COMPUTER TECHNIQUES IN MYTH ANALYSIS:

AN APPLICATION

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ABSTRACT

Researchers in the field of myth have shown an increasing interest in the use of computer techniques for analysis. This paper attempts to demonstrate one possible application. Undertaking as a basic assumption the view that a story (myth or folktale) serves as an instrument of socialization informing cultural members of "appropriate" forms of orientation, a method of analysis is constructed. A computer program is then presented which provides an analysis of character orientation in narratives. The program employs as its basic unit of analysis the "orientation unit". An orientation unit is a triple of the form: the actor - the object of orientation - the mode of orientation. By denoting the characters of a text by a number, 1, 2, ..., n and the mode of orientation by the number, 1, 2, ... m, the process of orientation in a text is represented by a data set of triples of the form: (1, 2, 5), (2, 3, 1), etc. Three basic data matrices are derived by a consideration of the data set: a frequency matrix, a row proportion matrix and a column proportion matrix. An array of options provided in the program is then presented which utilizes these matrices. For example, an option provides for a determination of the frequency and/or the proportion of a given mode of orientation for all characters in the text, another option provides for a frequency and/or a proportion matrix of the mode of orientation received by the characters in the text. Finally, a brief attempt is made to illustrate the manner in which such options may be employed to determine power relations, male-female relations, etc. in the narratives.

COMPUTER TECHNIQUES IN MYTH ANALYSIS

AN APPLICATION[1]

Introduction

This paper is a report of the initial phase of research directed toward the development of a measurement technique for the analysis of the structural dimension of narratives. The work undertaken, to date, involves the consideration of three general issues: the development of a theoretical structure for the technique, the construction of a computer program for analysis, and the establishment of procedures for evaluating the utility of the technique.

The theoretical structure is developed from the fundamental assumption that myths and folktales constitute a special case of social action which, like all forms of social action, is constructed from various strategies of orientation between characters (actors). Utilizing this assumption, an explication of the concept or orientation is undertaken in terms of three orthogonal dimensions: Directionality, Locomotion and Discretion. These three dimensions provide a partition of the array of acts into eight distinct classes of orientation strategies. This classification constitutes the basis for the analysis of narrative structures. The assessment of the structure involves the analysis of the distribution of orientation strategies for two types of narratives: the Cinderella stories and Okanagan Indian myths.[2]

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(1) This paper was originally prepared for presentation at the Annual Meetings of the Canadian Sociology and Anthropology Association held at St. Johns, Newfoundland, in June, 1971.

(2) Okanagan Indians live in British Columbia, Canada.

The second section of the paper provides a report of the utility of the technique for an analysis of the power dimension of narratives. While the analysis of the power dimension is both important and interesting per se, it is not the primary reason for considering this dimension. The power dimension is presented to illustrate the manner in which the technique may be utilized and to provide a further assessment of the technique itself. In this section the power dimension is specified in terms of a concatenation of the classes of orientation strategies and an analysis is provided of the power structure in narratives. From this analysis some inferences are made concerning the utility of the technique.

The final section of the paper attempts to provide some indication of the direction of further research with respect to this technique. The power dimension is reconsidered in the light of the present analysis and some suggestions are proposed for any further analysis. In addition, some indication is provided of other dimensions for which the technique appears well suited. Finally, a brief discussion is provided concerning the utility of the technique for identifying cross-cultural similarities.

An appendix is provided which discusses the computer routine which was developed for the analysis. The basic unit of analysis in this routine is the "Orientation Unit". This unit is an ordered triple of the form (1, 2, 3), where the first position specifies which actor is orientating, the second position identifies the object of orientation, and the third position indicates the type of orientation undertaken. A text is then represented by a set of such ordered triples. The analysis of a given dimension is carried out by specify-

ing various options in the routine; options which involve various combinations of the elements of the triple and which are determined by the theoretical specification of that dimension.

SECTION I

(A) The Structure of a Narrative: A perspective

A central axiom of this study is that the "structure" of narratives is both specified by and constructed from social action. This is not simply to state the obvious, i.e. that a story is concerned with social interaction, rather it is to suggest that those strategies, both conceptual and methodological, which have been developed for the study of "ongoing social interaction" may be fruitfully applied to the analysis of the structure of myths and folktales.

The suggestion that the structure of a narrative can be viewed from the perspective of an ongoing process of social action remains somewhat vacuous in as much as it fails to specify what aspects of social action facilitate such a treatment of "structure". In order to achieve such a specification it is useful to consider the conditions defining social action as set out by Max Weber.

Definition # 1 "Action is social in so far as, by virtue of the subjective meaning attached of it by acting individual (or individuals), it takes account of others and is thereby orientated in its course..."[2]

The present study focuses primarily in that condition of the definition which states that social action "takes account of others and is thereby oriented in its course". A principal concern of this paper will be the theoretical specification of the "orientation" dimension of social action.

(B) Toward a Theory of Orientation: Explicating the Concept of Orientation

(1) The Approach / Avoidance Dimension

Although Weber incorporates the concept of "orientation" as a central condition of social action he provides little further specification of its content. As a means of explicating the concept of orientation the following assumptions are proposed:

Assumption # 1 — "An orientation act is communicated by a choice on the part of the actor, from among a set of orientation strategies."

Assumption # 2 — "An orientation act is an assertion about the nature of the relationship between the actor and his object of reference."

Discussion

The first assumption is introduced primarily to establish the fact that the actor has control over the information he may give to both the object of reference and others in the situation. It should be noted that in a narrative these others may be either an audience or a reader. Given that such control is proposed then the second assumption proposes that the orientation act is meaningful to others in the situation.

Having now stated the somewhat intuitively obvious assumptions that an actor both conveys and controls information in the orientation process the question arises: How might such information be conceptualized to further specify the concept of orientation? In order to answer this question, however, it is necessary to proceed somewhat indirectly by first introducing the concept of "orientation distance".

Definition # 2 — "An orientation distance refers to a proximity relation between the actor and his object of reference."

