

2009

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Recommended Citation

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A LINGUISTIC ANALYSIS OF GROUP SUPPORT SYSTEMS INTERACTIONS FOR UNCOVERING SOCIAL REALITIES OF ORGANIZATIONS

Completed Research Paper

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Abstract

Language represents the medium through which we encounter reality and can be viewed as a human social action (Holtgraves 2002). In this study, we apply speech act theory to analyze the data collected in a study by Trauth and Jessup (2000) and demonstrate that GSS can be an effective tool for diagnosing the social life of an organization. Our linguistic analysis confirms previous research findings that both the topic and the group size influence the pattern of discussion, especially when issues are threatening. In addition, when GSS is applied to such an issue, linguistic analysis helps to uncover hidden defensive speech routines. Identifying the speech acts of GSS discussions may therefore complement positivist and interpretive analysis by examining if participants' engagement is superficial or profound, if consensus is reached or blocked, and if certain speech acts lead to dysfunctional organizational learning. Taken together with Trauth and Jessup (2000)'s study, we show that social realities revealed in GSS discussions are multi-dimensional and that, by adopting a different research stance to better understand the role of GSS, a variety of research benefits may be derived.

Keywords: Group support system, linguistic analysis, speech act theory, group dynamic

Introduction

Group support systems (GSS) are communication-mediated systems that combine communication, computer, and decision technologies to support problem formulation and solution in group settings (DeSanctis and Gallup 1987; Fjermest and Hiltz 1998-99). GSS have been employed to assist groups in their evaluation, aggregation, and modeling of information related to the issues under discussion, and helps the participants define the processes by which the tasks can be efficiently and effectively resolved (Dennis and Wixom. 2001). Most previous GSS studies have been normative, relying on the experimental approach to evaluate causal relations between contextual variables, such as GSS types and tasks, and outcome variables, such as amount of time, number of ideas, and decision quality, with possible moderating effects from variables such as session length and participation patterns (Fjermest and Hiltz 1998-99). Yet, a recent study by Dennis and Reinicke (2004) has pointed out that IS researchers have tended to focus on the number of ideas generated as the dominant measure of electronic brainstorming (such as GSS) effectiveness, despite the fact that electronic brainstorming has not yet displaced—or even joined—verbal brainstorming as a widely used idea generation technique.

Indeed, a study by Trauth and Jessup (2000) reveals that, while GSS may generate a satisfactory number of ideas it may still lead to unsatisfactory results. In their study, Trauth and Jessup (2000) applied both positivist and interpretive approaches to analyze GSS discussion text. The positivist approach, based on content analysis of the session transcripts, showed that a good number of ideas were generated and that both a high degree of participation and a fair degree of consensus were achieved. This indicated that GSS application was successful in promoting “effective group behavior directed toward consensus around alternative solution scenarios” (p. 43). However, the interpretive study uncovered an “absence of shared consciousness about the issue and imbalanced participation in the sessions” (p. 43), and showed that the context was “fraught with tension, suspicion, frustration, and incompatible differences in perception” (p. 64). GSS discussions were often emotionally charged, and the participants exhibited widely divergent views about the problem at hand. Trauth and Jessup (2000) thus questioned the value of anonymity and suggested going beyond the positivist approach to explore the social interactions that occur and the patterns that arise while the technology is being used (DeSanctis and Poole 1994; Chudoba 1999; Huang and Wei 2000).

It is in this context that the present researchers have employed the linguistic method to analyze GSS discourse as social actions. In information systems research, Lacity and Janson (1994) have proposed three main approaches to text analysis, linguistic, positivist and interpretive. Linguistic methods hold the assumption that language acts to shape, create, and define reality (Lyytinen 1985; Neff 1998). “Through language, researchers study the use of power, discrimination, decision processes, norms, and virtually any other social actions of interest” (Lacity and Janson 1994, p. 145). In this way, linguistic analysis reveals the dynamics of social life. Trauth and Jessup (2000) have generously shared their study results with us, and by applying linguistic analysis to the data collected, we are able to demonstrate that GSS can be an effective tool for diagnosing the social life of an organization. Taken together with Trauth and Jessup (2000)’s study, we show that the social realities revealed in GSS discussions are multi-dimensional and that, by adopting a different research stance to better understand the roles of GSS, a variety of research benefits can be derived.

Literature Review

Speech Act Theory

Speech act theory (SAT) provides a useful framework for studying language acts in everyday life (Holtgraves 2002). It is a rule-based theory of linguistic communication that stresses the use of language for the expression of feelings and attitudes and to establish and coordinate relationships with others (Lyytinen 1985). Austin, the originator of SAT, has argued that language does not merely describe reality in a neutral way, but is itself employed to shape, create and define reality. Simply put, people do things with words (Lacity and Janson 1994; Holtgraves 2002). A speaker utters a sentence in an appropriate context with certain intentions; he performs one or more acts, named “illocutionary acts by Austin” (Searle 1969). Searle (1969), who studied under Austin, provided recursive definitions of the set of all possible illocutionary forces and of the conditions for success and satisfaction of elementary illocutionary acts (Vanderveken 1990; Littlejohn 1999; Holtgraves 2002). In general an illocutionary act

consists of an illocutionary force *F* and a propositional content *P*. For example, the two utterances “You will leave the room.” and “Leave the room!” have the same propositional content, namely that you will leave the room; but characteristically the first of these has the illocutionary force of a prediction and the second has the illocutionary force of an order. Similarly, the two utterances “Are you going to the movies?” and “When will you see John?” both characteristically have the illocutionary force of questions but have different propositional contents (Searle 1969; Searle and Vanderveken 1985).

