family groups, groups of two, such as interviewer and interviewee, to name just a few. Bales (1950) recommends to use IPA in a comparative context:

> If we take care to ask our questions in a comparative context, as an attempt to account for similarities or differences, then it may be possible to return sensible answers. For example, if it is asked why it is that for a given group of people, composed of the same personalities, within the same series of meetings dealing with the same kind of problems, there is a higher rate of activity in Category 2, 'Shows tension release, jokes, laughs, etc.' in the first and last ten minutes of each meeting than in any other periods of the meetings, then a sensible answer may be returned (p. 120).

In Bales' (1950) book about IPA, one entire chapter is dedicated to the issue of observer training. This chapter by Bales provides all necessary information to train observers to use IPA appropriately and to prepare the observer for coding group communication. In addition to detailed descriptions of each category and ways to process the data analysis, some rules of thumb are provided to support the observer in deciding what category is appropriate, for example: (a) "View each act as a response to the last act of

the last other, or as an anticipation of the next act of the next other" (p. 91), or (b) "Favour the category more distant from the middle. Classify the act in the category nearer the top or the bottom of the list" (p. 92). The observer is requested to test his or her scoring at any point by asking how he or she would perceive this action if a group member would have directed it towards him or her. In practice a properly trained observer on interaction in groups of six or seven people engaged in group discussion should obtain from ten to fifteen scores per minute:

> Complex sentences always involve more than one score. Dependent clauses are separately scored. If a series of predicates are asserted of a single subject, a separate score is given for each additional predicate on the reasoning that each one constitutes a new item of information or opinion. Compound sentences joined by 'and,' 'but,' etc., are broken down into their component simple parts, each of which is given a score. As an example of the foregoing points, the following sentence would be analyzed into four units: 'This problem which we talked about for three hours yesterday / impresses me as very complicated / difficult / and perhaps beyond our power to solve. /' (End of units are indicated by the diagonal) (pp. 37-38)

The frequent and consistent application of the method over time appears to suggest that IPA is a good method to capture communication that leads to effectiveness or ineffectiveness of teams. Its twelve categories seem to capture most communication activities that distinguish communication within effective and ineffective teams. It captures task-related communication activities as well as socio-emotional communication activities; and in the area of socio-emotional communication activities it differentiates between positive and negative socio-emotional interaction.

1.4.1.3 Advantages and Disadvantages of Both Methodological Approaches

By analysing the team work process progressively, mainly through real time observation or capturing the data through audio or video taping, the researcher is able to view the situation with a higher degree of objectivity. However, this involves making assumptions about the team work process without knowing how the observed team members perceive the situation. Retrospective data are predominantly captured through interviews, questionnaires or narratives from team members or team leaders. The strength of this approach is to obtain subjective perceptions of people who are

involved in the process. But its strength is at the same time its weakness. Findings are based only upon subjective perception of team members.

Based on the advantages and disadvantages of the two approaches, it is suggested that an analysis of the team work process in progression combined with team members' perception about their team work process might provide a more complete picture of the situation. Conclusions built upon IPA would be supported by team members' subjective perception of the process.

1.4.2 When to study team communication

1.4.2.1 Team Meetings as a Legitimate Focus for Studying Team Communication

The analysis of team meetings is an established and acknowledged method for longitudinal studies of process factors. Schwartzman (1989) describes meetings as a specific type of cooperation setting which results in the exchange of information, problem solving, decision-making, or facilitating solution acceptance and execution. Research results suggest that team meetings are important parts of team work activities that are worthy of direct study in and of themselves, while recognising that important formal and informal interaction among team members also takes place outside team meetings and through the entire project duration (e.g., Badke-Schaub & Frankenberger, 1999; Sonnentag, 2001; Walz, 1988).

1.4.2.2 Longitudinal Research of Team Communication in Relation to Group Development

Most studies have focussed on team interactions over a short period, however the literature suggests that the study of communication is more productive when the research investigates communication patterns over some time periods. Literature seems to suggest, that communication patterns in groups are likely to be revealed more clearly over time, when the group has a chance to develop interpersonal relations between group members (Arrow, Poole, Henry, Wheelan, & Moreland, 2004; Bales, 1970; Wittenbaum *et al.*, 2004). This is because team communication is not constant; it is dynamic and therefore changes over time. Carron and Brawley (2000), for example, requested researchers to take into consideration the dynamic nature of teams by examining the temporal changes that occur in teams over time.

Two acknowledged models of team development follow. The first model that will be discussed presents group development as linear progression. The second views group development as punctuated equilibrium. Finally some examples of longitudinal research that investigates communication in relation to team performance will be discussed.

Group Development as Linear Progression

The concept that groups go through different developmental stages began in the late 40's. The first years of group development research was synthesised by Tuckman in 1965. From a review of 50 articles dealing with group development over time, Tuckman (1965) developed his well-known model of group development that is still frequently cited today (Okhuysen & Waller, 2002; Wheelan & McKeage, 1993). Tuckman and Jensen (1977) revised the model a few years later, and added stage 5 of group development to the model. Tuckman's (1965) model describes group development as linear progression, and divides the life span of a group into five different phases. For each phase predominant task-related and socio-emotional communication activities in the group are identified. The five stages of group development, proposed by Tuckman (1965) and Tuckman and Jensen (1977) are outlined in Table 1.04:

Table 1.04: Tuckman's (1965, 1977) five stages of group development

Stage of Group development	Task-related communication activity	Socio-emotional communication activity
1. Forming	Orientation	Testing and dependence
2. Storming	Emotional response to task demands	Intragroup conflict
3. Norming	Open exchange of relevant interpretations	Development of Cohesion
4. Performing	Emergence of solutions	Functional role-relatedness
5. Adjourning, Termination or Mourning	Analysing goal achievement	Coping with ending and making plans for the future

A variety of models about group development follow Tuckman's early work. Various models of group development are formulated from different perspectives towards aspects of the life cycle of the group, and therefore they differ somewhat on particular aspects. However, all of them bear obvious similarities at the macro level. For example,

they are all grounded in the assumption that group development includes certain identifiable stages of development. Although the particular order of the stages has been questioned in research over recent years (Gersick, 1989; Wheelan *et al.*, 2003), the general assumption on which this model is based is still grounded on the concept that group development follows an order of activities. Although these models describe group development as a linear progression, scholars acknowledge that progress in group development is likely to be irregular with periods of regression or stagnation (Chang, Bordia, & Duck, 2003; Waller, Zellmer-Bruhn, & Giambatista, 2002). Also the timing for each particular stage will vary from one group to another. A stage might last a few hours in one group and a few months in another group, and transition from one stage to another is usually more gradual than sharp. It may also be possible that a group skips a stage completely, and other groups may be trapped in one phase and make little or no progress.

Group Development as Punctuated Equilibrium

In 1988, Gersick published a group development model that is different to the approach of group development as linear progression. Gersick (1988) describes group development as punctuated equilibrium. Based on the theory of natural history, punctuated equilibrium is described as the progress of a system.

> Through an alternation of stasis and sudden appearance—long periods of inertia, punctuated by concentrated, revolutionary periods of quantum change. Systems' histories are expected to vary because situational contingencies are expected to influence significantly the path a system takes at its inception and during periods of revolutionary change, when systems' directions are formed and reformed (Gersick, 1988, p. 16).

Gersick observed and analysed task-related communication activities in work groups from the start to the end of the project. All observed project groups had a clear time frame for their project, including a deadline when the project would end. Results of the analysis suggest that groups do not progress gradually through a series of stages. Instead, group development is described as "alternating inertia" and "revolution." Gersick observed "that groups' progress was triggered more by members' awareness of time and deadlines than by completion of an absolute amount of work in a specific developmental stage" (Gersick, 1988, p. 9). In summary, the punctuated equilibrium model describes group development as follows: A group has a

phase 1, which is the first half of the group's calendar time. Phase 1 is described as initial period of inertial movement whose direction is set by the end of the first group meeting. At the midpoint of their allotted calendar time, groups undergo a transition. The transition sets a revised direction phase 2, which is the second period of inertial movement. Two concepts of this model are especially interesting. First, the importance and relevance of the first meeting as an indicator and predictor for further action of the group. The second is the occurrence of a midpoint transition at the calendar midpoint of the allocated time. These two concepts will be discussed in more detail below.

The First Meeting

Gersick (1988) proposes that the first group meeting can be seen as an indicator and predictor of behavioural and thematic patterns within the group for its "Phase 1." She describes her observations as follows: "A framework of behavioral patterns and assumptions through which a group approaches its project emerges in its first meeting, and the group stays with that framework through the first half of its life" (Gersick, 1988, p. 32). She supports her suggestion with reports from the psychoanalytic literature, where findings appear to suggest that the first few seconds of a therapeutic interview decide about the central issue of the session. Further, Gersick implies that group members' "earliest responses to each other set lasting precedents about how a team is going to handle the issues, ideas, questions, and performance strategies that members have brought in" (Gersick, 1988, p. 33).

The Midpoint Transition

Gersick (1988) concludes that groups go through a midpoint transition. At the calendar midpoint of the task or project, groups rethink and revise their work approach. Gersick (1988) explains the occurrence of the observed midpoint transition with the increasing time pressure for the group. Aware or unaware, growing time pressure makes the group reflect on the work they have done so far. The group uses the calendar midpoint to reflect, to gain feedback and to restart. Comparing the midpoint transition with the half-time of a football game, Gersick (1988) describes it as a powerful opportunity for the group to change direction. She stresses groups should use the midpoint in a carefully considered manner; later revision of the work approach may be not possible because of a lack of time. In summary, she suggests groups use the midpoint as a temporal milestone "to compare where they are with where they need to be and to adjust their progress" (Gersick, 1988, p. 34) to pace their work, change direction or

—being satisfied with the progress so far—proceeding with little visible change. Based on Gersick's (1988) findings, it is assumed that groups that have to deliver a task at a defined deadline use their time to work on the task as a metric or a punctuation devise. Further research supports this point (Chang *et al.*, 2003; Okhuysen & Waller, 2002; Perlow, Okhuysen, & Repenning, 2002; Seers & Woodruff, 1997; Waller *et al.*, 2002).

Some researchers have investigated the midpoint transition in more detail. Okhuysen and Waller (2002), for example, explored under what process factors midpoint transitions emerge and how time pressure and the awareness of time as a limited resource, forces groups to structure their process and their activities. Okhuysen and Waller (2002) analysed 80 experimental groups, and their findings suggest that midpoint transition can emerge under various conditions, but does not emerge in every group: When group members are familiar with each other and if there are formal instructions, midpoint transitions are more likely to occur.

Waller *et al.* (2002) investigated the occurrence of midpoint transition between groups with one defined deadline compared with groups with multiple dynamic deadlines and its influence on group members' perception of time pressure. Waller *et al.*'s (2002) findings confirm that groups steadily increase attention to time as the deadline comes closer and pressure increases, and they support the assumption of a task transition at, or near, the midpoint of the allotted time.

Busseri and Palmer (2000) conducted a study where they did not observe whether a midpoint transition occurs naturally; instead, they initiated a midpoint transition by instructing design teams to pause mid-way through a timed task to evaluate their team work process. Results from questionnaires and open-ended comments from team members propose that to pause mid-way through the task in order to assess the team process can initiate a midpoint transition. Findings indicate that midpoint transitions, naturally or initiated, can lead to: (a) significantly higher levels of self-rated and observer-rated group effectiveness, (b) significantly higher levels of self-rated group satisfaction, and (c) a high degree of positive comments from team members about the team work process (Busseri & Palmer, 2000, p. 233). Therefore, Busseri and Palmer (2000) recommend to use the midpoint of a project as an opportunity for teams to reassess and renew their process. A midpoint transition can be initiated or forced by the team leader through an assessment or reflection discussion about the team work process mid-way of the project to help improve team effectiveness.

Punctuated Equilibrium or Linear Progression

The punctuated equilibrium model questions the validity of the traditional models of group development as linear progressions. It provoked a high level of attention in the fields of small group and team research. The attention and interest in Gersick's (1988) study followed a number of studies. Researchers investigated and analysed the two approaches of group development from a variety of different angles (Chang *et al.*, 2003; Seers & Woodruff, 1997; Wheelan *et al.*, 2003).

Wheelan *et al.* (2003) conducted a study, which tested if the length of the task or the project has significant influence on communication behaviour, group development and team members' perceptions over time. Findings suggest significant relationships "between the length of time that work groups had been meeting and the verbal behavior patterns and perceptions of group members" (Wheelan *et al.*, 2003, p. 223). Work groups that worked as a team over a longer period of time showed less dependency and fight statements and more work statements than teams that existed just for a short time period. Team members from longer existing work teams perceived their groups also to be functioning at higher stages of group development. Wheelan *et al.*'s (2003) results lend support to traditional models of linear progression in group development over time. As suggested by Wheelan *et al.* (2003):

> The findings of this study are consistent with the traditional models of group development and cast doubt on the cyclic models and Gersick's punctuated equilibrium model (p. 241).

Seers and Woodruff (1997) investigated the relationship between time pressure or deadline pressure and Gersick's (1988) proposed model of team development. Their findings seem to suggest that the temporal pattern of group development postulated in Gersick's (1988) model only applies for groups who work under a deadline, and therefore the model may not be applicable as a generic model of group development.

Chang *et al.* (2003) conducted a study that compared similarities and differences of the two models (i.e. linear progression and punctuated equilibrium models). Their hypothesis was that project teams undergo both punctuated equilibrium and linear progression, but on different dimensions. Twenty-five simulated project teams were asked to develop a pilot commercial for a well-known airline. Segments of group meetings were analysed with both models to show how the models "transform" data

input differently. Results indicate that both models observe group interaction but data analysis of the models follows different approaches of group development. Chang *et al.*'s (2003) findings suggest that a combination of both models could provide rich information on the developmental pattern of project teams over time. A theory where both models, linear progression and punctuated equilibrium, are considered to be complementary rather than competing to describe group development is recommended. As suggested by Chang *et al.* (2003):

> Groups can follow various developmental patterns—punctuated equilibrium, linear progression, or a combination.… The fact that most of the groups in the present study did show some form of transition during their life spans supported the validity of the punctuated equilibrium model but … we found that transitions do not always occur at the midpoint (p. 113).

Chang *et al*. (2003) suggest that both models are reasonable, because on closer examination, it appears that each model is measuring different factors of group development. The punctuated equilibrium model focuses on ideas and decisions that give the final product its shape. Important ideas and decisions are usually referred to in the literature as milestones. Milestones are fundamental decisions, activities, or moves within the group that shape the final end result. The punctuated equilibrium model describes changes and moves in the way a group works on its task over time, which could be called productive developmental stages, focusing predominantly on task-related communication activities. The linear progression model captures sequential changes in a group's activities in two dimensions, socio-emotional interaction activities and task-related interaction activities.

Chang and Bordia (2001) examined group cohesion in relation to group effectiveness and its longitudinal changes. Data were gathered though questionnaires at two points of a 5-week project (during week 2 and week 5). Participants were 3rd-year students conducting an organisational psychology course on a voluntary basis. Cohesion was measured through seven items. Effectiveness was measured through the group grade, the subjective measure of group performance (2 items), viability of the team (2 items) and professional growth (2 items). Results suggest a relationship between group cohesion and group effectiveness. No significant changes over time were revealed in the data. Personal growth was the only scale that changed slightly over time. Cohesion showed no significant changes over time. Finally, findings propose that group

cohesion can be seen as an "antecedent" but not a consequence of the group performance.

While Chang and Bordia's (2001) findings contribute to a better understanding of the relationship between group cohesion and group effectiveness, it seems worth noting that data were gathered only at two points during a 5-week period (in week 2 and week 5). The fact, that no changes for the measured constructs cohesion and viability have been found could be in relation to the two points in time where these have been measured. Small group research literature about team development seems to suggest that especially the beginning, the midpoint and the end of a group's life-span seem to be worth investigation.

1.5 Conclusion

In this chapter, literature relevant to the topics of teams, team effectiveness and team communication were reviewed. Based on this review, a number of conclusions can be made. First, while many studies have been conducted over the last 30 years, the reality is that scholars do not fully understand why some teams are more effective than others. Part of the reason for this is that many researchers tend to look quite generally at team effectiveness. For example, there are many case study approaches that have looked at both effective and ineffective teams but their methods could be described as quite broad (e.g., Hackman, 1990, 2002; Hitchcock & Willard, 1995; Robbins & Finley, 2000). However, most of this literature seems to agree that the relationship between the interaction process and the team outcome is relevant to understanding team effectiveness. There is a need to look at teams on a more micro level. More in-depth research is needed that focuses on specific parts of team work; in particular the investigation of interaction differences in effective and ineffective teams seems to be relevant.

Second, scholars from communication, management, psychology and sociology seem to agree that communication is an important factor for task groups to perform effectively (e.g., Bales, 1950; Fisher, 1974; Hirokawa, 1990; McGrath, 1984). Communication enables team members to share information and resources, analyse ideas and suggestions, discuss opinions, and evaluate requisites for successful solutions. Hackman and Morris (1983) state "that the key to understanding the 'group effectiveness problem' is to be found in the on-going interaction process which takes place among group members while they are working on the task" (p. 331).

Third, the reviewed literature seems to show a lack of research observing socio-emotional communication in relation to team effectiveness. Reviewed small group research literature appears to suggest that only little observational research has been focused on task and socio-emotional communication differences between effective and ineffective teams. Existing research of team communication in effective and ineffective teams looked predominantly at task-related communication activities. This finding is interesting, because the literature about facilitators and inhibitors of team effectiveness indicates a strong relationship between socio-emotional communication behaviours and team effectiveness (e.g., Fleming & Monda-Amaya, 2001; Hirokawa *et al.*, 2000; Hirokawa & Keyton, 1995; Keyton, 1999a; Mayer, 1998).

Fourth, our understanding of dysfunctional or ineffective team work still appears to be fairly underdeveloped. Existing research of team communication looked predominantly at interaction in effective teams. Mostly, positive examples of effective team work have been used to develop instructions about how to improve team work. Empirical research that investigates unsuccessful and ineffective team work, or teams that fail, is relatively scarce. Little observation-based research about communication patterns in ineffective teams appears to exist. However, there is a variety of literature discussing broad symptoms of ineffective or dysfunctional teams, but predominantly based upon narratives and case study approaches (e.g., Hackman, 1990, 2002; Hitchcock & Willard, 1995; Robbins & Finley, 2000). Most research about ineffective teams is based upon retrospective research methods, while progressive research methods focus predominantly on effective teams. The few studies that focus in particular on the interaction process in effective and ineffective teams seem to agree that ineffective teams tend to show signs of dysfunctional communication behaviours, for example, an imbalance of positive and negative socio-emotional interaction behaviours.

Finally, while it has often been discussed in the literature, member viability has received little attention when the effectiveness of teams has been researched. Most team research has tended to focus mainly on the observable outcomes of the team (i.e., its outputs) and has payed little attention to the viability of its members as a component of team effectiveness. Only one study was found that included member viability as part of its measure of team effectiveness (Chang & Bordia, 2001). Consequently, we still know very little about this part of team effectiveness. In particular, little is still known about how member viability relates to other performance

outcomes (e.g., quality, sustainability, client acceptance) and how it develops over time. Therefore, more research is needed that investigates member viability.

Chapter 2
Proposed Research

2.1 Chapter Introduction

In this chapter, the research project and its scope are discussed. Based upon the literature review in the previous chapter, four research questions are developed. Finally expected significance and contribution to knowledge are discussed.

2.2 Scope of Research

This study aims to contribute to a better understanding of communication differences in effective and ineffective teams. It investigates task and socio-emotional verbal behaviours over time and its relationship to team effectiveness and team members' self-perceived member viability, as shown in Figure 2.01. Basically, this figure is McGrath's (1964) input-process-output framework for analysing team effectiveness, which was introduced in Chapter 1, filled with information where the focus of this research is placed. The grey fields show the main areas of investigation, which are the *interaction process* and the *outcomes* of the teams. Within the grey fields, the factors that will be examined and their measurement instruments are listed.

The author used an aural observational method to examine verbal communication. Spoken interaction has been audio recorded and analysed using Bales' (1950) Interaction Process Analysis (IPA). Three questionnaires were developed, mainly by combining existing measurement instruments from communication and small group research, measuring team effectiveness and member viability. Measurement instruments have been chosen in order to investigate task-related and socio-emotional communication activities over time. Questionnaires are added to IPA data to supplement findings with team members' perceptions in order to achieve a more comprehensive picture of team communication and its relationship to team effectiveness. To be able to compare the communication process, effectiveness of team performance and member viability, teams with little team history were selected, working on a similar task.

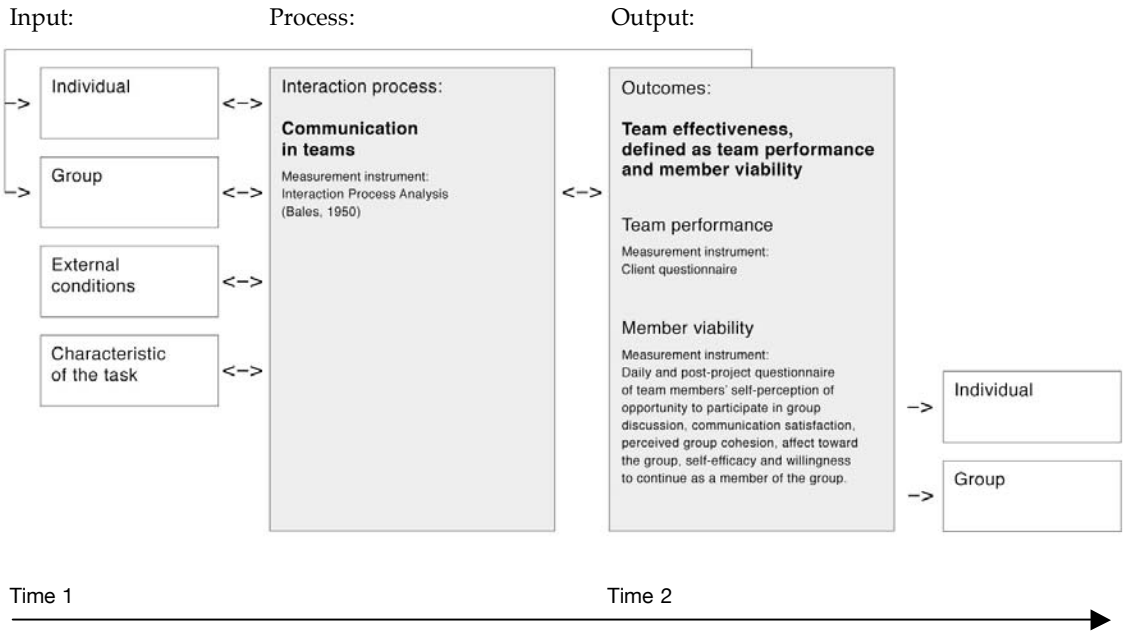


Figure 2.01: Scope of the research. Figure is based on the input-process-output framework for analysing team effectiveness by McGrath (1964).

It was noticed in the reviewed literature that the majority of studies that compare communication patterns in effective and ineffective teams used teams in a laboratory setting, where teams worked on a simple task of relatively short duration. It appeared that most studies agreed that this kind of setting, the simplicity of the task and the relatively short duration of the project lifetime could inhibit the unfolding of communication patterns. These research limitations are particularly interesting, considering that most studies attempt to have implications for workplace teams. It is unclear to what extent these research limitations allow conclusions for this kind of team. As this research intends to develop findings that do have implications for teams in various contexts, including workplace teams, it attempts to overcome these limitations. Participants are post-graduate students formed into teams, working on a complex and dynamic task over a project duration of five days in a classroom setting. These conditions would simulate more realistic conditions, similar to those found in teams in industry. A more detailed explanation of the selected teams and their members will be given in Chapter 3.

Literature about team effectiveness gives evidence that the examination of team communication helps to understand team effectiveness. Previous research indicates a strong relationship between communication behaviours and team effectiveness.

Most sources indicate that the relational side of team communication seems to impact upon group process and outcome factors (e.g., Keyton, 1999a; Mayer, 1998; Stohl & Schell, 1991). Having made this observation, this study strives to examine this general notion in more detail. The following research questions are developed in order to investigate task and socio-emotional communication behaviours in relation to effectiveness of team performance and member viability in-depth:

Research question 1.1: Are communication differences in effective and ineffective teams more visible in socio-emotional interaction than in task-related interaction?

Research question 1.2: Do socio-emotional interaction patterns in effective and ineffective teams change over time?

Research question 2.1: Is there a relationship between socio-emotional interaction patterns and member viability?

Research question 2.2: Does this relationship between socio-emotional interaction patterns and member viability change over time?

2.3 Expected Significance and Contribution of Knowledge

Beyond its substantive contribution, the present research differs methodologically from prior research in a number of ways. Two data gathering methods are combined to achieve a more complete picture about the team work process. Data gathering methods are IPA in combination with questionnaires. Questionnaires collect data from those who receive and review the team's output and from team members. It is a longitudinal study of team communication over time, which enables task and socio-emotional communication patterns to develop and unfold. Data will be collected and examined on a daily basis. Participants will work on a highly dynamic and complex task, which is expected to allow a significant relationship between the process factor communication and output factors to occur (Hirokawa, 1990).

As discussed before, there has been considerable effort in the literature investigating team communication in relation to team effectiveness. While most literature contributes to a better understanding of this relationship, some shortcomings in

existing research have been noticed. This study tries to address some of them by developing research questions that aim to fill some of the critical gaps in previous research and by attempting to select a research setting that suits these research questions.

Chapter 3
Methods

3.1 Chapter Introduction

This chapter discusses the methodological approach of this study. It comprises information about participants, research setting and the task the teams worked on. It gives information about the data collection as well as the analysis of collected data. Measurement instruments will be introduced and discussed. It has to be mentioned that IPA, one of the measurement instruments, was also discussed in Chapter 1. Therefore only those parts of this instrument will be covered in Chapter 3, which have not been already introduced before.

3.2 Introduction to the Research

In order to address the research questions specified in Chapter 2, a research project was undertaken by the author. As an overview, this research was conducted in a classroom setting at an Australian university and involved collecting data from students who were working on team-based projects as part of a subject requirement. While this setting was not drawn at random, it must be stressed that the researcher (the author) was not part of the teaching staff nor had any input into the design of the subject (including the group project). The researcher, for example, had no control over the requirements of the group project, the times teams met to work on their projects, the size of teams or how they were formed.

3.3 Participants

Participants in this study were fifty-three students (35 male, 18 female) enrolled in a project management workshop held at the University of Technology, Sydney (UTS). Participants ranged in age from 24 to 46 years with a mean age of 32 years (M = 32.13, SD = 6.09). Most were currently working in full-time professional or managerial positions and held an undergraduate degree. Professional backgrounds of participants varied greatly (e.g., Accounting, Architecture and Engineering).

3.4 Research Setting

The research setting for this study was a project management workshop in the Faculty of Design, Architecture and Building at UTS. This workshop was part of a post-graduate subject and was a requirement for students enrolled in Master of Project Management degree at UTS. The subject was also offered as an elective to students enrolled in other post-graduate courses at the university.

In order to simulate the work place as much as possible, this segment of the subject was designed and delivered in a workshop format (i.e., intensive "block" mode) over a 5-day period starting on a public holiday Monday and ending on the Friday. The first four days of the workshop (Monday to Thursday) ran from 9am to 9pm with the final day (Friday) running from 10am to 2pm. On each for the first four days, participants attended a series of lectures related to project management topics (e.g., project planning, risk management, time management). Subject matter lectures were conducted for two to three hours followed by team work meetings (some scheduled in the morning and some in the evening). Apart from the formal lectures, participants were required to spend the majority of their time working on a complex team-based project (see Team Task below). To support students working on this project, each team was provided with its own fully equipped meeting room containing tables, chairs, whiteboards, stationery etc. Teams were provided with this working space for the length of the project and were encouraged to configure the room to best fit their needs.

3.5 Team Task

As part of the requirements of the project management workshop, students participated in a team-based project. This project involved students, working in small groups, playing the roles of organisational members responsible for the design, production and delivery of a tender (bid) for a potential new business client (UTS Inc.) The roles of various stakeholders representing UTS Inc. were played by the teaching staff on the workshop. This tender comprised two deliverables—an oral presentation and a document. Both components were to be delivered to the client on the fifth and final day of the workshop (Friday). The length of the oral presentation, decided by the students as a whole cohort during the workshop, was approximately 20 minutes for each team and the form of the document was negotiated by individual teams and the cohort with the key stakeholders. Both components were assessed as "group efforts"

(i.e., all members received the same mark), were of equal value and together contributed 35% to the student's overall grade for the subject.

To satisfy a number of key learning objectives for the workshop (e.g., to work in a team environment under time pressure, to work on a task involving changing conditions), this group project was designed to be both complex and dynamic. To complete this project, teams were required to plan and undertake a number of demanding activities. These included clarifying procedural constraints (through meetings with the client), collecting relevant information, identifying available resources, researching and establishing history and requirements of the client, assessing whether they had enough information, critically examining gathered facts and information, considering valid and feasible solution idea, and deciding what a solution or outcome might look like. Teams were also given unclear goals, contrasting client needs and were required to obtain client approval (e.g., sign-off on stakeholder needs) at various steps through the project to add even further complexity.

3.6 The Teams

Students enrolled in the workshop were organised into nine teams of approximately six members each. Members were placed into teams by the Subject Coordinator based on a mix of gender, professional background, age, experience in the workplace and team role preferences, in accordance with the Belbin (1981, 1993) Interplace team role model. Information about students was gathered from Faculty records and via a pre-course questionnaire sent to students in the weeks leading up to the workshop. Teams were formed based on the criteria listed above prior to the subject being run. A listing of teams and its members was presented to students at the pre-workshop introductory session (see Procedure below).

