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Communication behaviour during management and design team meetings: a comparison of group interaction

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Although a few studies have investigated the communication behaviour of construction professionals this research represents the first attempt to model the construction team's interaction in live project meetings. Using the established Bales interaction process analysis (IPA) method, both task and relational interaction were recorded and a model of group communication was produced. A total of 36 meetings were observed from 10 construction projects and the data aggregated to provide a single profile of the groups' interaction. The construction meetings' interaction is compared to previous research undertaken in other contexts. Differences were found between the interaction patterns of work, social and academic groups. Typical of the interaction previously observed in work groups, the participants in construction meetings use high levels of task-based interaction and low levels of socio-emotional interaction. The adversarial environment often associated with construction was not found, indeed the level of negative emotion and critical discussion was so low that it could be suggested that problems may pass unchallenged.

Keywords: Communication, group dynamics, design, management, teams

Introduction

Design and construction is a collaborative social act that relies on effective interaction between project stakeholders. Construction professionals are temporarily brought together via projects and interact on an individual and group level using a variety of communication tools and media. Interaction affects the relationships between the actors and ultimately colours their ability to work together successfully.

Group interaction can be separated into two dimensions: social and task-based interaction (Bales, 1970; McLeod and Kettner-Polley, 2004). To achieve goals and discuss issues, groups share task-based information through the exchange of ideas, information, opinions and suggestions. And, by showing support, establishing values and resolving differences through interaction that has social and emotional content, relationships are formed and maintained. Although just a few key

interaction factors, these are inherently related to the actors' ability to communicate effectively in groups and achieve their goals. The field of group interaction and communication has received very little attention from researchers (Emmitt and Gorse, 2003, 2007; Dainty *et al.*, 2006) and despite group interaction being a fundamental aspect of construction there appears to be very little evidence of applied research.

Given the current focus on improving effectiveness and relational forms of contracting, it would be reasonable to conclude that research is needed into how construction participants interact in live projects. Anecdotal comparisons made between the interaction that takes place in construction meetings and other working environments does not provide a good basis for professional debate and there is a need to better understand the mechanisms of communication before advice can be given on how to improve communication with construction teams and groups.

In a comprehensive review of the communication literature Emmitt and Gorse (2003) found a paucity of scientific research. The early work by the Tavistock

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Institute, *Communications in the Building Industry: The Report of a Pilot Study* (Higgin and Jessop, 1965) and *Interdependence and Uncertainty* (Building Industry Communications, 1966) did not form a catalyst to research into interpersonal communications. Indeed, few researchers have attempted to observe or examine the nature of communication as it happens in live design and construction projects. Exceptions are a small number of projects (Kreiner, 1976; Wallace, 1987; Gameson, 1992; Pietroforte, 1992; Bowen, 1993; Loosemore, 1996; Hugill, 2001; Gorse, 2002; Abadi, 2005; den Otter, 2005; Luck, 2007), which collectively have helped to emphasize the importance of interpersonal communication while at the same time highlighting the difficulties of collecting robust data from live, commercially sensitive, design and construction projects. The theme running through this small body of work is the importance of face-to-face (synchronous) communication.

Our aim was to try and understand the nature of task-based and socio-emotional interaction as team members attempt to gain control over their physical and social environment during site progress meetings. Site-based meetings were chosen because they offered a regular event, with relatively stable group membership, providing the opportunity to collect data from the workplace. Interaction was researched using an established research method which provided the opportunity to compare the results with the behaviour of other groups.

Communication in groups

Sperber and Wilson (1986) suggest that when people communicate they intend to alter the cognitive environment of the persons whom they are addressing. As a result, it is expected that the receiver's thought process and possible actions will be altered. Failure to exchange task-based information and ask questions will decrease a person's ability to use the other's knowledge and thus considerably hinders effective communication (Brownell *et al.*, 1997). It is important to develop an understanding of the nature of construction interaction and the types of messages exchanged. Once a model of interaction has been developed a critical discussion of the communication behaviour found can unfold.

Communication is a complex issue and undertaking a research project to better understand the interaction that takes place in construction teams posed some formidable challenges. Trying to analyse who says what to whom is often too detailed and too project specific to identify trends or to have wider application. To avoid over-complicating the data through examination of

each individual word and the subtle nuances they carry, it was felt that the emphasis would be better placed on the characteristics of interaction. Thus, the exchange of information, opinions, beliefs, emotions and other task-based and socio-emotional acts was a fundamental concern. The research sought to understand how team members used task and socio-emotional interaction during their attempts to influence and gain control of the social network and physical environment.

Observing all communication stimuli would prove impossible, so observations were limited to verbal interaction, while at the same time recognizing that body language and facial expressions provided important information in helping to understand the meaning of the verbal messages. The physical observation of group interaction is considered important; it assists the researcher's interpretation of messages and their meaning.

Without pre-empting the discussion of methodological issues it is important to identify a number of factors that influenced the focus of this research and the research method. At an early stage in the research an exploratory investigation using postal questionnaires, interviews and case studies was undertaken (Gorse, 2002). The aim was to investigate the perceived effectiveness of communication media and communication problems encountered by construction participants. Face-to-face (interpersonal) communication was perceived to be the most effective communication medium. The results also identified that meetings, both formal and informal, were perceived to be beneficial to the successful completion of construction projects. Collecting data from informal (unstructured and unscheduled) meetings posed some methodological problems that were difficult to overcome. Prearranged meetings are, by their very nature, more amenable to systematic study, and so a decision was taken to collect data from site-based progress meetings.

Previous research (Higgin and Jessop, 1965; Wallace, 1987) indicated that socio-emotional communication (interaction that affects the development and maintenance of relationships) and task-based communication (interaction necessary to complete tasks) between individuals from different organizations appeared to be a core problem. As well as developing relationships, socio-emotional communication is used to engage in and manage conflict. Failure to balance relational and task-based exchanges could prevent group conflict from being properly managed. An uncontrollable escalation of conflict will threaten the team's ability to engage in the positive dialogue necessary for progression of the project. This led us to focus on task and relational interaction in live projects.

Structured and unstructured interaction in groups

Loosemore *et al.* (2000) and Gorse (2002) note that the construction industry is often portrayed as adversarial and chaotic, with professionals operating in an environment that is bound in negative emotion. However, it may be naive to suggest that the behaviour of construction professionals is unstructured, lacks control or is entrenched in negative emotion. Group behaviour that is characterized by high levels of uncontrolled emotion tends to be associated with children. When using task-based interaction, the suggestions made by children are presented almost entirely unsupported by accompanying analysis, inference or persuasion (Bales, 1970; Socha and Socha, 1994). In adult groups, information and suggestions are normally supported by explanation. Generally, communication in adult groups is very structured and restrained (Bales, 1950, 1970). Adults tend to restrict and control their use of emotional behaviour, whereas children are prone to outbursts of extreme emotional expression.

