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DREAMS AS STORIES: STRUCTURAL ANALYSIS OF SLEEP MENTATION

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Dreams as Stories: Structural analysis of sleep mentation submitted by Tore Andre Nielsen in partial fulfilment of the requirements for the degree of M.Sc. in Psychology.

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Abstract

Despite repeated reference to dreams' storylike form, the sense in which dreams are stories has not been clearly articulated. Recent descriptions of narrative organization provide a means by which attributes essential to story structure may be identified. In the present study, stage REM and stage 2 mentation protocols were compared using three indices of narrative structure derived from a story grammar designed specifically to analyze dream protocols (Structural Analysis of Stories). The protocols were collected from 24 subjects, self-rated as either high or low frequency dream recallers, during four nights in the laboratory. The first index, reflective of a minimal degree of narrative coherence, was defined as presence or absence of any hallucinatory prearousal mentation. This analysis replicated prior research in that stage REM reports were (marginally) more likely to include hallucinatory scenes, characters, or objects ($M=.44$) than stage 2 reports ($M=.28$; $p<.06$). A three-way interaction indicated that the difference between stage REM and stage 2 protocols was especially pronounced (.79 vs. .29) for self-reported high dream recallers awakened late in the night ($p<.02$).

A second index, reflective of greater structural coherence, was defined as reported hallucination of at least one character acting in a concretely described scene. To control for recall (i.e., presence or absence of any form of hallucinatory mentation), only those 20 subjects providing

both a stage REM and a stage 2 protocol with some form of hallucinatory content were included in this analysis. Results indicated that there were no significant sleep-stage differences in the proportion of such protocols which included characters acting in concrete scenes.

Finally, a third index, reflective of episodic progression, was defined as reported hallucination of at least one character's action for which both the initiating event(s) and consequence(s) were described. The proportion of protocols in which there was at least one instance of episodic progression was significantly greater for stage REM content reports (M=.66) than for stage 2 reports (M=.43, $p<.05$). This difference was negligible for self-reported low frequency dream recallers (M=.58 vs. M=.58) but substantial for high frequency recallers (M=.74 vs. M=.28).

These results suggest that hallucinatory vividness and episodic progression are attributes that differentiate dreams from other nocturnal mentation, especially for high frequency dream recallers.

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I. Introduction

Informal observations of sleep mentation have confirmed the popular belief that dreams depict organized and coherent dramas, i.e., that dreams are often like stories. Jung (Greene, 1979; Jacobi, 1959; 1962) was the first to propose that dream reports could be likened to prototypic stories containing the following general constituents: a) introduction of setting and protagonist; b) development of plot; c) culmination of plot; d) solution or result; and e) prototypic characters (Jung & von Franz, 1964). Jones' (1979) recent work involving dreams in learning creative writing supported the notion that the distinguishing quality of dreams is their similarity to stories. This idea is consistent with references to the extraordinary thematic coherence observed in dreams collected following experimental laboratory awakenings (e.g., Foulkes, 1978; Rechtschaffen, 1978). For example, Rechtschaffen (1978) observed that within dreams there is a 'definite chronological march of thematically connected material, which proceeds without significant detours for longer periods of time than most spontaneous waking thought.' (p. 102).

Although these authors emphasize the apparent storylike qualities of dreams, they do not provide specific formal criteria for determining how dream reports are similar to stories. One reason that such criteria remain obscure is that reliable descriptions of the basic features of stories

are also poorly developed. This is true for the basic features defining the class of all stories (i.e., story prototypes), the features defining various story genre (e.g., folk stories, short stories, fairy tales, myths, fantasy, etc.), and features describing numerous other story variations (e.g., stylistic variables). Recent interest in psychological processes underlying comprehension and recall of meaningful verbal discourse (e.g., spoken or written paragraphs) has motivated the development of methods for analyzing stories (see Stein & Trabasso, 1980 for review). The development of story 'grammars' (e.g., Mandler & Johnson, 1977; Rumelhart, 1977; Stein & Glenn, 1979) and a variety of other criteria for narrative coherence (e.g., Kintsch & Van Dijk, 1978) provides a conceptual context for specifying the storylike features of dreams. In particular, these methods enable inquiry into such preliminary questions as: Are dream reports organized like stories? What structural features uniquely characterize dream genre (e.g., stage-REM mentation, nightmares, lucid dreams)? The present research is an investigation of the applicability of story grammar methodology to dream reports. Specifically, a newly developed story grammar, Structural Analysis of Stories (SAS; Kuiken & Nielsen, unpublished manuscript) was used to identify story features and compare mentation reports from stage REM or 'dreaming' sleep with those from stage 2 sleep.