3.7 Data Collection

3.7.1 Recording of Team Communication

During the workshop, verbal communication taking place in team meeting rooms was recorded using portable audio recording units. Each unit consisted of an audio tape recorder and a discrete, multi-directional microphone placed in the centre of the team's meeting table. Recordings were made on 90 minute audio tapes. Due to resource

constraints, six recording units were available for use in the week scheduled for the workshop. Therefore only six of the nine teams were able to be audio taped.

3.7.2 Questionnaires

Three questionnaires were developed as part of this study. These were (a) the Daily Questionnaire, (b) the Post-Project Questionnaire and (c) the Client Questionnaire. For further reference see Chapter 6. All three questionnaires are listed as appendices 6.2, 6.3 and 6.4.

3.7.2.1 The Daily Questionnaire

To assess the perceptions of each team member, a Daily Questionnaire was designed. As this questionnaire would be completed by members on each of the first four days of the workshop, the Subject Coordinator requested that it must be kept as brief as possible (i.e., to a single sheet). Consequently, only a limited number of items were used to measure the constructs of interest in this study. In most instances, items from existing scales were used with items selected primarily on their face validity. These constructs, and their associated items, were as follows:

Opportunity to Participate in Group Discussions
This construct was measured by two items from DeStephen and Hirokawa's (1988) Feelings Regarding Individual Opportunity to Participate Scale. These items were "Other members of my team really listened to what I had to say today," and "During our team meeting today, I got to participate whenever I wanted to." These items were measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Communication Satisfaction
Three items from Witteman's (1991) Communication Satisfaction Scale were selected. These items were "I enjoyed talking to the other members of my team today," I had fun interacting with the members of my team today," and "I liked talking to the other members of my team today." These items were measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Perceived Group Cohesion
This construct was measured using four items drawn from Chin et al's (1999) Perceived Cohesion Scale. These four items were "I am happy to be part of this team,"

"I feel that I belong to this team," "I feel that I am a member of this team," and "I am content to be part of this team." These items were measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Affect Toward the Group

Items from Freeman's (1996) Affect Toward Group Scale were used to measure this construct. These items were "I feel we have good communication among team members," "I am satisfied with our team's overall performance today," "I feel that we are a very cohesive team," and "I am satisfied with how we have interacted with each other today." These items were measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Self-Efficacy

Self-efficacy was measured using a single item designed for this study. This item was "I am confident that our team will perform well on this project." This item was measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Willingness to Continue as a Member of the Group

This construct was measured using one item written for this study. This item was "I am looking forward to continuing as a member of this team." This item was measured on a 5-point Likert type scale with anchors of 1 = *disagree* and 5 = *agree*.

Perception of Task-Related Communication

Perception of Task-Related Communication was assessed by two questions. The first asked team members to respond to the question "How much time did your team spend on 'task-related' issues (e.g., clarifying goals, gathering information, generating, analysing, and assessing ideas etc)?" This was measured on a 5-point Likert type scale with anchors of 1 = *none* and 5 = *a lot*. This was followed by a second question that asked "How would you rate the quality of this time spent?" This question was measured on a 5-point Likert type scale with anchors of 1 = *very poor* and 5 = *excellent*.

Perception of Process-Related Communication

Perception of Process-Related Communication was assessed by two questions. The first asked team members to respond to the question "How much time did your team spend on 'process related' issues (e.g., deciding how work should be allocated to members, addressing differences of opinion etc)?" This was measured on a 5-point Likert type scale with anchors of 1 = *none* and 5 = *a lot*. This was followed by a second question

that asked "How would you rate the quality of this time spent?" This question was measured on a 5-point Likert type scale with anchors of 1 = *very poor* and 5 = *excellent*.

Objectives Set for the Team

At the end of the Daily Questionnaire, team members were asked to "Briefly list the objectives your team had set for the day." This was asked to help provide the researcher with an overview of the goals set by teams each day. Members were provided with three lines to list these objectives.

3.7.2.2 The Post-Project Questionnaire

Following the completion of the project, but before any performance feedback was provided to teams, students completed a Post-Project Questionnaire made up of two parts. The first part used the same items as the Daily Questionnaire. For this questionnaire however, items were used to assess member's perception of the whole project. This primarily involved the slight re-wording of some items (e.g., removal of the word "today"). This first part also included a number of additional open-ended questions. These were "What were the key decisions that influenced your final deliverables?", "What did you particularly like about this project?", "What did you find particularly difficult in the project?", "In hindsight, what would you have done differently?", and "What did you learn most by working on this project?" Students were also provided with space to write any additional comments about their project or their team.

In the second part of the Post-Project Questionnaire, students were required to assess their team's two tender components (i.e., the presentation and the documentation). The presentation was assessed on five criteria: comprehensive, informative, creative, engaging, and suitable for the client's needs. The documentation was also assessed on five criteria. These were comprehensive, informative, innovative, user-friendly, and suitable for the client's needs. All ten of these criteria were rated on a 5-point Likert type scale with the anchors of 1 = *very poor* and 5 = *excellent*. Students also rated the overall quality of their bid on a same 5-point Likert type scale format.

3.7.2.3 The Client Questionnaire

To obtain an objective measure of effectiveness, the main "client" of the project (the Subject Coordinator) assessed the two tender components of each team. These

components were assessed using the same criteria contained in the second part of the Post-Project Questionnaire that was administered to students (described above). At the request of the Subject Coordinator, each team was rated on a 10-point Likert type scale with the anchors of 1 = very poor and 10= excellent. This was to allow a greater level of discrimination between teams who performed similarly on several indicators.

3.7.3 Procedure

Six weeks prior to the commencement of the project management workshop, students were required to attend a pre-workshop introduction day. During this day, students were informed that a team project was part of this workshop (without any specific details given) and who their fellow team member would be. Students were then given time to meet their fellow team members and create a team name. Following this exercise, and whilst still sitting with their fellow team members, students were informed that an independent researcher (the author of this thesis) was interested in collecting data related to their team projects for a Master's thesis. Consent forms were then handed out to students and general information about the research was provided. Students were informed that participation was voluntary, had no inducement attached (e.g., money, grades), and their participation could be withdrawn at anytime during the project. Students were also informed that consent was required from all team members. Teams were then given time to discuss if they would like to participate in this research and were invited to ask the researcher (and teaching staff) any questions regarding the study. Eight of the nine teams formed for this workshop chose to participate in the research (one team chose not to participate). Consent forms were then signed by these team members and returned to the researcher.

On the first day of the workshop (Monday), students were given a series of introductory lectures related to project management. In the afternoon of this first day, students were fully briefed on the team assignment and provided with relevant documentation. Teams were then given the remainder of the afternoon to work on their projects in their allocated meeting rooms.

Prior to this first meeting taking place, audio recording equipment was set-up in the meeting rooms of those teams that had agreed to participate in the research. As there were more teams volunteering in the research than available audio recording equipment (see 3.7.1 Recording of Team Communication), two teams had to be excluded from the recording part of the research (the two teams were selected

randomly). The members of these two teams were told of the problem (i.e., the lack of equipment) and given the choice to withdraw their participation altogether. Both teams decided that they would still like to be involved in the research and volunteered to complete the daily and Post-Project Questionnaires.

Before each of the six teams being audio taped started their first meeting, they were briefed by the researcher about the audio recording equipment (e.g., the sensitivity of the microphone) and the requirements of the researcher (e.g., the need to periodically check equipment to ensure that it was working and the need to change audio tapes every 90 minutes). Following this briefing, audio equipment was turned on and the researcher left the room. All teams (both those with and without recording equipment) then worked on their projects up to a scheduled evening meal break. Following the evening meal break, students then attended a 90 minute evening lecture. At the end of this lecture, those students participating in the research were administered the Daily Questionnaire. Participants were informed that their responses would remain confidential and would not be shown to their fellow team members or the teaching staff. These surveys were administered and collected by the researcher. After the evening lecture was finished, students were given time to continue working on their projects. This evening, only two teams chose to go back to their meeting room to work where their communication was recorded.

For each of the next three days (Tuesday, Wednesday and Thursday), teams worked on their projects for approximately eight hours per day. Most of this work (approximately 80%) took place in the team's meeting rooms and was audio recorded. Teams were provided with lunch and evening meal breaks (however, most teams took these breaks in their meeting rooms). Teams were required to attend morning and evening lectures. Those students participating in the research were administered their daily team questionnaire at the end of the evening lecture on each of these three days.

On the fifth and final day of the workshop (Friday), each team gave a presentation to the client (and to the other teams) in a lecture theatre. Each teams' project documentation was also given to the client at this time. Following all team presentations, those students participating in the study were administered the Post-Project Questionnaire to complete. After this questionnaire was completed, those students participating in the study were thanked and debriefed on the aims of the study.

Four days after the workshop had finished, the researcher collected completed Client Questionnaires from the Subject Coordinator. Completed surveys were obtained for each of the eight teams participating in this study. The Subject Coordinator was issued with these client surveys at the start of day five (i.e., prior to team presentations) and collected after each team's written documentation had been assessed.

3.8 Data Analysis

3.8.1 Unexpected Problems

During the course of the workshop, two problems emerged that impacted on the researcher's plans for data analysis. The first and most important problem was the discontinuation of one team (Team A) on the fourth day of the project due to a number of issues (namely the personal distress exhibited by some members and that the team had made little progress on the project and would not be able to complete either component by the Friday morning). Members of this team had reported to the Subject Coordinator on the morning of day four that the level of conflict in the team was extremely high and after negotiation with the Subject Coordinator and a trained team facilitator, it was agreed that this team disband and its members be assigned to other teams in order to complete the subject requirements for the workshop. Following discussions with other teams, members of Team A were then randomly appointed to be members of the other eight teams for the remainder of the workshop. However, as this problem occurred relatively late in the workshop, and with teams in their final stages of the project, these members were unable to fully participate and played more of an "observer role" in their new teams. The second problem encountered by the researcher was the malfunctioning of two audio recording units on the first day of the team project in the meeting rooms of Teams E and F. As this first day of this workshop was held on a public holiday, technical assistance was not available until mid-morning of the following day. As a result, the first and second meetings of two teams were not fully recorded.

3.8.2 Summary of Data Collected

Despite the two problems mentioned above, a considerable amount of data was collected as part of this study. Client Questionnaires on all eight participating teams were collected. Daily team questionnaires were gathered from participating team

members for all days (except for Team A who only completed the questionnaires up to day 3). Finally, 157 hours of team communication was captured on audio tape. This included all meetings for three teams (Teams B, C & D) over the four days of the project, all meetings for Team A up to their disbandment, and most of the meetings for Teams E and F.

3.8.3 Selection of Data to be Analysed

Due to the size of the data set collected during this research (particularly the amount of audio recordings), it was considered beyond the scope of this thesis to analyse all data. As such it was decided to restrict the analysis to a selected number of teams and time periods (team meetings).

3.8.3.1 Selected Teams

Based on the results of the Client Questionnaires and the audio recordings captured, it was decided to analyse data collected for Teams A, B and C. Team A was selected because it was technically the most ineffective team at the workshop; it was the only team that failed to complete the task. Teams B and C were selected, because they were rated by the Subject Coordinator as the two most effective teams of those teams that were recorded. Two effective teams were selected (rather than one) because each of these teams produced components of high quality. For Team B, it was their documentation; for Team C, their presentation. (Overall, Team C's tender was rated by the Subject Coordinator as the most effective of these two teams). Further information on the members of Teams A, B, and C are listed in Tables 3.01 to 3.03.

Table 3.01: Overview of Team Members in Team A

Team member	Gender	Age	Degree held
A1	Male	34	B. Ceramic Eng.
A2	Female	31	B. Speech & Hearing
A3	Male	24	B. Civil Engineering
A4	Female	36	B. Architecture
A5	Female	34	Unknown
A6	Male	37	B. Building
A7	Male	27	B. Civil Engineering

Table 3.02: Overview of Team Members in Team B

Team member	Gender	Age	Degree held
B1	Female	31	Unknown
B2	Male	35	B. Business
B3	Male	28	B. Architecture
B4	Male	27	B. Civil Eng.
B5	Male	26	M. Building/Construction
B6	Female	34	Unknown

Table 3.03: Overview of Team Members in Team C

Team member	Gender	Age	Degree held
C1	Male	36	B. Economics
C2	Male	26	B. Architecture
C3	Female	28	B. Business
C4	Female	28	B. Electrical Eng.
C5	Male	27	B. Mechanical Eng.
C6	Male	40	B. Civil Eng.

3.8.3.2 Selected Meetings

As the audio recordings captured for Teams A, B and C were extensive (totalling 4978 minutes or 82 hours and 58 minutes), it was decided to restrict their analysis to a selected number of time periods. In an attempt to analyse comparable time periods, the teams' first meeting of each day was selected for analysis. In total, 11 meetings were analysed. Duration of these meetings ranged between 20 and 90 minutes (M = 54 minutes). Further information on analysed meetings are listed in Table 3.04.

It was decided to analyse the first meeting of each day because the literature suggests that the first meeting sets the direction for the day (e.g., Gersick, 1988). Research also supports the assumption that the first meeting displays the behaviours and themes that dominate the day. The first meeting forms a framework of the group situation and constitutes a platform for the day from which the group operates throughout the day. Psychoanalytic literature also indicates the power of the first minutes of a group meeting. For instance, Pittenger *et al*. (1960) suggest that the first few seconds of a therapeutic interview decide the central issue of the session.

Table 3.04: Overview of Analysed Meetings

Team	Day of project	Duration of meeting	Time when meeting was held
Team A	1	60	1.30 – 2.30 pm
	2	40	8.10 – 8.50 am
	3	90	12.00 – 1.30 pm
Team B	1	30	1.30 – 2.00 pm
	2	60	10.00 – 11.00 am
	3	60	12.30 – 1.30 pm
	4	30	8.30 – 9.00 am
Team C	1	70	1.30 – 2.40 pm
	2	20	10.15 – 10.35 am
	3	75	12.00 – 1.15 pm
	4	60	2.30 – 3.30 pm

3.8.4 Proposed Analysis of Audio Recorded Data

The selected audio recordings from Teams A, B, and C were analysed using Bales' (1950) IPA coding scheme. The IPA system was chosen for many reasons. First, the definitions of many of the IPA categories overlap with communication behaviours expected in effective and ineffective teams. Its twelve categories comprise categories in the areas of task and socio-emotional communication, six categories in each area. Second, the system, which is composed of only twelve categories, is comprehensive. In addition, Bales' book *Interaction Process Analysis: A Method for the Study of Small Groups* laid a comprehensive groundwork for a researcher to be able to become familiar with this method. Third, the method is widely tested. Bales and a number of other scholars have developed this method over the last decades. Based on Bales' recommendation it was decided to code the spoken interaction from audio tapes.

> Ideally, the method is designed for use in the original observation of interaction as it occurs. There is no doubt that a certain loss of content results when the observer attempts to depend upon sound recording alone, and still another loss as the sound record is converted into a written transcript (Bales, 1950, p. 4).

Resources were not available to enable simultaneous observation or video recording by the observer (e.g., an observer present in every group and a video recorder available for each group). Categorisation during the period of the groups' interaction was not possible for the researcher because the time chosen for team meetings varied for each team and many team meetings took place at the same time. Video recording was not feasible for this study because the technical equipment was not available.

Eleven tables were constructed (for each meeting one table) to help in the coding process. Tables were used to write down the scores for the units of analysis while listening to the audio tapes.[5] To assist the observer in the aural categorisation process, the utterance beginning each minute was noted. Under each listed utterance, scores for the verbal communication of this minute were listed.

The researcher undertook self-training to enable her to analyse the data with IPA and apply the IPA categories in accordance with Bales' (1950) instructions. The researcher familiarised herself with the IPA coding system for approximately 4 hours a day over a five week period by reading the IPA work manual, and by practicing the coding system on audio tapes from recorded teams other than Teams A, B, and C. During this training phase the researcher discussed and clarified Bales' category definitions and specific examples of statements with a number of researchers familiar with IPA.

A senior faculty member at UTS who had some experience with IPA, was used to check the reliability of the coding by the researcher. Initially, both coders coded representative sections of two meetings separately and then met to compare their codings. There was a substantial level of agreement, but where there were disagreements these were discussed to establish why the differences occurred and to develop principles for future coding. If they were unable to agree on a coding category, they listened to the tapes simultaneously, replaying segments if necessary, until agreement was reached on the beginning and end of units and the coding for each unit. This was done to the point at which they achieved 90% or better inter-rater agreement, which was reached after the second round of coding.

[5] In this research the unit of analysis is the smallest element of verbal communication based on Bales' (1950) description of the unit to be scored. He also labels the unit to be scored as "an act" or "a single interaction" which most frequently will be "a single simple sentence expressing or conveying a complete simple thought. Usually there will be a subject and predicate, though sometimes one of these elements will only be implied. As an example, if the actor in a conversation says 'What?', the observer translates 'What was that?' or 'I do not understand you' or 'Would you repeat that?', thus filling out both subject and predicate" (Bales, 1950, p. 37). Bales' definition of unit to be scored is adopted because his IPA method will be used in this research.

Following the training period, the researcher coded the audio taped interaction in accordance with the IPA coding scheme for all eleven meetings. The researcher listened to the tapes as many times as required in order to code the verbal behaviours.

After the coding for all 11 meetings was completed, IPA data were analysed and presented in three different ways: (a) frequency of IPA categories for each meeting, (b) frequency of IPA areas for each meeting, and (c) rates of activities for IPA areas through each meeting. Frequency of the IPA categories includes all twelve IPA categories. There are three IPA areas; these comprise (a) task communication, (b) positive socio-emotional communication, and (c) negative socio-emotional communication. The rates of activities contain these three areas as presented in the frequency of IPA areas (task communication, positive socio-emotional communication and negative socio-emotional communication). Rates of activities were measured in 5-minutes periods. Bales measured the course of communication behaviours throughout a defined time period in 10-minutes periods. But because the durations of the meetings were between 20 and 90 minutes it was decided, that a measure of communication activities during a five-minutes period would provide a more detailed picture of the course of communication activities.

3.8.5 Proposed Analysis of the Questionnaires

The Daily and the Post-Project Questionnaires completed by the members of Teams A, B, and C were also examined. The Daily and the Post-Project Questionnaire measured a number of constructs that were selected from existing measurement tools of small group research, as discussed earlier. Constructs were selected in order to measure global member viability as defined by Sundstrom and colleagues (Sundstrom, 1999; Sundstrom & Altman, 1989; Sundstrom *et al.*, 1990).

Rather than use these questionnaires for statistical analysis, it was intended to use this data to supplement IPA data with team members' viability and their perceptions of the process. When developing the outline of the questionnaires it was decided to use the mean of the measured viability constructs as a score for team members' global level of member viability. After scanning through the questionnaires it seemed to appear that the single constructs to measure member viability also provided highly interesting findings about team members' developments and perceptions. Therefore, it was

decided to analyse member viability as a global construct, but also, to investigate the single constructs.

Chapter 4
Results

4.1 Chapter Introduction

In this chapter, the results of data analysed for this thesis are presented. These results will first be presented for each team over each day. This will then be followed by a comparison of teams on a day-by-day basis. As this thesis is particularly interested in the verbal communication differences of effective and ineffective teams, this section will primarily focus on the comparison of the results of Team A (the ineffective team) with those of Teams B and C (the effective teams).

For each analysed meeting a number of findings will be presented. These are as follows:

1. The average IPA frequency count.
2. The average IPA area and domain frequency counts.
3. The course of IPA activity counts throughout each analysed meeting. These are measured and presented in 5-minute periods.
4. The results from administered questionnaires (those completed by group members each day and those completed by the Subject Coordinator after the teams' have completed their project). The results of questionnaires completed by the team members are presented on a group level with a group mean and standard deviation given for each rated construct.

With reference to the IPA data, it was decided to present the findings in a number of different ways (i.e., at the category, area, and domain levels; their course over time), because some communication patterns were more evident in the IPA categories whereas others were more visible at the IPA area or domain level. It should also be noted here that because of the unequal number of the total utterances in the analysed meetings and due to the unequal lengths of these meetings, the IPA activity frequencies have been converted into percentages.

Before presenting the results outlined above, a brief description of each analysed team meeting is also provided. This description offers information about the teams' main activities in the meeting and reports any noticeable developments during this time that

may help account for particular findings in the IPA or questionnaire data (e.g., an argument occurring between members in the meeting). To assist in this brief summary, each team member was given a unique identification code including the letter of their team (A, B, or C) and a number between 1 and 7. When individual team members are reported, this code is added to the information to provide further clarity. For example, "Two team members left the room (A1 and A5)" means that members A1 and A5 left the room in Team A's analysed meeting. More information about the members of each team is provided in Tables 3.01, 3.02 and 3.03 in Chapter 3.

4.2 Results for Team A (The Ineffective Team) on Day 1 of 5

4.2.1 Brief Description of the Meeting

The analysed meeting for Team A on day 1 took place between 1.30 and 2.30 pm and lasted 60 minutes. In this meeting, the team decided about the main activities for the day. These activities were: goal clarification, definition of project outcomes, analysis of briefing, and preparation for the first client meeting. This analysed meeting appeared leaderless and poorly structured. A high level of interruptions between team members took place during the meeting. Three of the seven team members were dominant during the meeting (A2, A4 and A6). There also appeared to be a certain degree of tension between A4 and A6.

4.2.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team A's analysed meeting on day 1 are shown in Figure 4.01. As can be seen in this figure, those categories with the highest frequency counts are *gives suggestion* (24.12%), *gives opinion* (19.85%), and *gives orientation* (14.45%). As can be also seen in this figure, Category 8 (*asks for opinion*) is the lowest category with only 1.50%. Also of interest in this figure is Category 12 *(shows antagonism)* that shows a frequency count of 9.92%. This category is higher than all other socio-emotional categories (positive and negative) and has the fourth highest frequency count of he twelve IPA categories.

IPA area frequencies for Team A's meeting on day 1 are shown on the left side of Figure 4.02. The area of attempted answers contributes 58.42% of the entire team communication within the analysed meeting. Also worth noting is that both areas of socio-emotional interaction (positive and negative) have similar frequency counts (with frequency counts of 15.34% and 17.21%, respectively). Overall, this meeting is task focused with 67.45% task communication and 32.55% socio-emotional communication. This can be seen on the right side of Figure 4.02, where frequency counts are combined to the domain level (i.e., task and socio-emotional domains).

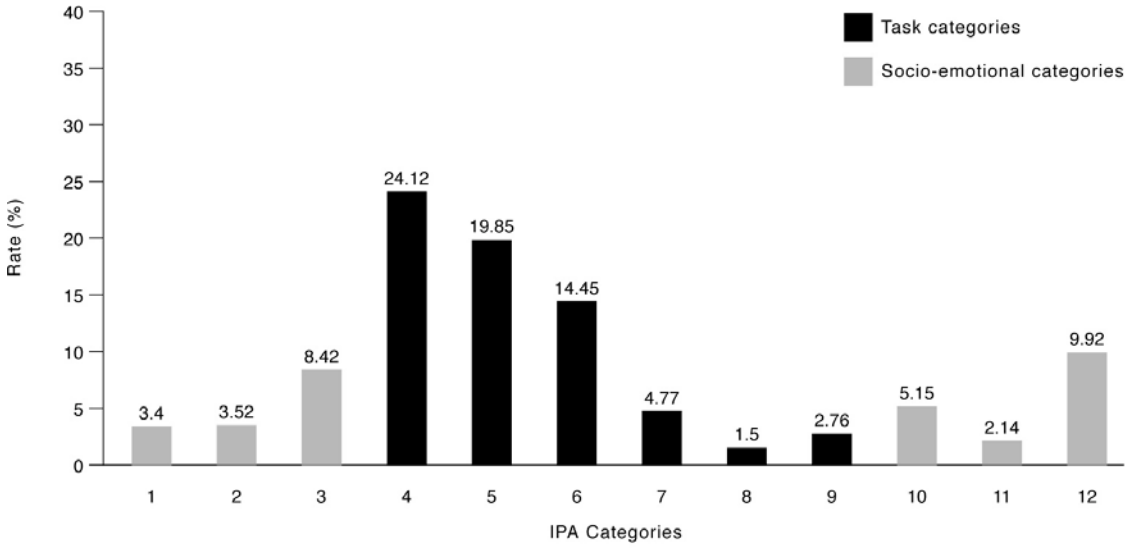


Figure 4.01: IPA category frequencies of analysed meeting for Team A on day 1. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

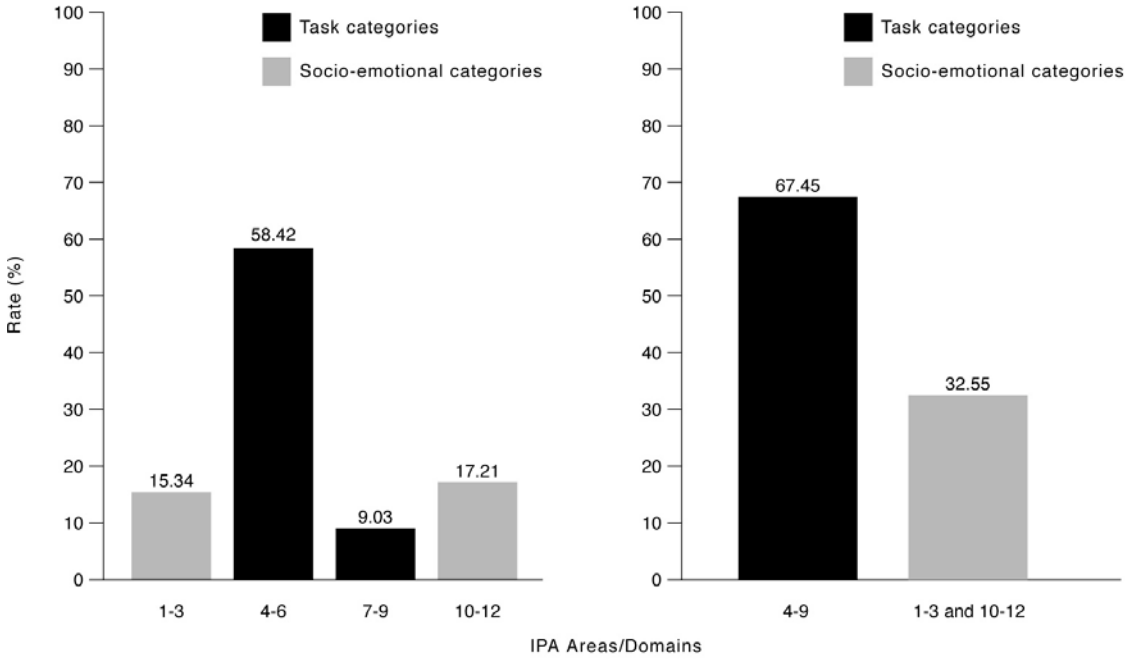


Figure 4.02: IPA area/domain frequencies of analysed meeting for Team A on day 1. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.2.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team A's analysed meeting on day 1 is shown in Figure 4.03. Task related communication is higher than both types of socio-emotional communication (positive and negative). Task related communication is also shown to be consistently high throughout the meeting with low levels of fluctuation existing between any of the twelve periods. Positive socio-emotional communication in this meeting shows a slight ∩-shaped trend with peaks at the beginning and end of the meeting. Positive socio-emotional activities, for example, start at over 20%, drop to a low of 5% in period 9, and then increase again to finish at a high of 31% in period 12. The course of negative socio-emotional communication throughout the meeting shows that this area is never below 6% and often reaches a rate higher than 20% in some periods throughout the meeting. Overall, Figure 4.03 shows that task related communication is relatively stable over the course of the meeting whereas positive and negative socio-emotional communication crosses over at two points. Also of interest is the slight ∩-shaped trend shown for this area over the course of the meeting and how this trend is the inverse to that found for positive socio-emotional communication (i.e., is ∩-shaped).

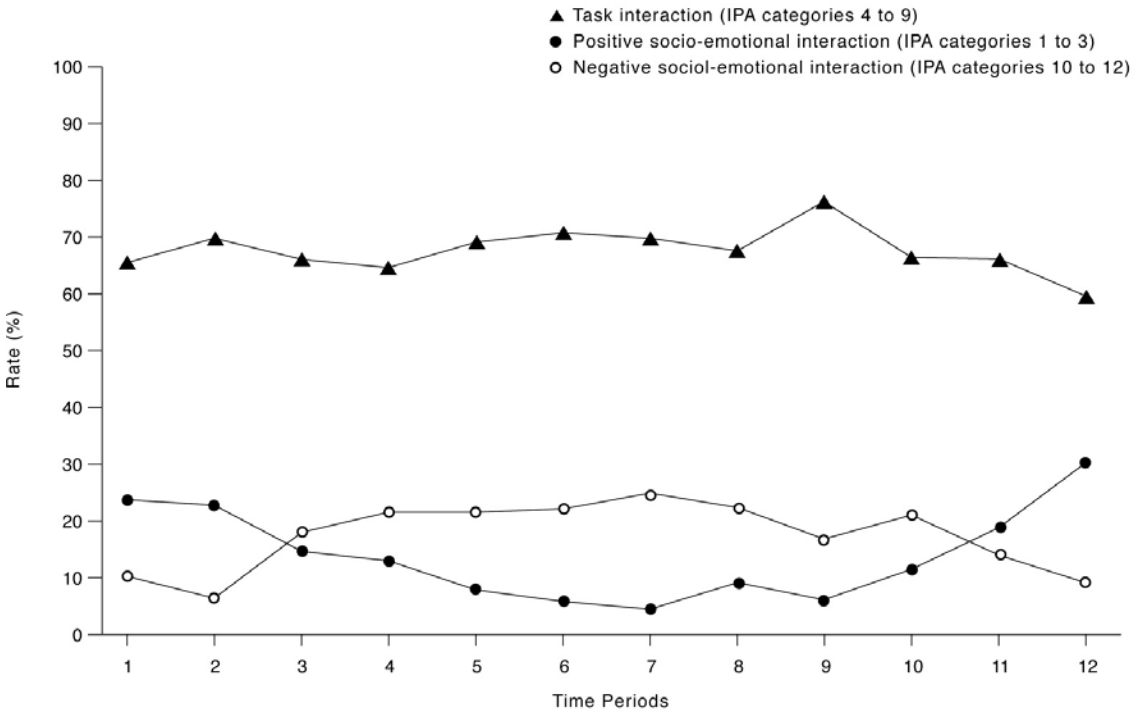


Figure 4.03: Course of verbal behaviours throughout analysed meeting for Team A on day 1. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.2.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by members of Team A at the end of day 1 can be found in the lower section of Table 4.01 on page 73. As can be seen in this table, group mean scores on the measured constructs range from a low of 2.82 (*affect toward the group*) to a high of 4.14 (*opportunity to participate in group discussion*). Most measured constructs are around the scale midpoint (a value of 3 on the used 5-point scale). The average *member viability* for Team A at the end of day 1 is 3.48 ($SD = 0.56$).