In his work, Searle (1979) modified Austin’s taxonomy and classified all speech acts as embodying one of five fundamental illocutionary points: assertives, directives, commissives, declaratives, and expressives (See Table 1). Searle and Vanderveken (1985) emphasized that these are the five basic universal ways to use language: we tell people how things are (Assertives), try to get them to do things (Directives), commit ourselves to doing things (Commissives), express our feeling and attitudes (Expressives), and bring about changes in the world through our utterances (Declaratives). In addition, there is a direction of fit, meaning that some illocutions match words to the world, while others match the world to the words. The psychological state expressed in the performance of illocutionary acts is the sincerity condition of the act (Searle 1979; Searle and Vanderveken 1985; Vanderveken 1990).

Table 1. Taxonomy of illocutionary act				
Type of illocutionary act	Point (or purpose)	Direction of fit words to the world	Psychological state (sincerity condition)	Notes
Assertive	To commit the speaker to something’ being the case, to the truth of the expressed proposition.	Words-to-world	Belief (that <i>P</i>)	All of the members of the assertive class are assessable on the dimension of assessment which includes true and false.
Directive	The speaker gets the hearer to do something.	World-to-words	Wants (or wish, or desire)	Questions are subclass of directive.
Commissive	To commit the speaker to some future course of action.	World-to-words	Intention	The propositional content is always that the Speaker does some future action <i>A</i> .
Declaration or declarative	To bring about changes in the world.	Words-to-world World-to-words	Belief and desire	
Expressive	To express the <i>S</i> attitude about the state of affairs that <i>P</i> .	Null	A state of affairs is specified in the propositional content.	The property specified in the propositional content of an expressive must, however, be related to <i>S</i> or <i>H</i> .

(Source: summarized from Searle’s book “Expression and meaning”, 1979)

Note: Abbreviation meaning, “*A*”→ Act; “*S*”→Speaker; “*H*”→Hearer; “*P*”→Proposition

This taxonomy classifies the possibilities of what a speaker can do with an utterance. The importance of an illocutionary point is the specification of meaning in terms of patterns of commitment entered into by the speaker and hearer by virtue of their taking part in the conversation (Winograd and Flores 1986; Winograd 1987-88). The key to understanding the structure of a conversation is to see that each illocutionary act creates the possibility of a finite and usually quite limited set of other appropriate illocutionary acts in response (Searle and Vanderveken 1985). Each illocutionary act in a conversation creates and constrains the range of such appropriate illocutionary acts.

RESEARCH METHODOLOGY

In the linguistic approach, classification schemes are often used to categorize what speakers and writers are trying to accomplish—convince, command, or motivate. This research relies on Searle’s taxonomy for speech act analysis. In the context of information systems, speech act analysis may reveal “action patterns of organizational exchange control and coordination of commitments sense making of organizational behavior” (Lyytinen 1985).

Different analyzers may categorize utterances differently and statistical analysis can generate numeric measures of dispersion among the interpretations of different individuals. In this way, inter-analyzer reliabilities may be calculated, and validity thus has a quantitative component (Lacity and Janson 1994). Furthermore, users of the linguistic approach tend to focus on the emergent properties of interaction through which researchers create their own realities rather than merely react to a presumed immutable world (Lacity and Janson 1994). Therefore, the validity of the linguistic approach rests on the strength of the analytical arguments used to defend the interpretation rather than on quantitative measures.

GSS Discussion Data

In this study we obtained the original data collected by Trauth and Jessup (2000) in their study of GSS. Forty people participated in the discussions and a total of 427 utterances in 124 threads were generated. Table 2 shows a summary of all sessions. In the original transcripts, each participant’s utterance was assigned a string of digits, the first representing the sequence number, the second showing its thread number, and the last being its discussed order. An example of a discussion is shown below.

1 1 Equal treatment in terms of salary? In terms of status? It seems as though there is a higher percentage of female faculty.

2 1 Is this a joke? Currently men make up 60% of the faculty, and their numbers are increasing faster than the numbers of women faculty.

3 1.1.1 What about the percentage when taken in terms of junior faculty?

4 1.1.1.1 Are required courses and/or big survey courses taught by one sex predominately?

Session	Topic	number of participants	number of utterances	number of threads	notes
1	Equal	7	45	10	
	Insuring Equity		45	10	
2	Equal	14	69	26	
	Insuring Equity		70(69)	21	One utterance is empty.
3	Equal	9	41	18	
	Insuring Equity		44	15	
4	Equal	10	50	9	
	Insuring Equity		64	15	
Sum	8 phases	40 people	428(427) utterances	124 threads	One utterance is empty

Most threads (74/124) are shorter than four interactions. Thirty-one threads have only one utterance, without any interaction, twenty-nine have two utterances, and fourteen threads have three utterances. This indicates a lack of interaction in the discussions and the possible existence of defensive routines used by participants to hold back their interactions, a point that will be analyzed later.