Discussion

The utility of the concept of "orientation distance" rests upon the conditions which specify the proximity relation. The conditions of the proximity relation may be stated as follows:

a) A proximity relation is a binary relation between the actor (A) and the object of reference (O) such that either A closes on O or A opens on O.

b) The concept of proximity as employed here refers both to "actual" distance and to "social distance". Thus, for example, to say that A closes on O is to say either that A undertakes to close the physical distance between himself and O (acts of assistance or attack denote this type of relation) or that A undertakes to close the social distance between himself and O (acts of support or encouragement denote this type of relation).

Returning to the problem of specifying the concept of "orientation" the following definition may be proposed:

Definition # 3 — "An orientation act is information, either behavioural or linguistic, about the modification of the orientation distance between the actor and his object of orientation."

Discussion

In specifying the concept of "orientation", a primary dimension of directionality is proposed. An act of orientation therefore is viewed as an assertion about the direction of the relationship between the actor and another who is his object of orientation. Thus the process of orientation is conceptualized as a process of decision and alteration of the orientation distance between the actor and his object of reference.

Utilizing the concept of orientation distance, the directionality dimension of orientation strategies may be partitioned into the following:

Definition # 4 — "An approach mode is that set of orientation strategies by which the actor attempts to decrease the orientation distance between himself and another in order to establish or increase association."

Definition # 5 "An avoidance mode is that set of orientation strategies by which the actor attempts to increase the orientation distance between himself and another in order to establish or increase dissociation."

Discussion

The above partition adds further specification to the directionality component of orientation. It should be evident that in terms of behaviour the assignment of orientation acts to either of the above modes should present no fundamental difficulties. The approach mode of orientation will involve such acts as assistance, attack, etc. while the avoidance mode of orientation is concerned with such acts as retreat, evasion, etc. (Note: For a complete specification see Section II).

However as stated in Definition # 2 condition b the approach mode will also contain such acts as encouragement, requests for assistance, requests for support etc.and the avoidance mode will contain acts such as evasive answers, verbal dismissal (eg. "Get away from me") etc. The "dual" aspect of the orientation distance is concerned with respect to these linguistic orientation acts. Whereas almost all behavioral acts can be viewed as either approach or avoidance modes, the linguistic acts require somewhat more consideration. For example, it may not be immediately apparent why a request for assistance should be conceived of as an approach strategy since behaviourally the approach will be on the part of the object of orientation. However by conditon b of Definition # 2, closure or approach refers not only to physical distance but also to social distance. Thus a request for aid may be seen as an attempt to effect closure via indicating a willingness to permit closer association. In other words while the act does not exhibit closure physically it does so socially. It is by way of condition b that both behavioural and

linguistic acts are linked with respect to either the approach or avoidance mode.

In addition to partitioning both linguistic and behavioural acts in terms of the directionality dimension, Definitions # 4 and 5 also state that orientation distance is altered either to increase or decrease association. Thus both the approach and avoidance modes of orientation require that action attend to promoting or inhibiting association. In certain interactions this condition is violated and hence must either be excluded or treated somewhat differently. In a subsequent section this issue will be treated in detail.

(2) The Stationary / Locomoting Dimension

Throughout this paper the objects of reference have always been taken to be one or more others. In this sense then, objects of reference unlike points of reference need not remain fixed in relation to the actor. Thus at a general level, the array of orientation strategies may be partitioned by a choice on the part of the actor to either induce locomotion on the part of his object of reference or to undertake locomotion himself. It is therefore meaningful with respect to either mode of orientation (approach or avoidance) to consider stationary orientation strategies or locomoting orientation strategies. Hence the following definitions may be proposed:

Definition # 6 — "An orientation act may be said to be stationary if the actor attempts to alter the orientation distance by means of inducing locomotion on the part of his object of reference."

Definition # 7 "An orientation act may be said to be locomoting if the actor attempts to alter the orientation distance by means of undertaking locomotion with respect to his object of reference".

Discussion

Implementing these definitions, both the approach and the avoidance modes of orientation may be partioned such that the, "stationary / locomoting" components of orientation constitute subspaces of both these modes. The array of orientation acts may then be conceived of as partitioned by the set: (1) Approach Mode of Orientation - Stationary subspace, (2) Approach Mode of Orientation - Locomoting Subspace, (3) Avoidance Mode of Orientation - Stationary Subspace, (4) Avoidance Mode of Orientation - Locomoting Subspace.

As previously suggested, the stationary/locomoting subspace of both modes of orientation is primarily associated with the "linguistic/action" distinction with respect to behavior. Although this association will be evident in the following illustration, a note of caution should be exercised when considering their similarities. Equating the stationary subspace with linguistic acts exclusively would result in the omission of such nonverbal acts as, "moving to attract attention" (e.g. deductive movement etc.) or "dressing to induce action" (e.g. assuming a disguise to frighten someone). It is clear that these acts of orientation, while definitely non linguistic, nevertheless should be located within the stationary subspace of either the approach or avoidance modes of orientation. Bearing this proviso in mind, the following examples should provide an intuitive grasp of the relation of specific acts to the proposed structure.

(1) Stationary - Approach Mode

e.g. "Would you help us with our plan."

e.g. or "He encouraged her to go on".

e.g. "Come here!"

e.g. "You must go with me."

(2) Locomoting - Approach Mode

e.g. "He rushed at him with a knife"

e.g. "She washed his wounds."

(3) Stationary - Avoidance Mode

e.g. "Get the hell out of here".

e.g. "Leave!"

e.g. "Please leave me now."

(4) Locomoting - Avoidance Mode

e.g. "Seeing him coming, he took the other path."

e.g. "He looked so angry that I ran away."

e.g. "She bored me so I left."

(3) The Imperative and Elective Dimension

The two dimensions of orientation which have been introduced partition the array of orientation strategies into four classes. In constructing this partition the primary assumption that, "an orientation act is a choice on the part of the actor" (see Assumption # 1) has been of central importance. The actor, in terms of this assumption, is viewed as having an array of potential alternative strategies which, via some choice process, result in an orientation act. In order to more fully explicate the concept of orientation, it is necessary to examine in somewhat greater detail the structure of this choice process.