4.3 Results for Team A (The Ineffective Team) on Day 2 of 5

4.3.1 Brief Description of the Meeting

The analysed meeting for Team A on day 2 took place between 8.10 and 8.50 am and lasted 40 minutes. The team meeting started with members reviewing the work from the day before and began to develop parts of the content of the bid. The team member A2 was chosen to be the team leader for day 2. Communication activities appeared to comprise a high level of task and process related suggestions, but a low level of feedback in relation to the suggestions made. Team A had difficulties in making decisions and moved on to other issues before agreement was reached. Two out of seven team members appeared to be dominating the team communication (A2 and A4).

4.3.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team A's analysed meeting on day 2 are shown in Figure 4.04. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives suggestion* (24.69%), *gives orientation* (18.37%) and *gives opinion* (14.49%). These are still the three highest categories as found on day 1 with *gives suggestions* the highest once again. This figure also shows that Category 12 (*shows antagonism*) decreased on day 2 to 1.63% (from 9.92% on day 1). In contrast, Category 3 (*agrees*) increased from 8.42% on day 1 to 14.29% on day 2.

IPA area frequencies for Team A's meeting on day 2 are shown on the left side of Figure 4.05. The area of attempted answers had the highest frequency count with 57.55%. This is very similar to that found on day 1 for this area (58.42%). In contrast to day 1, results for day 2 show a higher degree of positive socio-emotional communication (from 15.34% on day 1 to 25.73% on day 2), and a lower degree of negative socio-emotional communication (from 17.21% on day 1 to 5.31% on day 2). As shown on the right side of Figure 4.05, this meeting was overall task focused with 68.98% of communication task related and 34.01% socio-emotional. This ratio of task and socio-emotional communication is similar to that found on day 1 (task = 67.45% and socio-emotional = 32.55%).

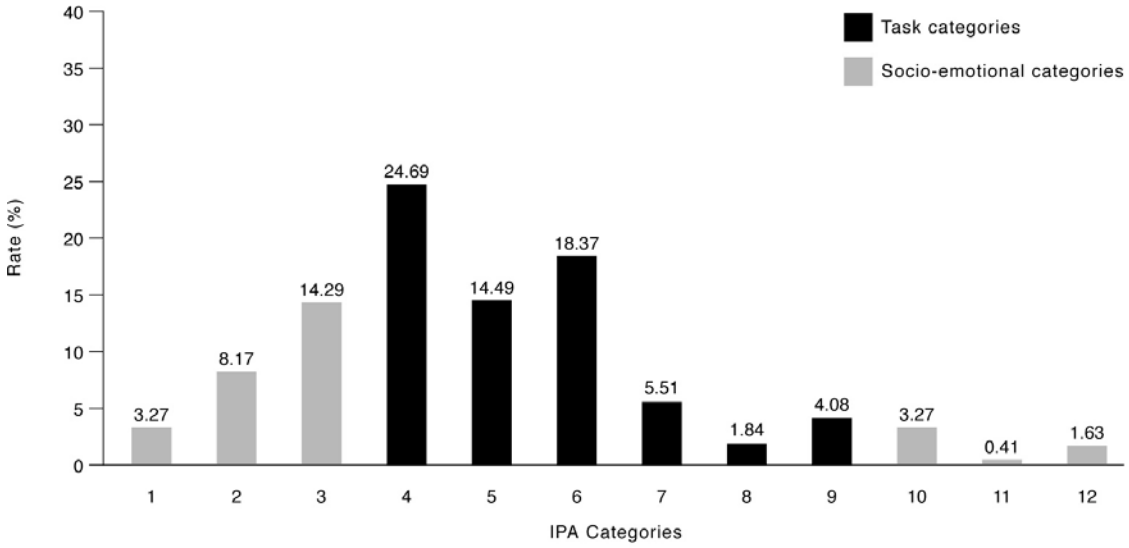


Figure 4.04: IPA category frequencies of analysed meeting for Team A on day 2. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

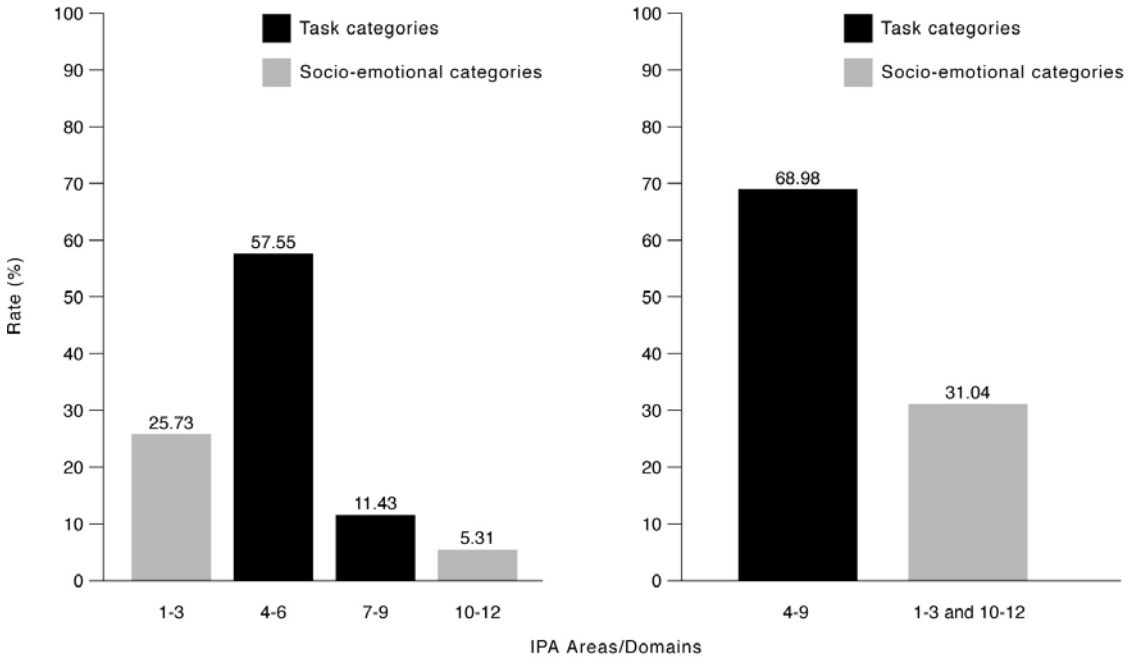


Figure 4.05: IPA area/domain frequencies of analysed meeting for Team A on day 2. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.3.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team A's analysed meeting on day 2 is shown in Figure 4.06. Task related communication activities average 68.98% and show only minor fluctuations throughout the entire meeting. These results are similar to those found on day 1 (67.45%). Positive socio-emotional communication activities were on average 25.73% and also showed only minor fluctuations. These results are different to those found on day 1 where these activities were lower (15.34%) and showed a ∩-shaped trend. Negative socio-emotional activities average 5.31% and display few fluctuations. These results are different to those found on day 1 where these activities were much higher (17.21%). Overall, each of the three communication activities seems to be relatively stable throughout the meeting and run parallel to each other. This is in contrast to day 1 where positive and negative communication activities were found to cross paths twice.

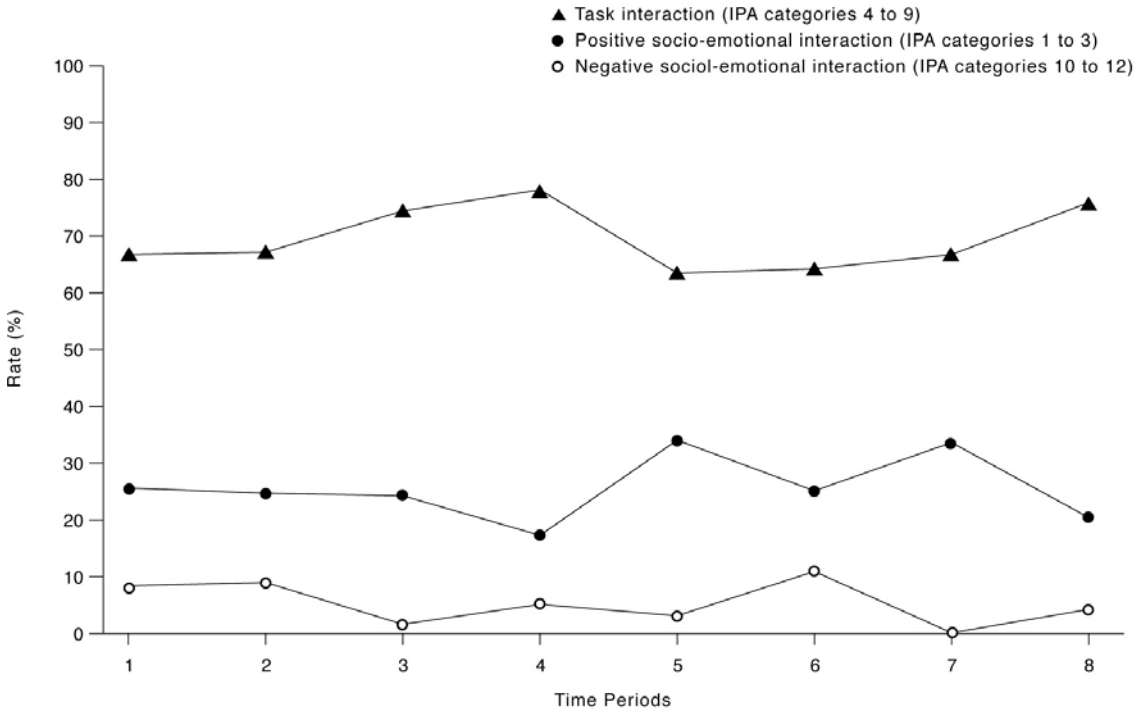


Figure 4.06: Course of verbal behaviours throughout analysed meeting for Team A on day 2. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.3.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team A at the end of day 2 can be found in the lower section of Table 4.01 on page 73. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.79 (*affect toward the group*) to a high of 4.43 (*willingness to continue as a member of the group*). Five of six measured constructs increased from day 1 to day 2. Only *opportunity to participate in group discussion* decreased from 4.14 to 4.07. The average *member viability* for Team A at the end of day 2 is 4.04 ($SD = 0.50$). This is an increase from day 1 where it was 3.48 ($SD = 0.56$).

4.4 Results for Team A (The Ineffective Team) on Day 3 of 5: The Final Day for Team A

4.4.1 Brief Description of the Meeting

The analysed meeting for Team A on day 3 took place between 12.00 and 1.30 pm and lasted 90 minutes. The team meeting started by members reviewing the work they had done the day before. The team suffered from conflict that occurred the day before with members appearing unsure how to behave around each other. Members of the team chose a new team leader for the day (A4). They had problems to define the scope of the project. Team members were not able to reach agreement on how to proceed. After 40 minutes another argument emerged resulting in one team member leaving the room (A6). The team's attention shifted from task-related issues to interpersonal issues. The team could not agree on the next steps of the project. The team could not move on, because one team member (A6), the same team member who left the room during the argument, disagreed with the suggestions made by other team members. Three team members dominated the communication (A4, A5 and A6). Interpersonal tension between two team members appeared high (A4 and A6). This interpersonal tension, which was noticed on day 1, seemed to have returned in this team meeting. A high amount of negative interpersonal communication characterised this meeting with high levels of disagreement, conflict and antagonism present.

4.4.2 Additional Comment about the Development of Team A on Day 3

After the members of Team A completed the Daily Questionnaire (at 6.30 pm in the Lecture Theatre) they went back to their meeting room. At 7.30 pm, after another

discussion about how to proceed on the project, five of the seven members (members: A1, A2, A3, A4, and A5) decided to stop working together as a team. See also 3.8.1 Unexpected Problems in Chapter 3. As Team A ceased to exist after this day this will be the final meeting analysed for this team.

4.4.3 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team A's analysed meeting on day 3 are shown in Figure 4.07. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives opinion* (32.83%), *gives suggestion* (13.24%), and *gives orientation* (12.09%). These are still the highest categories as found on both days 1 and 2. However, in this meeting *gives opinion* has the highest frequency count. This is different to days 1 and 2 where the highest category was *gives suggestion*. This figure also shows that *shows antagonism* is the negative socio-emotional communication category with the highest frequency count (7.06%). This finding is similar to the results found on day 1 (9.92%) but in contrast to the results of day 2 (1.63%).

IPA area frequencies for Team A's meeting on day 3 are shown on the left side of Figure 4.08. The area of attempted answers had the highest frequency count with 58.16%. This is similar to the results found on days 1 and 2 (58.42% and 57.55%, respectively). Results for day 3 show that positive socio-emotional communication activities had a frequency count of 17.83% with the area of negative socio-emotional activities reaching 14.48%. These findings are similar to day 1 but in contrast to day 2 where the former area was higher (positive socio-emotional equalled 25.73%) and the latter area were lower (negative socio-emotional equalled 5.31%). As shown on the right side of Figure 4.08, this meeting is once again task focused (67.69%) and similar to days 1 and 2.

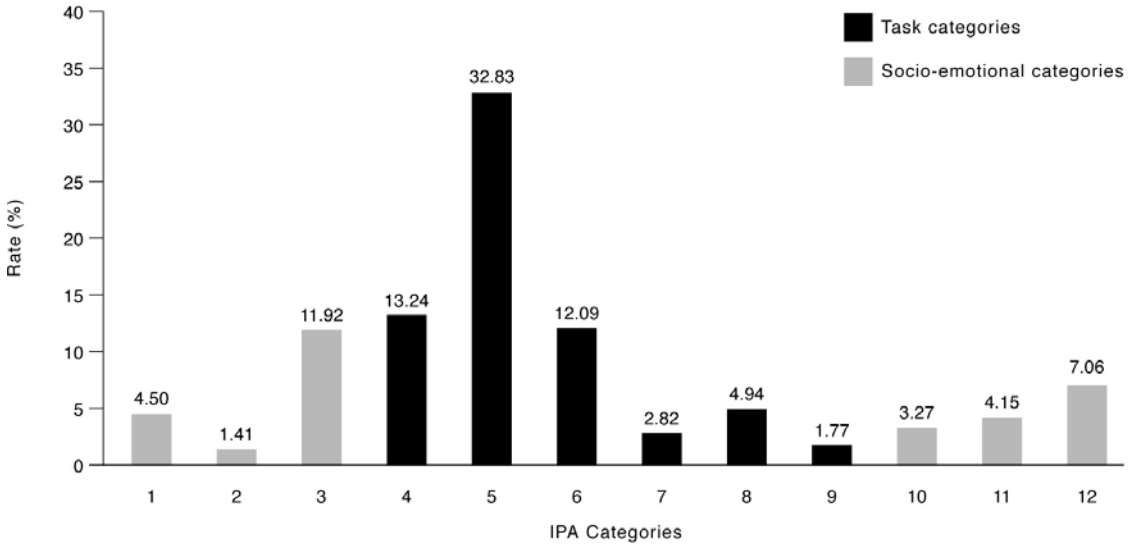


Figure 4.07: IPA category frequencies of analysed meeting for Team A on day 3. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

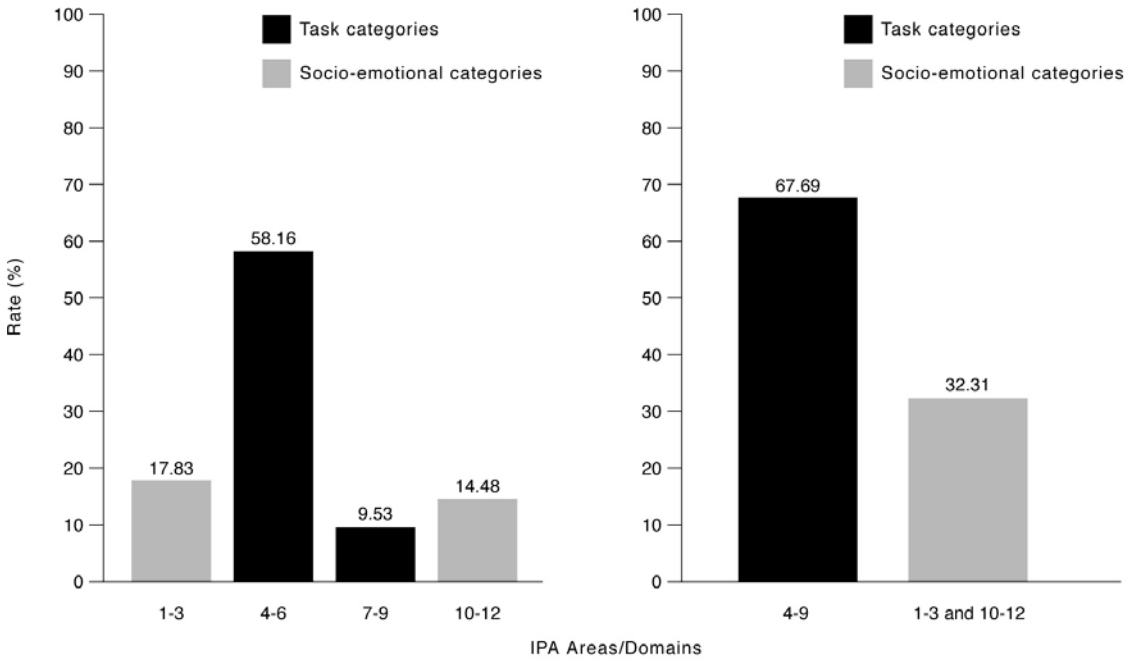


Figure 4.08: IPA area/domain frequencies of analysed meeting for Team A on day 3. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.4.4 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team A's analysed meeting on day 3 is shown in Figure 4.09. Task related communication activities average 67.69% but showed a number of fluctuations between periods. This trend is different to days 1 and 2 where less fluctuations were evident. Positive socio-emotional communication activities were on average 17.83% and also show considerable fluctuations between periods. These results are different to those found in days 1 and 2 where only minor fluctuations were visible. Negative socio-emotional activities average 14.48% and also display a number of fluctuations between periods. This is similar to day 1 in relation to its frequency (17.21%) but dissimilar to its overall trend (i.e., the extent of fluctuations). This result for day 3 is different to day 2 where the area of negative socio-emotional communication was much lower (5.31%) and had only minor fluctuations.

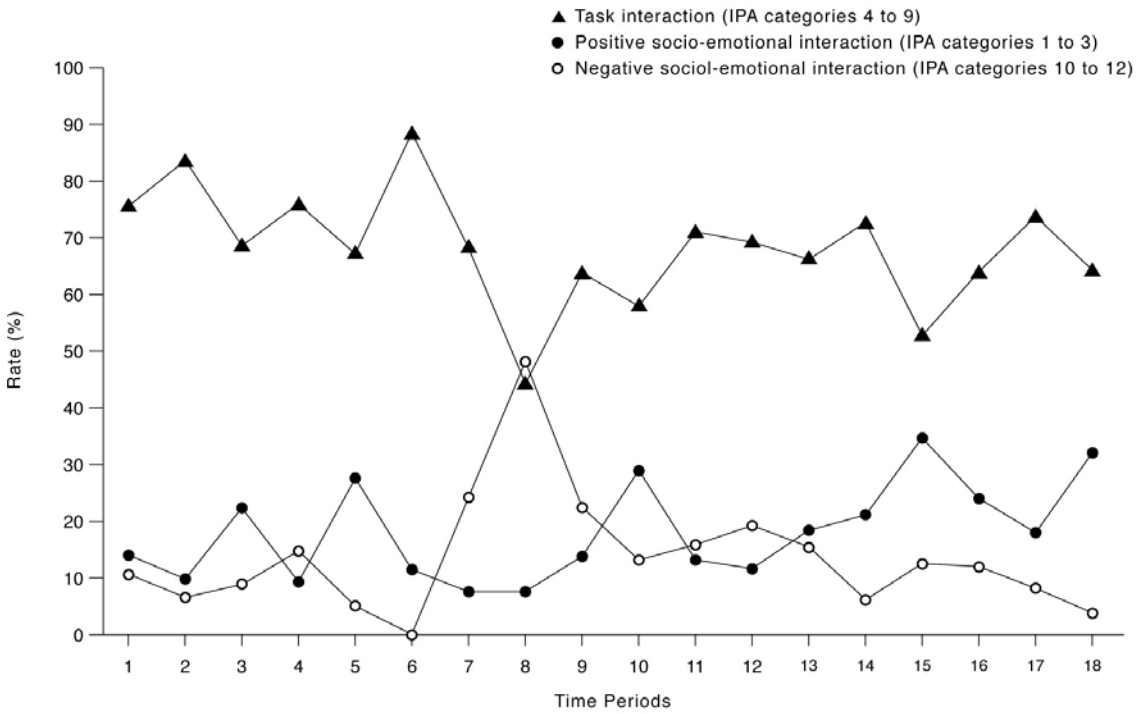


Figure 4.09: Course of verbal behaviours throughout analysed meeting for Team A on day 3. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.4.5 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team A at the end of day 3 can be found in the lower section of Table 4.01 (on this page). As can be seen in this table, group mean scores on the measured constructs range from a low of 2.04 (*affect toward the group*) to a high of 3.29 (*opportunity to participate*). All six measured constructs are lower on day 3 than on day 2. Those decreasing most were *perceived group cohesion* (from 4.18 to 3.07), *communication satisfaction* (from 4.05 to 2.52), *willingness to continue as a member of the group* goes (from 4.43 to 2.71). The average *member viability* for Team A at the end of day 3 is 2.66 ($SD = 0.79$). This has decreased markedly from day 2 where it was 4.04 ($SD = 0.50$).

Table 4.01: IPA and Questionnaire Data for Team A, all Days.

Team A	Day 1	Day 2	Day 3	Day 4	Day 5
IPA Categories[ac]					
1	3.04	3.27	4.50	–	–
2	3.52	8.17	1.41	–	–
3	8.42	14.29	11.92	–	–
4	24.12	24.69	13.24	–	–
5	19.85	14.49	32.83	–	–
6	14.45	18.37	12.09	–	–
7	4.77	5.51	2.82	–	–
8	1.50	1.84	4.94	–	–
9	2.76	4.06	1.77	–	–
10	5.15	3.27	3.27	–	–
11	2.14	0.41	4.15	–	–
12	9.92	1.63	7.06	–	–
IPA Areas[bc]					
1-3	15.34	25.73	17.83	–	–
4-6	58.42	57.55	58.16	–	–
7-9	9.03	11.43	9.53	–	–
10-12	17.21	5.31	14.48	–	–
Questionnaire[d]					
Opportunity to participate	4.14 (0.56)	4.07 (0.79)	3.29 (0.81)	–	–
Communication satisfaction	3.67 (0.90)	4.05 (0.45)	2.52 (0.86)	–	–
Perceived group cohesion	3.61 (0.69)	4.18 (0.57)	3.07 (1.14)	–	–
Affect toward the group	2.82 (0.84)	3.79 (0.51)	2.04 (0.68)	–	–
Self-efficacy	3.14 (1.35)	3.57 (0.53)	2.43 (0.79)	–	–
Willingness to continue	3.71 (0.95)	4.43 (0.53)	2.71 (1.38)	–	–
Member viability	3.48 (0.56)	4.04 (0.50)	2.66 (0.79)	–	–

Note: IPA and questionnaire data were not collected for Team A on days 4 and 5 as this team ceased to exist after day 3.

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.5 Results for Team B (The Effective Team) on Day 1 of 5

4.5.1 Brief Description of the Meeting

The analysed meeting for Team B on day 1 took place between 1.30 and 2.00 pm. This meeting was only 30 minutes in duration because this team decided (prior to the start of this meeting) to meet the client early. Therefore, the team members only had 30 minutes to prepare for this first client meeting. During this time, the team developed questions for the client in order to gather more information about the project scope. Further, the team worked on clarification of the project and discussed the strategy for the client meeting as well as the scope of the project. Three members dominated the team communication (B1, B2 and B6).

4.5.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team B's analysed meeting on day 1 are shown in Figure 4.10. As can be seen in this figure, those categories with the highest frequency counts are *gives suggestion* (26.63%), *gives opinion* (24.94%), and *agrees* (14.53%). As can also be seen in this figure, four categories are used under 1%: *shows solidarity* (0.48%), *asks for suggestion* (0.97%), *shows tension* (0.97%), and *shows antagonism* (0.73%). *Agrees* (14.53%) is considerably higher than *disagrees* (1.94%).

IPA area frequencies for Team B's meeting on day 1 are shown on the left side of Figure 4.11. The area of attempted answers contributes 62.47% of the entire team communication within the analysed meeting. Also worth noting is that the area of positive socio-emotional communication is considerably higher than the area of negative socio-emotional communication (28.18% and 3.64%, respectively). Overall, this meeting is task focused with 71.18% task communication and 28.82% socio-emotional communication. This can be seen on the right side of Figure 4.11, where frequency counts are combined to the domain level (i.e., task and socio-emotional domains).

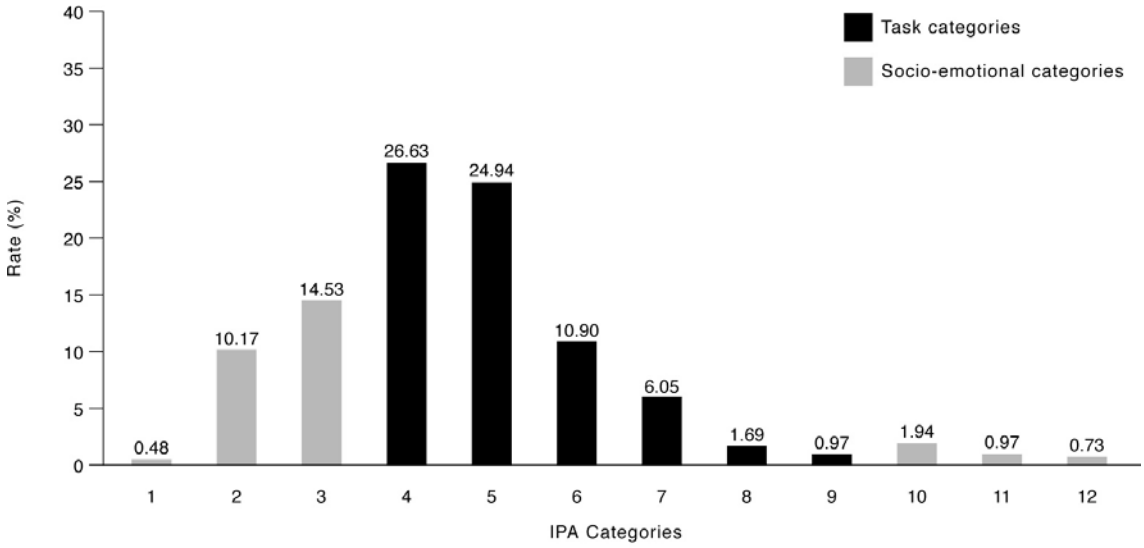


Figure 4.10: IPA category frequencies of analysed meeting for Team B on day 1. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

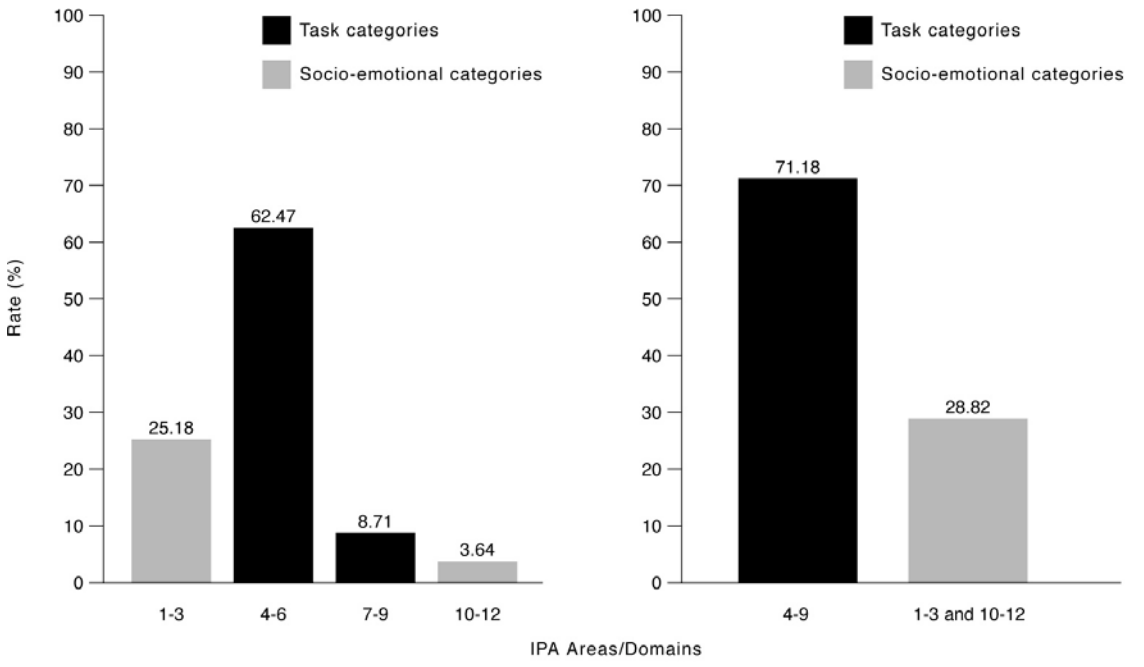


Figure 4.11: IPA area/domain frequencies of analysed meeting for Team B on day 1. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.5.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team B's analysed meeting on day 1 is shown in Figure 4.12. Task related communication is higher than both types of socio-emotional communication (positive and negative). Task related communication is also shown to be consistently high throughout the meeting with low levels of fluctuation existing between any of the six periods. There is also an increase over the periods from 62.50% to 80.00%. Positive socio-emotional communication shows a low level of fluctuation and it decreases across the periods. As can be seen in this figure, the course of negative socio-emotional communication throughout the meeting is shown to be quite low. Also of interest is that it does not start until period 2 (between minutes 5 and 10) and ends with only 1.66% in the last minutes of the meeting. Overall, Figure 4.12 shows that all areas are relatively stable over the course of the meeting. It is also worth noting that in the first period of the meeting (between minutes 1 and 5), positive socio-emotional communication almost reaches 40% whereas negative socio-emotional communication is zero.