Speech Act Analysis Procedure

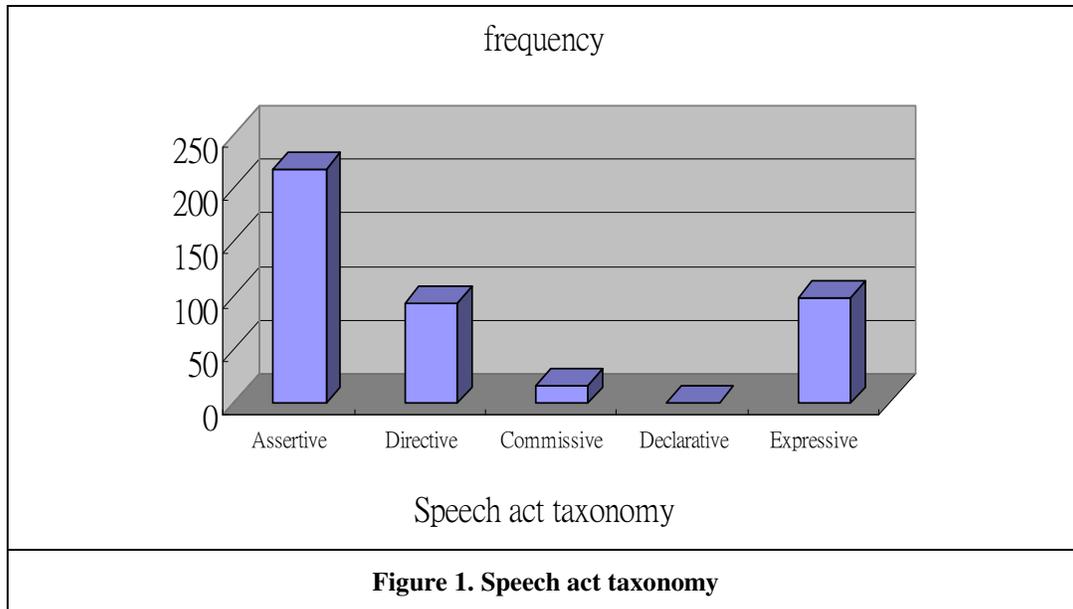
The basic unit of speech act analysis is each participant's utterance. Table 3 summarizes the processes involved. Two researchers participated in the analysis, which began with training on the concepts of speech act theory and the taxonomy of illocutionary acts. Next, the researchers discussed their perspectives of the five categories of illocutionary act, including their definitions and differences. As part of their training they were asked to categorize sentences into different speech acts, practicing with discussion transcripts gathered from "Washingtonpost.com," including "The RIAA and the Music Piracy Debate" and "The Digital Piracy Debate." The training process ended when agreement on the category of the utterances exceeded 90% (Cohen's Kappa) (Krippendorff 1980). A total of 11 training sessions were conducted. At this stage, the researchers began to analyze the GSS text by first selecting 10% of the discussion material for a pilot study. When inter-rater reliability exceeded 85% (Cohen's Kappa), they then started to analyze the entire text individually. The resulting consistency of speech act analysis between the two researchers was 87% (Cohen's Kappa). When disagreement occurred, the issue was resolved through discussion. Once all utterances had been classified, each thread was examined separately to find recurrent patterns in the discussions. A total of 11 basic recurrent patterns were identified.

Aim	Activity	Summary
Training	Study speech act theory. Practice outside text.	11 training sessions in total. End when inter-rater reliability is >0.90.
Identify uses of speech acts	Categorize all utterances in terms of the five illocutionary acts (speech acts).	427 utterances categorized; Inter-rater reliability:0.87
Analyze recurrent patterns	Analyze speech act interaction patterns for each thread.	11 recurrent patterns found.

ANALYSIS RESULTS

Table 4 and figure 1 show the results of the analysis. For all discussion sessions, the most frequently occurring utterance was assertive (218 times / 51.05%), followed by expressive (98 times / 22.95%) and directive (93 times / 21.78%). There were only a few commissive statements (17 times / 3.98%) and only one declarative. This uneven distribution indicates polarized discussions.

Taxonomy	Session 1-1	Session 1-2	Session 2-1	Session 2-2	Session 3-1	Session 3-2	Session 4-1	Session 4-2	Frequency	Percentage
Assertive	22	30	26	29	20	29	22	40	218	51.05%
Directive	11	6	15	20	11	5	12	13	93	21.78%
Commissive	2	1	0	7	2	2	1	2	17	3.98%
Declarative	0	0	0	0	0	0	0	1	1	0.23%
Expressive	10	8	28	13	8	8	15	8	98	22.95%
total	45	45	69	69	41	44	50	64	427	



Assertive

In assertive speech acts, the speaker states his or her viewpoint. These acts represent the speaker’s belief in a proposition which he asserts to be true and is willing to defend if necessary (van Eemeren et al. 1993). For example, in utterance 23 6, the speaker thought that equality meant not only “equal pay for equal work” but also required “mutual respect,” while the following utterance shows a different opinion, that while “mutual respect” may be a nice-sounding term, status gains more respect. The two speech acts represent the speakers’ respective beliefs about gender equality. Utterances 33 8 and 34 8.1 also show the beliefs of different speakers about gender equality.