While the interactions of adults and children are quite different, there also appear to be differences in the way work and social groups behave. The few studies that have looked at work groups (Landsberger, 1955; Gameson, 1992; Bell, 2001) provide some evidence that the working and commercial environment reduces emotional communication to a lower level compared with that found in social groups and laboratory experiments reported by Bales (1950, 1970). Recent studies of online communication have found very low levels of socio-emotional communication. Bellamy *et al.* (2005) and Fahy (2006) noted a complete absence of negative socio-emotional interaction during computer-mediated discussion. The communication medium and environment has an effect on the nature of communication. A low level of socio-emotional interaction (including agreeing and disagreeing) was found in Gameson's (1992) study of construction professionals during the first face-to-face meeting with potential clients. The majority of interaction was task based.

As groups develop, their behaviour changes over time, with emotional interaction being more prominent in the later stages of group development. Groups initially use task-based communication tentatively, gathering information on others' personal beliefs and attitudes before using socio-emotional interaction. Once groups reach the later stages of group development the amount of socio-emotional communication increases (Heinicke and Bales, 1953; Bales, 1950, 1970). Gameson's (1992) research supports this view. Gameson's research indicates that temporary groups do not experience heightened levels of socio-emotional

communication because they do not reach the final levels of group development.

Researching group communication using Bales IPA

Few studies have investigated the interaction behaviour during construction meetings. Evidence of the levels of socio-emotional (relational) and task-based interaction during *bona fide* meetings is scarce. In a review of communication research Gorse and Emmitt (2003) argued for rigorous research using methods that can be replicated by others. Their review led to a focus on the Bales interaction process analysis (IPA), an established tool used extensively in many fields, although rarely used in construction, exceptions being work by Gameson (1992), Gorse (2002), Bellamy *et al.* (2005), and as part of a bespoke methodology, Wallace (1987). Research that has used the IPA method to classify and examine group interaction includes Bales's (1950) profiles of children, married couples and academic groups; Bales's (1970) later review of 21 studies of adult groups; Cline's (1994) study of disagreement and agreement; Landsberger's (1955) records of management disputes during 12 mediation meetings; Bell's (2001) observations of multidiscipline child protection teams and Fahy's (2006) examination of face-to-face and online groups.

The Bales IPA method provides a robust method with a distinct focus on the socio-emotional and task-based components. The method is well established and was used in the production of Tuckman's (1965) and Belbin's (1981, 1993, 2000) seminal work. More recent studies have used the method to investigate interaction in self-managed work teams (e.g. Armstrong and Priola, 2001) and virtual environments (e.g. Chou, 2002; Fahy, 2006). New technologies and different ways of working have not reduced the usefulness of this established research method. For example, in construction Bellamy *et al.* (2005) have addressed the difference between co-located and virtual design teams using the Bales IPA. The longevity of use has resulted in a body of information, which has steadily developed understanding of group interaction.

Although well established, the Bales IPA direct observation method has experienced a slight decline in use, with researchers opting to use self-perceptions and interpersonal ratings from within the group. Direct observations are costly and time consuming, while interpersonal ratings allows all group members to provide their perceptions of others (McLeod and Kettner-Polley, 2004). What is lost with interpersonal ratings is the considerable detailed information and

analysis of group behaviour and development that is only possible with direct observation (McLeod and Kettner-Polley, 2004). Some research projects use both interpersonal ratings and direct observation. Priola *et al.* (2004) made use of interpersonal ratings, the Bales IPA and discourse analysis to investigate cognitive styles and group work. Their work was conducted in a staged setting. Unfortunately where participants are requested to voluntarily take part in 'real world' research projects that require them to undertake additional tasks, such as interpersonal ratings or completing questionnaires, response rates tend to suffer.

Although direct observation is time consuming for the researcher it places no resource implications on those being observed; indeed, it is desirable for those being observed not to do anything different from their normal behaviour. Interestingly Bales's more recent research method which uses interpersonal ratings can take the participants three to four hours to understand and complete (Bales, 1980). Gorse and Emmitt (2005) experienced considerable difficulties when attempting to obtain valid and consistent interpersonal ratings from professionals. Work demands and lack of interest meant that feedback sheets required from the professionals were given a low priority and the contributions varied with a significant number of professionals not responding with any meaningful data. Direct observation using the Bales IPA method was found to be an effective way of collecting interaction data from professional groups and is still as useful as it was in the 1950s when it was first introduced.

The Bales IPA method classifies interaction into 12 different categories, which are related to either socio-emotional or task-based interaction (Figure 1). Task-based and socio-emotional communication is considered an important part of group work. For the group to exist and develop the members engage in relational communication (socio-emotional) and, to achieve outcomes, groups move through various phases of task-based discussion (Bales, 1970). Depending on the group's composition, function and goals differences have been found in the levels of socio-emotional and task-based discussion. The classification system can be used and compared to other IPA research.

Research method

Data were collected using the established Bales (1950) IPA method. The unit of analysis was site-based management and design team meetings (M&D meetings), which were observed during the construction phase. The management and design teams' data were

then compared to IPA data collected from other contexts.

A company director of a large contracting company, known to the researchers, was approached. The contracting organization was involved in a significant number of construction projects that were located within a reasonable geographical distance of the research office; this allowed researchers time to get to the meetings and record data during a normal working day. The contractor was a well-known organization, involved in construction projects both regionally and nationally. After the background to the research was explained and the method of data collection discussed the director gave permission for the research to be carried out and for the results to be disseminated (subject to approval from the meeting participants). This had the effect of tying the researchers into the contractor's current projects, some of which were managed using design and build, some of which were procured under a traditional contract. All projects observed were located in the same geographical region of the UK and were associated with commercial building projects of a varied nature. This meant that each project was different from the next and therefore the meeting participants would differ between projects. The nature of the construction team is temporary, changeable and transient, meaning that participants enter and leave the team as project demands change (Emmitt and Gorse, 2003). It is to be expected that the project team will vary, as will the nature of the projects. Previous research has found that interaction within certain contexts can be consistent regardless of the number of participants (Bales, 1970). Comparison of the results from each project will indicate interaction differences and behaviour that is consistent across the meetings.

The projects

Ten construction projects were used to gather data. Eight of the projects were managed under a general contract (architect led) and the other two were managed through design and build contracts (contractor led). All projects had a minimum contract value of £3 million and a maximum contract value of £8 million sterling. All observations were undertaken during the construction phase when professionals interacted in site-based progress meetings, which were all held in the site offices. The interaction of each participant at the meeting was observed and coded using the Bales IPA method. By gathering data from all contributors it was possible to aggregate the interaction results to provide a profile of group interaction.