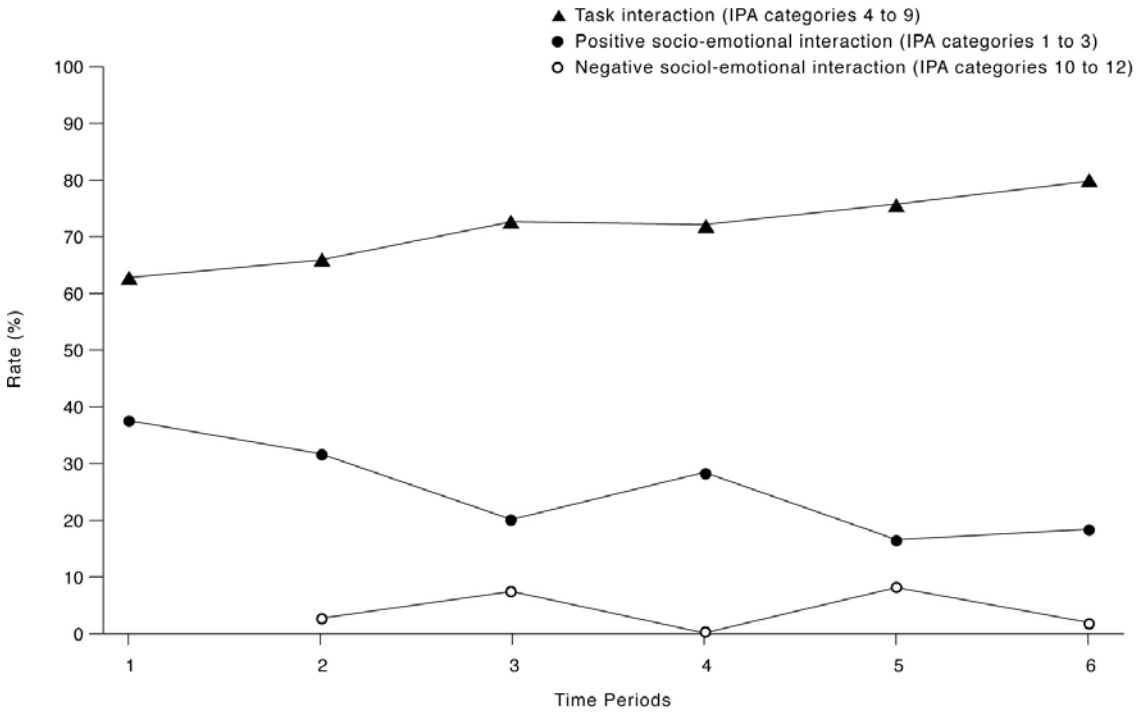


Figure 4.12: Course of verbal behaviours throughout analysed meeting for Team B on day 1. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.5.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by members of Team B at the end of day 1 can be found in the lower section of Table 4.02 on page 90. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.13 (*affect toward the group*) to a high of 4.00 (*opportunity to participate in group discussion* and *willingness to continue as a member of the group*). Most measured constructs are slightly above the scale midpoint (a value of 3 on the used 5-point scale). The average *member viability* for Team B at the end of day 1 is 3.56 ($SD = 0.96$).

4.6 Results for Team B (The Effective Team) on Day 2 of 5

4.6.1 Brief Description of the Meeting

The analysed meeting for Team B on day 2 took place between 10.00 and 11.00 am and lasted 60 minutes. At the beginning of the meeting, team members discussed the different levels of team members' participation. The team defined rules for the cooperative work during the project. Team B discussed characteristics of the task, and planed the work for the day. The members of Team B discussed the deliverables of the task, and who the stakeholders of the project were. No agreement could be reached at this point. Therefore, the team developed strategies for how to gather more information about the project during the next client meetings. While discussing different point of views, two team members were more dominant than the rest of the team (B1 and B2).

4.6.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team B's analysed meeting on day 2 are shown in Figure 4.13. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives opinion* (29.43%), *gives orientation* (26.16%) and *gives suggestion* (11.16%). Two of these categories are the same as on day 1, but Category 6 (*gives orientation*) replaces Category 3 (*agrees*). It is also worth mentioning that from day 1 to day 2, *agrees* (from 14.53% to 7.89%) and *gives suggestion* (from 26.63% to 11.16%) have decreased noticeably whereas *gives information* (from 10.90% to 26.16%) has increased in frequency rate.

IPA area frequencies for Team B's meeting on day 2 are shown on the left side of Figure 4.14. The area of attempted answers had the highest frequency count with 66.75%. This is similar to that found on day 1 for this area (62.47 %). In contrast to day 1, results for day 2 show a lower degree of positive socio-emotional communication (from 25.18% on day 1 to 16.23% on day 2), and a higher degree of negative socio-emotional communication (from 3.64% on day 1 to 7.32% on day 2). As shown on the right side of Figure 4.14, this meeting is overall task focused with 76.44% of communication task related and 23.55% socio-emotional. This ratio of task and socio-emotional communication is similar to that found on day 1 (task = 67.45% and socio-emotional = 32.55%).

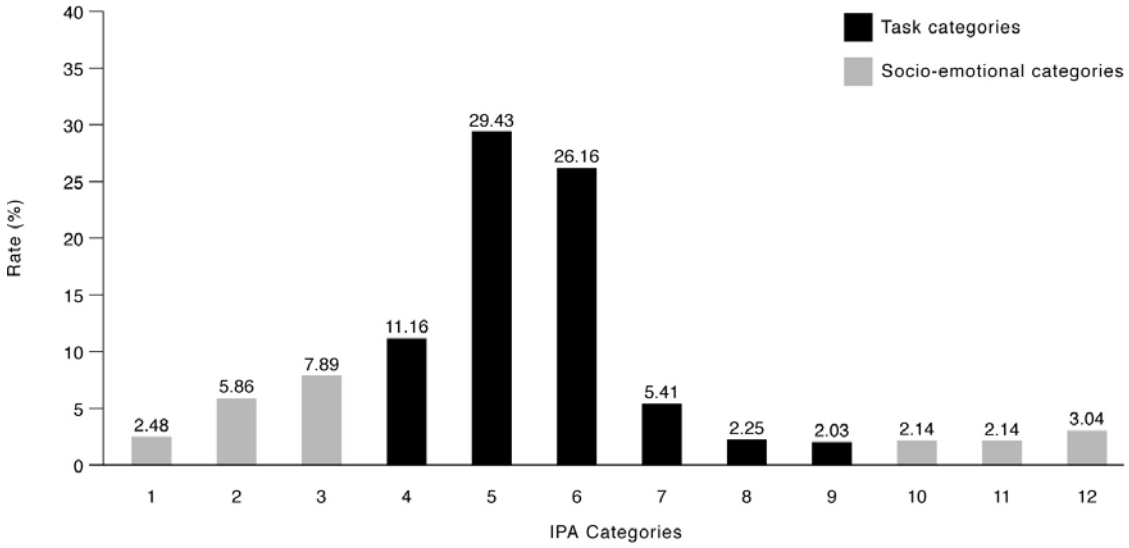


Figure 4.13: IPA category frequencies of analysed meeting for Team B on day 2. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

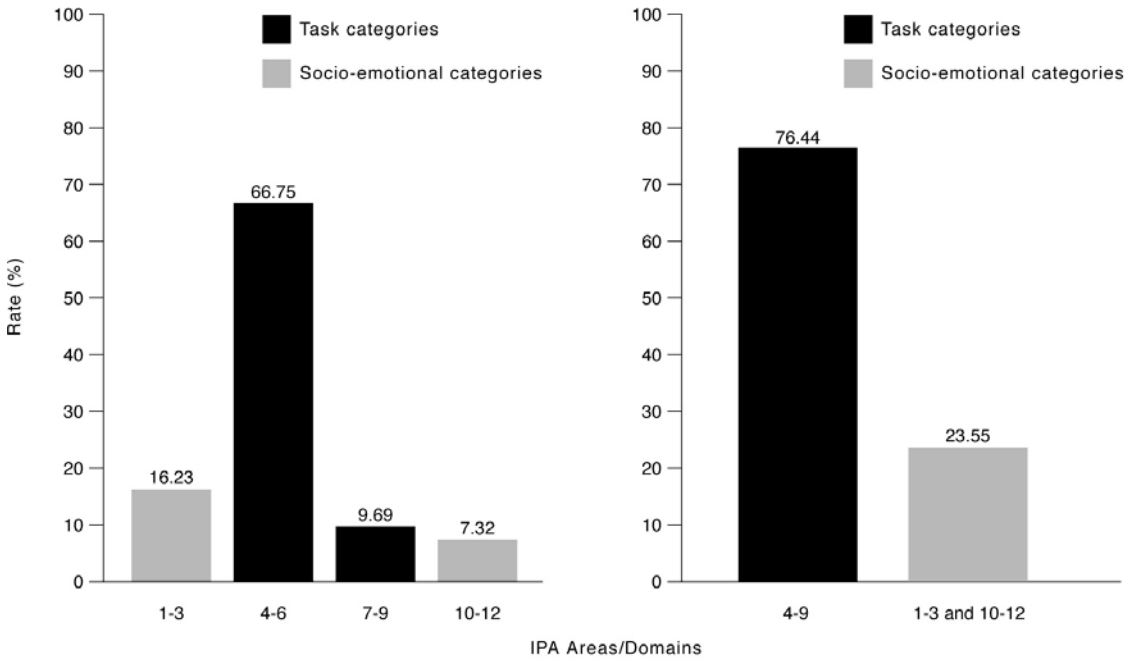


Figure 4.14: IPA area/domain frequencies of analysed meeting for Team B on day 2. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.6.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviours for Team B's analysed meeting on day 2 is shown in Figure 4.15. Task related communication activities average 75.44% and show considerable fluctuations across the periods. These fluctuations were not present on day 1 even though the average of task related communication was quite similar (71.18%). Positive socio-emotional communication activities are on average 16.23% and also show a number of fluctuations. These results are different to those found on day 1 where these activities were higher (25.18%) and showed less fluctuation. Negative socio-emotional activities average 7.32% and displayed one large fluctuation between periods 8 and 12 (between minutes 40 and 60). These results are different to those found on day 1 where these activities were much lower (3.64%) and quite stable. Overall, each of the three communication activities seems to display fluctuation throughout the meeting. The course of verbal behaviours also shows that positive and negative socio-emotional communication activities cross paths twice. This is in contrast to day 1 where the communication activities were quite stable and did not cross over at any point during the meeting.

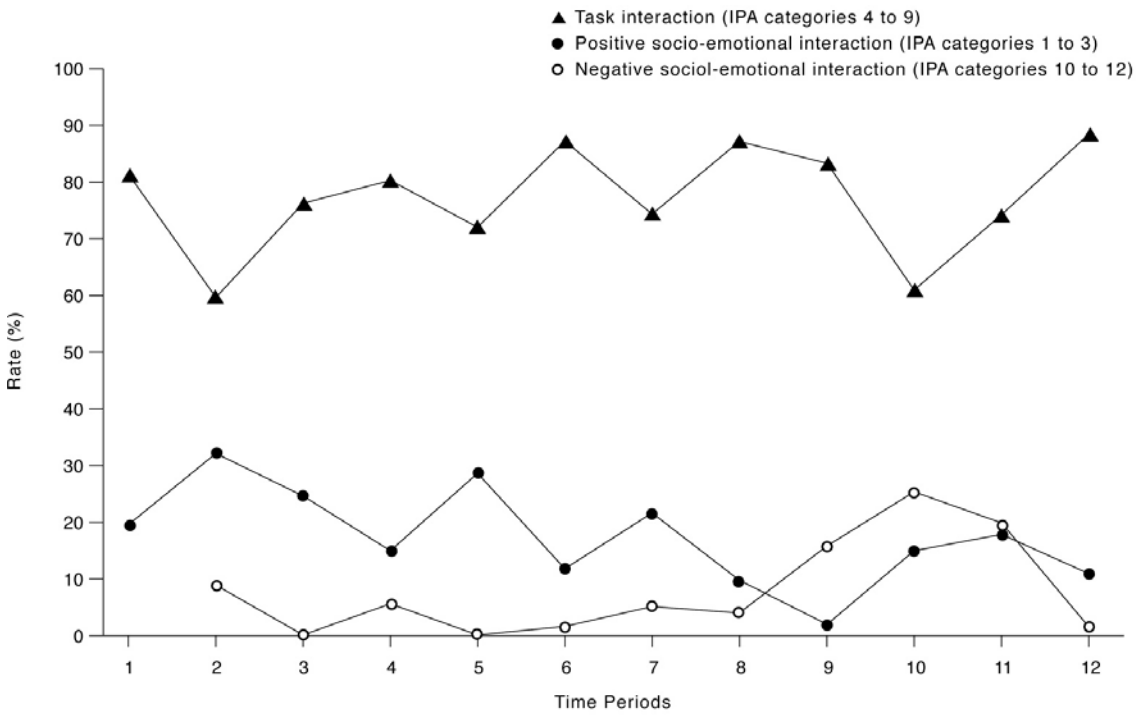


Figure 4.15: Course of verbal behaviours throughout analysed meeting for Team B on day 2. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.6.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team B at the end of day 2 can be found in the lower section of Table 4.02 on page 90. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.38 (*affect toward the group*) to a high of 4.80 (*opportunity to participate in group discussion*). Overall, the scores on the measured constructs are similar to day 1. Most constructs improved slightly from day 1 to day 2, for example: *perceived group cohesion* (from 3.63 to 3.67), and *opportunity to participate in group discussion* (from 4.00 to 4.08). The construct *affect toward the group* increased most from 3.13 to 3.38. Even though these changes were minimal, none of the constructs were lower than the day before. The average *member viability* for Team B at the end of day 2 is 3.65 ($SD = 0.87$). This is a slight increase from day 1 where it was 3.56 ($SD = 0.96$).

4.7 Results for Team B (The Effective Team) on Day 3 of 5

4.7.1 Brief Description of the Meeting

The analysed meeting for Team B on day 3 took place between 12.30 and 1.30 pm and lasted 60 minutes. The team meeting started with gathering ideas for the presentation and reviewing the work they did on day 2. After this was done, the members of Team B planned the next work steps for the day. Team B decided to split into different work groups (i.e., sub-groups) to be able to provide all required deliverables. The team built three work groups (each of 2 members) to start working on the different components of the tender they have to produce.

4.7.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team B's analysed meeting on day 3 are shown on Figure 4.16. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives suggestion* (23.97%), *gives information* (20.97 %), and *gives opinion* (19.60%). These are still the highest categories as found on day 2. However, in this meeting, *gives suggestion* has the highest frequency count. This is different to day 2 where the highest category was *gives opinion*. Figure 4.16 also shows that *agrees* is the socio-emotional communication category with the highest frequency count (12.32%). This finding is similar to the results found on days 1 (14.53%) and 2 (7.89%).

IPA area frequencies for Team B's meeting on day 3 are shown on the left side of Figure 4.17. The area of attempted answers had the highest frequency count with 64.36%. This is similar to the results found on days 1 and 2 (62.47% and 66.65%, respectively). Results for day 3 show that positive socio-emotional communication activities had a frequency count of 21.33% with the area of negative socio-emotional activities reaching only 5.04%. These findings are similar to days 1 and 2. As shown on the right side of Figure 4.17, this meeting is once again task focused (73.63%) and similar to days 1 and 2.

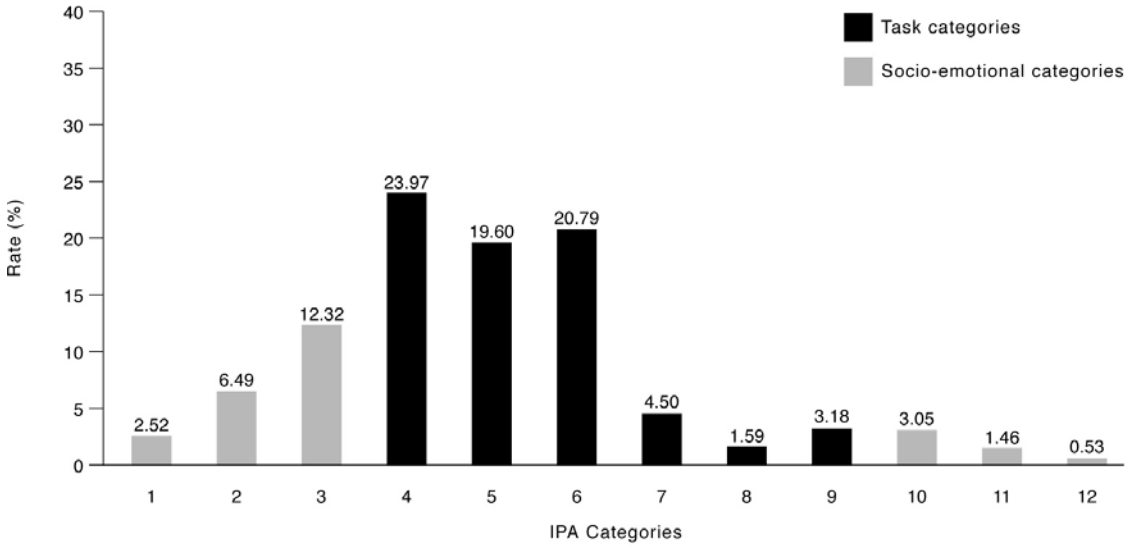


Figure 4.16: IPA category frequencies of analysed meeting for Team B on day 3. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

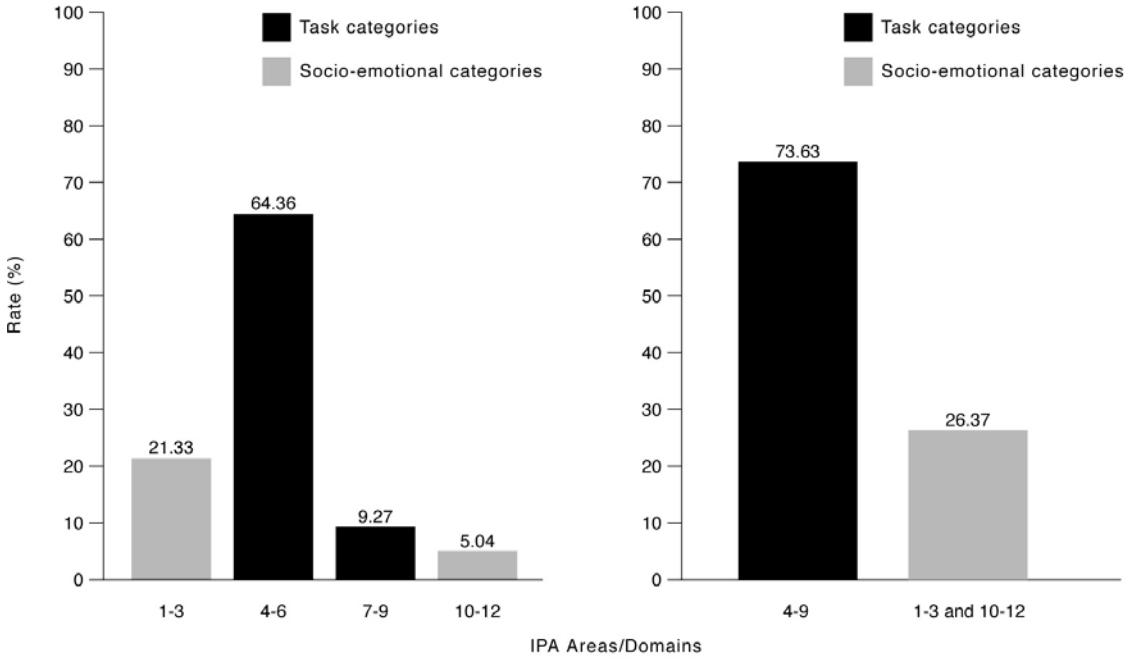


Figure 4.17: IPA area/domain frequencies of analysed meeting for Team B on day 3. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.7.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team B's analysed meeting on day 3 is shown in Figure 4.18. Task related communication activities average 73.63% but show a number of large fluctuations between periods. This trend is somewhat similar to day 2 but very different to day 1. Positive socio-emotional communication activities are on average 21.33% and show one large fluctuation between periods 2 and 4. These results are different to those found on day 1 (no fluctuations found) and day 2 (a number of small fluctuations evident). Negative socio-emotional activities average 5.04% and also display one fluctuation between periods 6 and 8. It is also worth noting that periods 10 to 12 show no negative socio-emotional communication activities in the meeting (0.00%). This is different to days 1 and 2. Overall, the three communication activities show a number of fluctuations and cross over each other at several points. Of particular interest is that in period 3 (between minutes 10 to 15), where positive socio-emotional communication increases up to over 50%, which is even higher than task communication at this point during the meeting. This trend is different to the days before.

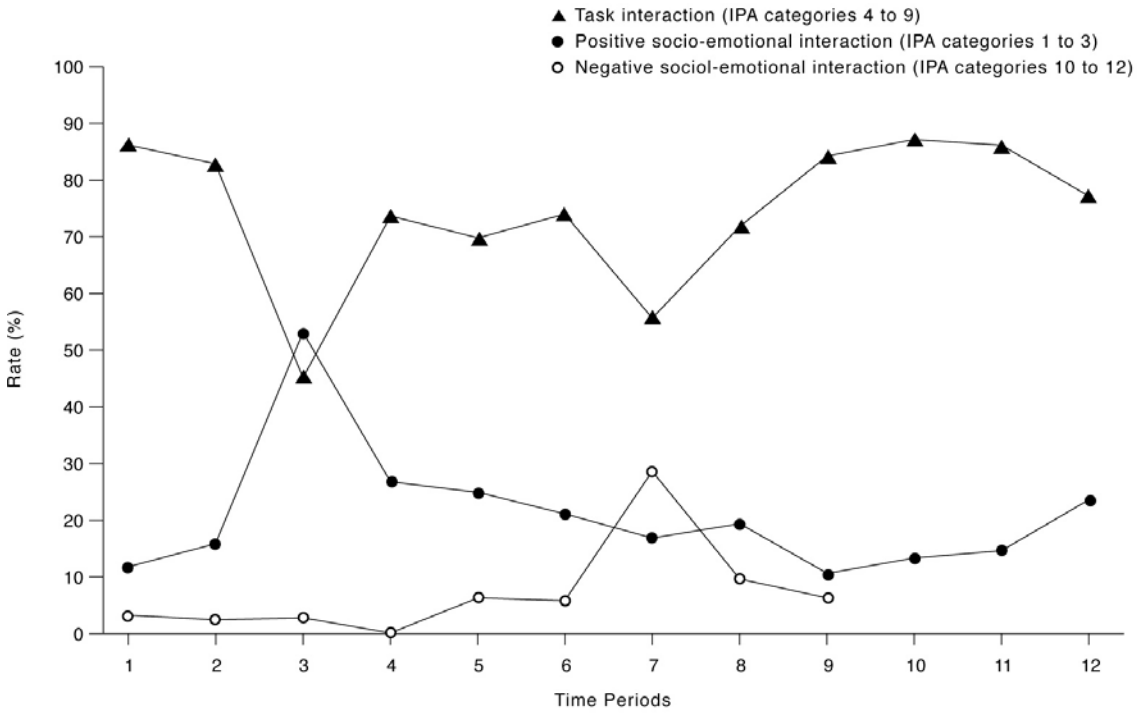


Figure 4.18: Course of verbal behaviours throughout analysed meeting for Team B on day 3. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.7.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team B at the end of day 3 can be found in the lower section of Table 4.02 on page 90. As can be seen in this table, group mean scores on the measured constructs range from a low of 4.00 (*self-efficacy*) to a high of 4.17 (*opportunity to participate* and *willingness to continue in the group*). Overall, all six measured constructs are 4 or above on the 5-point scale used. They all increase from day 2 to day 3, with *affect toward the group* increasing most (from 3.38 to 4.08). The average *member viability* for Team B at the end of day 3 is 4.12 (*SD* = 0.69). This has increased from day 2 where it was 3.65 (*SD* = 0.87).

4.8 Results for Team B (The Effective Team) on Day 4 of 5

4.8.1 Brief Description of the Meeting

The analysed meeting for Team B on day 4 took place between 8.30 and 9.00 am and lasted 30 minutes. The team meeting started with brainstorming ideas for the presentation on day 5. Members of this team also reviewed the work they did the days before and they planned the work for day 4. Finally, they discussed the content of the project documentation and the presentation.

4.8.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team B's analysed meeting on day 4 are shown on Figure 4.19. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives opinion* (26.54%), *gives orientation* (20.11%), and *asks for orientation* (11.80%). Two of these categories are the same as on day 3, but Category 7 (*asks for orientation*) replaces Category 4 (*gives suggestion*). As can also be seen in this figure, five categories are used under 2%: *disagrees* (1.61%), *shows antagonism* (1.16%), *asks for opinion* (1.07 %), *asks for suggestion* (1.07%), and *shows tension* (0.00%). These results are similar to all previous days.

IPA area frequencies for Team B's meeting on day 4 are shown on the left side of Figure 4.20. The task area of *attempted answers* had the highest frequency count with 56.30%. This is similar to the results found on the three days before. Results for day 4 show that positive socio-emotional communication activities had a frequency count of 26.54% with the area of negative socio-emotional activities reaching 3.22%. These findings are similar to the previous days. As shown on the right side of Figure 4.20, this meeting is once again task focused (70.24%) and similar to days 1, 2 and 3.

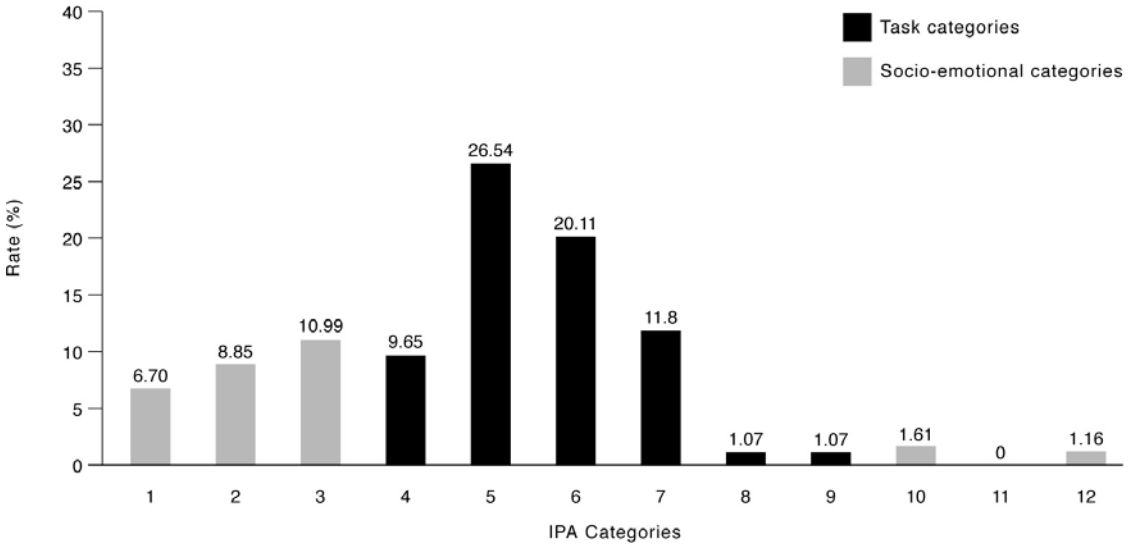


Figure 4.19: IPA category frequencies of analysed meeting for Team B on day 4. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

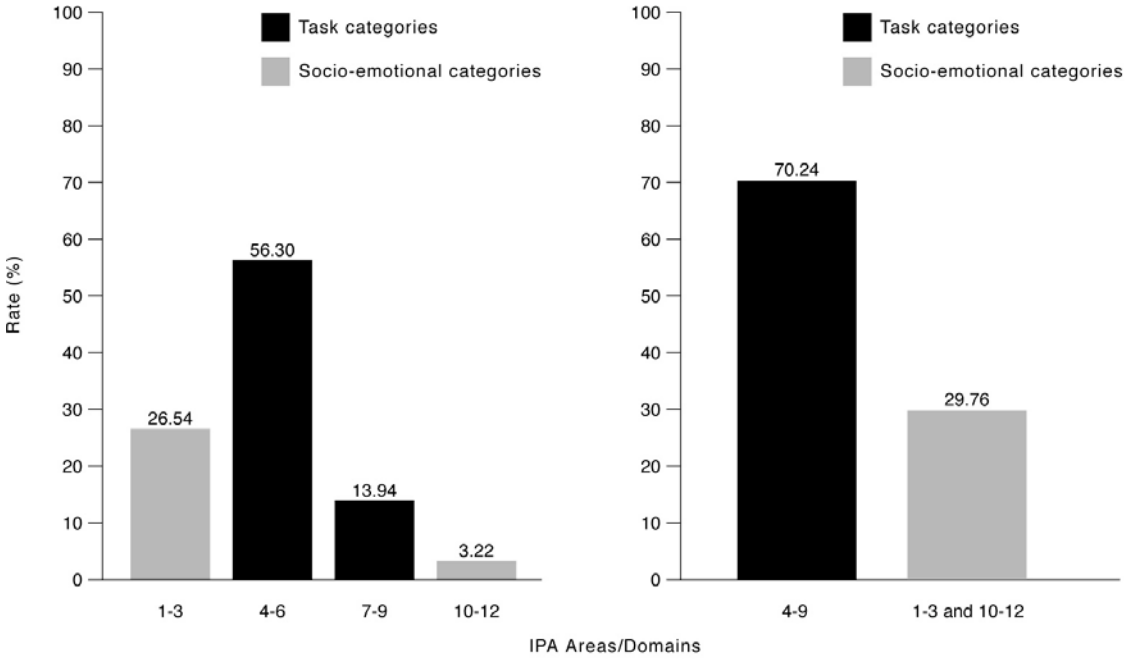


Figure 4.20: IPA area/domain frequencies of analysed meeting for Team B on day 4. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.8.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team B's analysed meeting on day 4 is shown in Figure 4.21. Task related communication activities average 70.24% and showed only slight fluctuations. Positive socio-emotional communication activities are on average 26.54% and also show only minor fluctuations between periods. Negative socio-emotional activities average 3.22% and display a stable course of activity in this area. As can also be seen in Figure 4.21, Team B's meeting ends (period 6) with a higher degree of task activity and a lower degree of positive socio-emotional activity compared to that found in the preceding periods (periods 3 to 5). This meeting also ends with no negative socio-emotional activities. Overall, each of the three communication activities seems to be most similar to those found on days 1 and 2 and particularly dissimilar to day 3.