A. Story Grammar Research

Interest in the analysis of discourse types has led to the development of numerous systems and concepts which are applicable to the problems of story description. These developments fall roughly into two categories according to the level of complexity of discourse which they address. The analysis of discourse may consist of 'microstructural' descriptions of individual concepts and propositions occuring primarily at the level of single sentences or it may consist of 'macrostructural' descriptions of themes and intentions encompassing the whole narrative (Kintsch & Van Dijk, 1978). The coherence of stories depends on features occurring at both these levels, since they are not mutually exclusive. For example, description of a macrostructural story theme might require a prior description of propositional microstructure.

Microstructural Story Organization

One broad class of discourse concepts describes the narrative coherence of low-order semantic units (e.g., concepts, words, propositions). For example, in their model of text comprehension and recall, Kintsch and Van Dijk (1978) use as their smallest unit of analysis two simple semantic elements: predicative concepts (verbs, adverbs, adjectives, connectors) and arguments (agents, objects, goals). These elements combine to form propositions (e.g., Pete was walking) which in turn may be part of propositional

sequences with some degree of coherence. The simplest case of such coherence is referential identity, i.e., when two or more propositions share a common argument or concept. For example the propositions: 'Pete sold his ticket' and 'Pete was ill yesterday' are coherent because they refer to a single argument (Pete).

Another, more complex order of microstructural coherence is the specification of a conditional relationship between propositions in terms of temporal, enabling or causal connectivity (e.g., Rumelhart, 1977; Stein & Glenn, 1979). The events described in one proposition may temporally precede those of another proposition, as in the sequences 'It rained for a while. Then the sun came out.' and 'Pete went to the dog show. Later Pete became ill.' Beyond this, the events described in one proposition may enable those of another proposition, as in the sequences. 'The door fell off and the wind blew leaves into the room.' and 'Pete walked into the room and hung up his hat.' Finally, the events described in one proposition may cause the events in another proposition, as in the sequences 'It rained for a while, settling the dust on the street.' or 'Pete sold his ticket because he was ill yesterday.' Schank (1975a) employs a similar set of connecting relations between propositions: one state or event may enable, initiate, be the reason for, or result in another state or event.

Macrostructural Story Organization

A second broad class of concepts describes higher-order configurations of several propositions. One configuration suggested by Prince (1973; see also Black & Bower, 1980) is a description of the minimal number and type of constituents and interrelationships necessary to define a story. He proposed that five syntactic features comprise a minimal story: a) an initial state description (e.g., 'John was anguished'); b) a temporal connective ('Then'); c) an active event ('He burned his credit cards'); d) a causal connective ('As a result'); and e) a final state ('He felt better'). This configuration is based on syntactic rather than semantic features and therefore also describes concatenations of propositions which together are implausible or meaningless (Black & Bower, 1980). For example,

> Frost covered the slough. Then, a burglar slipped into the secretary's closet. As a result, the coffee was cold.

This feature may make the system appropriate for the analysis of dreams, where the plausibility or meaningfulness of the configuration should not be assumed. However, the definition of story presented by Prince does not specify that the 'active event' must be the action of some animate character. It allows that the event could be a change in the state of inanimate matter (e.g., It rained).

A second kind of analysis specifies the nature of the active event, as well as other narrative attributes, to define a higher level of structure called an episode. Stein & Glenn (1979) specify that an episode includes: a) an event, b) a causal connective, c) a character action, d) a causal connective, and e) a state or event. In other words, an initiating event causes a character to act and that action causes specific consequences. For example

> John gave Mary roses for their first anniversary. She was thrilled by the gift and in return baked him a chocolate cake. John feasted on the cake and felt the day was a success.

In this example, John's act of giving is an initiating event which causes his wife to bake a cake. The immediately caused consequence of this action is John eating the cake. Propositions describing internal reactions (such as goals, cognitions, emotions) may also occur in episodes (Stein & Glenn, 1981), as in the above example where John's wife is thrilled by the gift and where John is content with his dessert. Note, however, that internal responses are only infrequently represented in story productions (Stein & Glenn, 1979) and are not defining features of an episode. On the other hand, causal connectives are defining features of stories and yet these are frequently omitted from story productions as well. In the example, the reader's assumptions about how Mary's baking may psychologically cause John's feasting are necessary to identify this

sequence of propositions as an episode.