23 6 Equality transcends “equal pay for equal work” issues. The essence of equality emanates from mutual respect.

24 6.1 Mutual respect is lovely. Status gains more respect. Equal pay for equal work is vital for self respect and the respect of others because it translates into status. This is a patronizing statement. (Session 1: Topic 2)

33 8 Accept one another as equals in our work and recognize the important contributions we all contribute, regardless of gender, classification, or level. We haven’t developed a respect for each other here – how can we ensure equality without that.

34 8.1 We cannot assure equality without respect. But this language is so vague – (Session 2: Topic 2).

Confirming the findings of the quantitative analysis in Trauth and Jessup (2000)’s study, the large number of assertives shows that there are numerous opinions or ideas in the discussion. That is, the GSS sessions are indeed efficient in achieving the goal of bringing ideas to the surface, but that this efficiency may also mean that there is a lack of consensus among the participants on the issue of gender equality.

Expressive

The point of expressive illocutionary acts is to express feelings and attitudes, such as anger, sorrow, or grief. For instance, utterance 29 5.2.1 reveals the speaker’s emotion, while utterance 36 8 indicates anger and complaint. Most of the expressives in the discussion reflect emotion or mood and their high number shows a high level of emotional expression or heat of argument. This is also consistent with the findings of Trauth and Jessup (2000), whose qualitative analysis found that these computer-mediated discussions were emotionally charged events.

29 5.2.1 Awwwww...breaks my heart (Session 1: Topic 1)

36 8 No. The President is male, the provost is male, the Vice Presidents are male, the Deans are male. Is this escaping anyone's attention? (Session 1: Topic 1)

51 19 Some language is not appropriate. It's paternathreadic to dismiss a valid response with telling someone not to be emotional or don't get pouty. I can't imagine employees being told these things.

52 19.1 No, a male employee would be termed as being aggressive. Also, unacceptable? Not really from what I've witnessed. (Session 2: Topic 1)

Directive

Directive illocutionary acts represent attempts by the speaker to get the hearer to do something or refrain from doing something. They include requests, commands, questions, threats and prohibitions (Searle 1979; van Eemeren et al. 1993). In the GSS discussion, most of the directives are questions that demand answers. For example, utterances 3 1.1.1 and 4 1.1.1.1 show the speaker requesting information so as to clarify an issue. Utterance 3 1.1.1 also challenges a viewpoint—that women occupy a higher percentage of faculty positions. In another example, utterance 47, a question was asked about possible bias against hiring males for lower level positions, while the next utterance (48) challenges this and makes a request for further argumentation. Following this exchange, in utterance 49, the speaker expressed his feeling about the treatment of female managers. Finally, in utterance 50, the speaker questioned the view put forward in utterance 49 quoting the high percentage of female faculty in COE. Discussion stopped at this point and no conclusion was reached. A similar pattern can be found in many other threads.

3 1.1.1 What about the percentage when taken in terms of junior faculty?

4 1.1.1.1 Are required courses and/or big survey courses taught by one sex predominately? (Session 2: Topic 1)

47 18 While there may be equality among faculty and management, it still seems most lower level positions are females; could there be bias against hiring males at this level?

48 18.1 What does equality mean in this context? Equal numbers doesn't mean equal treatment or equal advantages, authority and power.

49 18.2 I doubt that female managers feel they have equity with male faculty. They aren't treated as tho they do.

50 18.3 Is there? COE has what, 80 or 90% female faculty? (Session 2: Topic 1)

Commissive

Commissive acts allow the speaker to commit to some future course of action. They fulfill the roles of accepting a viewpoint, accepting a challenge to defend a viewpoint, accepting the argumentation, agreeing on the rules of discussion, and, if relevant, deciding to begin a new discussion (van Eemeren et al. 1993). For example, the speakers of utterances 17 and 70 agreed with a previous discussant's viewpoint and reached consensus. In the four sessions, there were just 17 commissive acts in total. This small number indicates little consensus in the discussion.

17 3.2.1 This response I agree with. (Session 1, topic 1)

70 21 I agree. Let's do our job with pride. (Session 2, topic 2)

Declarative

The declarative type of illocutionary act is used "to bring about changes in the world." In all four sessions, there was only one declarative act (41 11.1.1.1.1 "let's outlaw the coffee pot"). This is not surprising since declarative acts are typically performed by someone with authority, such as a priest who declares the marriage of a couple or a manager who declares the firing of an employee. In the GSS study conducted by Trauth and Jessup (2000), the discussion is anonymous and the participants' identity is hidden, making it difficult to declare changes in words.