It is clear that one possible way of viewing the manner in which the orientation act is determined is to assume that all actors have identical repertoires, in terms of the type and number of orientation

strategies, from which to choose. In other words, the array of orientation strategies is conceptualized as fixed in size, and choice always involves a survey of this array and a selection from it. However, without some modification this would imply that no constraints enter into the choice process, i.e. that the actor is "free" to select from the e ntire array any orientati on strategy. This would appear to be an untenable assumption since for most choice situation while an array of logically possible choice alternatives exists, it is clear that some of the costs associated with certain alternatives are so undesirable as to exlcude the alternative from consideration. Thus such a mode of conceptualization of the choice process would not appear to be too useful.

An alternative to the assumption of a fixed array is the view that the size of the array of orientati on strategies from which the choice is made is determined by the context in which the choice is made, i.e. components of the situation in which the actor finds himself define a set of operational alternatives which are derived from the set of possible alternatives. In this manner the set of "operational alternatives" may be either the entire set of possible alternatives or any subset of this. It then follows from this that the notion of constraints on the entire array of orientations has meaning.

With the introduction of the notion of "constraints" on the array of orientation strategies, a third primary dimension of orientation may be proposed: the dimension of "Discretion". In proposing this as a primary dimension, the question to be answered is: How much control is permitted by or given to the actor in terms of his choic e of orienta-

tion? It should be noted that in considering the degree of discretion which the actor exercises over the array of possible orientation strategies, it is asserted that there is a concern for both the degree of discretion permitted to the actor and the degree of discretion permitted by the actor. Of importance here is the idea that the actor may either be permitted only to choose from a restricted array of orientation strategies or, as part of the interaction (situation), his acts may create the constraints for another's (i.e. his object of orientation) array of orientation strategies.

A specification of the "discretionary" dimension therefore involves the following definitions:

Definition # 8 — "An imperative act is an orientation act through which the actor either attempts to provide a minimal array of orientation strategies to another (his object of orientation) or orients to another as a consequence of a minimal array of orientation strategies."

Definition # 9 — "An Elective Act is an orientation act whereby the actor neither attempts to provide a minimal array of orientation strategies to another nor orients to another as a consequence of a minimal array of orientation strategies."

Discussion

Partitioning the array of orientation strategies along this dimension is perhaps more difficult than for the two dimensions previously proposed. This is almost necessarily the case since specifying the conditions for a "minimal array" or what constitutes "minimizing an array" is difficult. However, a consideration of some types of specific orientation acts suggests some necessary, if perhaps not suficient conditions for "minimizing an array".

Note the following examples:

Approach - Locomoting: "He attacked him with his spear."

Approach - Stationary: "Come here, now!"

Avoidance - Locomoting: "There were too many and he fled."

Avoidance - Stationary: "Get out of my sight."

Each of these examples suggests that one important means of either minimizing the array of orientation strategies or of having a minimal array of orientation strategies upon which to act is to either indicate or to have received an indication that "prohibitive costs" are attached to certain acts in the array of orientation strategies. Indications of prohibitive costs are conveyed by such acts as threat, attack, retreat, etc. Thus the following condition may be stated.

Condition a "An array of orientation strategies is minimized if a subset of the array has attached to it prohibitive costs."

As contrasted with the above examples consider the following orientation acts:

Approach - Locomoting: "He helped the old man with his bag."

Approach - Stationary: "She encouraged him to go on."

Avoidance - Locomoting: "He shook hands and left."

Avoidance - Stationary: "Shall I leave you."

The above examples provide no basis for the inference that either the actor is constraining the array of orientation strategies or is constrained in terms of his own orientation strategies. Because of this such acts would be classified as "elective acts."

(4) Information and Orientation

In approaching the problem of the analysis of the "structure" of texts the view was taken that narratives constitute a special case of social action. The basis for this claim rests on the notion that while the analysis of a text is an analysis of description of social action whereas the analysis of social action is an analysis of action itself, there is no theoretically significant reason for differentiating between them. As a direct consequence of this perspective it was proposed that the structural dimensions of texts could be viewed as various patterns of types of orientation since orientation was a primary condition of social action.

The explication of the concept of "orientation act" was undertaken on the assumption that an orientation act is an assertion about the nature of the relationship between the actor and his object of reference (see Assumption # 2). The "nature of the relationship" was conceived of in terms of either increasing or decreasing association between two actors (see Definitions # 2 and # 3). In view of this perspective, a question of central importance to the analysis which arises is: "Does this mode of conceptualization permit the classification of all types of action and/or interaction in the text?

It is clear that no simple answer to this question can be provided. In essence the problem is whether or not it is theoretically useful to consider all forms of interaction as attempts at either association or dissociation.

While it is a tacit assumption that much of the social action in narratives can be conceived of as processes of either association or

dissociation, there is a class of interactions for which the utility of this assumption is unclear. This class might generally be denoted as "information conveying" acts. This class of acts may be distinguished from "orientation" acts on the basis that such acts permit no inference concerning the actor's desire to promote either association or dissociation. Acts in this class are viewed as information conveying in the strictest sense, i.e. the actor does not utilize the information to modify his relationship with another. The following definition locates these acts.

Definition # 10 "An information act is an act in which no attempt is made, by the actor, to alter the orientation distance between himself and his object of orientation."

Discussion

It is clear from the definition that the distinction between an orientation act and an information act rests primarily on whether or not the information is conveyed with modification of the relationship in mind. While the identification of an information act is highly inferential requiring a consideration of the context and the implications of the assertion, it should not, in practice, be too difficult to locate. In order to facilitate this identification two further definitions may be proposed which partition the array of information acts into two subclasses: direct and indirect:

Definition # 11 "An information act will be called direct if the information conveyed it self determined."

Definition # 12 "An information act will be called indirect if the information conveyed by the actor is done so on behalf of another."

Discussion

The primary distinction with respect to these definitions rests upon

whether the actor is a generator of the information or a transmitter of information. Thus for class of direct information, the focus is upon information acts which convey observations, evaluations etc. which are self generated, while for the class of indirect information the focus is upon observations, evaluations etc. conveyed on the behalf of another. It should be noted, with respect to this latter subclass, that an act which is undertaken on behalf of another and which alters the relationship between its author and the actor to whom the transmitter communicated is located within the indirect information class. This is consistent with the definition of information because, in this case, the actor does not alter the relationship between himself and his object of reference; he is rather the instrument by which the relationship between his object of reference and another (the author of the information) is altered. Thus in identifying an information act the primary concern is whether or not an act is simply information in the strictest sense, i.e., the information is not instrumental to the achievement of either association or dissociation in the relationship. Such an act, when located, is then classified on the basis of whether the actor is the author of the assertion or simply an instrument of its transmission.