The episode thus specifies a higher level of narrative coherence than the minimal story definition presented by Prince in two ways: a) the active event in an episode is specified as the actions of an animate character, and b) an episode includes two causal relations rather than one temporal and one causal relation.

Still greater organizational complexity may depend upon additional relationships between successive referents. Specifically, successive referents within an episode may refer to a common argument. For example, a complex action sequence in an episode may take a form in which two or more actions have the same goal (e.g., John drank orange juice, John drank Gatorade). This is a specific type of referential identity between propositions - the actions are the "same" in that they have a common goal. Consider the following example:

Edith was restless. She wanted to stop feeling this way.

She walked to her room. Then she walked to the basement.

She did jumping jacks. Afterwards she felt much better.

In this example, referential continuity (Garnham, Oakhill, & Johnson-Laird, 1982) is established both by the internal reaction statement which depicts the protagonist's goal (i.e., She wanted to stop feeling this way) and by the protagonist's sequence of actions in relation to this goal. These actions are analogous attempts to achieve the same goal.

Another specification of episodic structure (Omanson, 1980) involves several actions directed toward the same goal but connected by enabling relations to allow a protagonist to attain, first, one or more subgoals, and then a superordinate goal. In this type, one action is a prerequisite to a second action, which may be prerequisite to a third, and so on. For example:

> After studying late, John was hungry. He decided he wanted pizza. He walked to the cupboard and got out the pizza ingredients. He made a pizza with 'everything' on it. He set the table and sat down to eat his meal.

Note that each action is a prerequisite to the next step in achieving the overall goal of satisfying John's hunger.

The preceding description of relations among constituents of episodes may be elaborated further to provide an organizational structure in which the initiating events or consequences are themselves episodes. For example, each episode of a sequence of episodes may describe attainment of a subgoal which must be achieved before the next subgoal can be attempted. The sequence of such related episodes may describe the eventual attainment of a superordinate goal (e.g., Botvin & Sutton-Smith, 1977; Rumelhart, 1977). In this case, however, the subgoal-goal structure applies to sequences of episodes and not to the structure of one character's complex action sequence. Complex relations such as these may in future provide natural delineation of paragraphs or chapters which depict

the competitive and/or cooperative goals of one or more characters (Stein & Trabasso, 1980) or the collective goals of an entire group, institution, religion, and so on.

In summary, micro- and macrostructural levels of discourse analysis have produced conceptual units for specifying the key features of stories with different levels of coherence and organizational complexity. The methodology introduced in this report (SAS grammar) provides a means for assessing these story features in dream reports. Therefore, diverse types of sleep mentation varying in coherence from brief utterances to extensive productions will be amenable to analysis within a single unitary system.

In the following sections, the implications of story grammar analysis for current psychological dream theory will be reviewed.

B. Contemporary Research on Dreaming

The level of analysis in most contemporary studies of dreaming is microstructural rather than macrostructural. This statement applies to Freud's classic description of dream work (Freud, 1900), recent research on the psychophysiology of dreaming, and recent experiments on presleep determinants of dream contents. In the following sections, the levels of structure studied in each of these three paradigms for dream analysis are reviewed.

Story Formation in Psychoanalysis

Foulkes' (1978) discussion of Freud's psychological dream model indicates that dream work processes (e.g., condensation, displacement) actually describe the private, associative origins of elements of the dream, elements which are similar to the concepts and arguments of propositions. Specifically, Foulkes argues that 'motive structures' (e.g., infantile wishes), which Freud considered to be the latent thoughts behind the manifest dream, are propositional in form (e.g., 'I hate my father.'). Moreover, the arguments and concepts of these motive structures are transformed by the 'dreamwork' processes into manifest dream elements (e.g., 'I kicked an old man.'), thereby creating specific dream images.

Freud's description of condensation illustrates how his model emphasizes the determinants of microstructural rather than macrostructural features of dreams. Condensation is described as a process by which 'a whole mass of dream-thoughts' (e.g., image of my father, of an elderly male neighbor, etc.) is reduced to a lesser number of 'composite' or 'collective' elements (e.g., image of a strangely familiar older man) which represent the most frequent and most psychically intense elements in the dream thoughts (1900, p. 389). Each manifest element is 'determined many times over' by its associative precursors (p. 389). Condensation, then, determines which predicative concepts and arguments (elements) will be included in the

propositions of the manifest dream.