Data were gathered from each of the construction projects by attending, observing and recording interaction

Numerical ID	CATEGORY DESCRIPTION	
1	SHOWS SOLIDARITY – raises others status, gives help, encourages others, reinforces (rewards) contribution, greets others in a friendly manner, uses positive social gesture.	SOCIAL-EMOTIONAL AREA
2	SHOWS TENSION RELEASE – jokes, laughs, shows satisfaction, relives or attempts to remove tension, expresses enthusiasm, enjoyment, satisfaction.	Positive reactions. Behaviours used to encourage commitment, help build and strengthen relationships.
3	AGREES – shows passive acceptance, acknowledges understanding, complies, co-operates with others, expresses interest and comprehension.	
4	GIVES SUGGESTION – makes firm suggestion, provides direction or resolution, implying autonomy for others, attempts to control direction or decision.	TASK AREA: NEUTRAL
5	GIVES OPINION – offers opinion, evaluation, analysis, express a feeling or wish. Seeks to analyses, explore, enquire. Provides insight and reasoning.	Input and attempted answers. Acts used to develop information, understanding and control
6	GIVES ORIENTATION – provides background or further information, repeats, clarifies, confirms. Brings relevant matters into the forum, acts that assist group focus.	
7	ASKS FOR ORIENTATION – asks for further information, repetition or confirmation. Acts used to request relevant information and understand the topic.	TASK AREA: NEUTRAL
8	ASKS FOR OPINION – asks others for their opinion, evaluation, analysis, or to express how they feel. Acts used to request or explore reasoning.	Questions and requests Acts used to seek, analyse and explore information and request direction
9	ASKS FOR SUGGESTION – asks for suggestion, direction, possible ways of action. Requests for firm contribution, solution or closure to problem.	
10	DISAGREES – shows passive rejection, formality, withholds help, does not support view or opinion, fails to concur with view, rejects a point, issue or suggestion.	SOCIAL-EMOTIONAL AREA
11	SHOWS TENSION – shows concern, apprehension, dissatisfaction or frustration. Persons interacting are tense, on edge. Act that express sarcasm or are condemning.	Negative reactions Behaviours used to reject task information, question commitment and threaten relationships
12	SHOWS ANTAGONISM – acts used to deflate others status, defends or asserts self, purposely blocks another or makes a verbal attack, expressions of aggression and anger.	

Interaction process analysis categories

Figure 1 Bales's 12 interaction categories (adapted from Bales, 1950, p. 9)

from three to four sequential meetings. In total, data were gathered from 36 site meetings, involving 96 different participants. Before observing the first progress meeting on each project the researcher contacted all the key personnel scheduled to attend and briefly outlined the nature of the research. All of the subjects were shown the data collection sheet and reassured by the type of data that was to be collected. All participants gave their

consent for the meetings to be observed and the data recorded. During the first meeting of every project the researcher was briefly introduced to the meeting participants. At the start of the meeting some of those present asked to have a look at the data collection sheet, and this was shown to them. Following this, those attending the meeting paid little attention to the presence of the researcher; however, we need to recognize that the

presence of the researcher may have influenced the behaviour of the group.

Coding the communication acts

Each communication act was coded in accordance with the Bales IPA (Figure 1). The smallest part of the interaction process coded and analysed was a sentence or a statement of meaning. Analysis of individual words would be impractical when recording interaction in real time, and would be of little use when analysing the results.

Training in accordance with Bales's recommendations was undertaken to ensure that the categorizing was consistent and valid prior to the data collection. Bales (1950, 1970) recommends a three-month training period; this is used to learn the categories and work with others to ensure unitizing, identifying and categorizing are consistent. Bales also suggests that the use of the chi-square at the 0.50 (not $p=0.05$) probability level, or above, to demonstrate that the system being used is common to the observers, although not exact. Working with two other researchers the intercoder agreement developed from initial scores of $\chi^2=14.648$, $df=7$, $p=0.04$ (which shows significant difference) to scores of $\chi^2=4.916$, $df=8$, $p=0.766$ (which is acceptable).

The chi-square test is the standard method of demonstrating consistency between observers using the Bales IPA method. For example, Gameson (1992) also used chi-square to show intercoder reliability. Although Bales is critical of other tests used to check the validity of intercoding reliability, including the use of correlation coefficients, Norusis (2000) notes that chi-square is not a good measure of association. Norusis suggests the use of Cohen's kappa to measure the degree of agreement between different observers. To improve the coding training and remove doubt generated by this argument Cohen's kappa test was also used. A list of 100 statements compiled from examples provided in previous research was produced. Scores in excess of 0.95 were achieved by the coder. Further explanation of the training undertaken can be found in Emmitt and Gorse (2007).

The IPA quantitative data were manually entered into a computer-based spreadsheet (SPSS v.10) ready for statistical analysis. Analysis of the quantitative data was made on a case-by-case basis in the form of graphical profiles and tabulated results. Then the aggregated results for all observations were used to provide a single profile for the management and design team meeting. This profile could then be compared to previous studies of groups based on the IPA method.

Brief notes were made by the observer about the nature of the observed interaction against the IPA

classification. IPA classifications are broad and grouped together to cover many different types of communication acts under one common heading. When one act within a communication band was more prominent than others a note was made of this behaviour. For example, category 11 (shows tension) includes 'shows concern, apprehension, dissatisfaction, frustration, agitation, alarm'; when observing group interaction tension can be quickly recorded (IPA category 11) and it is also possible to note whether the act was a sign of dissatisfaction or frustration. The notes do not go beyond the behaviours and acts listed in the Bales system, but are useful as they provide detail that is helpful when interpreting quantitative results.

Analysing the data

The IPA system relies on the classification of communication from a finite number of nominal communication categories (12), shown in Figure 1. When analysing the results the categories can be discussed and different sets of data compared. It is conventional for researchers using the Bales methodology to pay particular attention to the trends found in the descriptive statistics, using line graphs (profiles) and tables. Many researchers, including Bales, choose not to support all of their analyses with inferential statistics. Most recent IPA studies use a combination of descriptive and inferential analysis (Cline, 1994; Socha and Socha, 1994; De Grada *et al.*, 1999).

Differences between the results from the management and design team meeting and previous research are compared and analysed using graphical and tabulated data. Descriptive statistics have also been used to examine the difference between communication categories. As the full datasets of previous research were not available it was not appropriate to use inferential analysis in this section of the research project.

Results

Interaction profiles

The data from all 10 projects (Table 1) were aggregated to provide a single dataset for the M&D meetings. Following the tradition for presenting IPA data a line graph for the M&D team meeting was produced (Figure 2). One advantage of using line graphs is that multiple profiles can be presented on the same graph, with the lines connecting the data points helping to distinguish the individual profiles. When data points are presented without connecting lines the overlapping data points, which have the same value, become