The lack of declaratives may be seen as an inherent characteristic of the anonymous GSS that is employed for the purpose of generating ideas but not for making specific recommendations for changes.

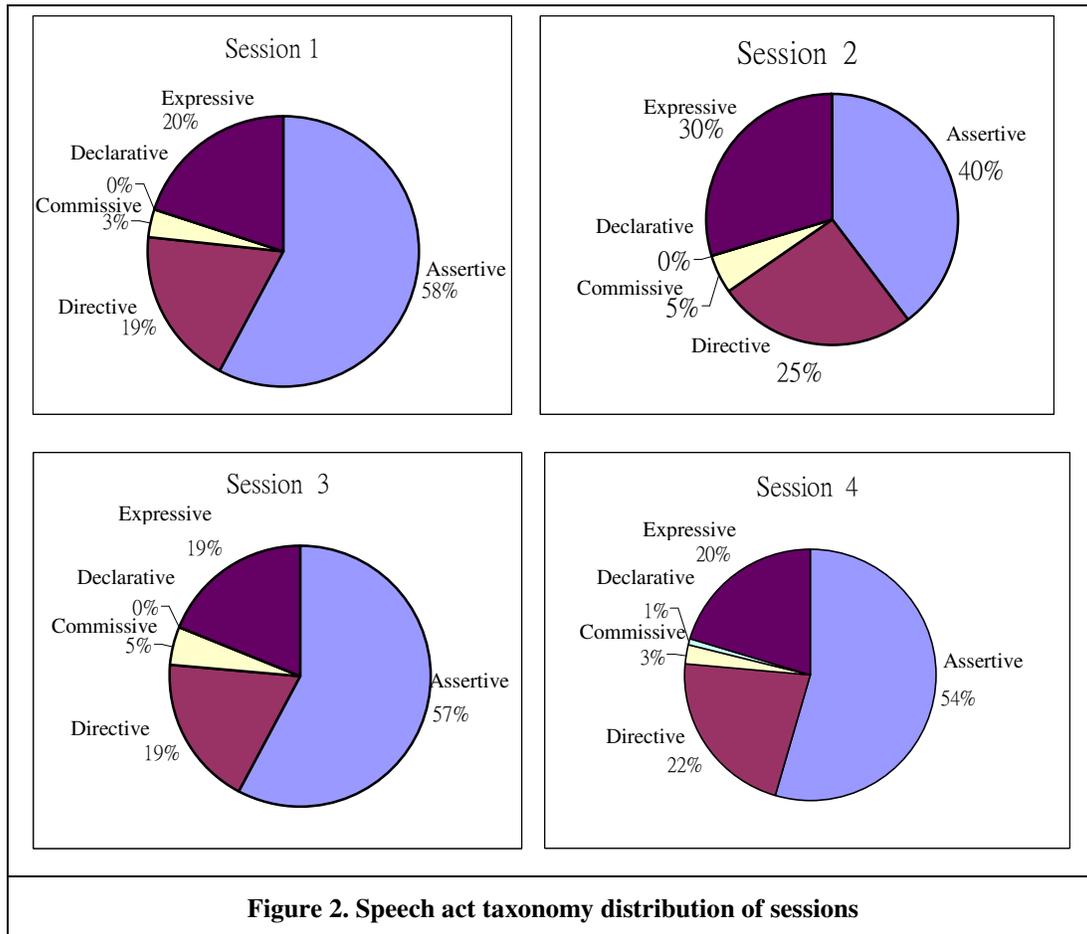
Comparison between topics and sessions

Our data indicates that the topic of discussion could affect the types of illocutionary acts performed by the participants. Table 5 depicts the distribution of illocutionary acts between the two topics. The Chi-Square analysis was applied to test the independence. The results indicate that the distributions of illocutionary act are significantly correlative to topics ($\chi^2=16.65, p<0.01$). They show a higher percentage of assertives and commissives in Topic 2 than in Topic 1, but a higher percentage of expressives and directives in Topic 1 than in Topic 2. The issue in Topic 1 is gender equality in the university which is a rather emotional and controversial issue and may be expected to lead to more directives and expressives, as well as fewer commissives. In Topic 2 participants were asked “what should be done to insure that both genders receive equal treatment.” This may explain why there are more assertives and commissives.

Taxonomy	Topic 1 Equal treatment		Topic 2 Insuring equity	
Assertive	90	44%	128	58%
Directive	49	24%	44	20%
Commissive	5	2%	12	5%
Declarative	0	0%	1	0%
Expressive	61	30%	37	17%
The distributions of illocutionary act are correlate with topic significantly s ($\chi^2=16.65, p<0.01$)				