In concluding this section it would perhaps be useful to discuss at somewhat greater length the reasons which lay behind the extensive consideration given to the concept of information. Since the concept of social action was explicated exclusively in terms of orientation and orientation was specified in terms of the attempt to promote either dissociation or association, one potential approach to the information dimension would have been to ignore it on the basis that it was of no

theoretical consequence to the formulation. To treat information exchange as not a social action process would have been too restrictive, however, in terms of the objective of providing an instrument for the analysis of the structure of texts, since the information dimension is of importance to structure. Thus simply disregarding this dimension would be antithetical to the central objective of the paper.

Acknowledging the significance of the information dimension, two possible approaches were considered as strategies of integrating it. One possible approach would have been to reconceptualize orientation in such a manner as to incorporate the information dimension into this concept. Such a strategy, however, was rejected on the basis that cost in terms of a loss of conceptual clarity was too high. A second approach, the one utilized, involved differentiating between orientation and information. This of course allows the retention of the conceptual clarity of orientation and acknowledges the importance of the information dimension. However these are not the only benefits which accrue from this strategy. In treating the orientation act as either an attempt at association or dissociation, the focus is invariably upon the direct relation between two characters; the actor and his object of reference. In considering the information dimension, one subclass is specified by an indirect relationship between the author of information, the transmitter of information and the transmitter's object of reference. In differentiating between these two dimensions the instrument becomes sensitive to both direct and indirect actions of characters. While the significance of this is as yet to be explored, it should be clear that the present conceptualization extends both the range and sensitivity of the measurement technique.

SECTION II - The Assessment Process

(A) (1) Introduction

In this section of the paper an analysis of the interaction and power structure of the narrative will be undertaken in order to provide some tentative conclusions concerning the validity of the measurement procedure. In this analysis, the criterion by which validity will be assessed is, the extent to which the technique identifies a similarity of structure for similar texts. In order to employ this criterion the data for the analysis was collected from four versions of Cinderella. These four texts were randomly selected from a collection of variants of Cinderella by M.R. Cox.[3] While some error is inevitable in this procedure due to temporal or geographical differences, it was expected that the three versions would yield a sufficient similarity to provide an adequate analysis under the above criterion.

(2) Data Processing

Each text was broken into a set of orientation units with each unit identifying a transaction between characters. The structure of each unit involves the person initiating the interaction, the person to whom the set is directed and the orientation strategy adopted by the initiator of the act. As a result, each text was characterized by a series of units of interaction identifying the actors and a partition of types of interaction.

The data analysis consists of the examination of these units by means of a computer routine. The basic feature of the program is the generation of a martix of transformations from one unit to the next. Options exist for the identification of transformations from any feature

of a unit to any other feature of that unit or any other unit. In addition, the program allows one to select transformations subject to conditions on any feature of the units. A more detailed discussion of the features of the program is presented in the Appendix.

The following discussion deals with the identification of each element of the units as coded. Each unit may be seen as an ordered triad of the form: (1, 2, 3).

Elements 1 and 2

i) Initiator and Recipient of Act.

Each character in the text was assigned a number or letter. These numbers were used to identify initiators and recipients of acts in each unit. Each unit if first of all identified by the initiator of the act and by the recipient of the act.

In some texts, groups of individuals are often used as recipients of acts. Our strategy has been to simply identify such groups by the assignment of a number in the same way as individuals are identified.

ii) Element 3: Category of orientation strategies

The coding of orientation strategies may be simplified by representing the decisions to be made as a branching process. Figure 1 identifies the modes of this process in terms of the categories discussed earlier in this paper.

Figure 1 - Branching process for orientation strategies

			Numerical Assignment for coding
Approach Mode	Locomoting	Imperative	1
		Elective	2
	Stationary	Imperative	3
		Elective	4
Avoidance Mode	Locomoting	Imperative	5
		Elective	6
	Stationary	Imperative	7
		Elective	8
Information	Direct		9
	Indirect		A

iii) Coding Strategies

While the technique specifies a set of necessary conditions for each orientation strategy, it is clear that, in scoring the text, these sets of conditions will not invariably be sufficient for the assignment of acts to these classes. It should also be clear that the task of stating a set of both necessary and sufficient conditions for each strategy would be a most difficult, if not impossible, goal. The conditions which were stated in order to specify the strategies were felt to be sufficient to provide for the assignment of most acts to be encountered. However where the assignment of an act is unclear, we have attempted to adopt the position of a 'generalized other'; an observer of the interaction who has knowledge of the context in which the set has taken place and who evaluates acts with respect to their 'common meaning' in social situations. The problems associated with this strategy are often minimized by the knowledge which a coder may have of the

resolution of conflict, and intrigue, etc. in the narrative as a whole.

'1' Attacks, restraints, and other aggressive acts on persons were included in this category. Since this is under the locomoting dimension it referred almost exclusively to behavioral aspects of the narratives.

'2' Indications of support such as embraces or shaking hands were coded under this category.

'3' Commands and instructions were the most usual acts coded in this way.

'4' Indications of compliance and invitations to come together were coded as '4'. In some respects the only difference between this category and number '3' above was the inference on the part of the coder that options were open for the recipient and a refusal to come together had few costs associated with it.

'5' Retreating under pressure was coded as '5'. Our rationale for this strategy was that retreat removed the options for the recipient insofar as his relationship with the initiator is concerned.

'6' Withdrawal from the relationship without the degree of pressure implied in number '5' above was coded as '6'. Usually this meant a parting of friends.

'7' A command to depart or separate (as opposed to a commandto come together in code number '3') was coded as '7'.

'8' As in code number '4', invitations were coded as '8' when they were invitations to separate. The only condition was that there were few costs associated with refusal to comply.

'9' Questions and declarations on the part of the initiator which represent his own concerns were coded as '9', as long as they gave no clear indication that the initiator was attempting to change his orientation to the other.

'A' Questions and declarations by the initiator for which another is being represented are coded as 'A'. "He wants to know" or "He says" rather than "I want to know" or "I say" (which would be coded as '9') are paradigms for the acts under this category.