Table 1 Results of all 10 case studies and interaction categories

<i>Interaction category</i>	Project 1			Project 2			Project 3			Project 4			Project 5			Project 6			Project 7			Project 8			Project 9			Project 10			Total	
	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	%	Adj.	No.	Adj.
1. Shows solidarity	6	1	4.1	0	0	-1	2	0	0.2	0	0	-1.5	4	0	1.2	0	0	-1.7	1	0	-0.7	0	0	-1.4	1	0	-0.7	4	0	2.2	18	0
2. Shows tension release	16	1	0.4	1	0	-3.0	14	1	-1.1	13	1	-1.8	30	2	1.1	37	2	2.2	9	1	-2.9	25	2	1.2	21	1	0.1	27	2	3.1	193	1
3. Agrees	198	17	15.4	61	8	1.3	146	10	6	157	10	5.4	118	6	-0.8	101	5	-3.3	55	3	-5.6	62	4	-4.2	41	3	-6.8	39	3	-4.8	978	7
4. Gives suggestion	125	11	-6.8	59	7	-8.3	126	9	-9.8	300	18	0	291	15	-4.1	525	25	8.6	339	20	2.1	421	27	9.3	316	20	1.3	274	23	4.0	2776	18
5. Gives opinion	308	27	-0.1	301	38	7.0	303	21	-5.1	353	22	-5.1	419	22	-5.6	611	29	2.6	451	27	0.1	466	30	2.8	580	36	8.7	268	22	-3.9	4060	27
6. Gives information	255	22	-4.9	188	24	-3.2	507	36	6.1	527	32	3.5	642	33	4.8	501	24	-4.9	495	30	1	335	22	-6.5	420	26	-2.3	433	36	5.8	4303	29
7. Asks for information	66	6	-1.6	26	3	-4.2	133	9	3.8	147	9	3.5	242	13	10.4	91	4	-4.9	83	5	-3.3	88	6	-2.1	110	7	-0.1	56	5	-3.3	1042	7
8. Asks for opinion	71	6	3.8	49	6	3.1	88	6	4.3	44	3	-2.9	87	5	1.1	57	3	-3.3	76	5	1.1	61	4	-0.3	43	3	-2.9	33	3	-2.4	609	4
9. Asks for suggestion	46	4	-1.3	55	7	2.8	25	2	-5.7	76	5	-0.3	83	4	-1.2	90	4	-1.1	137	8	6.9	76	5	0.1	64	4	-1.6	73	6	2.1	725	5
10. Disagrees	40	4	5.2	48	6	10.1	55	4	7.1	16	1	-2.1	15	1	-3.1	37	2	0.6	5	0	-4.5	16	1	-1.9	11	1	-3.1	0	0	-4.6	243	2
11. Shows tension	12	1	0.9	12	2	2.2	24	2	3.9	0	0	-3.9	6	0	-2.6	36	2	5	20	1	1.9	8	1	-1.4	2	0	-3.2	2	0	-2.6	122	1
12. Shows antagonism	4	0	4.5	0	0	-0.7	4	0	3.9	0	0	-1.0	0	0	-1.1	0	0	-1.1	0	0	-1.0	0	0	-1.0	0	0	-1.0	0	0	-0.8	8	0
	1147			800			1427			1633			1937			2086			1671			1558			1609			1209			15077	

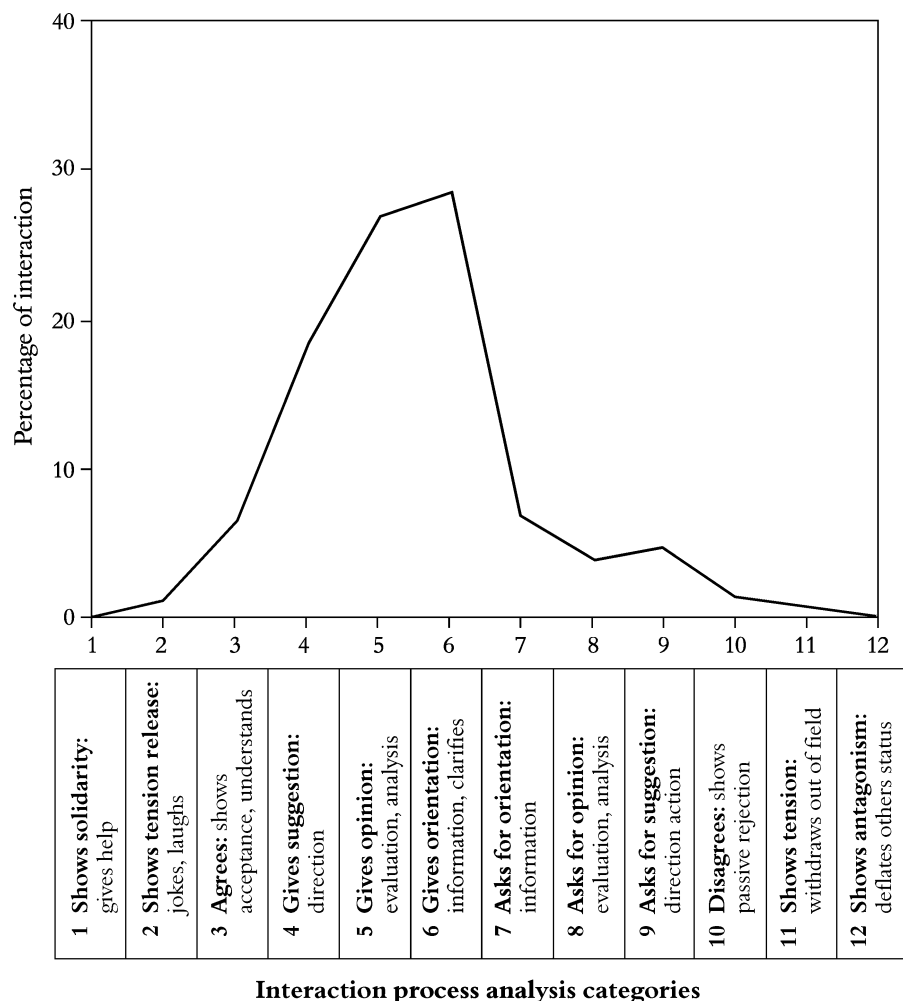


Figure 2 Management and design team interaction: interaction profile representing interaction data from 36 meetings

difficult to read. Histograms are used when only a few bars are needed.

Interaction characteristics

Comparisons were made with previous research that used the Bales IPA method. Before the comparisons were made with other research, the trends revealed by the descriptive statistics of the 10 cases were investigated. Figure 2 provides a summary of group interaction observed during the M&D team meetings.

Figure 2 illustrates the trend of group interaction found in the management and design team meetings. The norms operating within the meeting result in the groups' use of giving task-based interaction being consistently higher than that of requesting task-based interaction. The positive socio-emotional interaction is also consistently higher than the negative socio-emotional communication. The degree of consistency varies depending on the category. The most consistent to least consistent categories are shown in Table 2. The more

Table 2 Consistency of categories

Interaction category Interaction code: description	Adjusted residual (difference between expected and observed counts)
2. Shows tension release	Most consistent
1. Showing solidarity	3.1
8. Asking for opinion	4.1
12. Shows antagonism	4.3
11. Shows tension	4.5
6. Gives orientation	5.0
9. Asks for suggestion	-6.5
5. Gives opinion	6.9
4. Gives suggestion	8.7
10. Disagrees	-9.8
7. Asks for orientation	10.1
3. Agrees	10.4
	15.4
	Least consistent

extreme socio-emotional categories (shows tension, shows tension release, shows antagonism, shows solidarity) were a rare occurrence in the meetings, and the results in Table 2 show that this was consistent across most observations. Although the construction sector is often described as a volatile and antagonistic environment, this was not evident in the data collected from the site meetings. Observations of extreme negative and positive emotion were rare. This observation was consistent across the meetings. The levels of agreement and disagreement, which are considered to be low level emotional behaviours, were not consistent across meetings and experienced variation between cases.

Discussion: comparison of findings with previous studies

To what extent is the M&D team different?