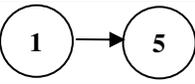
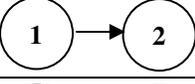
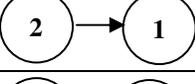
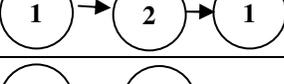
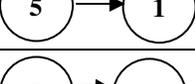
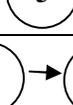
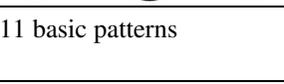
The number of participants may also affect the discussion pattern. The Friedman test was applied to evaluate the differences. The Friedman test is a nonparametric test that compares three or more paired groups (Myles 1999). The distributions of illocutionary act of four sessions are significantly different ($\chi^2=18.1, p<0.01$). A total of 14 participants took part in Session 2, more than the number for other sessions. Figure 2 and table 6 show that Session 2 had a higher percent of directives (30%) and expressives (25%) than other sessions, but a lower percentage of assertives (40%) than other sessions (>50%). In other words, the statements in Session 2 involved more questioning and expressions of emotion. More importantly, the threads are shorter in Session 2: for topic 1, 15 out of 26 threads have fewer than three utterances; and for topic 2, 12 out of 20 threads have only one or two utterances. Shorter threads mean a lack of interaction among the participants, possibly indicating that for GSS, group size matters. The higher the number of discussants, the less may be the interaction.

Taxonomy	Session 1		Session 2		Session 3		Session 4	
Assertive	52	58%	55	40%	49	58%	62	54%
Directive	17	19%	35	25%	16	19%	25	22%
Commissive	3	3%	7	5%	4	5%	3	3%
Declarative	0	0%	0	0%	0	0%	1	1%
Expressive	18	20%	41	30%	16	19%	23	20%
The difference of sessions' distributions is significant ($\chi^2=18.1, p<0.01$)								



Speech act patterns of threads

A further analysis of the interaction patterns reveals several important characteristics of the GSS discussion. Table 7 shows the recurrent patterns of speech acts observed from our data. Thirty-one out of a total of 124 threads have only one utterance, meaning that there is no response. Of the remaining 93 threads, 66 are used to extract 11 basic patterns. As we can see in Table 7, “assertive→assertive” is the most frequently appearing pattern. In fact, of 11 threads, six begin with an assertive and five end with one. This shows that in these discussions, participants often simply argue assertively, focusing on their own proposition and ignoring directives requesting further argumentation or commissives to accept another’s views or commit to future action. It appears that there are exchanges of opinion but little mutual understanding, as the following thread exemplifies.

Table 7. Recurrent patterns of GSS text		
Pattern	Frequency	Percentage
	21	21/93
	7	7/93
	6	6/93
	5	5/93
	5	5/93
	4	4/93
	4	4/93
	4	4/93
	4	4/93
	3	3/93
	3	3/93
11 basic patterns	(Total=66)	(Total=93)

Notes: 1→assertive, 2→directive, 3→commissive, 4→declarative, 5→expressive

66 19. Actually, do we have real evidence that they don't already receive equal treatment?

67 19.1 Good question – are we making an assumption this is not true?

68 19.2 maybe yes, maybe no – but we sure have a lot of women convinced of it. (Session 2, Topic 2)

Another interesting pattern to emerge involves the high number of expressives in the observed data. Of the 11 basic patterns, three begin with an expressive and five end with one, indicating that the discussion is emotionally highly charged. In fact, the combination of assertive and expressive statements account for more than half of all the threads. In the discussions, many assertions by participants stimulate an emotional response, and vice versa. It is worth noting that ending a thread with an expressive statement indicates that no final consensus is reached in this thread. Mere expression of feelings cannot be an argument in support of a viewpoint. This is not to say that expressives should not occur, but only that in the case of mere emotional expression, they may not create any commitments for the speaker or writer which are directly relevant to the resolution of a dispute (van Eemeren et al. 1993). The following example demonstrates this phenomenon.

67 25 Where are the men as part of this exercise on gender issues. This room is almost filled with women. Did they attend gender issue I?

68 25.1 Exactly. As long as gender issues are seen as primarily “women’s issues”, we have a problem. (Session 2, Topic 1)

Also, one pattern worthy of attention involves directive acts. Of the 11 basic patterns, five (22 threads) include directive statements. Most of the directives observed in this study are questioning. For example, the two patterns, “Directive→Assertive” and “Assertive→Directive” (11 threads), are usually situations in which someone asks a question or proposes an opinion, followed by another who answers or questions. However, no commissive speech acts are observed in these threads, meaning that the discussions simply stop without consensus being reached. This can be seen in the following two threads:

1 1 All transactions should take place in a environment of respect.

2 1.1 And what generates this kind of environment? Do we have it here?” (Session 2: Topic 1)

35 11.1 I agree but let’s look at also targeting women of color.

36 11.1.1 I suppose this is necessary, but I would sure like us to get to a point of looking at people, ability, resumes and not color.