Table 1 gives an outline of the basic distributions for this system of categorizations, and character identifications.

Table 1a

Distribution of basic statistics for initiators

Text Number

125		28		127		68	
Character number	Freq. of initiators	Char.	Freq.	Char.	Freq.	Char.	Freq.
1	47	1	52	1	27	1	26
2	13	2	7	2	2	2	11
3	13	3	6	3	4	3	0
4	39	4	14	4	27	4	12
5	32	5	37	5	5	5	5
6	9	6	8	6	13	6	4
7	18	7	3	7	8	7	4
8	3	TOTAL	127	8	1	8	12
9	4			TOTAL	87	9	4
A	1					A	3
B	3					B	13
TOTAL ACTS	182					TOTAL	94

Table 1b

Distribution of basic statistics for categories of orientation

Cat #	Text number 125 Freq.	% of total	28 freq.	%	127 freq.	%	68 freq.	%	TOTAL freq.	%
1	58	(32)	66	(52)	41	(47)	40	(43)	205	(42)
2	25	(14)	12	(9)	0	(0)	8	(9)	45	(9)
3	24	(13)	11	(9)	2	(2)	6	(6)	43	(9)
4	19	(10)	14	(11)	11	(13)	10	(11)	54	(11)
5	15	(8)	9	(7)	4	(5)	1	(1)	29	(6)
6	1	(1)	15	(12)	18	(21)	2	(2)	36	(7)
7	36	(20)	0	(0)	11	(13)	2	(2)	49	(10)
8	0	(0)	0	(0)	0	(0)	12	(13)	12	(2)
9	4	(2)	0	(0)	0	(0)	3	(3)	7	(1)
A	0	(0)	0	(0)	0	(0)	10	(11)	10	(2)

(3) Analysis - Frequency of Interaction

The first feature of the texts examined was the simple distribution of acts by the characters involved. We assumed that the central characters could be identified by the amount of activity which they showed by means of the unit analysis. If our measure is sensitive, it should identify similarities in the central characters across the four texts. Table 2 shows the distribution of acts. We chose to focus on those characters which contributed at least 10% to the total number of acts in each text.

Table 2

Order of Frequency of activity and central characters.
(characters who initiate at least 10% of total output)

Text Number

125 Char.	% total acts	28 Char.	%	127 Char.	%	68 Char.	%
1	(26)	1	(41)	1	(31)	1	(28)
4	(21)	5	(29)	4	(15)	B	(14)
5	(18)	4	(11)	6		4	(13)
7	(10)					8	
						2	(12)

Key to character type:

- □ - Cinderella figure (protagonist)
- ○ - antagonist
- △ - ally for protagonist
- ∪ - reward character (Prince, etc.)

This analysis satisfactorily separates three major types of characters from the various texts: the 'Cinderella' figure, the antagonist and an ally for the former. In all the texts the Cinderella figure shows the most relative amount of activity which in 3 of the texts (# 125 excepted) is substantially (at least 14%) ahead of the next frequent interactant. For the identification of the significance of interaction of the other characters we must look to different factors.

(4) Analysis - Frequency of interaction category

A second attempt to check the consistency of our measure across the texts was the examination of the distribution of orientation strategies in the data.

Table 3

Order of frequency of orientation strategies

(strategies occuring at least 10% of the total)

Text number 125		28		127		68	
Strategy number	% of total	Strat	%	Strat	%	Strat	%
○1	(32)	○1	(52)	○1	(47)	○1	(43)
□7	(20)	□6	(12)	□6	(21)	□8	(13)
○2 ○3	(14)	○4	(11)	○4 □7	(13)	○4	(11)
○4	(10)						

Key to mode types:

- ○ - approach mode
- □ - avoidance mode

If we separate the orientation strategies in Table 3 into those which fall under the approach mode and those under the avoidance mode, we find a strong ordinal consistency between the versions. 'Approach' units are the most frequent in all texts, followed by 'avoidance' units and then 'approach' modes again (except for a variation in the last category in text 127).

Our first concern was with the possibility that this consistency might be an artifact of our measuring instrument alone and not a function of consistency between texts. To make a rough check on this possibility we compared the distribution of orientation strategies in four Indian myths.[3]

Table 4

Order of frequency of orientation strategies in 4. Indian myths.

Strategy number	OKM 4 % of total	OKM 6 Strat	OKM 6 %	OKM 9 Strat	OKM 9 %	OKM 12 Strat	OKM 12 %
(5)	(21)	3	(25)	1	(34)	1	(40)
[3]	(19)	1	(17)	5	(18)	6	(17)
(4)	(16)	4	(15)	2	(16)		
TOTAL N	[63]		[124]		[108]		[161]

Key to modes: (○) - approach mode

[□] - avoidance mode

The results of table 4 show a very different distribution of unit types. First of all, this table supports the notion that the distribution is not totally a function of the measuring instrument since we find with different types of narratives a different ordering of orientation strategies. Secondly, the particular orderings found are consistent with our intuitive feelings for the two genres. The Cinderella tales are built around a more pronounced

antagonist-protagonist-resolution structure than the Indian myths. The Indian myths are more ambiguous insofar as conflict and resolution are concerned for each of the characters are both successful and unsuccessful in conflicts which may occur and there is no clear polarization of relationships.

B) Analysis - Power Relations

(1) The Definition of Power

The literature in the fields of Anthropology, Sociology and Psychology abounds with attempts at specifying the concept of power. In surveying this literature, the point is evident that as much difference of opinion exists within these disciplines as between them with respect to the necessary and sufficient conditions for the specification of this concept. While no concensus is clearly evident it would appear that most points of contention are concerned with whether, for any given definition, a set of sufficient conditions has been established, i.e., there would seem to be some general agreement with respect to the necessary conditions but little agreement about whether any stated set of necessary conditions is also sufficient. For purposes of this paper, no attempt will be made to engage in this polemic. Instead an attempt will be made to set out two necessary conditions, upon which there seems to be general agreement, and to operate within the bounds of these conditions. The question of sufficiency, though its importance is acknowledged, is reserved for future consideration.