Interaction profiles of children present an example of what is described as 'unorganised communication' (Bales 1950). Compared with the characteristics of groups of children the M&D meeting interaction is much more restrained and is more typical of adult

groups. Even in the M&D meeting observed in Project 7, where a level frustration was expressed, the emotional interaction patterns produced did not resemble the type of the unrestrained behaviour used by children. In the management and design team meetings the majority of the discussion is task-based with emphasis on information and explanation; the use of emotion is very restricted with only rare occurrences of extreme emotion.

As already discussed, the levels of social-emotional behaviour in M&D meetings are very low. This type of behaviour is more like the academic discussion group (thesis group) studied by Bales (1950) (Figure 3), where the amount of socio-emotional behaviour was described as a bare minimum. Although categories 1 (shows solidarity) and 2 (shows tension release) are low in the M&D profiles, Bales (1950) stated that in adult discussion groups it is rare to find the rate of joking and laughing to be higher than the rate of agreement.

Although the positive socio-emotional communication in the Bales thesis group is described as a minimum, there is even less positive socio-emotional communication in the M&D team meeting. The level of socio-emotional interaction falls outside the scope of what Bales (1970) considered normal (Figure 4). Both positive and negative emotional expression is less than

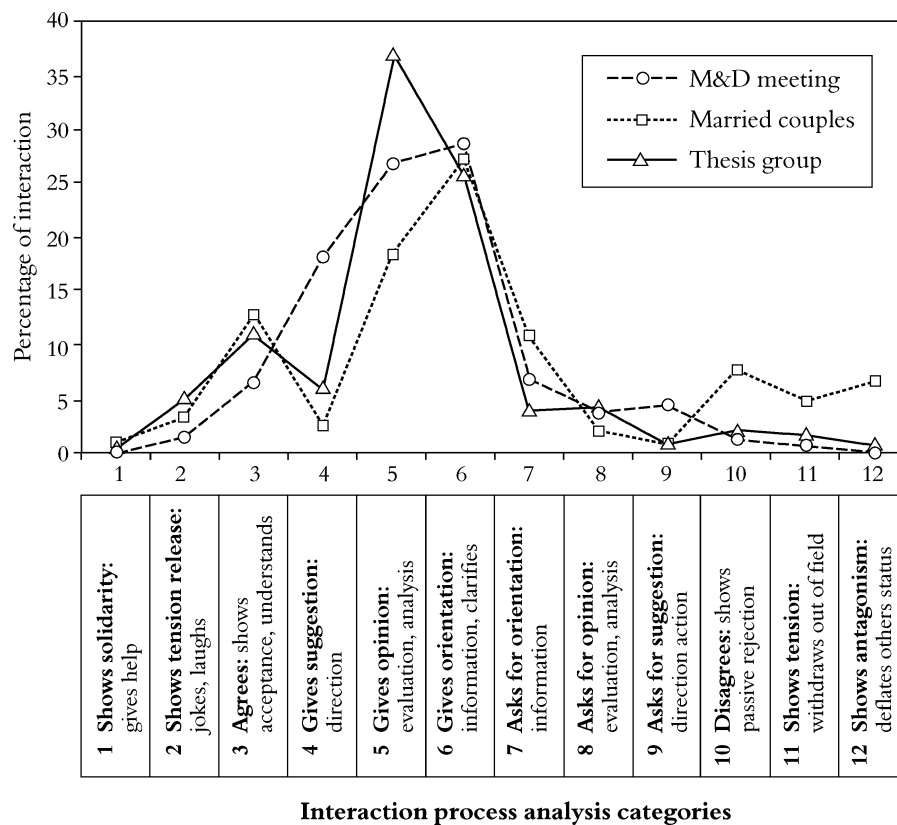


Figure 3 M&D profile and Bales's (1950, p. 25) observations of married couples and thesis groups

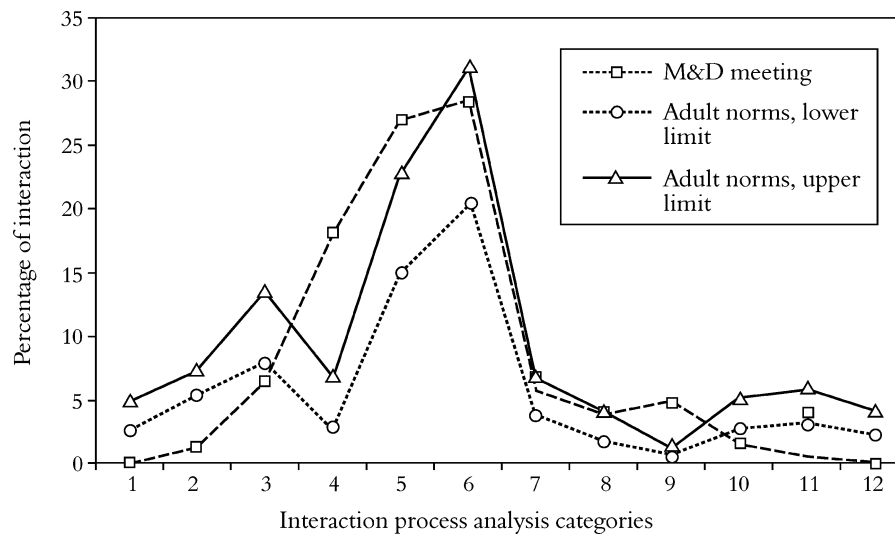


Figure 4 M&D profile and Bales's (1970, p. 473) interaction norms of adult groups (upper and lower limits)

the lower limit. The results show that the construction participants are either reluctant to use, or are avoiding, socio-emotional communication in the meeting. Bales (1953, 1970) noted that groups tend to use more neutral socio-emotional interaction during early stages of interaction, with positive and negative social interaction being increasingly used in the later phases of group development. The low level of socio-emotional interaction observed in the M&D team meeting is consistent with the results from work groups studied by Gameson and Sher (2005) and Bellamy *et al.* (2005).

Wallace (1987) found that when the group membership changed, when members entered or left the group, the group regressed back to early stages of the group development. During the M&D meetings the majority of members were consistent, but new members would occasionally join the group. This resulted in temporary changes to interaction, as people familiarized themselves with other members and the topic being discussed. Considering the technical complexity of some of the discussions such familiarization periods were short and the behaviour typical in previous meetings soon resumed. The number of participants attending each meeting varied. However, Bales's (1950) report of different sized chess groups showed that the number of participants undertaking a specific activity does not necessarily have a great effect on group interaction patterns.

Gameson's results (Figure 5) provide data on the early stages of group behaviour, the results show no recorded evidence of the extreme socio-emotional categories 1, 2, 11 and 12. Gameson's findings were generated from transcripts of audio tape recordings, which restricted the dataset. The only socio-emotional categories observed were agreeing and disagreeing. The

levels of agreeing were comparable to those found in the M&D meeting; however, the levels of disagreement found from Gameson's observations were considerably lower than that found in the M&D meetings. It is suggested that the professional relationships in this and Gameson's study have not developed sufficiently to allow higher levels of socio-emotional interaction to emerge.