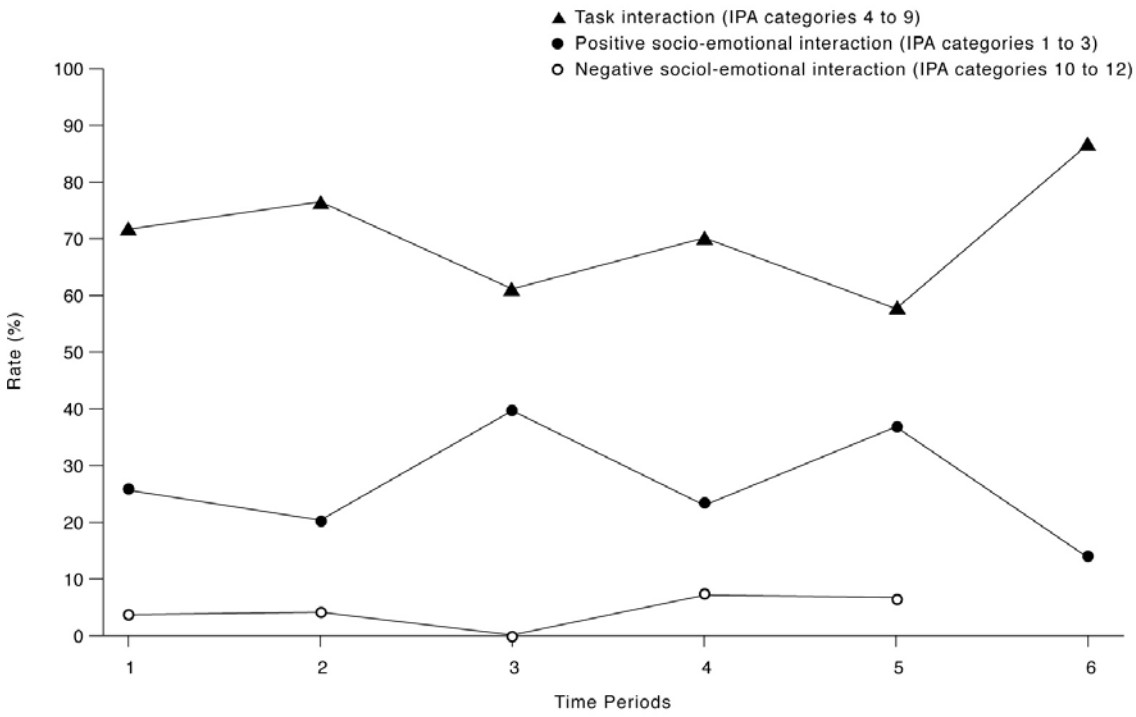


Figure 4.21: Course of verbal behaviours throughout analysed meeting for Team B on day 4. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.8.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team B at the end of day 4 can be found in the lower section of Table 4.02 on page 90. As can be seen in this table, group mean scores on the measured constructs range from a low of 4.04 (*affect toward the group*) to a high of 4.33 (*willingness to continue as a member of the group*). Four constructs increase and two decrease from the previous day. Increased constructs are *opportunity to participate in group discussion* (from 4.17 to 4.25), *communication satisfaction* (from 4.11 to 4.28), *willingness to continue as a member of the group* (from 4.17 to 4.33) and *self-efficacy* (from 4.00 to 4.17). Decreased constructs are *perceived group cohesion* (from 4.13 to 4.08) and *affect toward the group* (from 4.08 to 4.04). The average *member viability* for Team B at the end of day 4 is 4.15 ($SD = 0.39$). This has increased slightly from day 3 where it was 4.12 ($SD = 0.69$).

4.9 Results for Team B (The Effective Team) on Day 5 of 5

4.9.1 Results of the Post-Project Questionnaire

Results from the Post-Project Questionnaire completed by the members of Team B after the completion of their project can be found in the lower section of Table 4.02 on page 90. As can be seen, group mean scores on the measured constructs range from a low of 3.96 (*affect toward the group*) to a high of 4.58 (*opportunity to participate*). Overall, most measured constructs are similar to day 4, except for two that were shown to decrease. These two constructs were *affect toward the group* (decreased from 4.04 to 3.96) and *willingness to continue as a member of the group* (decreased from 4.33 to 3.50). The average *member viability* for Team B at the end of the project is 4.14 ($SD = 0.80$). This is very similar to the day before where it was 4.15 ($SD = 0.39$).

On average, members of Team B rated their group presentation 3.80 ($SD = 0.18$) and their project documentation 4.07 ($SD = 0.39$). Both of these components are rated above the scale midpoint of 3, where 1 equals *very poor* and 5 equals *excellent*.

4.9.2 Results of the Client Questionnaire

On a scale from 1 to 10 (with anchors of 1 = *very poor* and 10 = *excellent*) the Subject Coordinator rates Team's B presentation 8.20 and their project documentation 7.20. At the item level, *informative presentation* rates highest (9 out of 10) with *innovative documentation* rating lowest (5 out of 10). In the space provided for qualitative comments the Subject Coordinator wrote the following about Team B: "Today's presentation exceeded my expectations for this team's ability to become both cohesive and creative."

Table 4.02: IPA and Questionnaire Data for Team B, all Days.

Team B	Day 1	Day 2	Day 3	Day 4	Day 5
IPA Categories[ac]					
1	0.48	2.48	2.52	6.70	–
2	10.17	5.86	6.49	8.86	–
3	14.53	7.89	12.32	10.99	–
4	26.63	11.16	23.97	9.65	–
5	24.94	29.43	19.60	25.54	–
6	10.90	26.16	20.79	20.11	–
7	6.05	5.41	4.50	11.80	–
8	1.69	2.25	1.59	1.07	–
9	0.97	2.03	3.18	1.07	–
10	1.94	2.14	3.05	1.61	–
11	0.97	2.14	1.48	0.00	–
12	0.73	3.04	0.53	1.16	–
IPA Areas[bc]					
1-3	25.18	16.23	21.33	26.54	–
4-6	62.47	66.75	64.36	56.30	–
7-9	8.71	9.69	9.27	13.94	–
10-12	3.64	7.32	5.04	3.22	–
Questionnaire[d]					
Opportunity to participate	4.00 (0.71)	4.08 (0.92)	4.17 (0.82)	4.25 (0.52)	4.58 (0.80)
Communication satisfaction	3.61 (0.80)	3.61 (0.53)	4.11 (0.50)	4.28 (0.71)	4.39 (0.12)
Perceived group cohesion	3.63 (0.86)	3.67 (0.83)	4.13 (0.59)	4.08 (0.52)	4.08 (0.75)
Affect toward the group	3.13 (1.18)	3.38 (1.00)	4.08 (0.90)	4.04 (0.37)	3.96 (0.91)
Self-efficacy	3.67 (0.82)	3.67 (0.82)	4.00 (1.10)	4.17 (0.75)	4.17 (0.75)
Willingness to continue	4.00 (0.89)	4.00 (1.26)	4.17 (0.75)	4.33 (0.52)	3.50 (1.22)
Member viability	3.56 (0.96)	3.65 (0.87)	4.12 (0.69)	4.15 (0.39)	4.14 (0.80)

Note: IPA data were not collected for Team B on day 5 as there were no meetings held on this day.

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.10 Results for Team C (The Effective Team) on Day 1 of 5

4.10.1 Brief Description of the Meeting

The analysed meeting for Team C on day 1 took place between 1.30 and 2.40 am and lasted 70 minutes. The team meeting started with distributing different functions for the day to the team members (e.g., team leader, note taker, time keeper). The team decided to rotate the functional roles during the week. After reading and discussing the project description and the project briefing, the team clarified the scope of the project and planned the day. The team continued the discussion until agreement was reached between all team members. Team C prepared for the first client meeting. The members of Team C discussed strategies for the client meeting until agreement was reached. There were two dominant people in the team (C4 and C6).

4.10.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team C's analysed meeting on day 1 are shown in Figure 4.22. As can be seen in this figure, those categories with the highest frequency counts are *gives orientation* (27.04%), *gives opinion* (20.36%), and *gives suggestion* (16.18%). As can also be seen in this figure, five categories are 2.04% or lower: *shows solidarity* (2.04%), *asks for suggestion* (2.04%), *asks for opinion* (1.13%), and *shows tension* (0.79%) and shows *antagonism* (0.79%).

IPA area frequencies for Team C's meeting on day 1 are shown on the left side of Figure 4.23. The area of *attempted answers* contributes 63.58% of the entire team communication within the analysed meeting. Also worth noting is that the area of positive is considerably higher than the area of negative socio-emotional communication (19.23% and 7.24%, respectively). Overall, this meeting is task focused with 73.54% task communication and 26.47% socio-emotional communication. This can be seen on the right side of Figure 4.23, where frequency counts are combined to the domain level (i.e., task and socio-emotional domains).

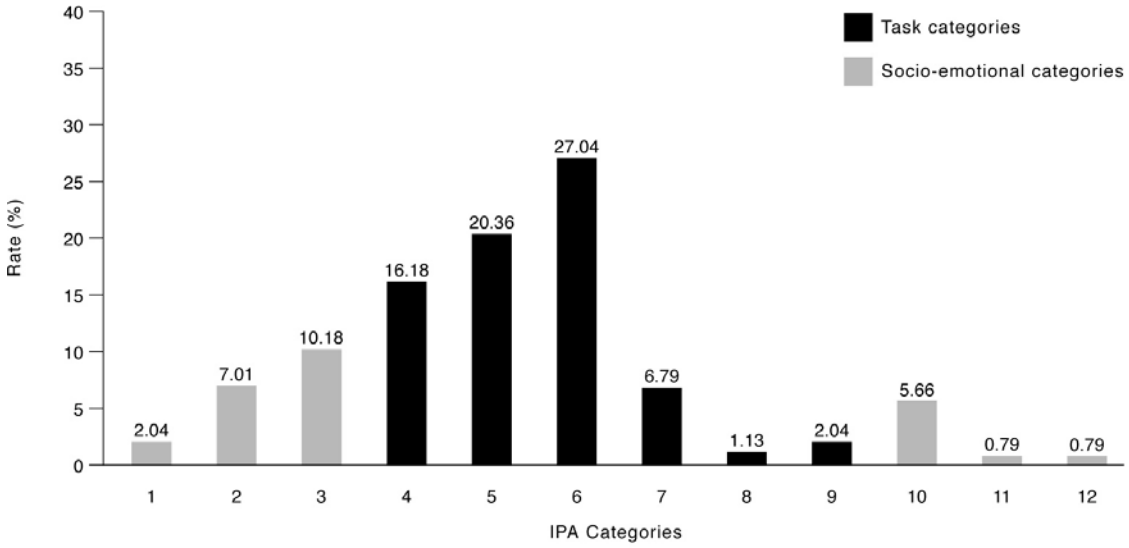


Figure 4.22: IPA category frequencies of analysed meeting for Team C on day 1. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

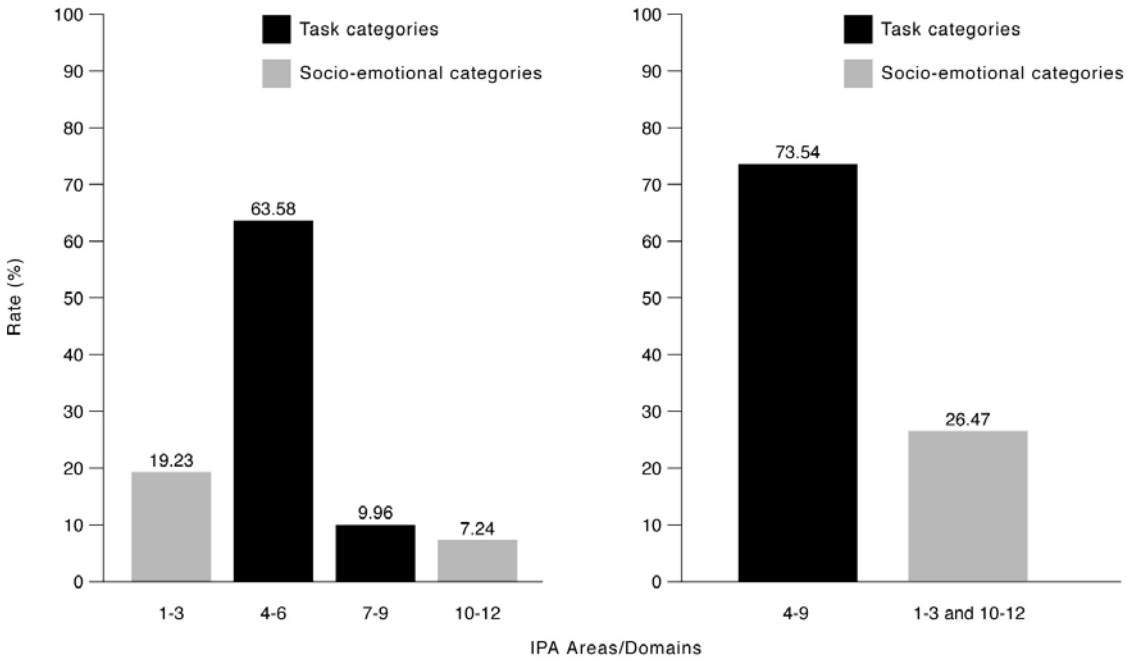


Figure 4.23: IPA area/domain frequencies of analysed meeting for Team C on day 1. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.10.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team C's analysed meeting on day 1 is shown in Figure 4.24. Task related communication is higher than both types of socio-emotional communication (positive and negative). Task related communication is also shown to be consistently high throughout the meeting with some fluctuations existing across the fourteen periods. Positive socio-emotional communication in this meeting shows a number of fluctuations. It is also shown that this area starts with over 30% communication activity. The course of negative socio-emotional communication throughout the meeting shows two fluctuations (between periods 4 to 6 and 10 to 12). It is also worth noting that this area does not start before period 3 (between minutes 15 to 20). Overall, Figure 4.24 shows that all three areas show some fluctuation. Also of interest is that both areas of socio-emotional communication (positive and negative) are at similar frequency rates at some periods and cross over at two points.

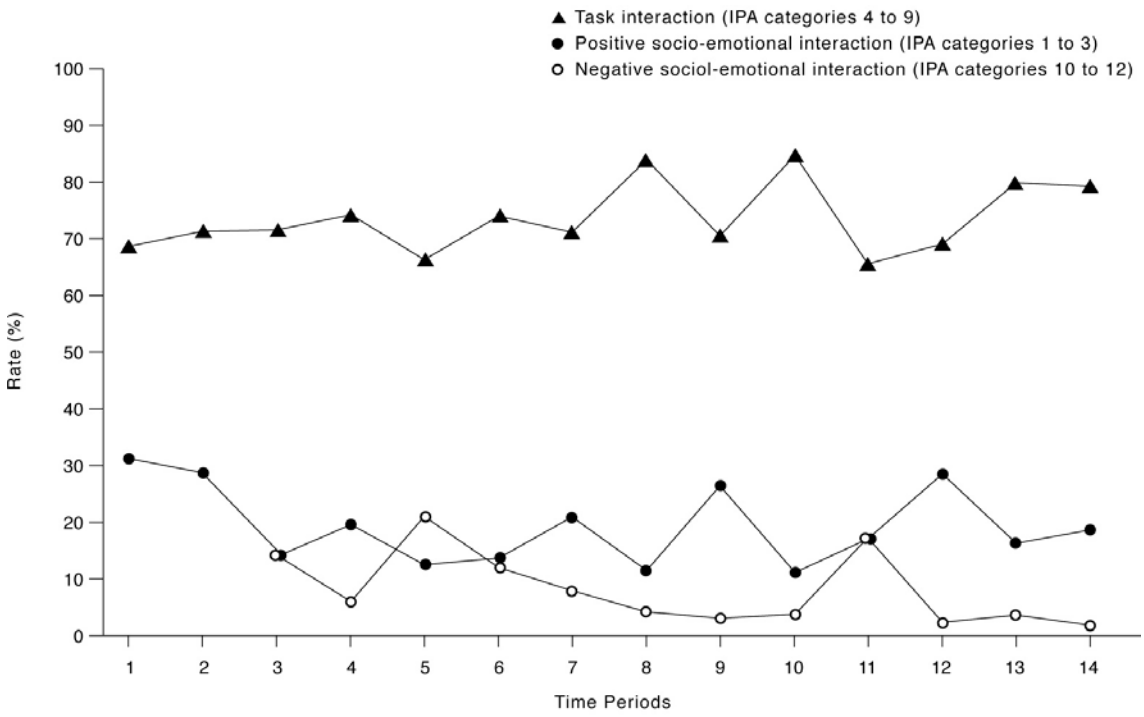


Figure 4.24: Course of verbal behaviours throughout analysed meeting for Team C on day 1. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.10.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by members of Team C at the end of day 1 can be found in the lower section of Table 4.03 on page 107. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.00 (*affect toward the group*) to a high of 4.04 (*perceived group cohesion*). Most measured constructs are around the scale midpoint (a value of 3 on the used 5-point scale). The average *member viability* for Team C at the end of day 1 is 3.60 (SD = 0.51).

4.11 Results for Team C (The Effective Team) on Day 2 of 5

4.11.1 Brief Description of the Meeting

The analysed meeting for Team C on day 2 took place between 10.15 and 10.35 am and lasted 20 minutes. The team meeting started with a discussion about the deliverables for the day and for the entire project. Members of Team C decided to split up into three work units of two members each. The team discussed the needs of the client but no agreement could be reached at this point. The team structured the work that had to be done before starting to work in groups of two. Two team members dominated this meeting (C4 and C6).

4.11.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team C's analysed meeting on day 2 are shown in Figure 4.25. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives suggestion* (22.46%), *gives orientation* (22.10%) and *gives opinion* (17.89%). These are still the three highest categories as found on day 1. It is also worth noting that *shows tension* and *shows antagonism* are both 0.00%. This result is similar to day 1 where these two categories where both 0.79%.

IPA area frequencies for Team C's meeting on day 2 are shown on the left side of Figure 4.26. The area of *attempted answers* had the highest frequency count with 62.45%. This is very similar to that found on day 1 for this area (63.58%). Results for day 2 show a higher degree of positive socio-emotional communication (17.89%), and a lower degree of negative socio-emotional communication (3.51%). This is similar to day 1. As shown on the right side of Figure 4.26, this meeting is overall task focused with 78.59% of communication task related and 21.40% socio-emotional. This ratio of task and socio-emotional communication is similar to that found on day 1 (task = 73.54% and socio-emotional = 26.47%).

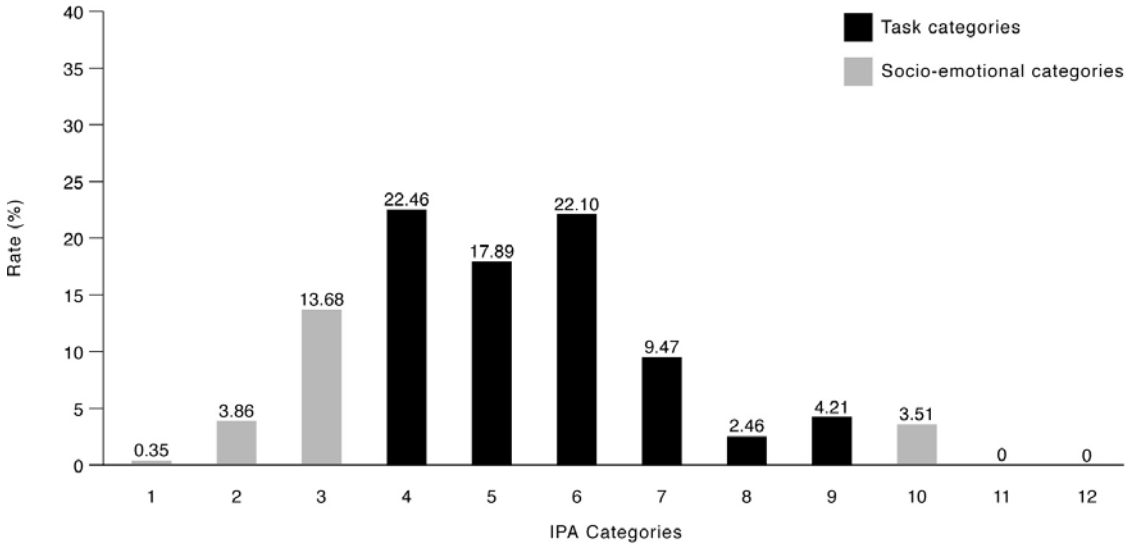


Figure 4.25: IPA category frequencies of analysed meeting for Team C on day 2. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

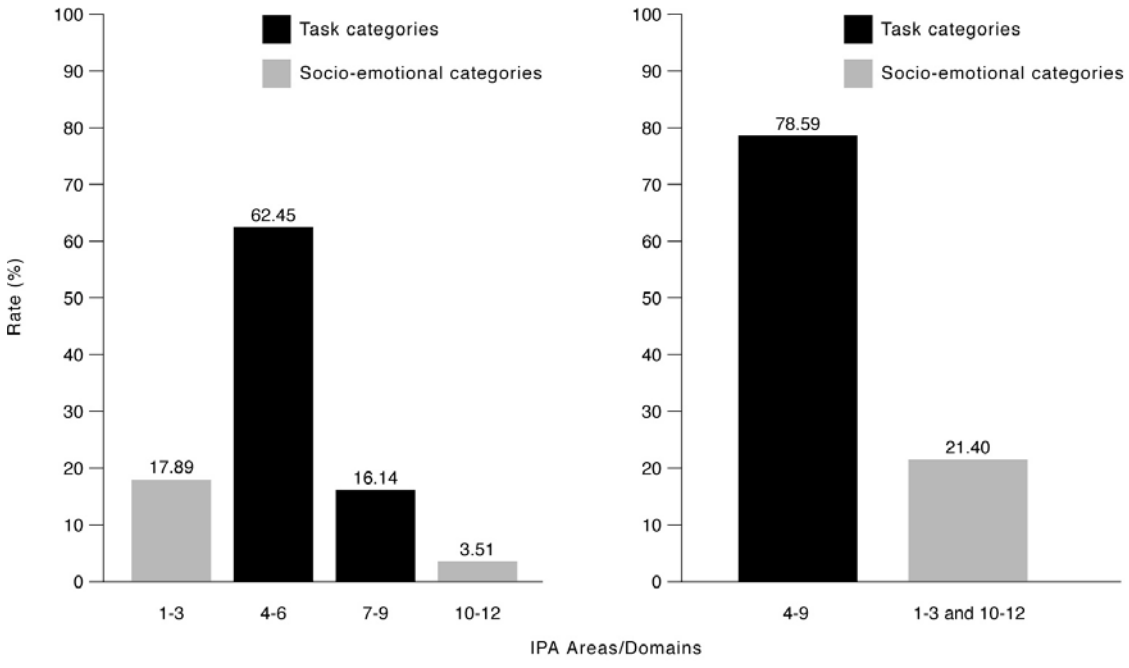


Figure 4.26: IPA area/domain frequencies of analysed meeting for Team C on day 2. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.11.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team C's analysed meeting on day 2 is shown in Figure 4.27. Task related communication activities average 78.59% and are stable throughout the entire meeting. This result is somewhat different to day 1 where some fluctuations where evident. Positive socio-emotional communication activities are on average 17.89% and are also stable over time. These results are different to those found in day 1 where some fluctuations existed. Amount of negative socio-emotional interaction was constantly under 5% throughout the meeting and stops five minutes before the end of the meeting. This result is different to that found on day 1 where two fluctuations where present. Overall, each of the three communication activities seems to be relatively stable throughout the meeting and run parallel to each other. This is different to day 1 where fluctuations occurred.

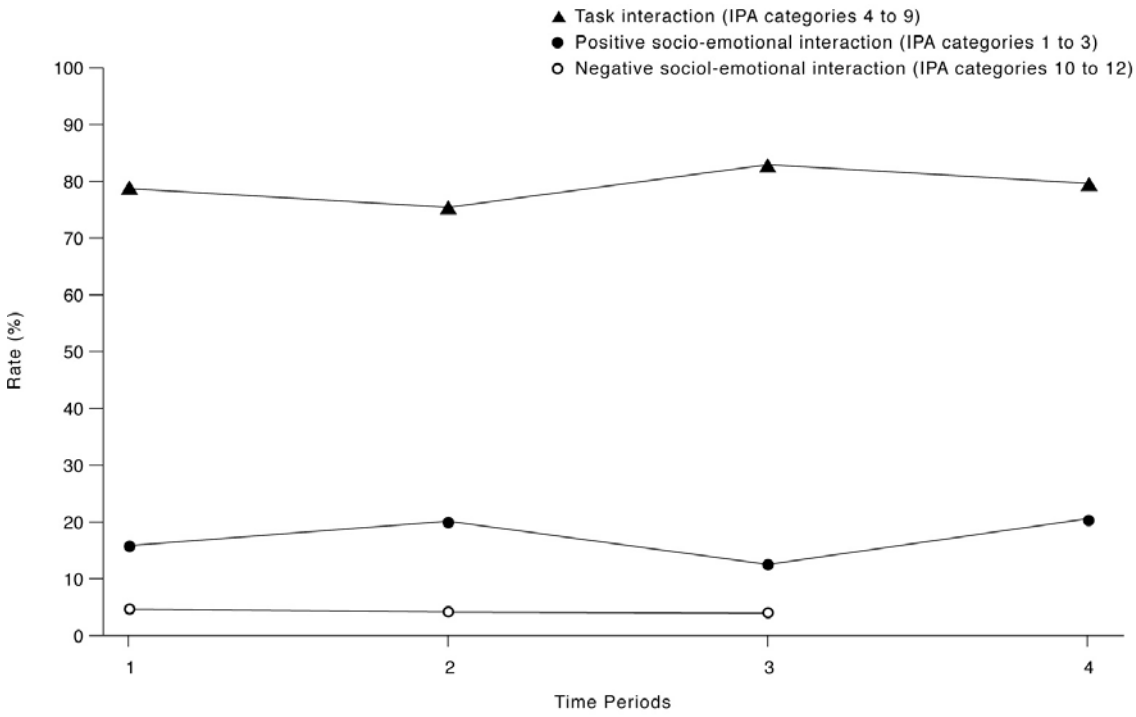


Figure 4.27: Course of verbal behaviours throughout analysed meeting for Team C on day 2. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.11.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team C at the end of day 2 can be found in the lower section of Table 4.03 on page 107. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.83 (*self-efficacy*) to a high of 4.50 (*willingness to continue as a member of the group*). All six measured constructs increase from day 1 to day 2 with four increasing markedly: *Opportunity to participate in group discussion* (from 3.33 to 4.25), *communication satisfaction* (from 3.94 to 4.36), *willingness to continue as a member of the group* (from 3.67 to 4.50) and *affect toward the group* (from 3.00 to 4.17). The average *member viability* for Team C at the end of day 2 is 4.32 ($SD = 0.44$). This is an increase from day 1 where it was 3.60 ($SD = 0.51$).

4.12 Results for Team C (The Effective Team) on Day 3 of 5

4.12.1 Brief Description of the Meeting

The analysed meeting for Team C on day 3 took place between 12.00 and 1.15 pm and lasted 75 minutes. The team started the meeting by discussing the deliverables of the day. After this was done, the team started to work on these deliverables and on the project documentation. Two members were the main contributors in developing ideas for the project documentation during the team discussion (C4 and C6). One of them (C4) led the team through the meeting and presented the first ideas for the presentation. Team C discussed the contents of the project documentation and presentation.

4.12.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team C's analysed meeting on day 3 are shown in Figure 4.28. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives suggestion* (25.93%), *gives opinion* (25.62%), and *gives orientation* (15.12%). These are still the highest categories as found on both days 1 and 2. It is also worth noting that *shows tension* and *shows antagonism* are both under 1% (0.62% and 0.41% retrospectively). These results are similar to days 1 and 2.