Power	"If R is a binary relation on a set of individuals, then R is a power relation if: 1) "Actor A has the ability to affect the outcomes of actor B".[4] 2) the ability to affect such outcomes is expressed in terms of a reduction of choice for actor B.

Discussion

It is evident, in specifying the relation, that power is conceived of in a very general sense. Within this definition only two types of conditions are proposed: an existential condition and a directional condition. The existential condition requires that an ability be present. In requiring the presence of this ability no attempt is made to specify either how it arises or of what it is composed. While such considerations may be important for a full appreciation of the structure of a power relation, these issues were felt to be beyond the scope of the present analysis. In addition, while such issues might be contentious, it was felt that little or no disagreement would arise over proposing the existence of an ability as a necessary condition. The directional condition, i.e., that the outcomes are affected through a reduction of choice, again makes no attempt to explicitly consider the various strategies by which such a reduction is achieved. It is stated primarily to provide an identification of the ability.

(2) The Concept of a Power Orientation

Having specified the concept of power, it is now necessary to consider orientation strategies with reference to such power relations. Such strategies will be referred to as power orientations. This concept may be specified as follows:

Power Orientation — "Any act in which the actor either attempts to establish or reinforce a power relation, or is required to take into account such an attempt on the part of another.

Taking the concept of power in conjunction with the concept of power orientation, the concepts of High and Low Power Orientation may be specified as follows:

Low Power Orientation — "Any act by actor A which does not reduce the choice of action which actor B has".

High Power Orientation "Any act by actor A which reduces the choice of acts which actor B has",

On the basis of these two definitions the categories of orientation strategies were divided as follows:

High Power Orientation:

Category 1 - Approach Mode, Locomoting, Imperative
Category 3 - Approach Mode, stationary, Imperative
Category 7 - Avoidance Mode, stationary, Imperative

Low Power Orientation:

Category 2 - Approach Mode, locomoting, Elective
Category 4 - Approach Mode, stationary, Elective
Category 5 - Avoidance Mode, locomoting, Imperative
Category 8 - Avoidance Mode, stationary, Elective

(3) Specification of the power relation

For a preliminary examination of the myths we developed a set of roles for identifying a power relation in terms of the relative distribution of acts between persons. Since power is defined in terms of two persons, it was decided that each relationship would be standardized with respect to that relationship. Table 5 presents the paradigm for this analysis.

Table 5

Paradigm for the identification of power relations between two persons

	High power orientation	Low power orientation	
Person A to Person B	percentage of responses cell 1	cell 2	100%
Person B to Person A	cell 3	cell 4	100%

A set of rules for the ordering of power was devised.

These rules were based on techniques of contingency table analysis of statistics. The extent of variation in each cell from that expected if there were a symmetrical relationship between persons is used as an indication of the nature of the relationship. Since we are dealing with small numbers of a cts at this point, and since the measuring technique is crude, we decided to establish a level of tolerance for deciding the amount of difference between cells which we feel is significant. This level was chosen as a difference of 10% in the individuals' standardized scores.

In the following list of rules, "$A \succ_p B$" means "A has power over B"

$A \sim_p B$ means "A equal power to B"

and $A \succcurlyeq_p B$ means "A has power over B or equal power to B"

Rules for power relations (cf. Table 5 for interpretation of cell numbers)

(1) If no interaction then the power relation is undefined (ie $A \not\sim B$)

(2) If cell 1 is greater than zero but cell 3 is zero, then $A \succ_p B$

(3) If the total of cell 1 and cell 3 is zero, but cell 2 or cell 4 are greater than zero, then $A \sim_p B$

(4) If cell 1 is at least 10% greater than cell 3 and cell 4 is at least 10% greater than cell 2 then $A \succ_p B$

(5) If either of the percentage differences in rule 2 is less than 10% then $A \succcurlyeq_p B$

(6) If cell 1 equals cell 3 and cell 4 equals cell 2 then $A \sim_p B$.

Using this set of rules, each relationship between central characters as defined in section II A 3, was examined. The results of this examination are shown in Table 6 with graphic representations.

If we examine the power relations within text there are 2 occurences of

"intransitivities" in the relationships. That is,A has power over B and B has power over C but A does not have power over C. This may be a logical problem, but not necessarily one which is unreasonable when it comes to relationships between persons.

(4) Analysis of Power Relationships

a) Differentiation

The graphs of power relations in Table 6 illustrate one variation in consistency with respect to the amount of power differentiation. Only text number 28 shows no hierarchical arrangement of characters with respect to power. The question raised by this occurence is whether it is a function of insensitivity of the measuring instrument, or in fact an indication of its sensitivity to variations between texts.