37 11.1.2 Aren’t we mixing apples and oranges here? The topic is gender. (Session 3: Topic 2)

More importantly, the above examples exhibit patterns of organizational defensive routines as proposed by Argyris (1990). Argyris studied speech acts in organizational settings and found that when dealing with threat, people are programmed to employ defensive routines and to cover them up with further defensive routines that inhibit the generation of valid information and ideas (Argyris et al. 1985; Argyris 1990; Argyris and Schön 1996). For example, one common strategy is to “explain nontesting by blaming others or by exhibiting care for others.” In the GSS study by Trauth and Jessup (2000) many such speech acts exist, for example: “Do men feel that they have been treated unfairly?” (Session 2: Topic 1, 60 16) or “And what generates this kind of environment? Do we have it here?” (Session 2: Topic 2, 2 1.1). Another frequently employed strategy identified by Argyris and Schön (1996) is to “organize attributions into patterns that predict changes that are unlikely to occur” such as saying “I know so-and-so; he will not change.” A similar example from Trauth and Jessup (2000)’s data was: “Yes, the campus environment mirrors our society’s ills, doesn’t it” (Session 3: Topic 1, 25 11.1.1). Yet another strategy is to “make attributions about other’s personalities and motives”. This is an utterance that requires no further testing. For example, in Trauth and Jessup (2000)’s study we have: “Oh, this really bugs me. Why is there WOMEN’S STUDIES and not Men’s Studies offered here????!!!!” (Session 1: Topic 1, 40 9), “The problem is, men are experiencing the loss of priveledge as a wrong.” (Session 1: Topic 1, 43 9.1.2) and “Where are the men as part of this exercise on gender issues. This room is almost filled with women. Did they attend gender issue I?”(Session 2: Topic 1, 67 25).

DISCUSSIONS

Our speech act analysis of the data collected by Trauth and Jessup (2000) shows that the majority of utterances are assertives, directives, and expressives, and that declaratives and commissives are rare. Typically, participants present their opinions about a state of affairs (assertive), question or challenge others’ viewpoints (directive), and express their psychological states (expressive), but fail to show responsibility for changing things or give any commitment to action. Nearly half of the threads (60/124) consist of only one or two utterances, indicating a lack of interaction. It is worth noting that most of the commissive acts appear in long threads that have six or more utterances, indicating that interactions are crucial for reaching consensus or giving commitment. This finding is consistent with that of Rafaeli and Sudweeks (1997) and Herring (1999) who argue that interactivity plays a role in the social dynamics of group CMC and can lead to more cooperation.

Our linguistic analysis also suggests that both the nature of the topic and group size may influence the pattern of the discussion, especially when issues are threatening. For example, Topic 1 is more threatening and controversial than topic 2, and our analysis shows that it contains more directives and expressives and fewer assertives than topic 2. According to Mullen et al. (1991), as group size increases, procedurally there are more people available to interrupt

the discussion and take up time talking, while psychologically, there is also a higher probability of people becoming perceptually immersed and emotionally aroused, causing a loss of productivity for the group. In session 2, where group size is larger than that of other sessions, there are more disconnected and shorter threads as well as a higher percentage of directives (30%) and expressives (25%). In other words, there is more questioning and emotional expression and less interaction than in other sessions (see Figure 3). This adds to the findings of Dennis and Wixom (2001), whose meta-analysis shows that while larger groups took less time and were more satisfied relative to their control groups than were smaller groups, improvements in decision quality, the number of idea generation and satisfaction of outcome are not observed. Importantly, the existence of defensive speech acts (Argyris 1990) is likely to inhibit the quality of discussion. As suggested by Argyris and Schön (1996, p. 162), such speech acts are likely to reinforce each other and thereby contribute to “constructing a social reality that was anti-learning and overprotective.” Consequently, a GSS discussion might be “fraught with tension, suspicion, frustration, and incompatible differences in perception” (Trauth and Jessup 2000, p. 64).

According to Trauth and Jessup (2000), interpretive qualitative analysis of GSS discussion allows for the development of conclusions different from that of positivist analysis. Likewise, linguistic analysis, which is qualitative in nature, may be expected to further add to the findings. Table 8 shows a comparison of the three approaches based on the taxonomy developed by Trauth and Jessup (2000). The goal of linguistic analysis is to understand language usage, which, according to speech act theory, acts to shape, create and define reality. The regularities of language are determined by its constitutive rules. Meaning is a result of rule following behavior instantiated in speech acts that mediate the intentions of the speakers (Lyytinen 1985; Holtgraves 2002). Reality emerges through language, and any intrusion by researchers may lead reality in an unnatural direction. Detached observation is hence required (Lacity and Janson 1994). By assuming the role of outsiders, researchers can apply linguistic analysis to the GSS discussion transcripts and thereby capture the emerging reality.

Dimension	Linguistic	Positivist	Interpretive
Goal	Understanding the language usage and the emerging reality	Efficient conveyance of ideas and convergence on a solution	Understanding the meaning of the information exchanges of a computer-mediated group
Analysis	Quantitative and Qualitative	Quantitative	Qualitative
Assumptions	Understanding of reality arises through the study of linguistic structure.	Technology helps participants to generate and evaluate useful ideas	No explicit a priori assumptions as to what meaning may arise from the transcripts
Coding	Based on Speech act theory	Established, pre-tested, a priori categories applied to transcripts	Categories developed in grounded fashion through open coding
Decision perspective	Language does not merely neutrally describe reality, but instead language itself acts to shape, create and define reality.	Focus on considering alternative solution scenarios	Focus on better understanding of the problems and issues
Viewpoint	Outsider	Outsider: what text do the participants produce	Insider: the meaning of the participants' text
Coding assumptions	Through language, researchers study the use of power, discrimination, decision processes, norms, and virtually any other social actions of interests (Lacity and Janson 1994).	Text has static meaning	Meaning of text is dependent upon the context