IPA area frequencies for Team C's meeting on day 3 are shown on the left side of Figure 4.29. The area of attempted answers had the highest frequency count with 66.67%. This is similar to the results found on days 1 and 2 (63.58% and 62.45%, respectively). Results for day 3 show that positive socio-emotional communication activities had a frequency count of 19.74% with the area of negative socio-emotional activities reaching 2.78%. These findings are similar to days 1 and 2. As shown on the right side of Figure 4.29, this meeting was once again task focused (77.48%) and once again similar to days 1 and 2.

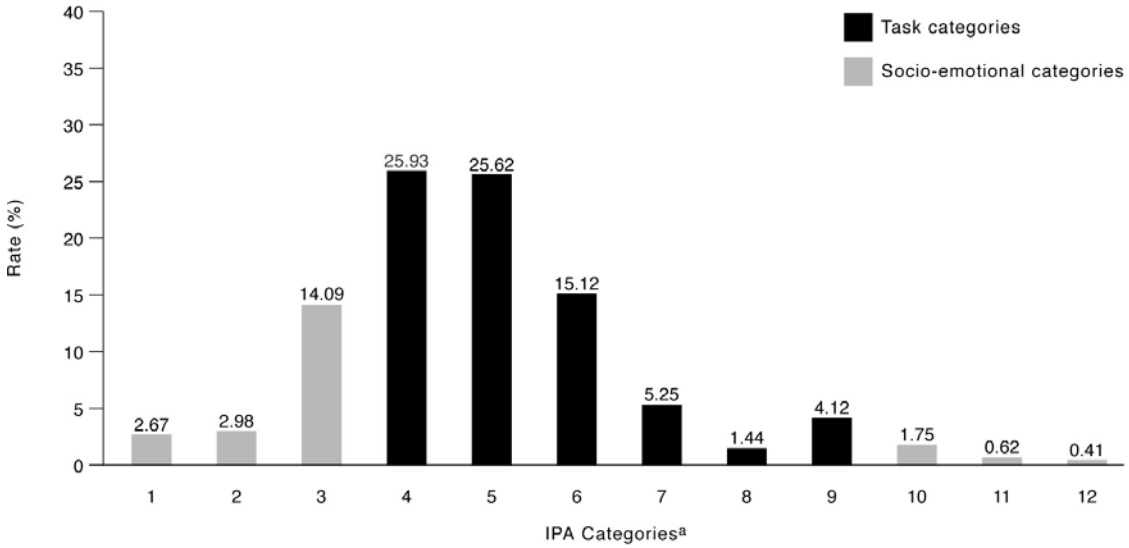


Figure 4.28: IPA category frequencies of analysed meeting for Team C on day 3. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

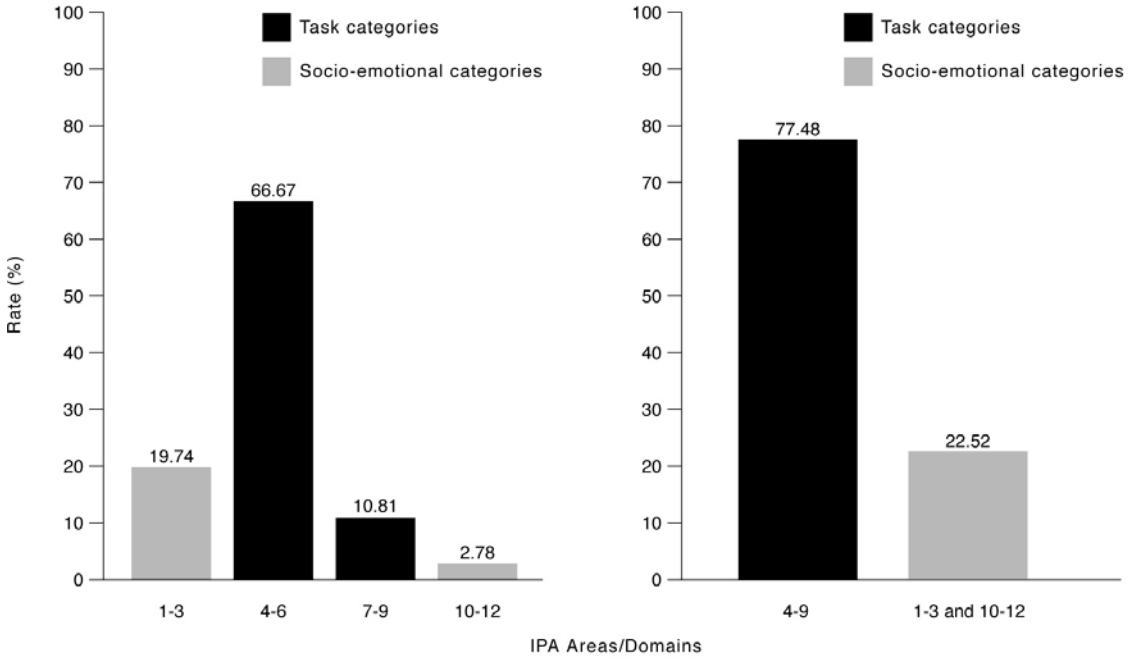


Figure 4.29: IPA area/domain frequencies of analysed meeting for Team C on day 3. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.12.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team C's analysed meeting on day 3 is shown in Figure 4.30. Task related communication activities average 77.48% and show a number of fluctuations between periods (between periods 2 to 8 in particular). This trend is different to day 1 where the fluctuations occurred later in the meeting, and very different to day 2 where the course of verbal behaviours was stable. Positive socio-emotional communication activities are on average 19.74% and show a number of fluctuations during the meeting. This is similar to day 1 but different to day 2. Negative socio-emotional activities average 2.78% and display one fluctuation between periods 5 and 8. This is similar to day 1. Overall, the three communication activities show a number of fluctuations at several points, particularly up to period 8. This trend is different to day 1 where the fluctuations occurred in the latter periods of the meeting and very different to day 2 where communication activities were very stable throughout the course of the meeting.

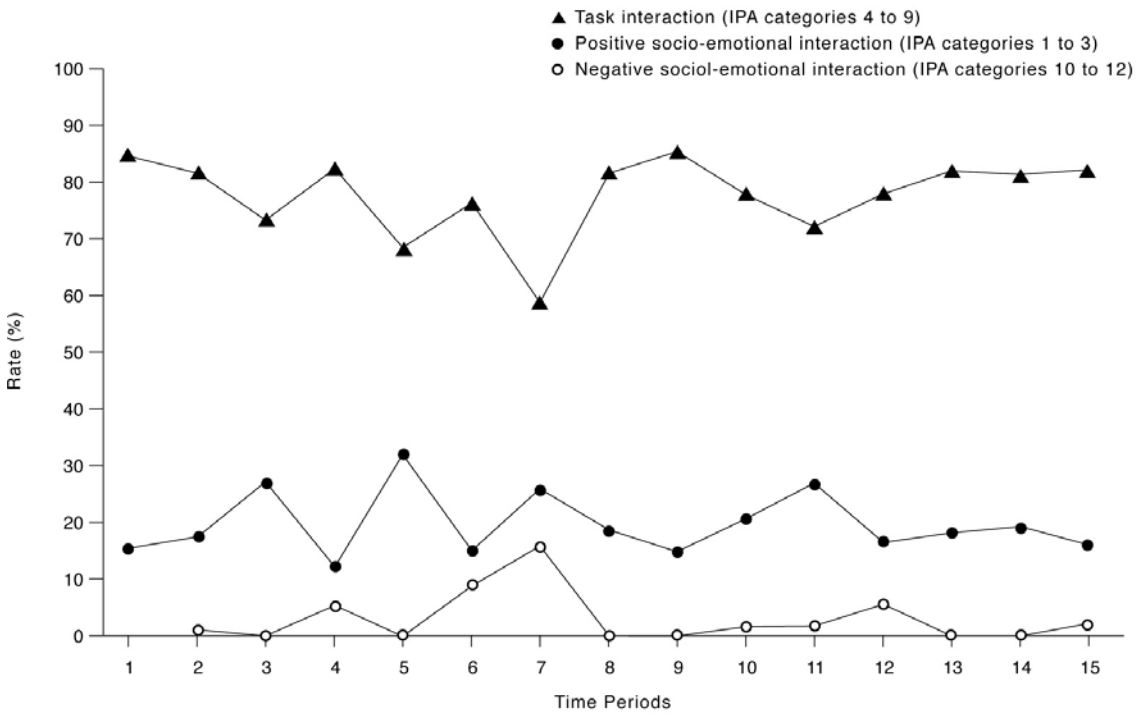


Figure 4.30: Course of verbal behaviours throughout analysed meeting for Team C on day 3. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.12.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team C at the end of day 3 can be found in the lower section of Table 4.03 on page 107. As can be seen in this table, group mean scores on the measured constructs range from a low of 3.36 (*affect toward the group*) to a high of 3.67 (*willingness to continue as a member of the group*). All six measured constructs decrease from day 2 to day 3. The average *member viability* for Team C at the end of day 3 is 3.48 ($SD = 0.90$). This has decreased markedly from day 2 where it was 4.32 ($SD = 0.44$).

4.13 Results of Team C (The Effective Team) on Day 4 of 5

4.13.1 Brief Description of the Meeting

The analysed meeting for Team C on day 4 took place between 2.30 and 3.30 pm and lasted 60 minutes. At the beginning of this meeting the team members worked in groups of two on the project while having a team discussions during their work. The team brainstormed ideas for the final presentation. One team member started to work on a concept for the presentation (C4). Other members of the team liked this idea and the team developed the concept further during a team discussion. During this meeting, the team put together the different parts of the project documentation, developed by the different work units, and spent the rest of the meeting working on the presentation.

4.13.2 Frequencies of IPA Categories and IPA Areas

IPA category frequencies for Team C's analysed meeting on day 4 are shown in Figure 4.31. As can be seen in this figure, the three highest frequency counts are for the IPA categories of *gives suggestion* (24.96%), *gives opinion* (19.73%), and gives *orientation* (19.26%). This is the same as the three previous days. As can also be seen in this figure, *shows tension* and *shows antagonism* are the two lowest categories (1.00% and 0.00%, respectively). These results are similar to all previous days.

IPA area frequencies for Team C's meeting on day 4 are shown on the left side of Figure 4.32. The area of attempted answers has the highest frequency count with 64.05%. This is similar to the results found on the three days before. Results for day 4 also show that positive socio-emotional communication activities has a frequency count of 22.23% with the area of negative socio-emotional activities reaching only 2.28%. This is the same as found on previous days where positive socio-emotional communication is shown to be higher than negative socio-emotional communication activities. As shown on the right side of Figure 4.32, this meeting was once again task focused (75.46%) and this is once again similar to days 1, 2 and 3.

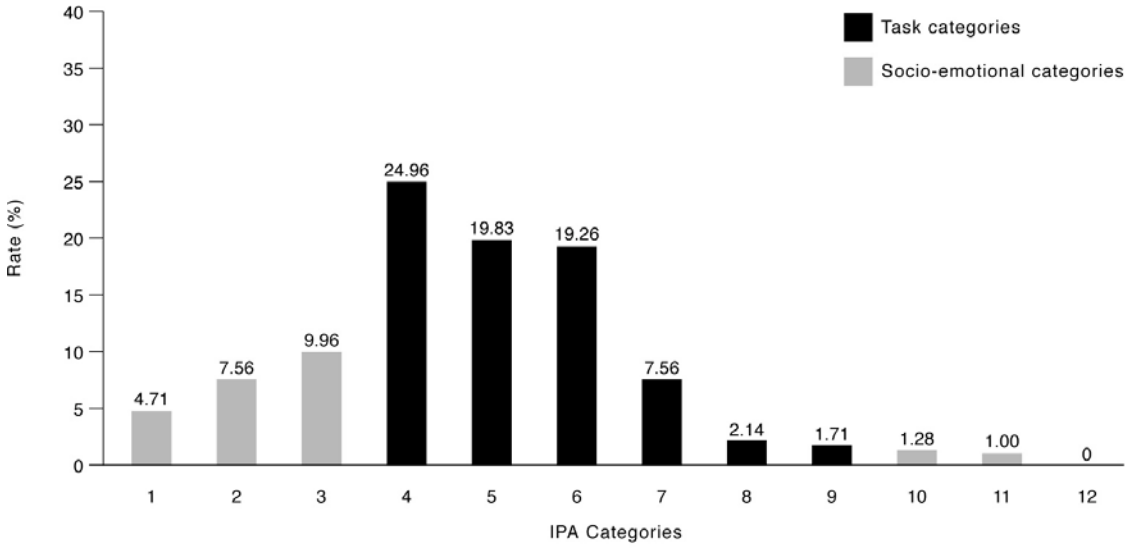


Figure 4.31: IPA category frequencies of analysed meeting for Team C on day 4. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

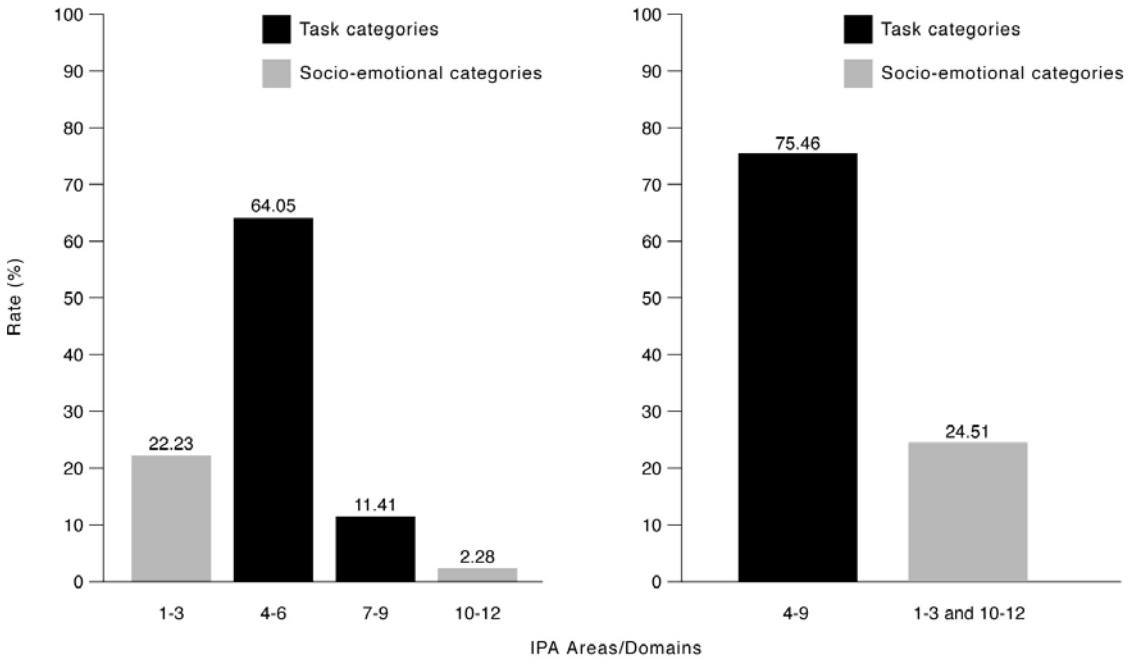


Figure 4.32: IPA area/domain frequencies of analysed meeting for Team C on day 4. IPA areas: 1-3 = Positive socio-emotional, 4-6 = Attempted answers (task), 7-9 = Questions (task), 10-12 = Negative socio-emotional. IPA domains: 4-9 = Task, 1-3 and 10-12 = Socio-emotional.

4.13.3 Course of Task and Socio-Emotional Verbal Behaviours through Meeting

The course of verbal behaviour for Team C's analysed meeting on day 4 is shown in Figure 4.33. Task related communication activities average 75.46% and show a number of fluctuations. Positive socio-emotional communication activities were on average 22.23% and also showed fluctuations between periods. Negative socio-emotional activities average 2.28% and display a stable course of activity. Overall, task related and positive socio-emotional communication activities seem to be somewhat similar to those found on days 1 and 3. Negative socio-emotional activities are most similar to day 2.

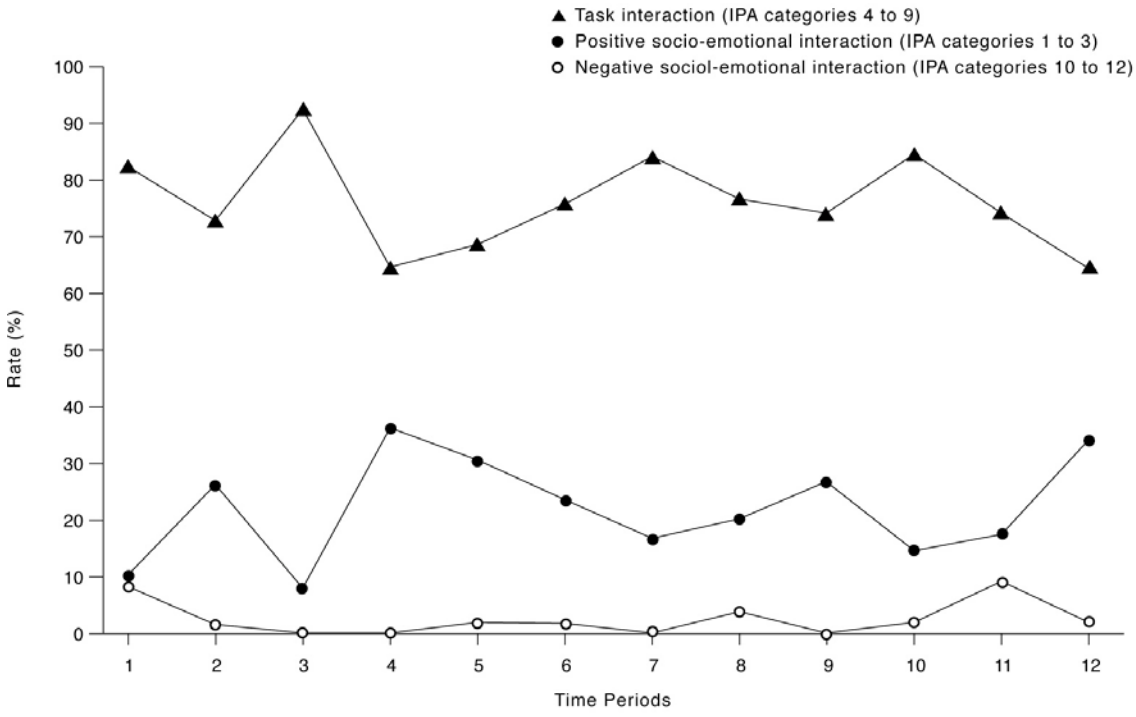


Figure 4.33: Course of verbal behaviours throughout analysed meeting for Team C on day 4. Rates for each period represent the proportion of activities in the given area for all team members. Each period represents a duration of five minutes. IPA categories: 1 = Shows solidarity, 2 = Shows tension release, 3 = Agrees, 4 = Gives suggestion, 5 = Gives opinion, 6 = Gives orientation, 7 = Asks for orientation, 8 = Asks for opinion, 9 = Asks for suggestion, 10 = Disagrees, 11 = Shows tension, 12 = Shows antagonism.

4.13.4 Results of the Daily Questionnaire

Results from the Daily Questionnaire completed by the members of Team C at the end of day 4 can be found in the lower section of Table 4.03 on page 107. As can be seen in this table, group mean scores on the measured constructs range from a low of 4.50 (*opportunity to participate* and *willingness to continue*) to a high of 4.69 (*affect towards the group*). None of the measured constructs are under 4.50 and all increase markedly from day 3 to day 4. The average *member viability* for Team C at the end of day 4 is 4.60 (*SD* = 0.50). This has increased from day 3 where it was 3.48 (*SD* = 0.90).

4.14 Results for Team C (The Effective Team) on Day 5 of 5

4.14.1 Results of the Post-Project Questionnaire

Results from the Post-Project Questionnaire completed by the members of Team C after the completion of their project can be found in the lower section of Table 4.03 on page 107. As can be seen in this table, group mean scores on the measured constructs range from a low of 4.33 (*opportunity to participate*) to a high of 4.67 (for four of the constructs). Overall, most measured constructs are similar to day 4. The average *member viability* for Team C at the end of the project is 4.61 (*SD* = 0.48). This is the highest over all five days and is very similar to the day before where it was 4.60 (*SD* = 0.50).

On average, members of Team C rate their group presentation 4.80 (*SD* = 0.40) and their project documentation 4.33 (*SD* = 0.47). Both of these components are rated above the scale midpoint of 3, where 1 equals *very poor* and 5 equals *excellent*.

4.14.2 Results of the Client Questionnaire

On a scale from 1 to 10 (with anchors of 1 = *very poor* and 10 = *excellent*) the Subject Coordinator rates the Team's C presentation 9.40 and their project documentation 3.80. At the item level *creative presentation* and *engaging presentation* are rated highest (10 out of 10) with *comprehensive documentation*, *informative documentation* and *documentation is suitable for the client's needs* rates lowest (3 out of 10). In the space provided for qualitative comments the Subject Coordinator wrote the following about Team C (with reference to the presentation): "Truly creative! Great use of storytelling."

Table 4.03: IPA and Questionnaire Data for Team C, all Days.

Team C	Day 1	Day 2	Day 3	Day 4	Day 5
IPA Categories[ac]					
1	2.04	0.35	2.67	4.71	–
2	7.01	3.86	2.98	7.56	–
3	10.18	13.68	14.09	9.96	–
4	16.18	22.46	25.93	24.96	–
5	20.36	17.89	25.62	19.83	–
6	27.04	22.10	15.12	19.26	–
7	5.79	9.47	5.25	7.56	–
8	1.13	2.46	1.44	2.14	–
9	2.04	4.21	4.12	1.71	–
10	5.66	3.51	1.75	1.26	–
11	0.79	0.00	0.62	1.00	–
12	0.79	0.00	0.41	0.00	–
IPA Areas[bc]					
1-3	19.23	17.89	19.74	22.23	–
4-6	63.56	62.45	66.67	64.05	–
7-9	9.96	16.14	10.81	11.41	–
10-12	7.24	3.51	2.78	2.28	–
Questionnaire[d]					
Opportunity to participate	3.33 (0.26)	4.25 (0.71)	3.58 (0.41)	4.50 (0.63)	4.33 (0.55)
Communication satisfaction	3.94 (0.62)	4.44 (0.92)	3.44 (0.56)	4.61 (1.10)	4.67 (0.49)
Perceived group cohesion	4.04 (0.68)	4.38 (0.57)	3.54 (0.49)	4.58 (0.46)	4.63 (0.56)
Affect toward the group	3.00 (0.81)	4.17 (0.60)	3.36 (0.63)	4.69 (0.41)	4.67 (0.49)
Self-efficacy	3.67 (0.82)	3.83 (0.75)	3.50 (0.75)	4.67 (0.63)	4.67 (0.63)
Willingness to continue	3.67 (0.41)	4.50 (0.52)	3.67 (0.55)	4.50 (0.41)	4.67 (1.03)
Member viability	3.60 (0.51)	4.32 (0.44)	3.48 (0.90)	4.60 (0.50)	4.61 (0.48)

Note: IPA data were not collected for Team C on day 5 as there were no meetings held on this day.

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.15 Comparison between Team A with Teams B and C on Day 1 of 5

Results comparing Team A with Teams B and C on day 1 are presented in Table 4.04. As shown in this table, all three teams have high frequency counts for the task categories of *gives suggestion*, *gives opinion* and *gives orientation.* Also noticeable at the category level is the difference between Team A and Teams B and C on the socio-emotional category *shows antagonism* (A = 9.92%, B = 0.73%, and C = 0.79%). The middle section of Table 4.04 shows that all teams are quite similar on the task activities of attempted answers and questions (A = 58.42% and 9.03%, B = 62.47% and 8.71%, C = 63.56% and 9.96%, respectively). However, Team A's negative socio-emotional communication activities are quite high compared to Teams B and C (A = 17.21, B = 3.64%, C = 7.24%, respectively).

The course of verbal behaviours on day 1 for Teams A, B and C are shown in Figures 4.03 (p. 65), 4.12 (p. 76) and 4.24 (p. 93), respectively. Even though some slight fluctuations are found, task related communication is consistently higher than socio-emotional communication across the first meeting of all three teams. The most interesting difference between Team A and Teams B and C is found in the area of negative socio-emotional communication. This area in Teams B and C occurs after the second or third time period (between minutes 10 and 15) whereas it is present from the first minute of Team A's meeting.

Questionnaire results for all three teams are presented in the lower section of Table 4.04. Overall, the measured constructs for all three teams are quite similar after day 1. Of particular interest is that of *member viability* that is found to be around the scale midpoint (i.e., 3 on the 5-point scale used) for all three teams (A = 3.48, B = 3.56, C = 3.60).

Table 4.04: IPA and Questionnaire Data for Day 1, all Teams.

Day 1	Team A	Team B	Team C
IPA Categories[ac]			
1	3.40	0.48	2.04
2	3.52	10.17	7.01
3	8.42	14.53	10.18
4	24.12	26.63	16.18
5	19.85	24.94	20.36
6	14.45	10.90	27.04
7	4.77	6.05	5.79
8	1.50	1.69	1.13
9	2.76	0.97	2.04
10	5.15	1.94	5.66
11	2.14	0.97	0.79
12	9.92	0.73	0.79
IPA Areas[bc]			
1-3	15.34	25.18	19.23
4-6	58.42	62.47	63.56
7-9	9.03	8.71	9.96
10-12	17.21	3.64	7.24
Questionnaire[d]			
Opportunity to participate	4.14 (0.56)	4.00 (0.71)	3.33 (0.26)
Communication satisfaction	3.67 (0.90)	3.61 (0.80)	3.94 (0.62)
Perceived group cohesion	3.61 (0.69)	3.63 (0.86)	4.04 (0.68)
Affect toward the group	2.82 (0.84)	3.13 (1.18)	3.00 (0.81)
Self-efficacy	3.14 (1.35)	3.67 (0.82)	3.67 (0.82)
Willingness to continue	3.71 (0.95)	4.00 (0.89)	3.67 (0.41)
Member viability	3.48 (0.56)	3.56 (0.96)	3.60 (0.51)

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.16 Comparison between Team A with Teams B and C on Day 2 of 5

Results comparing Team A with Teams B and C on day 2 are presented in Table 4.05. As shown in this table, all three teams have high frequency counts for the task categories of *gives suggestion, gives opinion* and *gives orientation.* This is the same as the day before. Overall, all three teams are quite similar at the category level. This is in contrast to the previous day where *shows antagonism* was higher for Team A than for Teams B and C.

The middle section of Table 4.05 shows that all teams are quite similar on the task activities of attempted answers and questions (A = 57.55% and 11.43%, B = 66.75% and 9.69%, C = 62.45% and 16.14%, respectively). However, Team A's positive socio-emotional communication activities are higher to those of Teams B and C (A = 25.73%, B = 16.23%, C = 16.89%, respectively). These results are different to the day before where Team A was higher on negative socio-emotional communication activities than the other two teams.

The course of verbal behaviours on day 2 for Teams A, B and C are shown in Figures 4.06 (p. 68), 4.15 (p. 81) and 4.27 (p. 97), respectively. Even though some slight fluctuations are found, task related communication is consistently higher than socio-emotional communication across the analysed meeting on day 2 for all three teams. This is similar to day 1. Also, socio-emotional communication activities (both positive and negative) are similar for all three teams, which is in contrast to day 1.

Questionnaire results for all three teams are presented in the lower section of Table 4.05. Overall, the measured constructs for all three teams increase on day 2 compared to day 1. Subsequently, the average *member viability* for Teams A, B and C was higher than the day before (A = 3.48 to 4.04, B = 3.56 to 3.65, C = 3.60 to 4.32).

Table 4.05: IPA and Questionnaire Data for Day 2, all Teams.

Day 2	Team A	Team B	Team C
IPA Categories[ac]			
1	3.27	2.48	0.35
2	8.17	5.86	3.86
3	14.29	7.89	13.68
4	24.69	11.16	22.46
5	14.49	29.43	17.89
6	18.37	26.16	22.10
7	5.51	5.41	9.47
8	1.84	2.25	2.46
9	4.06	2.03	4.21
10	3.27	2.14	3.51
11	0.41	2.14	0.00
12	1.63	3.04	0.00
IPA Areas[bc]			
1-3	25.73	16.23	17.89
4-6	57.55	66.75	62.45
7-9	11.43	9.69	16.14
10-12	5.31	7.32	3.51
Questionnaire[d]			
Opportunity to participate	4.07 (0.79)	4.08 (0.92)	4.25 (0.71)
Communication satisfaction	4.05 (0.45)	3.61 (0.53)	4.44 (0.92)
Perceived group cohesion	4.18 (0.57)	3.67 (0.83)	4.38 (0.57)
Affect toward the group	3.79 (0.51)	3.38 (1.00)	4.17 (0.60)
Self-efficacy	3.57 (0.53)	3.67 (0.82)	3.83 (0.75)
Willingness to continue	4.43 (0.53)	4.00 (1.26)	4.50 (0.52)
Member viability	4.04 (0.50)	3.65 (0.87)	4.32 (0.44)

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.17 Comparison between Team A with Teams B and C on Day 3 of 5

Results comparing Team A with Teams B and C on day 3 are presented in Table 4.06. As shown in this table, all three teams have high frequency counts for the task categories of *gives suggestion*, *gives opinion* and *gives orientation.* This is the same as days 1 and 2. Also at the category level, *shows antagonism* is higher for Team A than for Teams B and C (A = 7.06%, B = 0.53%, and C = 0.41%). This result is very similar to day 1 but not day 2 where all three teams had low frequency counts on this category.