Table 6

Power Relations

Text number

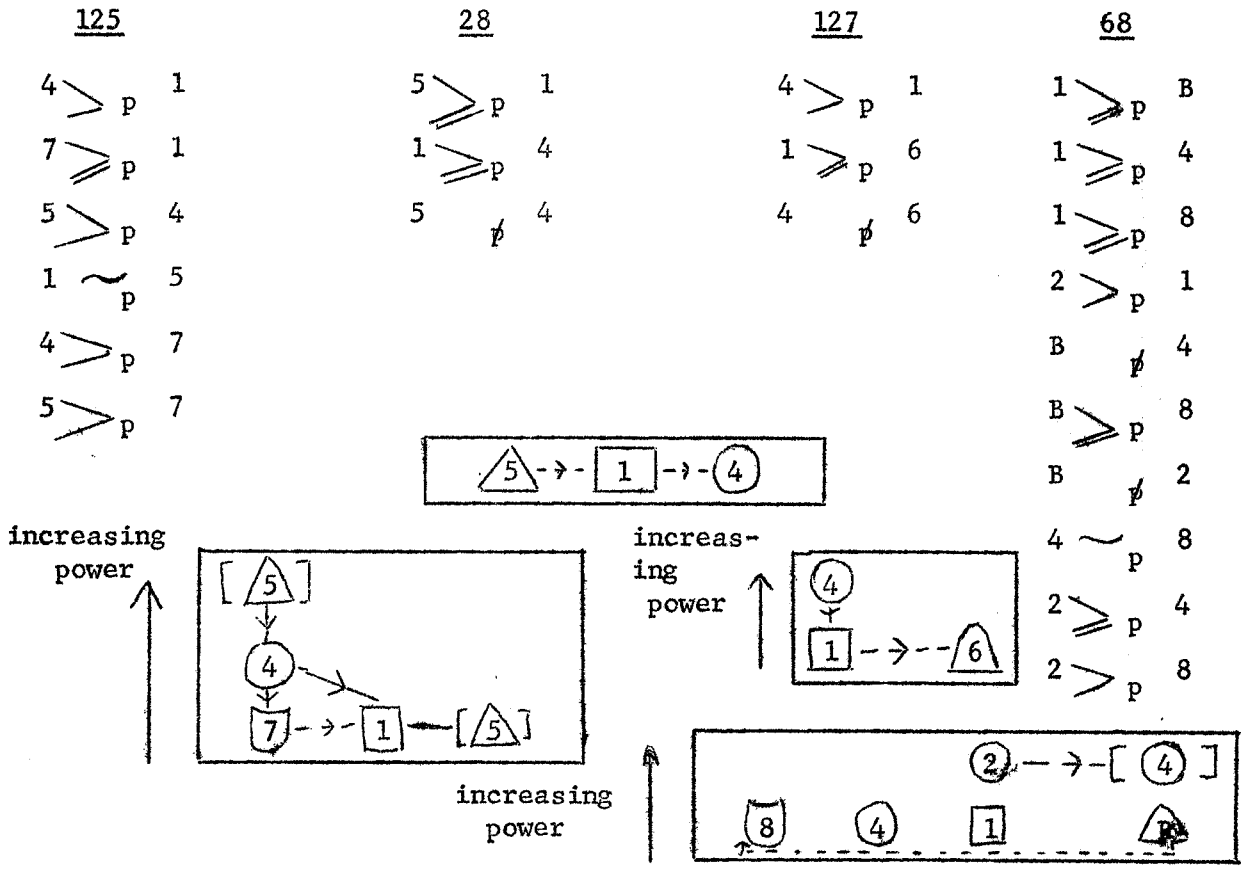

Table 6 (cont)

Key to relationships

A ——>—— B means $A >_p B$

A — -> — B means $A \geqq_p B$

A ———— B means $A \sim_p B$

"Intransitivities" identified by square brackets

Key to character type

□ - protagonist

○ - antagonist

△ - allyfor protagonist

∪ - reward character

If we examine the texts, we find that text number 28 is peculiar in that no punishment is given to any of the characters. In the other three, some form of retribution is given to the high power person, but in number 28 all characters end up in a better position from when the story began. In this story good fortune and an old woman (there is no account of her motives) provide the means by which the Cinderella figure (and through her, her family) are blessed.

This variation in the structure of the texts might account for the variations found by our technique. If this is the case, it would support the technique as one which is sensitive to variations in power structures, at least insofar as differentiation is concerned.

b) Character type

In all the differentiated texts (number 125, 127 and 68) we find that the antagonist holds a position of high power relative to the protagonist.

This is illustrated in the graph. In Table 6 by the antagonist being higher on the page than the protagonist in each narrative. Each case of this relationship is of the $>_p$ type which indicated the strongest type of power relationship possible.

In addition, the antagonist is more powerful than the ally of the protagonist. (This relationship is complex in text number, 125, where the intrasitivity occurs.)

Such results occur because of the high proportion of interactions between the antagonist and protagonist in which the protagonist is ordered to behave in certain ways. This behavior sets the context for the eventual supremacy of the protagonist in the end. As we indicated in the discussion of differentiation, this supremacy is accompanied by punishment of the antagonist.

The consistency of these relationships across the texts argues once again for the sensitivity of the instrument, although further exploration under more controlled conditions is required.

5) Conclusions

On the basis of these preliminary tests, there appears to be reasonable support for the measuring instrument as a sensitive tool for the analysis of narratives. If we assume similarity between the Cinderella versions there is reasonable consistency in the analysis of them to suggest the measures are sensitive to this. On the other hand, those variations we do find have been relatively easy to account for in terms of variations within the structure of the texts themselves. This argues for the sensitivity of the analysis to specific variations within each narrative.

SECTION III - APPLICATIONS

The objective of this paper was to develop a measurement technique which permitted the systematic analysis of the structural dimensions of narratives. Having discussed the theoretical and analytical structure of the technique, an attempt will now be made to indicate areas, in the field of text analysis, where the technique might have utility.

A tacit, yet pervading, assumption which the technique embodies is that complex structural dimensions can be constructed from the combination of the classes of orientation strategies. Thus any application of the technique mades mandatory a consideration of way in which the various orientation classes are combined in order to specify the structural dimension of interest. Two positive consequences accrue from this: first the analysis goes forward in a systematic manner, i.e. the conditions specifying the dimension cannot shift throughout the analysis, and second more complex conditions may be stated subsequently to permit a reformulation of the concept, a recombination of the classes and a re-evaluation of the data. The utility of employing a technique of this type is that it permits a systematic theoretical development of any dimension.

As an example of the above discussion, consider the previous analysis of the power dimension or structure of the narrative. Certain assumptions were proposed which were necessary conditions for the establishment of a power relation and which differentiated certain categories with respect to high and low power. A power relation was then said to exist when the frequency of either high or low power orientations was unequal

between characters. Thus our measure of power was specified in terms of the frequency of power orientations between characters, and the analysis was carried out on this basis. Consider now the possibility that the analysis has a high error, i.e. the results run counter to intuition or the result conflict with some previous analysis etc. In addition assume that it is the present analysis that the researcher wishes to reconsider in the light of this evidence. Furthermore, assume that the researcher concludes that the possible reason for the problem is that his concept of "power" is inadequate, i.e. that the previous conditions specifying the concept while necessary were not sufficient. The task in this case is then to reformulate the concept. To achieve this, consider the following two conditions in relation to the previous definition:

Conditions # 1	Amount of power is a consequence of the difference between the number of high power orientations and the number of low power orientations.
Condition # 2	The amount of power is the ratio of the difference between high and low power orientations to the total output of orientation strategies between characters.

Discussion

The initial conditions views power as a relation between classes of high and low power orientation, rather than simply focusing upon a single class. Thus instead of simply considering the absolute number of high and low power orientations undertaken by the character, the focus is upon the difference between the two power classes. The second condition modifies the original conception of power by making it conditional to the overall o utput. Thus two characters with high power (as determined by condition # 1) would be differentiated if their outputs (total) differed significantly.