Freud suggests two mechanisms responsible for higher levels of organization in the dream. First, Freud accounts for the apparent coherence of a number of propositions in the dream by suggesting that different elements in the dream (e.g., a king, an old man) may be determined by a single, potent dream thought (e.g., my father). Obviously this description of condensation does not explain the causal connectivity or episodic coherence of the propositions of a storylike dream narrative, although it does, at least, illustrate a condition of referential identity between several manifest dream elements and one isolated, 'determining' dream thought.

As a second mechanism responsible for coherence of dreams, Freud described how the 'conglomerate' of dream fragments was organized into an intelligible and coherent whole (story?) by the largely unspecified process of 'secondary revision'. Foulkes (1978) documented how Freud de-emphasized the role of secondary revision and vacillated on its significance for understanding the dream. Certainly secondary revision did not receive the clarifying attention of the other dream work processes, like condensation.

Foulkes (1978) concludes:

> The great explanatory power of Freud's dream-work processes is <u>semantic</u>. These processes enable us to explain the referents of discrete dream images, to unravel the sources from which we believe their meaning derives. The great explanatory shortcoming of such processes is <u>syntactic</u>. They do not explain a central fact of dream experience: how such multidetermined images are put together in the form

> of coherent dramatic episodes, stories with sensible beginnings, middles, and ends. (p. 71)

Contemporary Psychophysiology of Dreaming

Since the discovery that rapid eye movements (REMs) accompany periods of vivid dreaming (Aserinsky & Kleitman, 1953; 1955, Dement & Kleitman, 1957), dream psychologists have explored a variety of potential parallels between physiological characteristics of sleep and primarily microstructural dream elements. For example, the correlation between REM and 'dreaming' suggested that individual eye movements might represent the dreamer's 'scanning' reactions to specific visual events in the dream (Dement & Kleitman, 1957). Dement & Wolpert (1958) found a significant correlation between pre-awakening eye movement direction and the direction of the last reported (or implied) gaze in the dream. This research appears to describe a parallel between a physiological event (e.g., upward eye movement) and, most likely, a single proposition representing the locus of a salient object or event in the dreamer's hallucinatory visual field (e.g., There was a man at the top of the stairs.) These authors and Dement and Kleitman (1957) reported a few instances in which a sequence of eye movements was related to a sequence of dreamer gaze changes. These reports refer to a sequence of dream propositions which are coherent by virtue of the referential identity of parallel or analogous movements in the dreamer's hallucinatory visual field. For example, Dement and Kleitman

(1957) recorded a case of purely horizontal eye movements preceding a dream report in which the subject was watching two people throw tomatoes at each other (p. 344).

Analysis of auditory imagery similarly has been limited to assessments of microstructural features. The correlation between middle ear muscle activity (MEMA) and loud or repetitive dreamed sounds (Roffwarg, Adrien, Herman, Lamstein, Pessah, Spiro, & Bowe-Anders, 1973) suggests an association between MEMA and either individual propositions (e.g., occurrence of a loud noise) or a sequence of referentially identical propositions (e.g., a series of speech sounds 'heard' in the dream).

In the kinesthetic domain, Gardner, Grossman, Roffwarg, and Weiner (1975) found an association between the amount and location of electromyographically recorded skeletomuscular activity in the sleeping subject and the amount and location of activity by the dreamer acting in the dream. As is true of research on physiological correlates of auditory imagery, assessment of kinesthetic imagery in the Gardner, et al. study most likely includes simple propositions of action (e.g., I sliced the cheese.) or propositions summarizing repetitive action (e.g., I walked through the park.) Moreover, these propostions show referential identity by virtue of their association with the same body region (i.e., the upper on lower girdles of the dreamed body).

The coherence criterion in the preceding research on dream content should be contrasted with other coherence criteria compatible with psychophysiological methodology. The very modest degree of psychophysiological parallelism demonstrated to date may be extended beyond the propositional, sensory qualities of discrete dream images to 'the peculiarities in the way the succession of dream images unfolds' (Rechtschaffen, 1973).

There is evidence consistent with this possibility. Specifically, certain motor system activity is known to be associated with sudden interruptions of the dream narrative sequence. For example, phasic integrated muscle potential activity recorded from extraocular muscles (E-PIPs) correlates positively with the occurence of narrative discontinuity (Watson, 1972). Similarly, there is evidence that REM periods punctuated by gross body movements are more often followed by discontinuous, multithematic dream reports while REM periods undisturbed by such body movements are more often continuous stories (Dement & Wolpert, 1958). In both research examples, discontinuity may mean that successive episodes lack referential identity or some level of causal connectivity.