The middle section of Table 4.06 shows that all teams are quite similar on the task activities of attempted answers and questions (A = 58.16% and 9.53%, B = 64.36% and 9.26%, C = 66.67% and 10.81%, respectively). Team A's negative socio-emotional communication activities, however, are quite different to those of Teams B and C (A = 14.48, B = 5.04%, C = 2.78%). This result is once again similar to day 1 but not day 2.

The course of verbal behaviours on day 3 for Teams A, B and C are shown in Figures 4.09 (p. 72), 4.18 (p. 85) and 4.30 (p. 101), respectively. Even though all three teams show fluctuations, task related communication is consistently higher than socio-emotional communication across the analysed meeting on day 2. This is similar to days 1 and 2. Two other findings are worth noting on day 3 and both concern the course of negative socio-emotional communication. First, while all teams show some fluctuation in this area, Team A had one point in the meeting where negative socio-emotional communication is higher than task communication. This is not found in any of Teams B and C's analysed meetings. Second, Team A starts the meeting with a higher level of negative socio-emotional communication than Teams B and C. This is similar to day 1.

Questionnaire results for all three teams are presented in the lower section of Table 4.06. Overall, measured constructs for Teams A and C have decreased from day 2 to day 3 whereas Team B's constructs have increased. Average *member viability* follows this same trend (A = 4.04 to 2.66, B = 3.65 to 4.12, C = 4.32 to 3.48). Of particular interest is that Team A's *member viability* has fallen to its lowest level (2.66) and is now below the scale midpoint of 3.

Table 4.06: IPA and Questionnaire Data for Day 3, all Teams.

Day 3	Team A	Team B	Team C
IPA Categories[ac]			
1	4.50	2.52	2.67
2	1.41	6.49	2.98
3	11.92	12.32	14.09
4	13.24	23.97	25.93
5	32.83	19.60	25.62
6	12.09	20.79	15.12
7	2.82	4.50	5.25
8	4.94	1.59	1.44
9	1.77	3.18	4.12
10	3.27	3.05	1.75
11	4.15	1.48	0.62
12	7.06	0.53	0.41
IPA Areas[bc]			
1-3	17.83	21.33	19.74
4-6	58.16	64.36	66.67
7-9	9.53	9.27	10.81
10-12	14.48	5.04	2.78
Questionnaire[d]			
Opportunity to participate	3.29 (0.81)	4.17 (0.82)	3.58 (0.41)
Communication satisfaction	2.52 (0.86)	4.11 (0.50)	3.44 (0.56)
Perceived group cohesion	3.07 (1.14)	4.13 (0.59)	3.54 (0.49)
Affect toward the group	2.04 (0.68)	4.08 (0.90)	3.36 (0.63)
Self-efficacy	2.43 (0.79)	4.00 (1.10)	3.50 (0.75)
Willingness to continue	2.71 (1.38)	4.17 (0.75)	3.67 (0.55)
Member viability	2.66 (0.79)	4.12 (0.69)	3.48 (0.90)

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

4.18 Comparison between the Teams B and C on Days 4 and 5 of 5[6]

Results comparing Team B with Team C on day 4 are presented in Table 4.07. As shown in this table, both teams have high frequency counts for the task categories of *gives opinion* and *gives orientation.* Overall, frequencies of communication activities are quite similar for both teams during the analysed meetings. They are also similar to previous days.

The middle section of Table 4.07 shows that both teams are quite similar on the task activities of attempted answers and questions (B = 56.30% and 13.94%, C = 64.05% and 11.41%). These results are once again similar to days 1, 2, and 3.

The course of verbal behaviours on day 4 for Teams B and C are shown in Figures 4.21 (p. 88) and 4.33 (p. 105), respectively. Even though both teams show some fluctuations, task related communication is consistently higher than socio-emotional communication across the analysed meeting on day 4. This is similar to previous days. It is also worth noting, that negative socio-emotional communication is generally low and decreases even further at the end in Teams B and C.

Questionnaire results for Teams B and C on day 4 are presented in the lower section of Table 4.07. Overall, measured constructs for Team B remain high and increase for Team C. Average *member viability* for both teams is well above the scale midpoint of 3 (B = 4.15, C = 4.60).

Questionnaire results for Teams B and C on day 5 are presented in Table 4.08. Measured constructs for Teams B and C remain high with average *member viability* finishing above 4 on the final day (B = 4.14, C = 4.61). Overall, Team C rates higher than Team B on member viability on the Post-Project Questionnaire.

[6] As Team A did not exist on days 4 and 5, only the comparison between Teams B and C will be presented in this section.

Table 4.07: IPA and Questionnaire Data for Day 4, all Teams.

Day 4	Team A	Team B	Team C
IPA Categories[ac]			
1	–	6.70	4.71
2	–	8.86	7.56
3	–	10.99	9.96
4	–	9.65	24.96
5	–	25.54	19.83
6	–	20.11	19.26
7	–	11.80	7.56
8	–	1.07	2.14
9	–	1.07	1.71
10	–	1.61	1.26
11	–	0.00	1.00
12	–	1.16	0.00
IPA Areas[bc]			
1-3	–	26.54	22.23
4-6	–	56.30	64.05
7-9	–	13.94	11.41
10-12	–	3.22	2.28
Questionnaire[d]			
Opportunity to participate	–	4.25 (0.52)	4.50 (0.63)
Communication satisfaction	–	4.28 (0.71)	4.61 (1.10)
Perceived group cohesion	–	4.08 (0.52)	4.58 (0.46)
Affect toward the group	–	4.04 (0.37)	4.69 (0.41)
Self-efficacy	–	4.17 (0.75)	4.67 (0.63)
Willingness to continue	–	4.33 (0.52)	4.50 (0.41)
Member viability	–	4.15 (0.39)	4.60 (0.50)

Note: IPA and questionnaire data were not collected for Team A on day 4 as this team ceased to exist after day 3.

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

Table 4.08: IPA and Questionnaire Data for Day 5, all Teams.

Day 5	Team A	Team B	Team C
IPA Categories[ac]			
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–
7	–	–	–
8	–	–	–
9	–	–	–
10	–	–	–
11	–	–	–
12	–	–	–
IPA Areas[bc]			
1-3	–	–	–
4-6	–	–	–
7-9	–	–	–
10-12	–	–	–
Questionnaire[d]			
Opportunity to participate	–	4.58 (0.80)	4.33 (0.55)
Communication satisfaction	–	4.39 (0.12)	4.67 (0.49)
Perceived group cohesion	–	4.08 (0.75)	4.63 (0.56)
Affect toward the group	–	3.96 (0.91)	4.67 (0.49)
Self-efficacy	–	4.17 (0.75)	4.67 (0.63)
Willingness to continue	–	3.50 (1.22)	4.67 (1.03)
Member viability	–	4.14 (0.80)	4.61 (0.48)

Note: IPA and questionnaire data were not collected for Team A on day 5 as this team ceased to exist after day 3. IPA data were not collected for Teams B and C on day 5 as there were no meetings held on this day.

[a] 1 = Shows solidarity. 2 = Shows tension release. 3 = Agrees. 4 = Gives suggestion. 5 = Gives opinion. 6 = Gives orientation. 7 = Asks for orientation. 8 = Asks for opinion. 9 = Asks for suggestion. 10 = Disagrees. 11 = Shows tension. 12 = Shows antagonism.

[b] 1-3 = Positive socio-emotional. 4-6 = Attempted answers (task). 7-9 = Questions (task). 10-12 = Negative socio-emotional.

[c] IPA data presented in percentage.

[d] Questionnaire data presented as team means (standard deviation).

Chapter 5
Discussion and Conclusion

5.1 Chapter Introduction

In this chapter, the results of this study will be discussed. As an overview, this study produced a number of findings in relation to the research questions. However, as some findings appear to be related to more than one research question, it was decided to discuss the key findings first and then discuss them in relation to the research questions. Following this, a discussion of the significance and contribution to existing knowledge and practice is presented. This commences with a discussion of limitations of the study and then offers some recommendations for further research. Finally, this chapter summarises key findings, followed by the conclusions of the thesis.

5.2 Discussion of Key Findings

As an overview, this study produced a number of key findings in relation to the aim of the study. These findings focus on communication differences between effective and ineffective teams. These differences range from broad observations to more specific communication patterns in the analysed teams. The most important found will now be discussed in this section.

Finding 1: The ineffective team showed a higher level of negative socio-emotional verbal communication compared to the effective teams.

In this study, the ineffective and effective teams differed on a number of negative socio-emotional communication behaviours. First, the ineffective team showed an overall higher level of negative socio-emotional communication. This was visible at both the category and area levels. At the category level, it was found that *shows antagonism* (Category 12) was particularly high. This finding is of interest as *shows antagonism* is the category at the outer edge of negative socio-emotional behaviours in Bales' model and could therefore be viewed as the strongest form of negative socio-emotional behaviour. Further, these negative communication behaviours were found mostly at days 1 and 3. These were the first meetings of the teams' life and what

Gersick's (1988) would label the temporal midpoint. This finding is interesting because some authors describe these time points as critical in a team's life span (e.g., Hackman & Wageman, 2005).

Second, the ineffective team also appeared to differ on negative socio-emotional communication over the course of the analysed meeting. Of most interest were the high levels of this type of communication found at the beginning and end of their meetings and how this was not found in the effective teams. This finding tends to suggest that socio-emotional behaviours occurring at the outset of a meeting may re-emerge towards the end of a meeting. This may be due to the issues creating the negative behaviours remaining unresolved at the start of the meeting and being re-addressed when the opportunity arises at the end of the meeting.

Third, as was also shown in the course of the verbal communication, negative socio-emotional communication was always present in the analysed meetings of the ineffective team. This was different to that found in the effective teams, where at a number of times negative socio-emotional communication was at zero during the meeting. In other words, the effective teams had "negative free" time periods whereas it existed at some level throughout the course of all analysed meetings for the ineffective team. This is interesting because it seems to suggest that negative socio-emotional communication did not appear as a by-product of task-related discussion but rather had a permanent presence in the ineffective teams' process and one less associated with their task-related communication. Further, the effective teams showed this negative free time predominantly at the beginning and the end of the meeting, which could be seen in light of the previous point. In relation to the ineffective team, it is possible that the consistently high level of negative socio-emotional communication found in this team may have led to a number of group related problems such as a climate where there was a lack of support for open expression. This appears to confirm Broome and Fulbright (1995) suggestion that group climate related problems are barriers to successful team work.

Fourth, the ineffective team showed a number of large fluctuations (peaks) in the area of negative socio-emotional communication throughout the course of the meeting. This was seen most clearly on day 3 where at one point, negative socio-emotional communication was even higher than task-related communication. These high fluctuations were not found in the effective teams. This is interesting because these peaks could be seen as time periods where the ineffective team showed a

communication behaviour that could be viewed as conflict. Although some scholars see conflict in teams as something that should be prevented or resolved, most imply that conflict can facilitate team effectiveness, and see it as inevitable in decision-making groups (Witteman, 1991). Research distinguishes between two main types of conflict: Task-related conflict, which is described as substantive, productive and constructive, and socio-emotional conflict, which is described as affective, unproductive and destructive. Task-related conflict involves an intellectual opposition among participants deriving from the content of the group's agenda or specific ideas presented in discussions, is constructive and represents a different opinion regarding issues involving the task. Socio-emotional conflict represents emotional clashes or interpersonal struggles, is disruptive and reflects issues stemming from personality and personal differences. The results found in the ineffective team seem to suggest that this team suffered from interpersonal conflict and could therefore be seen as supporting the notion that a relationship exists between interpersonal conflict and team ineffectiveness.

Finding 2: The effective teams showed larger positive socio-emotional verbal communication fluctuations compared to the ineffective team.

The effective teams showed a number of larger positive socio-emotional fluctuations (peaks) throughout the courses of the analysed meetings than the ineffective team. These were found in six of eight meetings in the effective teams, but were only found in one of the ineffective team's analysed meetings (day 3). These peaks could be seen as signs of good relationships among team members and an important part of team effectiveness. This appears to support Hirokawa *et al.* (2000) suggestion that the relational quality is perceived to influence the behaviours, attitudes and motivations which in a general sense seem to be necessary for the success of a team. These peaks could also be viewed as part of a functional team process where statements such as "*Come on, I'll get a coffee for us"* or "*I really like this idea"* help build a positive climate in the team and helps the members to function more effectively.

Finding 3: The ineffective team showed changing socio-emotional verbal communication behaviours compared to the effective teams.

In this study, the ineffective team showed a changing relationship between the two socio-emotional areas (positive and negative) that was different to those found in the effective teams. In the effective teams, a consistent pattern was found where positive

was much higher than negative socio-emotional communication (around 20% and 3%, respectively) in each analysed meeting. However, this pattern was not found in the ineffective team. On day 1, both areas were fairly high with 15.34% positive and 17.21% negative socio-emotional communication. On day 2, this changed to 25% positive and 5.31% negative socio-emotional communication. On day 3, a communication pattern similar to day 1 was found, but the highest socio-emotional area this time was positive compared to negative socio-emotional communication (17.83% and 14.48%, retrospectively).

These changing socio-emotional communication patterns in the ineffective team appear to be similar to what Keyton (1999a) describes as confusing verbal behaviours in dysfunctional teams. According to Keyton, socio-emotional communication patterns found in the ineffective team can be seen as inhibitors of team effectiveness. Examining the communication patterns in effective and dysfunctional teams, Keyton found that dysfunctional teams showed more changing and fluctuating socio-emotional communication behaviours than the effective teams. These effective teams tended to show more consistent socio-emotional behaviours, especially on the friendly-unfriendly dimension and displayed consistently higher levels of positive than negative socio-emotional interaction. Both suggestions offered by Keyton's seem to be supported in this research.

These changing behaviours also seem to be consistent with the findings from other authors. Pagliari and Grimshaw (2002) analysed communication behaviours in decision-making teams. Their findings suggest that a well functioning and task oriented team is characterised by a higher level of positive rather than negative socio-emotional behaviours. This was found in the meetings analysed for the effective teams in this thesis.

Mayer (1998) also analysed the interaction behaviour in effective and ineffective teams and found results similar to the current study. His findings seem to suggest that the presence of positive socio-emotional communication behaviours in combination with little negative socio-emotional behaviours facilitates team effectiveness. Both studies conclude that a high level of negative socio-emotional communication can impact upon team effectiveness and this was found in the teams analysed in this study.

Finding 4: The ineffective team displayed some task-related verbal communication differences compared to the effective teams.

In this study, the ineffective and effective teams differed on a number of task-related communication behaviours. First, the ineffective team showed lower levels of information sharing. This was visible at the category level where *gives orientation and information* (Category 6) and *asks for orientation and information* (Category 7) were lower in the ineffective team than in the effective teams. This finding was of interest because it appears to support suggestions that the exchanging of information is especially important for a team to achieve its goals when the task is complex and requires a high level of co-operative work (e.g., Gouran, Hirokawa, & Martz, 1986; Hirokawa, 1980).

Second, on day 3, the ineffective team showed a higher level of *asking for opinion* (Category 8) compared to the effective teams. While this is quite specific, this finding is important to mention. This is because of the events that took place in this team at the end of day 3 (i.e., team disbanded). It is suggested that the higher level of *asking for opinion* in the ineffective team can be seen as an indicator of confused team members. It could be seen as an expression of team members' uncertainty and helplessness about the task and how to proceed. Examples of questions asked in the ineffective team in this study were: *How do you feel about this?*, *Do you agree?*, *Are you happy with this decision?*, *Do you think this is a good idea?* These differences seem to be consistent with previous research on communication patterns in effective and ineffective teams. Hirokawa (1980) found that task-related differences between effective and ineffective teams are much lower than he had expected. However, his results suggest that ineffective teams tend to produce more questions asking for opinions than do members in effective teams, which is consistent with the findings of the current study.

Finding 5: The ineffective team showed a different relationship between task and socio-emotional verbal communication at the domain level compared to the effective teams.

Overall, the ineffective team showed a different relationship between task and socio-emotional communication than the effective teams. This was particularly evident at the domain level where the ratio between these two types of verbal behaviours was different. In the effective team, this ratio was approximately 75% task to 25% socio-emotional. This ratio, however, was different in the ineffective team where it was more 65% to 35%, respectively. While one could argue that these differences are not that

strong, they are important because they show that even a 10% shift from task related to socio-emotional communication can have a strong impact upon the team's overall process (Bales, 1999). It also shows that the ineffective team is more focused on socio-emotional issues rather than focusing on the task at hand. This finding appears to supports Stohl and Schell's (1991) suggestion that team members in problematic teams become so distracted in dealing with interpersonal issues that they often fail to work on the task and priorities become confused.

While the ineffective team showed a different ratio of task and socio-emotional communication, it is still important to point out that all teams were predominantly task-focused throughout the analysed meetings (between 67.45% and 78.59% in all analysed meetings). This finding confirms existing team work research suggesting that team meetings are predominantly task-focused (Chang *et al.*, 2003; McGrath, 1984). This high level of task communication could be explained by the time pressure that the teams experienced in this study. DeGrada *et al.* (1999), for example, investigated team communication in relation to time pressure and found that "group members placed under time pressure acted rather differently than did members free from pressure. They tended to focus mainly on the task per se, providing answers and solutions to task-related problems and paying less attention to the interpersonal aspects of the situation, or to 'social niceties,' hence, emitting a lower proportion of positive socio-emotional acts" (DeGrada *et al.*, 1999, p. 355). Based on this suggestion by DeGrada *et al.* (1999), the findings in this study indicate that the ineffective team may not have handled the pressure as well as the effective team (hence the lower level of task and higher level of socio-emotional communication).

Finding 6: The ineffective team's first project meeting showed different verbal communication patterns compared to the effective teams.

The results of this study indicate that the first meeting of the ineffective team was different to the effective teams. Of interest, however, was that the ineffective team did not differ on all communication behaviours but rather only those related to negative socio-emotional behaviours. First, at the category level, this team displayed higher levels of antagonism. Second, the analysis over the course of the teams' first meetings showed that negative socio-emotional communication behaviours were much higher in the ineffective team. Third, negative socio-emotional communication was found to be present from the beginning of their meeting whereas in the effective teams it emerged later and in a much lower level. Fourth, these negative behaviours were found to be

higher than the positive behaviours at most time periods over the ineffective team's first meeting. These findings seem of interest as it appears to suggest that the first meeting was an indicator of the team's future problems.

While these differences only relate to the negative socio-emotional behaviours, they do seem to support Gersick's (1988) assumption that the first meeting is important in a team's life. However, of particular interest here is that these differences were not found on task related issues as found in Gersick's research but rather only on the socio-emotional side. As these behaviours were not examined by Gersick, these findings could be seen as extending her ideas regarding the importance of the first meeting further. These findings associated with the first meeting are also consistent with other authors in the literature (Bales & Cohen, 1979; Hackman & Wageman, 2005; Keyton, 1999a). These authors seem to agree that problematic issues tend to occur early in the team's life and can be carried through the entire work process. Pittenger *et al.* (1960) suggest that the opening of a meeting can set the stage for further activities within the group. He reports the power of the first minutes of a therapeutic session and its influence on the entire development of the meeting.

Finding 7: The ineffective team's verbal communication differed at the calendar midpoint compared to the effective teams.

This study found that the ineffective team's verbal communication differed to the effective teams most strongly at the calendar midpoint. As described in the results, the ineffective team's communication patterns differed considerably to those of the effective teams on day 3 of the project. In particular, they differed in three important ways. First, a higher level of negative socio-emotional communication was present in the ineffective team's meeting compared to the effective teams. Second, the entire course of communication showed many fluctuations for all three areas. Third, one large negative socio-emotional fluctuation (peak) occurred during the course of communication. As described earlier, this peak was higher than task communication at one point of the meeting. These communication behaviours were not found in the effective teams.

Based on these findings, it seems to indicate that the ineffective team went through a stage that could be described as a crisis around the midpoint. This appears to support Gersick's (1988) notion of the midpoint transition in work teams. According to Gersick, teams go through a critical phase at the midpoint of the project (midpoint transition)

where teams reflect on their past progress and work approach. The ineffective team, however, appears to have failed to pass through this transition. One possible reason for this failure could be that this team was unable to cope with the growing time and performance pressure associated with this project. Some authors suggest that midpoint transitions occur predominantly when teams are under considerable time pressure (Arrow *et al.*, 2004; Okhuysen & Waller, 2002; Perlow *et al.*, 2002; Seers & Woodruff, 1997; Wheelan *et al.*, 2003).

Finding 8: A relationship exists between team members' verbal communication and member viability in both effective and ineffective teams.

Overall, this study found a relationship between verbal communication and member viability. This relationship occurred in both effective and ineffective teams and was found to exist throughout the five days that teams worked on their project. Generally, this study found that member viability was mostly associated with negative socio-emotional communication behaviours. When these communication behaviours were high, viability was low and vice versa. Also of interest is that this relationship was not found on day 1. On this day, all teams rated member viability around the scale midpoint of 3 on the questionnaire irrespective of the communication patterns of the team. This finding seems to suggest that viability develops over time and becomes influenced by the relational side of teams; particularly the amount of negative socio-emotional communication present in a team.

Despite finding this relationship between team communication and member viability in all teams, it is important to point out that it did not occur for one of the effective teams (Team C) on day 3. On this day, the results showed that while member viability decreased, this was not associated with an increase of negative socio-emotional behaviours in the analysed meeting. This finding could be explained in at least two ways. First, something in the team's course of communication could have occurred that did not take place in the analysed meeting of this day (the first meeting of the day was analysed and they participated in a number of other meetings during the day whereas the Daily Questionnaire measuring viability was administered to team members at 6.30 pm on days 1 to 4). Another explanation for this result could be that this effective team went through a midpoint transition that was not captured in the analysis of the verbal interaction taking place in this meeting. In other words, the team did go through a midpoint transition but this did not occur in the teams first meeting; it could have occurred in another meeting of day 3.

5.3 Discussion of Findings in Relation to Research Questions

As outlined above, a number of key findings associated with this study were discussed. These key findings were presented in this manner because they tended to cut across more than one research question. The purpose of the following section will be to now discuss these findings in relation to the research questions posed in this thesis.

5.3.1 Discussion of Findings in Relation to Research Question 1.1: Are communication differences in effective and ineffective teams more visible in socio-emotional interaction than in task-related interaction?

Generally, results in this study seem to suggest that communication differences in effective and ineffective teams are more visible in socio-emotional than in task-related interaction. This answer is based on a number of findings related to the analysis of the IPA data. First, even though task-related communication differences were found (e.g., the ineffective team showed lower levels of exchanging information and higher levels of asking for opinions compared to the effective teams), they could be described as relatively minor. This is because they are only visible at the IPA category frequency level and they seem to differ in only a small way to the effective teams. Second, socio-emotional communication differences seem to be much stronger. This is because they are visible on the category and area level as well as through the course of the verbal communication. Third, communication differences in relation to the category of *shows antagonism* (a negative socio-emotional category) seems to be the strongest difference between the effective and ineffective teams.

5.3.2 Discussion of Findings in Relation to Research Question 1.2: Do socio-emotional interaction patterns in effective and ineffective teams change over time?

Overall, results of this study seem to suggest that socio-emotional interaction patterns change over time. This however was found predominantly in the ineffective team. Results of the IPA data showed that the ineffective and effective teams differed on socio-emotional behaviour throughout the course of meetings and across the entire project. At the meetings level, the ineffective team showed higher levels of negative socio-emotional communication behaviours especially at the beginning and at the end of the meeting, displayed a greater number of negative socio-emotional fluctuations

with more peaks, and had a permanent presence during meetings. This is in contrast to the effective teams where negative socio-emotional communication was at a lower level, displayed fewer fluctuations, and showed negative free periods. At the broader project level, the ineffective team showed a pattern of socio-emotional behaviours that changed over the three days. On day 1, negative was higher than positive. On day 2, positive was higher than negative. On day 3, however, the pattern shifted back to be similar to that found on day 1 (i.e., negative higher than positive socio-emotional communication). These changes were not found in the effective teams where all meetings showed a similar pattern (i.e., positive far outweighed negative verbal communication).

5.3.3 Discussion of Findings in Relation to Research Question 2.1: Is there a relationship between socio-emotional interaction patterns and self-perceived member viability?

Overall, results of this study seem to suggest that a relationship exists between socio-emotional interaction patterns and self-perceived member viability. This relationship seems to be more evident on the negative side of socio-emotional communication. Further, this relationship seems to exist for both effective and ineffective teams. This research question, however, is difficult to answer as most findings relevant to member viability and its relationship to communication appeared to develop over time (see below).

5.3.4 Discussion of Findings in Relation to Research Question 2.2: Does this relationship between socio-emotional interaction patterns and self-perceived member viability change over time?

Overall, results of this study seem to suggest that the relationship between socio-emotional interaction patterns and self-perceived member viability changes over time. Interestingly, this relationship was found to occur in different ways at different points. On the first day of the project, it appeared that no or little relationship existed in both effective and ineffective teams. All teams, irrespective of the course of interaction on the first day had similar scores (close to the scale midpoint of 3). On day 2, however, this relationship started to occur. All teams showed an increase of member viability from day 1 to day 2 and this was related to the IPA data. On day 3, the relationship between socio-emotional communication and member viability appears most

interesting. This is because the ineffective team scored member viability noticeably lower on day 3 of the project. This is interesting in two ways. First, this day could be described as the temporal midpoint of the project. Second, these low scores of member viability have to be considered in relation to the fact that the ineffective team decided to disband one hour later. On day 4, both of the effective teams, showed an increase of member viability. This is of interest as it may suggest that these two teams were able to pass through the midpoint transition. On day 5, after both effective teams had made successful presentations, team members scored viability consistently high; for one team it even increased from day 4 to day 5. Overall, member viability for both effective teams increased constantly and ratings moved from the scale midpoint of 3 to ratings up to 4.61 on a 5 point scale used in the questionnaire.

5.4 Significance and Contribution of the Research to Existing Knowledge

Based on the findings presented above, this thesis makes a number of significant contributions to existing knowledge. It contributes to existing knowledge in the field of small group research and communication, by looking at task and socio-emotional communication differences in effective and ineffective teams, investigating task and socio-emotional communication as equal communication activities, which has been overlooked in this form in the existing body of small group research and communication literature.

Most theories about interpersonal communication behaviours in teams are inferred from retrospective data or research about effective teams. In contrast, the present research findings relied on analysis of the interaction process, supplemented by team members' self-reported members viability on a day-to-day basis. The unexpected fact that one of the observed teams discontinued its work enabled the researcher to analyse a dysfunctional and ineffective team and its communication in progression. Furthermore, this study confirms existing notions about the relationship between communication and effectiveness as well as the relationship between dysfunctional and ineffective team performance and outcomes. The six main areas of significance and contribution are listed as follows:

1. Communication differences between effective and ineffective teams are more visible in socio-emotional communication activities. Therefore it seems to appear, that the investigation of socio-emotional communication is important to understand team effectiveness.

2. Findings seem to support the notion that (a) teams' first meetings are important for their future development and (b) teams go through a critical phase at their calendar midpoint.

3. Findings of the ineffective team confirm existing research about the relationship between a dysfunction process and an ineffective outcome.

4. It appears that the longitudinal study of communication has two significant strengths. First, it seems to suggest, that the longitudinal study reveals communication patterns, which would not be that visible within a short task, conducted in a couple of hours. Second, it seems to indicate, that a longitudinal task enables socio-emotional communication patterns and relational dynamics to develop.

5. Questionnaire data support IPA-based findings and appear to provide a more comprehensive picture of team communication and its influence upon team effectiveness.

6. Beyond its substantive contribution, the present research differs methodologically from prior work relating to analysis and comparison of communication in effective and ineffective teams. This research combined a number of approaches to conduct a study were in-depth analysis of team communication in both effective and ineffective teams has been compared longitudinally. This differs from existing methods where researchers have tended to (a) conduct studies in shorter time frames, (b) use case-study approaches, or (c) use surveys only in order to gain insight into team communication in relation to team effectiveness.

5.5 Significance and Contribution of the Research to Practice

Implications for practice address predominantly leadership and support for teams over time; focusing on socio-emotional communication and relational dynamics as important facilitators or inhibitors of team effectiveness. Socio-emotional communication seems to be a transmitter of relational dynamics as well as its origin. The findings of this research are not only interesting for small group research, but also for practitioners. Four closely related implications for practice are listed:

1. There are certain periods in a team's life or during a project, where support and leadership are especially important for a team. It is suggested that two times are especially critical: (a) the first meeting or first time a group starts working on the project, and (b) the team's calendar midpoint of the allocated time to work on the project.

2. Findings of the current study seem to suggest that a combination of procedural disagreement and relational conflict may require help from outside the team to improve internal relational dynamics.

3. Socio-emotional communication should be monitored carefully, because team members' viability, and therefore its effectiveness, is highly influenced by it.

4. It seems that socio-emotional communication behaviours in teams change over time. Therefore, team communication has to be monitored at different times during the project to obtain a more complete picture about the relational health of teams.

These assumptions have implications for further actions in practice. Team leaders should watch and support teams carefully over time, especially during the first project stages and at their calendar midpoint, in order to intervene as early as possible if problems occur. This study has shown that early in the team's life, even in the first meeting, symptoms of interpersonal problems and dysfunctional behaviours can occur. Understanding the importance of socio-emotional or relational communication behaviours in teams can help to develop suitable precautions and interventions to improve and support team work in practice. Team leaders, in industry (and education), have to be aware of early signs of dysfunctional communication behaviours.

Findings in this study have shown that team members' viability can be seen as an indicator for relational dynamics in the team. It is suggested that the level of member viability can be used in practice, by team leaders or team managers, to monitor a team's interpersonal dynamics.

This research has shown, that socio-emotional communication behaviours can have a strong impact upon team effectiveness. It is suggested, that team members and team managers have to monitor these kinds of communication behaviours carefully.