Thus in reformulating the concept, the measure to be employed in a re-analysis would be:

$$\text{Amount of Actor's Power} = \frac{\text{freq. of high power - freq. of low power}}{\text{Total Output}}$$

This illustrates one way in which the technique permits a systematic analysis of any single, specific dimension of interest.

Another utility of the technique, again focusing primarily upon a single dimension, would be the identification of similar characters in texts from different cultures. In this case similarity is assessed along some dimension(s) of interest. For example, focusing upon the power dimension, the technique might be employed in order to identify and compare characters in the narratives of different cultures in terms of either high or low power.

If it were then possible to provide propositions regarding the qualities of the characters, e.g. strong, aggressive, cunning, etc., an analysis ould be carried out of the prerequisites of power for different cultures.

While the present discussion has considered the utility of the technique rather exclusively in terms of the analysis of power structures in narratives, it should not be regarded as restricted exclusively to this dimension. Under the assumption that complex social relations are constructed from various configurations of orientation, the technique should facilitate the investigation of any number of dimensions. For example, at a general level, such dimensions as age of kinship relations or sex differences are amenable to such an analysis. More specifically, considering the dimension of sex differences, the analysis of "courtship patterns" in narratives of either the same or different cultures would appear to be a research area for which the technique would be admirably suited.

Finally, although the analytical structure is as yet to be developed, the technique would appear to permit the investigation of the sequential aspects of structure. It would appear that it would be possible to consider, throughout time, i.e. throughout the story, the development of relationships between characters in terms of the sequential patterns, of orientation. Such "over-time" data would appear to be very useful to the analysis of "Hero - Heroine" or "Protagonist - Antagonist" relations.

Although this discussion certainly does not exhaust the potential range of applicability of the technique, it is to be hoped that some indication has been provided of the future direction of research connected with this technique.

Appendix

Computer Program Options

The data is in the form triples of symbols which represent in order - the initiator of the act, the recipient of the act and the orientation strategy - used by the initiator of the action. For purposes of specifying options in the computer program, a series of such triples is represented by triples of integers beginning with '1'. Three such 'ideal' units would be: 123, 456, 789.

(1) Transformations option

The basic routine of the program will produce a matrix representing 'transformations' from one location in the set of 'ideal' units to another. For example, if we wanted to have a matrix representing the 'transformations' from an initiator to the orientation strategy used, we would specify this transformation as one from '1' to '3' (ie: position 1 to position 3 in the ideal units). The program would then examine each unit in turn and calculate the frequency of units which fall into each all of the following matrix:

TABLE OF TRANSITION FREQUENCIES

	ORIENTATION Strategy	1	2	3	4	5	6	7	8	9	A	TOTAL
Initiator's number	1											
	2											
	3											
	4											
	5											
	6											
TOTAL												

Options for calculating horizontal probabilities and/or vertical percentages are available.

The option exists for examining transformations from any location in an 'ideal' unit to any other location in the same or any other 'ideal' units. The most commonly used transformations are:

'1' to '2' (initiator to recipient of the act)

'1' to '3' (initiator to category of the act)

'2' to '4' (recipient of the act to next initiator in sequence)

'3' to '4' (category of the act to next initiator in sequence)

(2) Omissions option

The programmer has the option of excluding any type of unit which he desires. Omissions are identified by their location in the 'ideal' unit and by a list of symbols which the programmer wishes to be excluded from the transformation matrix. For example, if one wished to look at transformations from initiator to recipient for orientation strategies identified by symbols other than 7, 8, 9, or A, then one would identify the location of the omission as '3' (location '3' in the ideal unit) and request the program to omit from analysis all those units which have 7, 8, 9, or A in location 3.

(3) Statements option

Very often one finds that a long conversation by a character will result in a series of units in sequences which have the same person as initiator. If one was interested only in those instances where a change of initiator occurred, the program would allow one to define 'statements' by a change in initiator. This option will generalize to any change in

consistency between consecutive units. (eg: change in recipient of act or orientation strategy).

(4) Squaring option

The program includes an option for calculating the theoretical distribution of acts under the assumptions that the transformation probabilities calculated at one point in the interaction do not change over time. This is done by successive squaring of the probability matrix (calculated from the frequency matrix of transformations.) In ergotic processes repeated squarings of this order will reach an asymptotic distribution in a relatively short time.

At present this program is written for the IBM 360/67 computer at UBC. If a copy of the program with a more detailed description of the coding instructions is desired please write to the authors at the Department of Anthropology and Sociology at UBC.

FOOTNOTES

2. Weber M. "Theory of Social and Economic Organization", Translated by Henderson, A.M. and Parsons, T. Free Press Glencoe, Ill 1947 p. 88.

3. M.R. Cox, Cinderella, London, David Nutt, 1893.

The texts were randomly selected from this collection while we eliminated those which were less than a page long. They are identified in this paper by the numbers which Cox assigns to them. In order of their temporal occurance they are:

125 - A. Waldau, Bohischis Marchenbuch (Translated from the original of Bozena Nemcova (Prague, 1860, pp. 635-55. (Cox, pp. 420-422).

28 - Domenico Comparetti, Novelline popolari Italiane, Roma Torino, Firenze, 1875, pp. 95-100 (From Pisa) (Cox, pp. 192-194).

127- Rev. A.H. Wratslaw, Sixty Folk-Tales [Southern Slavonians: Bulgarian Stories], London, 1880, Story No XXXVII, pp: 181-86, (Cox, pp. 428-430).

68 - A. Landes, Contes Tjames, Saigon, 1887, No X, pp: 79-93 (Cox, pp. 299-302).

4. These were myths kindly lent to us by P. Maranda. They are myths of Okanagan Indians (BC) collected by Larry Timoyakin. These myths were coded using a classification scheme which is slightly different from the one presented in this paper. The two schemes were identical with respect to the approach-avoidance dimension and for that reason comparisons may be made with regard to that dimension only.

5. Thibaut, J.W. and Kelly, H.H. "The Social Psychology of Groups", John Wiley & Sons Inc., 1967.