The findings from the M&D meetings and Gameson's results suggest that disagreements during initial meetings are rare. The level of disagreement is comparable to that found in Cline's (1994, see Figure 6) study of the differences between the interaction of groups that fall into the trap of groupthink and those groups that avoid groupthink. Cline's study suggests that group members that agree with each other without challenging and evaluating proposals can suffer from groupthink. The important point here is that the level of agreement, although less than that in Cline's study, is closer to groups that do not suffer from groupthink.

Comparison between Bales's (1970), Landsberger's (1955) and the M&D team results (Figure 7) show that the participants in the M&D meetings did not engage in the same level of disagreement as that previously reported by Bales, nor did it reach that experienced in Landsberger's study of disputes. Landsberger found that those unable to resolve their differences on their own and who subsequently used a third party, such as a mediator, expressed a higher level of disagreement, tension and antagonism during mediation.

The level of disagreement in the management and design study is lower than that reported in Bales's work and comparable to Cline's study of groupthink. Cline notes that failing to disagree is one indicator of

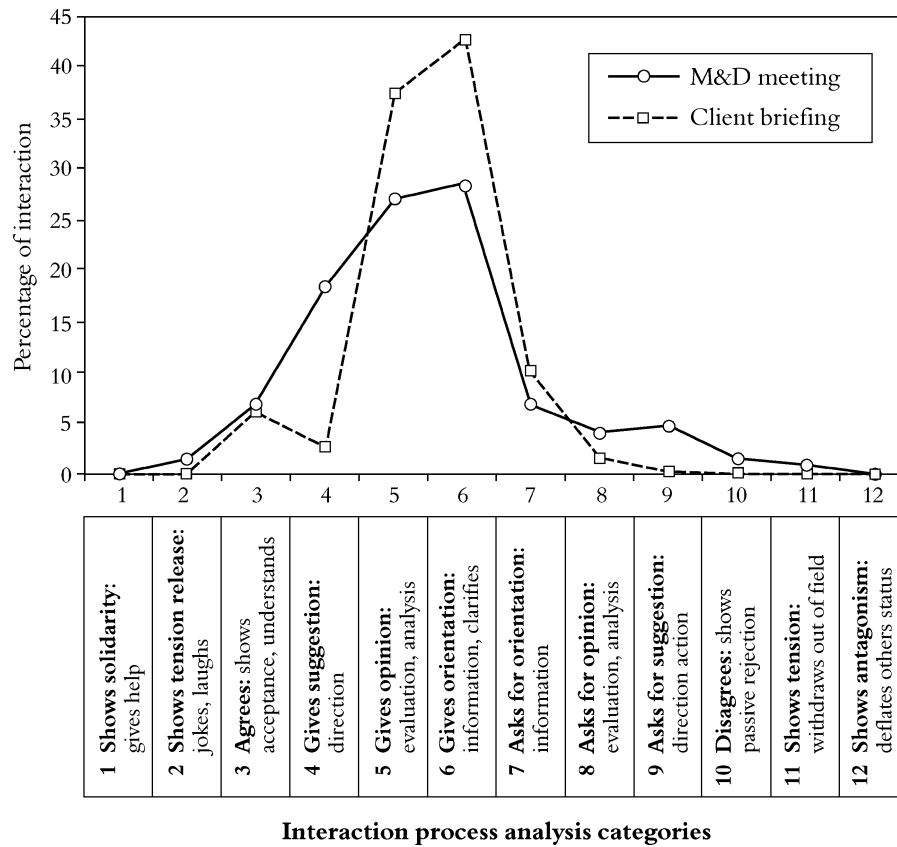


Figure 5 M&D profile and Gameson's (1992, pp. 312–17) observations of client briefing

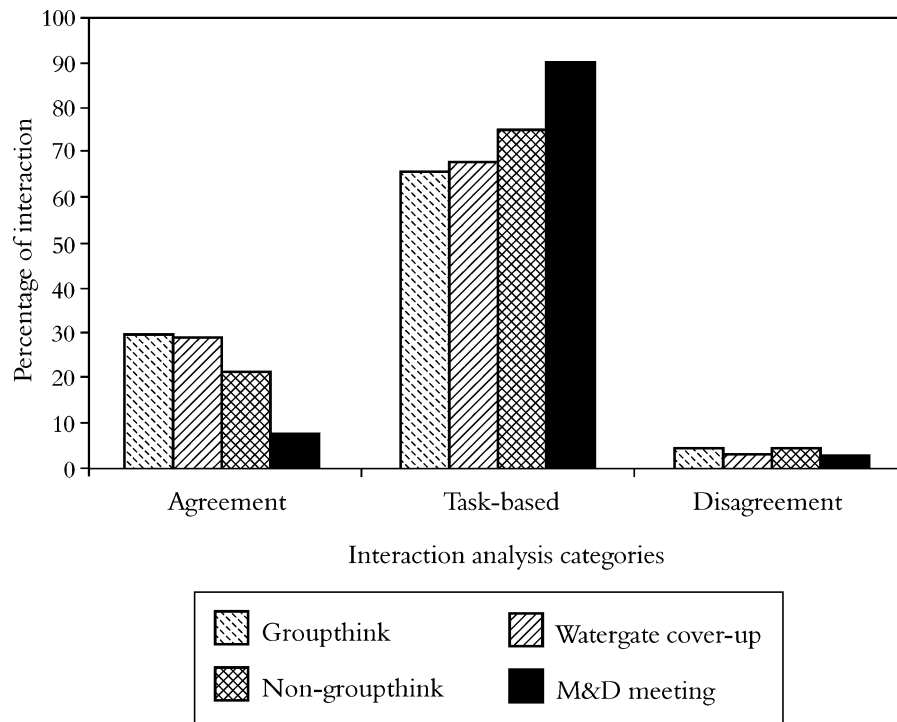


Figure 6 M&D and Cline's (1994) observations interaction that results in 'groupthink'