A high level of negative socio-emotional communication (e.g., disagreement, tension, antagonism, interruptions and interpersonal conflict) could be a sign of a dysfunctional team process. In most cases, the team may not be able to change established communication patterns and dynamics itself and external support could be needed.

5.6 Limitations and Suggestions for Further Research

While this study has produced interesting findings, it does, however, have three key limitations that need to be acknowledged. The first, and perhaps the most important, is that this research was based on groups drawn from students rather than a work organisation setting. As these groups were not embedded within an organisational context, they therefore lack a number of important conditions that have the potential to influence the behaviours displayed by team members (e.g., a task with significant financial outcomes, formal leadership structure within the team, accountability to senior management by the team, pay structures and future employment prospect based on individual performance). Consequently, it is still unknown whether these findings would generalise to teams operating within work organisations. It could be argued that the classroom setting, as an unreal field setting, is not displaying the same socio-emotional development that naturally occurring work teams would show. In reply to this claim, it must be mentioned again that a research design was chosen that included a highly dynamic and complex task that reflected circumstances faced in industry and that students were all mature aged, post-graduate students who had experience in the workplace.

The second limitation of this study is the small number of groups examined. With this study focusing on only three groups (one ineffective and two effective groups), the extent to which these findings apply to other effective and ineffective teams is unclear.

The third limitation is that only selected time periods of communication in each of these three teams were examined (i.e., the first team meeting of each day). As such, it is not known if the communication patterns discovered in these selected time periods were representative of the team's communication throughout the entire day. Furthermore, one might question the generalisability of the findings, because the task of the study was conducted in the context of one professional domain (project management). However, there are no reasons to believe that the findings are based on specificities of the project management domain. Rather, one can assume that the findings generalise to other areas where knowledge has to be communicated

continuously and where important decisions are made during team meetings, with the purpose of the meeting to produce an agreed outcome.

In light of the limitations raised above, it is apparent that further research is needed into this area of small group/team research. Task and socio-emotional communication have been analysed on a group level. It is expected, that the frequency of utterances and the course of communication behaviours through a meeting for each team member would provide even more insights into interpersonal team dynamics. Therefore, future research is required to investigate socio-emotional communication behaviours between team members on an individual level. Small group research focuses mainly on output factors such as task performance and productivity to determine team effectiveness. More research is needed that explores process factors in relation to output factors, other than team performance, for example, cohesion and member satisfaction.

Most comparisons between effective and ineffective teams focuses on the decision making process of teams in order to understand why some teams are more effective than others. Findings of this research suggest that small group research needs to pay more attention to the socio-emotional side of team communication. Most notably, there is a need to examine the communication patterns of effective and ineffective teams (both newly formed and existing teams) operating in work organisations. This, however, is a difficult undertaking as teams in industry tend to perform different tasks and can be thus difficult to compare in terms of effectiveness. Further, it is also difficult to capture team communication for the entire duration of the project (e.g., from the first to the last meeting as attempted in this study). One possible line of research may be to recruit intact teams and have them complete the same task as the groups in this current study performed. By doing so, we may be in a better position to understand how the likes of member history (i.e., member familiarity) and structure (e.g., formal leadership) influence communication patterns. This would also provide valuable data, which could be directly compared to the zero-history groups examined in this study. Another line of research would be to recruit teams who are making genuine project tenders (rather than a hypothetical one such as the one used in this research). This would allow communication patterns to be examined using intact teams who are embedded within their organisations and who are performing a task with important (group and individual) outcomes. It would also once again allow communication patterns to be captured for the entire project (first to last meeting). Whilst this latter suggestion would be a large undertaking, it is the type of research needed if we are to

move beyond the laboratory or classroom settings and help organisations improve the functioning of their work teams and the viability of their members.

5.7 Conclusion

The aim of this thesis was to examine verbal communication in effective and ineffective teams. It also attempted to investigate if the verbal communication that took place in effective and ineffective teams was related to member viability. To pursue this aim, a study was conducted, where the verbal communication patterns in an ineffective team and two effective teams were audio recorded while members worked on a complex and dynamic task over a 5-day period. A number of these recordings for each team (the first meeting of each day) were then analysed using Bales' (1950) IPA with data then compared to each other. This IPA data was also compared to data collected from team members who completed a questionnaire measuring viability.

Overall, the results of this study produced a number of interesting findings that contribute to a better understanding of team effectiveness. At the broadest level, results seem to confirm that effective and ineffective teams have different communication patterns. In particular, this research has found that these differences are most prominent in the types of negative socio-emotional communication behaviours exchanged between team members. More specifically, these behaviours are found to develop over time and are related to member viability.

The findings associated with this study are of particular importance as they are based on teams operating on a complex and dynamic task, over a 5-day period, in a non-laboratory setting. These are conditions quite rare in research investigating communication and group development that have in most instances been based on ad-hoc groups performing novel tasks in a laboratory environment. Second, these findings are based on a team that was truly ineffective (i.e., a team that failed to complete its task). While such teams have been reported in the literature, this research is unique as it was able to capture the communication of a team that fell apart. Third, these findings are based on the analysis of both audio recordings and questionnaire data collected from team members. This has been an approach not often used in communication research but one often recommended. Finally, these findings are based on data analysed and presented in a number of ways (e.g., frequency counts of categories and verbal behaviours over the course of the analysed meeting). By presenting the data in

these two ways, communication differences were more visible and thus led to results that would not have been found if only one approach was used.

In summary, the findings of this thesis are important as they help to both support and extend research related to team effectiveness. Most notably, it addresses three areas that up to now have received little research attention in the team work literature: (a) The importance of negative socio-emotional communication in relation to team effectiveness, (b) the development of communication patterns over time in relation to effectiveness, and (c) the relationship between team communication and member viability. In all three of these areas, this study produced findings that appear to advance our understanding of team effectiveness and may therefore be of interest to team researchers, practitioners, managers and employees working in teams.

Chapter 6
Appendices

6.1 Consent Form

Project management workshop
Research observation (Student research)
Participants consent form

We the undersigned, members of team __ agree to participate in the research project entitled 'Interaction during the team process: An exploration of communication' being conducted by Ilka Staudinger for her Masters by research thesis.

I understand that the purpose of this research is a study of interaction and communication behaviour amongst team members during a cooperative complex task.

I understand that my participation in this research will involve audio taping of my spoken interaction during team meetings and completion of a daily questionnaire and timesheet. This will take less than 10 minutes each day to complete.

I am aware that I am at liberty to contact Ilka Staudinger or her supervisor Kaye Remington (Ph. 02 – 9514 8882) if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish and without giving reason. My decision to participate or withdraw from participating in the research study will not affect my participation in the Project management workshop or my student assessment and my academic progression.

I agree that the researcher Ilka Staudinger has answered all my questions fully and clearly.

I understand that the research data gathered from this project may be published. I agree to participate on the basis that I will not be identified in any way in the publication.

Name, Signature ……..	Name, Signature ……..
Name, Signature ……..	Name, Signature ……..
Name, Signature ……..	Name, Signature ……..
Name, Signature ……..	Name, Signature ……..

Contact:
Ilka Staudinger, Faculty of Design, Architecture and Building, University of Technology, Sydney, 702 – 730 Harris Street, Broadway, NSW 2007, e-mail: ilka.staudinger@gmx.de, telephone: 02 – 9514 8817

Note:
This study has been approved by the University of Technology, Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research you may contact the Ethics Committee through the Research Ethics Manager, Louise Abrams (Ph: 9514 9615, e-mail: Louise.Abrams@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

6.2 The Daily Questionnaire

Project Management Workshop Day 2 of 5

Name* _____ Team No _____ or Team Name _____

* Your name is needed for research purposes only and will be removed after data entry.
NOTE: Your responses will be treated confidentially and will not be shown to your fellow team members.

INSTRUCTIONS:
Please answer the following statements about your team by circling the most appropriate response.

	DISAGREE				AGREE
01. Other members of my team really listened to what I had to say today	1	2	3	4	5
02. I am looking forward to continuing as a member of this team	1	2	3	4	5
03. I am happy to be a part of this team	1	2	3	4	5
04. I enjoyed talking to the other members of my team today	1	2	3	4	5
05. I feel we have good communications among team members	1	2	3	4	5
06. I am satisfied with our team's overall performance today	1	2	3	4	5
07. I feel that I belong to this team	1	2	3	4	5
08. During our meeting today, I got to participate whenever I wanted to	1	2	3	4	5
09. I am confident that our team will perform well on this project	1	2	3	4	5
10. I feel that we are a very cohesive team	1	2	3	4	5
11. I feel that I am a member of this team	1	2	3	4	5
12. I have had fun interacting with the members of my team today	1	2	3	4	5
13. I liked talking to the other members of my team today	1	2	3	4	5
14. I am satisfied with how we have interacted with each other today	1	2	3	4	5
15. I am content to be part of this team	1	2	3	4	5

16. How much time did your team spend today on **"task-related"** issues (eg clarifying goals, gathering information, generating, analysing and assessing ideas etc)?	NONE 1	2	3	4	A LOT 5
17. How would you rate the quality of this time spent?	VERY POOR 1	2	3	4	EXCELLENT 5
18. How much time did your team spend today on **"process-related"** issues (eg deciding how work should be allocated to members, discussing team dynamics, addressing differences of opinion etc)?	NONE 1	2	3	4	A LOT 5
19. How would you rate the quality of this time spent?	VERY POOR 1	2	3	4	EXCELLENT 5

20. Briefly list the objectives which your team had set for today:

_____

_____

_____

Thank you.

6.3 The Post-Project Questionnaire (Three Pages)

Project Management Workshop Page 1 of 3, Day 5 of 5

Name* _____ Team No _____ Team Name _____

* Your name is needed for research purposes only and will be removed after data entry.
NOTE: Your responses will be treated confidentially and will not be shown to your fellow team members.

INSTRUCTIONS:
Please answer the following statements about your team by circling the most appropriate response.

	DISAGREE				AGREE
01. **Overall**, other members of my team really listened to what I had to say	1	2	3	4	5
02. Given the opportunity, I would like to work with the same member of my team again	1	2	3	4	5
03. I was happy to be a part of this team	1	2	3	4	5
04. I enjoyed talking to the other members of my team	1	2	3	4	5
05. I felt we had good communications among team members	1	2	3	4	5
06. I am satisfied with our team's overall performance	1	2	3	4	5
07. I felt that I belonged to this team	1	2	3	4	5
08. During our meetings, I got to participate whenever I wanted to	1	2	3	4	5
09. Our team will perform well on this project	1	2	3	4	5
10. I felt that we were a very cohesive team	1	2	3	4	5
11. I felt that I was a member of this team	1	2	3	4	5
12. I have had fun interacting with the members of my team	1	2	3	4	5
13. I liked talking to the other members of my team	1	2	3	4	5
14. I was satisfied with how we have interacted with each other	1	2	3	4	5
15. I was content to be part of this team	1	2	3	4	5

16. **Overal**l, how much time did your team spend on **"task-related"** issues (eg clarifying goals, gathering information, generating, analysing and assessing ideas etc)?	NONE 1	2	3	4	A LOT 5
17. **Overall**, how would you rate the quality of this time spent?	VERY POOR 1	2	3	4	EXCELLENT 5
18. **Overall**, how much time did your team spend on **"process-related"** issues (eg deciding how work should be allocated to members, discussing team dynamics, addressing differences of opinion etc)?	NONE 1	2	3	4	A LOT 5
19. **Overall**, how would you rate the quality of this time spent?	VERY POOR 1	2	3	4	EXCELLENT 5

How would you rate your team's **presentation** on the following:	VERY POOR				EXCELLENT
20. Comprehensive	1	2	3	4	5
21. Informative	1	2	3	4	5
22. Creative	1	2	3	4	5
23. Engaging	1	2	3	4	5
24. Suitable for the client's needs	1	2	3	4	5

How would you rate your team's **project plan (documentation)** on the following:	VERY POOR				EXCELLENT
25. Comprehensive	1	2	3	4	5
26. Informative	1	2	3	4	5
27. Innovative	1	2	3	4	5
28. "User friendly"	1	2	3	4	5
29. Suitable for the client's needs	1	2	3	4	5

	VERY POOR				EXCELLENT
30. **Overall**, how would you rate the quality of your bid?	1	2	3	4	5

31. What were the key decisions that influenced your final deliverables?

_____

_____

_____

32. What did you particularly like about this project?

_____

_____

_____

_____

33. What did you find particularly difficult in the project?

_____

_____

_____

_____

34. In hindsight, what would you have done differently in the workshop?

_____

_____

_____

_____

35. What did you learn most by working on this project?

_____

_____

_____

_____

36. If you have any additional comments to make about the project or your team, please write in the space below:

_____

_____

_____

_____

Thank you.

6.4 The Client Questionnaire

Project Management Workshop Day 5 of 5

INSTRUCTIONS:
Please answer the following statements about the team's outcomes by circling the most appropriate response for:

Team No
Team Name

How would you rate the team's **presentation** on the following:	VERY POOR									EXCELLENT
01. Comprehensive	1	2	3	4	5	6	7	8	9	10
02. Informative	1	2	3	4	5	6	7	8	9	10
03. Creative	1	2	3	4	5	6	7	8	9	10
04. Engaging	1	2	3	4	5	6	7	8	9	10
05. Suitable for the client's needs	1	2	3	4	5	6	7	8	9	10

How would you rate the team's **project plan (documentation)** on the following:	VERY POOR									EXCELLENT
06. Comprehensive	1	2	3	4	5	6	7	8	9	10
07. Informative	1	2	3	4	5	6	7	8	9	10
08. Innovative	1	2	3	4	5	6	7	8	9	10
09. "User friendly"	1	2	3	4	5	6	7	8	9	10
10. Suitable for the client's needs	1	2	3	4	5	6	7	8	9	10

	VERY POOR									EXCELLENT
11. **Overall**, how would you rate the quality of the team's bid?	1	2	3	4	5	6	7	8	9	10

12. If you have any additional comments to make about the outcomes or the team, please write in the space below:

_____

_____

_____

_____

Thank you.

Chapter 7
References

Alderfer, C. P. (1977). Group and intergroup relations. In J. R. Hackman & J. L. Suttler (Eds.), *Improving the quality of work life*. Palisades, CA: Goodyear.

Arrow, H., Poole, M. S., Henry, K. B., Wheelan, S. A., & Moreland, R. (2004). Time, change, and development. The temporal perspective on groups. *Small Group Research, 35*(1), 73-105.

Badke-Schaub, P., & Frankenberger, E. (1999). Analysis of design projects. *Design Studies, 20*, 465-480.

Badke-Schaub, P., & Stempfle, J. (2001). Kommunikation und Problemlösen in Gruppen: Eine Prozessanalyse (translation: Communication and problem-solving in groups: A process analysis). *Unpublished manuscript*.

Bales, R. F. (1950). *Interaction process analysis: A method for the study of small groups*. Chicago: University of Chicago.

Bales, R. F. (1970). *Personality and interpersonal behavior*. New York: Holt, Rinehart and Winston.

Bales, R. F. (1999). *Social interaction systems. Theory and measurement*. New Brunswick, NJ: Transaction Publishers.

Bales, R. F., & Cohen, S. P. (1979). *SYMLOG: A system for the multiple level observation of groups*. New York: Free Press.

Beck, D., & Fisch, R. (2000). Argumentation and emotional processes in group decision-making: Ilustration of a multi-level interaction process analysis approach. *Group Processes & Intergroup Relations, 3*(2), 183-201.

Belbin, R. M. (1981). *Management teams: Why they succeed or fail*. Oxford, UK: Butterworth-Heinemann.

Belbin, R. M. (1993). *Team roles at work*. Oxford, UK: Butterworth-Heinemann.

Bell, L. (2001). Patterns of interaction in multidisciplinary child protection teams in New Jersey. *Child Abuse & Neglect, 25*, 65-80.

Bettenhausen, K. L. (1991). Five years of group research: What we have learned and what needs to be addressed. *Journal of Management, 17*, 345-381.

Broome, B. J., & Fulbright, L. (1995). A multistage influence model of barriers to group problem solving. *Small Group Research, 26*(1), 25-55.

Brown, R. (1988). *Group processes: Dynamics within and between groups*. New York: Blackwell.

Busseri, M. A., & Palmer, J. M. (2000). Improving teamwork: The effect of self-assessment on construction design teams. *Design Studies, 21*, 223-238.

Carron, A., & Brawley, L. R. (2000). Cohesion: Conceptual and measurement issues. *Small Group Research, 31*(1), 89-106.

Chang, A., & Bordia, P. (2001). A multidimensional approach to the group cohesion - group performance relationship. *Small Group Research, 32*(4), 379-405.

Chang, A., Bordia, P., & Duck, J. (2003). Punctuated equilibrium and linear progression: Toward a new understanding of group development. *Academy of Management Journal, 46*(1), 106-117.

Chin, W. W., Salisbury, W. D., Pearson, A. W., & Stollak, M. J. (1999). Perceived cohesion in small groups. Adapting and testing the perceived cohesion scale in a small-group setting. *Small Group Research, 30*(6), 751-766.

Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, 23*, 239-290.

Cohen, S. G., Ledford, G. E., & Spreitzer, G. (1996). A predictive model of self-managing work team effectiveness. *Human Relations, 49*, 643-676.

Cupach, W. R., & Spitzberg, B. H. (1994). *The dark side of interpersonal communication*. San Diego, IL: Lawrence Erlbaum Associates.

DeGrada, E., Kruglanski, A. W., Mannetti, L., & Pierro, A. (1999). Motivated cognition and group interaction: Need for closure affects the contents and processes of collective negotiations. *Journal of Experimental Social Psychology, 35*, 346-365.

Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (1975). *Group techniques for program planning: A guide to nominal group and delphi processes*. Glenview, IL: Scott, Foresman.

DeStephen, R. S., & Hirokawa, R. Y. (1988). Small group consensus. Stability of group support of the decision, task process, and group relationships. *Small Group Research, 19*(2), 227-239.

Doenau, S. (1998). *Building better work teams*. Sydney: Edvance.

Donnellon, A. (1996). *Team talk: The power of language in team dynamics*. Boston: Harvard Business School Press.

Dumaine, B. (1994). The trouble with teams. *Fortune, 5 September*, 88-94.

Fisher, B. A. (1974). *Small group decision making: Communication and the group process*. New York: McGraw-Hill.

Fleming, J. L., & Monda-Amaya, L. E. (2001). Process variables critical for team effectiveness. *Remedial and Special Education, 22*(3), 158-171.

Freeman, K. A. (1996). Attitudes toward work in project groups as predictors of academic performance. *Small Group Research, 27*(2), 265-283.

Gersick, C. J. G. (1988). Time and transition in work teams: Towards a new model of group development. *Academy of Management Journal, 31*(1), 9-41.

Gersick, C. J. G. (1989). Marking time: Predictable transitions in task groups. *Academy of Management Journal, 32*(2), 274-309.

Goodman, P. S. (1986). The impact of task and technology on group performance. In P. S. A. E. Goodman (Ed.), *Designing effective work groups* (pp. 198-216). San Francisco: Jossey-Bass.

Gordon, J. (1992). Work teams: How far have they come? *Training, 29*(10), 59-65.

Gouran, D. S., Hirokawa, R. Y., & Martz, A. E. (1986). A critical analysis of factors related to the decision processes involved in the Challenger disaster. *Central States Speech Journal, 37*, 119-135.

Guzzo, R. A., & Salas, E. (1995). *Team effectiveness and decision making in organizations*. San Francisco: Jossey-Bass Publisher.

Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 315-342). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Hackman, J. R. (1990). *Groups that work (and those that don't)*. San Francisco: Jossey-Bass.

Hackman, J. R. (2002). *Leading teams*. Boston: Harvard Business School Press.

Hackman, J. R., & Morris, C. G. (1975). Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. *Advances in Experimental Social Psychology, 8*, 45-99.

Hackman, J. R., & Morris, C. G. (1983). Group tasks, group interaction process, and group performance effectiveness. *Small Groups and Social Interaction, 1*, 331-345.

Hackman, J. R., & Wageman, R. (2005). A theory of team coaching. *Academy of Management Journal, 30*(2), 269-287.

Hall, J., & Watson, W. H. (1970). The effects of a normative intervention in group decision-making performance. *Human Relations, 23*, 299-317.

Hambrick, D. C. (1987). The top management team: Key to strategic success. *California Management Review, 30*, 88-108.

Handy, C. B. (1981). *Understanding organizations* (2nd ed. ed.). Harmondsworth: Penguin.

Hare, A. P. (1976). *Handbook of small group research*. New York: Free Press.

Hawkins, K., & Power, C. B. (1999). Gender differences in questions asked during small decision-making group discussions. *Small Group Research, 30*(2), 235-256.

Hiltz, S. R., Johnson, K., & Turoff, M. (1986). Experiments in group decision making: Communication process and outcome in face-to-face versus computerized conferences. *Human Communication Research, 13*(2), 225-252.

Hirokawa, R. Y. (1980). A comparative analysis of communication pattern within effective and ineffective decision-making groups. *Communication Monographs, 47*, 312-321.

Hirokawa, R. Y. (1990). The role of communication in group decision-making efficacy. A task-contingency perspective. *Small Group Research, 21*(2), 190-204.

Hirokawa, R. Y., DeGooyer, D., & Valde, K. (2000). Using narratives to study task group effectiveness. *Small Group Research, 31*(5), 573-591.

Hirokawa, R. Y., Gouran, D. S., & Martz, A. E. (1988). Understanding the sources of faulty group decision making: A lesson from the Challenger disaster. *Small Group Behavior, 19*(4), 411-433.

Hirokawa, R. Y., & Keyton, J. (1995). Perceived facilitators and inhibitors of effectiveness in organizational work teams. *Management Communication Quarterly, 8*(4), 424-446.

Hirokawa, R. Y., & Orlitzky, M. (2001). To err is human, to correct for it divine. A meta-analysis of research testing the functional theory of group decision-making effectiveness. *Small Group Research, 32*(3), 313-341.

Hitchcock, D. E., & Willard, M. L. (1995). *Why teams can fail and what to do about it*. Chicago: Irwin Professional.

Hutson-Comeaux, S. L., & Kelly, J. R. (1996). Sex differences in interaction style and group task performance: The process-performance relationship. *Journal of Social Behavior & Personality, 11*(5), 255-275.

Janis, I. L. (1982). *Groupthink: A study of foreign policy decisions and fiascos* (2nd. ed. ed.). Boston: Houghton Mifflin.

Katzenback, J. R., & Smith, D. K. (1993). *The wisdom of teams: Creating the high-performance organization*. Boston: Harvard Business School Press.

Keyton, J. (1999a). Analyzing interaction patterns in dysfunctional teams. *Small Group Research, 30*(4), 491-518.

Keyton, J. (1999b). Relational communication in groups. In *The handbook of group communication theory & research* (pp. 192-224). Thousand Oaks: Sage Publications, Inc.

Kirkman, B. L., & Shapiro, D. L. (1997). The impact of cultural values on employee resistance to teams: Towards a model of globalized self-managing work team effectiveness. *Academy of Management Journal, 22*, 730-757.

Labich, K. (1996). Elite teams get the job done. *Fortune, 19 February*, 90-99.

Larson, C. E., & LaFasto, F. M. (1989). *Teamwork: What must go right/what can go wrong*. Newbury Park, CA: Sage.

Lawler, E. E., Mohrman, S. A., & Ledford, G. E. (1992). *Employee involvement and total quality management: Practices and results in fortune 1000 companies*. San Francisco: Jossey-Bass Publishers.

Lawler, E. E., Mohrman, S. A., & Ledford, G. E. (1995). *Creating high-performance organizations: Practices and results of employee involvement and quality management in fortune 1000 companies*. San Francisco: Jossey-Bass Publishers.

Lumsden, G., & Lumsden, D. (2004). *Communication in groups and teams* (4th ed. ed.). Belmont, CA: Thomson.

Mankin, D., Cohen, S. G., & Bikson, T. K. (1996). *Teams and technology: Fulfilling the promises of the new organization*. Boston: Harvard Business School Press.

Mayer, M. E. (1998). Behaviors leading to more effective decisions in small groups embedded in organizations. *Communication Reports, 11*(2), 123-132.

McDermott, L. C., Brawley, N., & Waite, W. W. (1998). *World class teams: Working across borders*. New York: John Wiley & Sons.

McGrath, J. E. (1964). *Social psychology: A brief introduction*. New York: Holt, Rinehart and Winston.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Mohrman, S. A., Cohen, S. G., & Mohrman, A. M. (1995). *Designing team-based organizations: New forms for knowledge work*. San Francisco: Jossey-Bass.

Norton, R. (1976). Manifestations of ambiguity tolerance through verbal behavior in small groups. *Communication Monographs, 43*, 35-43.

Okhuysen, G. A., & Waller, M. J. (2002). Focusing on midpoint transitions: An analysis of boundary conditions. *Academy of Management Journal, 45*(5), 1056-1065.

Olson, G. M., Olson, J. S., Carter, M. R., & Storrøsten, M. (1992). Small group meetings: An analysis of collaboration. *Human-Computer Interaction, 7*, 347-374.

Orsburn, J. D., Moran, L., Musselwhite, E., & Zenger, J. H. (1990). *Self-directed work teams: The new american challenge*. Homewood: Business One Irwin.

Pagliari, C., & Grimshaw, J. (2002). Impact of group structure and process on multidisciplinary evidence-based guideline development: An observational study. *Journal of Evaluation in Clinical Practice, 8*(2), 145-153.

Perlow, L. A., Okhuysen, G. A., & Repenning, N. P. (2002). The speed trap: Exploring the relationship between decision making and temporal context. *Academy of Management Journal, 45*(5), 931-955.

Pescosolido, A. T. (2003). Group efficacy and group effectiveness. The effects of group efficacy over time on group performance and development. *Small Group Research, 34*(1), 20-42.

Pittenger, R., Hockett, C., & Danehy, J. (1960). *The first five minutes: A sample of microscopic interview analysis*. Ithaca, NY: Paul Martineau.

Polley, R. B. (1987). The dimensions of social interaction: A method for improving rating scales. *Social Psychology Quarterly, 50*(1), 72-82.

Robbins, H., & Finley, M. (2000). *Why teams don't work* (2nd ed.). San Francisco: Berrett-Koehler Publishers.

Schwartzman, H. B. (1989). *The meeting: Gatherings in organizations and communities*. New York: Plenum.

Seers, A., & Woodruff, S. (1997). Temporal pacing in task forces: Group development or deadline pressure? *Journal of Management, 23*(2), 169-187.

Sonnentag, S. (2001). High performance and meeting participation: An observational study in software design teams. *Group Dynamics, 5*(1), 3-18.

Sonnenwald, D. H. (1996). Communication roles that support collaboration during the design process. *Design Studies, 17*, 277-301.

Steiner, I. D. (1972). *Group process and productivity*. New York: Academic Press.

Stempfle, J., & Badke-Schaub, P. (2002). Thinking in design teams - an analysis of team communication. *Design Studies, 23*, 473-496.

Stohl, C., & Schell, S. E. (1991). A communication-based model of small-group dysfunction. *Management Communication Quarterly*, *5*(1), 90-110.

Sundstrom, E. (1999). *Supporting work team effectiveness: Best management practice for fostering high performance*. San Francisco: Jossey-Bass Publishers.

Sundstrom, E., & Altman, I. (1989). Physical environments and work-group effectiveness. *Research in Organizational Behavior, 11*, 175-209.

Sundstrom, E., De Meuse, K., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist, 45*(2), 120-133.

Syer, J., & Connolly, C. (1996). *How teamwork works: The dynamics of effective team development*. London: McGraw-Hill Publishing Companies.

Tuckman, B. W. (1965). Development sequence in small groups. *Psychological Bulletin, 63*, 384-399.

Tuckman, B. W., & Jensen, M. A. (1977). Stages of small-group development revisited. *Group & Organization Studies, 2*(4), 419-427.

Tyson, T. (1989). *Working with groups* (2nd ed.). Swinburne, Australia: Macmillan Education Australia.

Unsworth, K. L., & West, M. A. (2000). Teams: The challenges of cooperative work. In N. Chmiel (Ed.), *Introduction to work and organizational psychology* (pp. 327-346). Oxford, UK: Blackwell Publishers.

Waller, M. J., Zellmer-Bruhn, M. E., & Giambatista, R. C. (2002). Watching the clock: Group pacing behavior under dynamic deadlines. *Academy of Management Journal, 45*(5), 1046-1055.

Walz, D. B. (1988). *A longitudinal study of the group design process.* Unpublished PHD thesis, The University of Texas at Austin.

Warfield, J. N. (1976). *Societal systems: Planning, policy, and complexity*. New York: Wiley.

Warfield, J. N. (1990). *A science of generic design: Managing complexity through systems design*. Salinas, CA: Intersystems.

Wellins, R. S., Byham, W. C., & Dixon, G. R. (1994). *Inside teams: How 20 world-class organizations are winning through teamwork*. San Francisco: Jossey-Bass.

West, M. A. (2004). *Effective teamwork*. Oxford: Blackwell.

Wheelan, S. A., Davidson, B., & Tilin, F. (2003). Group development across time. Reality or illusion? *Small Group Research, 34*(2), 223-245.

Wheelan, S. A., & McKeage, R. L. (1993). Developmental patterns in small and large groups. *Small Group Research, 24*(1), 60-83.

Wish, M., D'Andrade, R. G., & Goodnow, J. E. (1980). Dimensions of interpersonal communication: Correspondences between structures for speech acts and bipolar scales. *Journal of Personality and Social Psychology, 39*(5), 848-860.

Witteman, H. (1991). Group member satisfaction. A conflict-related account. *Small Group Research, 22*(1), 24-58.

Wittenbaum, G. M., Hollingshead, A. B., Paulus, P. B., Hirokawa, R. Y., Ancona, D. G., Peterson, R. S., *et al*. (2004). The functional perspective as a lens for understanding groups. *Small Group Research, 35*(1), 17-43.