Table 9 presents additional findings provided by linguistic analysis based on the dimensions developed by Trauth and Jessup (2000). For the dimension, participant level, linguistic analysis shows that the majority of speeches are accounted for by a few simple recurring patterns (see Table 7), reflecting superficial participation. For the dimension, engagement, while both positivist and interpretive analyses indicate high participant engagement in the sessions, linguistic analysis shows that participants are rather close-minded. There is much talk (i.e., exchanges of words that are self-assertive and expressive), but little is actually said (i.e., little mutual understanding, as shown by the rarity of commissives). As a result, for the consensus dimension, linguistic analysis not only indicates a lack of consensus, as also reported by Trauth and Jessup (2000), but also shows that this is related to (1) the abundance of speech acts like assertives, directives, and expressives, and (2) the simple recurrent patterns of very short threads in which commissive acts are absent.

Table 9 Additional Information Acquired from Linguistic Analysis of GSS Sessions	
Dimension	Linguistic
Participation level	The majority of speeches are accounted for by 2-3 simplistic recurring patterns, reflecting superficial participation
Participant's engagement	Close-minded engagement: In addition to emotionally charged exchanges, there are exchanges of words that are self-assertive, but there is little mutual understanding (as indicated by few commissives).
Consensus	Not only reflects a lack of consensus, but also shows that this lack of consensus is caused by specific speech acts like assertives, directives, and expressives.
Conflict	Shorter interaction, More expressive and directive, Lack of commissives
Information type	Distribution and recurrent patterns of speech acts.
Anonymity	More aggressive and flaming speeches (expressive and directive), and possibly defensive routines
Redundancy	An absence of shared consciousness
Usefulness	Can provide diagnosis of organizational dysfunctional learning

Interestingly, for the conflict dimension, linguistic analysis helps to uncover the defensive speech routines hidden in the GSS discussion. When GSS is applied to a potentially threatening issue like gender equality, people often employ defensive routines, as shown by an abundance of expressives reflecting anger, sadness, and sarcasm as well as directives that question others' opinions. For the information type dimension, linguistic analysis reveals the richness of language usage such as the distribution of speech acts, the recurrent patterns of the short threads, and the employment of defensive routines.

Turning to the anonymity dimension, while Trauth and Jessup (2000)'s analysis finds that participants speak openly and honestly about their feelings and biases, linguistic analysis demonstrates that these language uses inhibit the generation of valid information and create self-sealing patterns of escalating error (Argyris and Schön 1996). Participants may speak at high levels of inference, asserting that what they say is concrete and obvious. Worse still, anonymity may be related to the deterioration of the discussion as participants may attribute defensiveness or unpleasant motives to others or to situational factors rather than to themselves. This is consistent with the finding by Trauth and Jessup (2000) that anonymity might simultaneously stimulate idea generation and encourage the expression of thoughts and feelings on an emotionally charged topic. However, unlike Trauth and Jessup (2000)'s conclusion that there is consensus around the solution alternatives in session 2, linguistic analysis shows that session two is filled with more expressives (30%) and directives (25%) and contains more short-threads than other sessions (60% of the threads are two utterances or shorter). Considered from this viewpoint, consensus is still lacking in session 2. From the above discussions, it is clear that linguistic analysis of the GSS sessions does indeed provide different information from that which results from positivist and interpretive analysis of the same transcripts.

IMPLICATIONS AND LIMITATIONS

There are a number of benefits to be gained by the application of linguistic analysis to investigate the use of GSS in organizations. Talks are actions and can be a window on practical reasoning (Argyris and Schön 1978; Argyris et al. 1985). Identifying the speech acts within GSS discussions may therefore complement positivist and interpretive analysis by indicating whether the participants' engagement is superficial or profound, whether consensus is reached or blocked, and whether certain speech acts lead to dysfunctional organizational learning. Also, given that the exercise of organizational power is often enacted through language, linguistic analysis can contribute to the understanding of how communication may be distorted. Furthermore, linguistic analysis may advance the theories of information systems in researching how people work together through language. In an Internet era where so much organizational communication takes place in linguistic form, this is especially important if we wish to improve the quality of linguistic interactions.

For research, our study suggests that, in addition to brainstorming, GSS could be used to diagnose group dynamics. The analysis of language usage can help to detect dysfunctional learning that may exist within organizations. Our findings also confirm previous studies that show factors such as topic, time, and group size can influence the interaction processes and outcomes and, therefore, GSS design should go beyond the generation of ideas. Consistent with the findings of Trauth and Jessup (2000) and Dennis and Reinicke (2004), our study indicates that focusing simply on the number of ideas may result in the neglect of important organizational issues such as group well being and member support. Anonymity, for example, may facilitate the generation of ideas but inhibit learning. Similarly, topic and group size may influence the quality of discussion when issues are threatening or embarrassing. These factors should be considered carefully when applying GSS to the resolution of organizational disputes.

Acknowledgements

We thank Trauth, E. M. and Jessup, L. M. for generously sharing us the analysis text. .

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