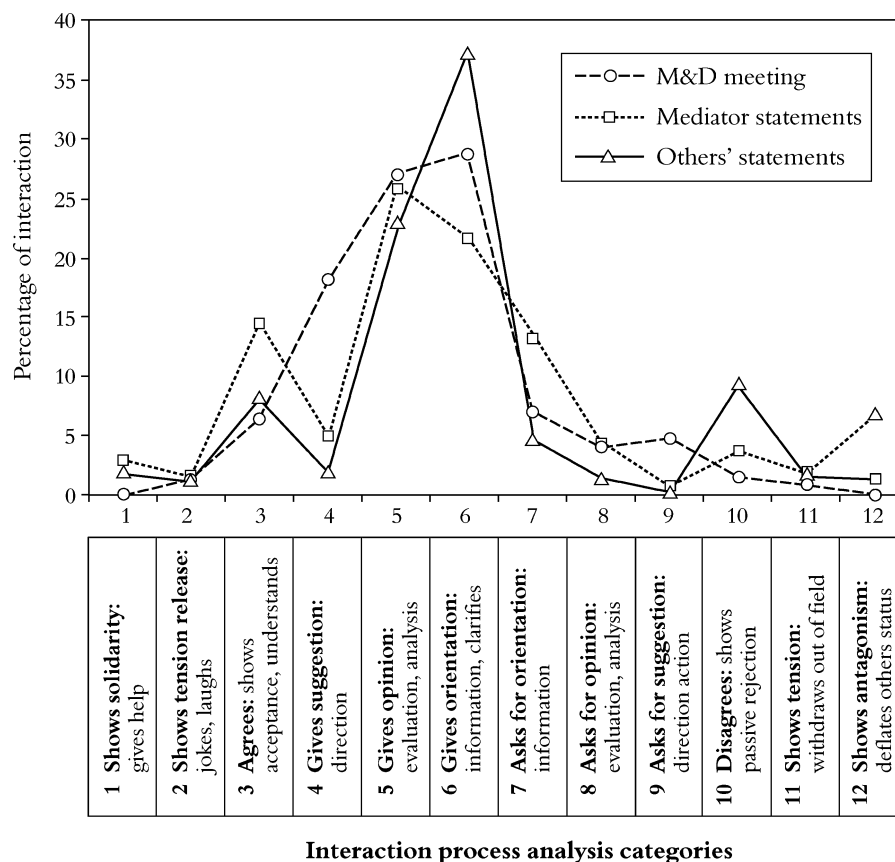


Figure 7 M&D meeting profile and Landsberger's (1955, p. 568) observations of workers' representatives and management dispute during mediation

groupthink. The low level of disagreement could be detrimental to the groups' performance. If members are accommodating the views of others without challenging them, when they secretly have concerns with the proposal, then they fall victim to groupthink. If groupthink occurs and problems are not properly discussed then such issues can become of greater consequence as time unfolds. The issue of disagreement and groupthink requires further investigation.

The use of negative emotional expression had a profound effect on the groups' behaviour. When members of a group disagreed or expressed tension the mood of the discussion quickly changed and members became focused on the conversation. Those engaged in the disagreement held the floor while others remained silent. Those with an interest in the outcome of the situation would interject to reinforce the discussion or attempt to control emotion by suggestions that helped resolve matters. Although a rare occurrence, the effect of negative emotion was sometimes used to ensure matters were given desired importance and resulted in action or agreement. Negative and positive emotion had a notable effect on the group behaviour. The use of emotion changed the group

dynamic. Some members used socio-emotional interaction to influence group behaviour and reaction.

The level of socio-emotional interaction observed by Cline (1994), Gameson (1992), Bell (2001) (see Figure 8) and Bellamy *et al.* (2005) (see Figure 9) are notably lower than that found by Bales (1970). Interaction between professionals, in business rather than social situations, uses less socio-emotional interaction. The formal interaction between construction professionals shows greater emotional restraint when compared to group discussions and meetings in other contexts. Even in Landsberger's (1955) labour-management dispute, the level of socio-emotional interaction is less than the lower band of Bales's (1970) group norms. Early research by Bales, which did look at a multitude of meetings and group discussions, tended to look at the behaviour of school groups, college students, family discussions, groups engaged in role play and other social situations. More recent studies, which have looked into the behaviour of work groups, show considerable differences in the interaction style. Recent studies of adult behaviour, especially those of groups in work contexts, challenge the range of interaction norms provided by Bales (1970) (see

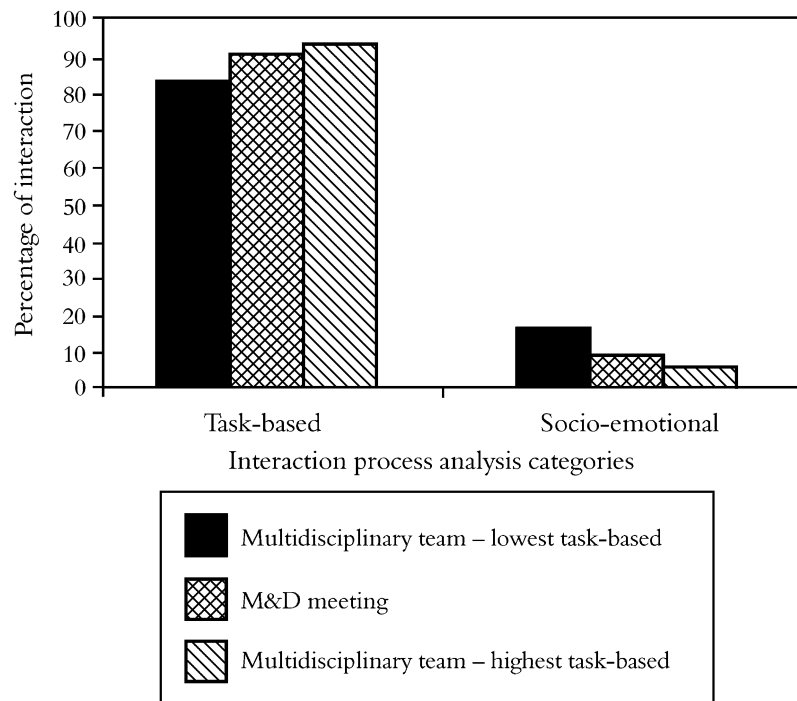


Figure 8 Interaction in M&D meetings and multidisciplinary child protection team meetings (Bell, 2001, p. 74)

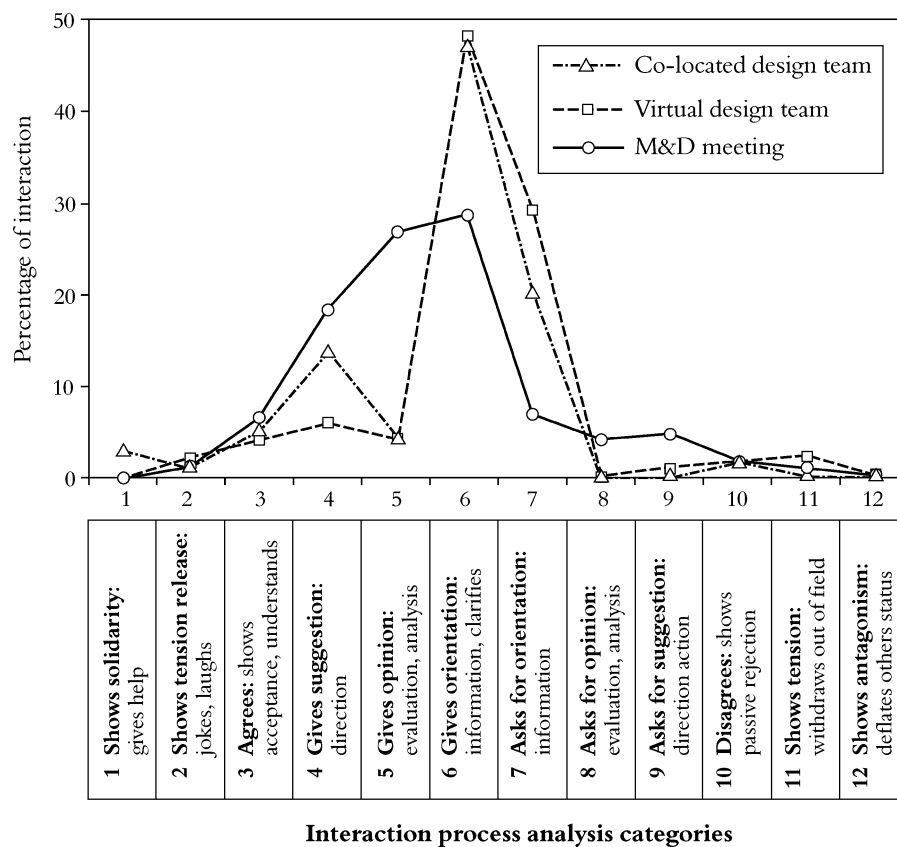


Figure 9 Interaction in M&D meetings and co-located and virtual design team interaction (Bellamy *et al.*, 2005, p. 359)

Figure 4). Work groups are far less emotionally expressive than the social groups falling below these norms shown in early studies.

In the business context there is greater use of the giving of task-based information and far less use of the socio-emotional categories. In the M&D meeting, when socio-emotional communication acts were used they often resulted in reciprocal responses of emotional behaviour. When positive emotion was used most of the participants responded with reciprocal positive emotional expression. The occurrence of positive emotion stimulated a positive emotional response from other participants. The heightened positive expression continued when all group members participated or was restrained and normality restored where key members did not participate with the same level of positive emotion. The observations suggest that the positive expression from influential members was by comparison usually more restrained. The restrained behaviour of a few group members has the effect of quickly restoring the normal task-based interaction. Space for emotional expression was allowed, but was controlled and quickly curtailed by influential group members. The meeting was emotionally expressive yet sufficiently reserved to ensure the focus on business matters was retained. Short positive emotional episodes were often used to quickly disperse tension or ease the group discussion.

Discussion of team interaction characteristics

The results suggest that the low level of socio-emotional interaction in the M&D meeting is resulting from the temporary nature of the team, its instability (with people entering and leaving the group) and the short period of time that the group has existed. Thus, it is suggested that the group has not progressed to the later stages of group development achieved by other groups; alternatively the group restrains itself from using socio-emotional expression. It is also noted that the business environment tends to be less emotionally expressive than other group contexts. The level of emotional control that key members of the group showed would suggest that only small levels of emotion are used to influence group behaviour.

Gameson (1992) found that the differences in the use of task-based categories were related to experience and profession. Both experienced and inexperienced clients, when meeting with construction professionals, primarily used category 6 (giving information); however, the inexperienced clients tended to request more information (category 7) and opinions (category 8). In

this research the total interaction observed shows higher levels of information giving (category 6) and marginally lower levels of opinion giving (category 5); however, in half of the cases the level of opinions were higher than information (Table 1).

The interaction of married couples (Figure 3) has much higher levels of emotional communication; however, the task-related categories giving information (category 6) opinions (category 5) and suggestions (category 4) while not as high, follows the same order as the M&D group. Bales (1950) inferred that the high level of antagonism (category 12) observed between married couples is only possible due to the strength of the partnership, knowing that such emotional outbursts would not damage the relationship. Thus, the extreme negative emotional outbursts would not be expected and are uncommon in the M&D team meetings and similar work-based environments.

In the M&D team, the levels of giving information (category 6) are higher than giving opinion, analysis, etc. (category 5). In the studies described (Bales, 1950), this type of pattern, with giving information being higher than opinions, is presented in only one situation: interaction among married couples (Figure 3). It was suggested by Bales that this pattern could arise from a type of communication efficiency. The close relationship allows them to simply state relatively incomplete information that would otherwise need to be explained. In the M&D meeting, construction professionals use construction terms that have implied meanings, without the need to fully explain them. Construction professionals are able to do this due to a degree of commonality in education, training and experience. This may help to explain the high level of information given. However, as most projects are temporary in nature and participants belong to different organizations it is unlikely that the professionals have such a close relationship that all statements are fully understood. The high level of giving information, opinions and explanation is considered to be necessary to enable parties to express issues sufficiently so that other members understand. However, Bales's results would suggest that it is normal for explanation to exceed information to achieve a sufficient level of understanding. It is not possible to say from our data why the results differ from the findings of Bales; however, this unique characteristic is worthy of further research to identify why greater emphasis is not placed on explanation in the meetings and the effect of this in terms of individual project team performance.

Gameson (1992) also observed that the construction professionals used high levels of category 6, when inexperienced clients and construction professionals met for the first time. The information provided was supported with opinion, explanation and analysis. In

Gameson's study, when the construction professionals met with experienced clients, the amount of category 5 (explanation) was higher than category 6 (information). Clients who understood less about the construction process received less explanation than the more knowledgeable and experienced clients. With experienced clients, the construction professionals had to justify their information and suggestions more than with inexperienced clients. Interestingly, the levels of asking for explanation and opinions (category 8) by inexperienced and experienced clients were similar. The only difference in the level of question asking was that experienced clients asked for more information, but received more opinions and explanation than information. Experienced professionals delve deeper into issues and ask more questions compared to their less experienced peers.

Conclusion

In comparison with the earlier research the amount of positive socio-emotional interaction is considerably less when compared to social groups, but comparable to groups of professionals. The amount of negative socio-emotional communication is also lower than in previous studies of social groups. A combination of the members' temporal relationships and the commercial context appears to restrain interaction, thus restricting socio-emotional development, as achieved in more stable groups. The high levels of conflict reported in construction literature were not evident in the data; indeed, if the levels of conflict reduced much further the groups may be subject to groupthink. From the data it would appear that too much emphasis is being placed on conflict avoidance, and there is a serious danger of ineffective decisions, which could have serious implications later in the project.

A number of peculiarities were found in the task-based interaction categories. Giving suggestions, giving information and requesting suggestions have higher interaction levels than in any of Bales's studies. Category 6 was lower than in Gameson's study. Although the requests for task-based interaction are not considerably different from the previous studies, all of the three giving task-based interaction categories are high and the amount of giving compared with requesting task-based interaction is greater than in all of Bales's studies. The high level of task-based interaction resulted from the low level of socio-emotional interaction, owing to the groups' restricted development. This is supported by Gameson's results, which have even higher amounts of task-based interaction than the M&D meeting. Restricted development of the group

is common to construction; indeed given the temporary nature of construction projects it is highly unlikely that many groups ever reach maturity, which has implications for teamwork and relational forms of contracting.

Our aim was to understand the nature of task-based and socio-emotional interaction as team members attempt gain control over their physical and social environment during meetings. We found that the level of emotional expression within the group was low, yet some members of the group did use emotion to gain attention and some control of the discussion. Work-based groups make much greater use of task-based interaction, which is to be expected. However, it is clear that the use of positive and negative socio-emotional interaction is used to emphasize the importance of the information conveyed. Emotional behaviour changes and influences the behaviour of the group; further research is required in this area.

These findings have implications for design and construction managers, especially those charged with managing and chairing meetings. Recognizing how actors behave in meetings and the effect on decision making is an essential component of a manager's skill set. However, before embarking on training programmes we need to better understand the dynamics at work within construction progress meetings.

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