The preceding review indicates that a) physiological indeces are typically related to microstructural propositions in dream reports, and b) although not prevalent in literature to date, physiological indices also may be meaningfully related to macrostructural features of dream

content.

Contemporary Research on Dream Formation

Another approach to the empirical study of dreams is to explore the transformation in dreams of pre-sleep events, such as stressful films or pre-sleep fantasies (e.g., Bertini, Lewis, & Witkin, 1972; Cohen & Cox, 1975). Most hypotheses and most of this research indicate some form of parallel or continuity between the pre-sleep events and dream content, provided, of course, that the complexities of transformation (e.g., condensation), are taken into account. An experiment by Cartwright, Bernick, Borowitz, & Kling (1969) will serve to demonstrate the levels of analysis characteristic of this research. Cartwright, et al. showed subjects a presleep film in which erotic interaction was depicted between, first, an attractive young man and woman in an 18th century brothel and second, a young bride and groom in a contemporary hotel room. Subsequently, their subjects' dreams were assessed for the proportion of dreams with a single character acting alone, a character interacting with others of the same sex, and a character interacting with others of the opposite sex. Compared with prefilm levels, the proportion of heterosexual dreams declined after viewing the film, and returned to the prefilm levels three nights later. This index of incorporation requires understanding the composition of several kinds of propositions: (a) propositions about the identities of dream

characters (male/female), and (b) propositions about the social nature of one of these character's actions vis a vis another character in the dream ('interaction with'). Note in the latter case, however, that the event(s) causing a character's actions or the consequence(s) of these actions are not explicitly scored, i.e., the episodic nature of these events is not being considered.

Other dependent measures in this study appear to rely on single propositions in the dream, e.g., references in the dream to drinking that echo events in the film, or multiple propositions linked by referential identity, e.g., repeated references to some kind of erotic activity. This microstructural kind of analysis characterizes the 'symbolic' incorporation reported by Cartwright, et al., as well. For example, erotic dream contents associated with the pre-sleep film, such as specific or repeated propositions about clothing, were scored as 'symbolic' incorporations.

An equally common strategy in studies of pre-sleep incorporation is to include subjects' as well as judges' ratings of particular dimensions of the dream. For example, Cohen and Cox (1975) had subjects rate their own dreams for general pleasantness - unpleasantness, finding that this rating correlated significantly with presleep mood for high, but not low, neuroticism subjects. It is difficult to determine what criteria these subjects used in order to perform the ratings. They may have relied on simple and direct propositions about affect in the dream report, or

they may have assessed characters' failure to attain goals, as indicated by the more complex causal relations between characters' actions and the consequences of these actions.

Judges' ratings in this study included ratings of neuroticism in the dream, i.e., incidences of dysphoric affect, negative state of being, instrumental failure, and threat. Some judgements, e.g., dysphoric affect, were probably based upon simple propositions (e.g., 'I was afraid of...'), whereas other judgements probably depended upon higher levels of structure. Specifically, assessment of 'instrumental failure' likely required consideration of a network of propositions about the goals of an action, the execution of that action by a character, and the consequences of that action for that character. In short, the level of analysis at issue in the latter example is that of a story episode.

The preceding analysis of two exemplary studies indicates that research on pre-sleep determinants of dream content relies on an unspecified combination of microstructural and macrostructural levels of analysis. Perhaps experiments on the effects of presleep events would benefit from a clearer conception of the level of analysis appropriate for studying such events. For example, presleep events that are 'episodic' in structure may have effects on dream content that should be assessed in protocols manifesting at least that level of organization, regardless of stage of awakening from sleep. This possibilty remains to

be explored.

C. Implications and Hypotheses

To depart from the imbalanced emphasis on microstructure manifest in psychoanalytic dream theory and in most contemporary research on psychophysiolgical parallels in dreams, researchers require a standardized vocabulary for story structure which subsumes both microstructural and macrostructural levels of dream narrative organization. Such a unified system may also provide a more objective basis for assessing the incorporation of presleep events in studies of dream formation. Finally, this system would enable a systematic assessment of the different orders of dream complexity and permit us to state in what sense dreams are like stories.

The story grammar termed 'Structural Analysis of Stories' (SAS) is designed specifically to describe the component structures of dream reports (see Appendix 3). Although this grammar incorporates many of the same features found in conventional story grammars (e.g., Mandler & Johnson, 1977; Stein & Glenn, 1979), it includes a more comprehensive array of story options. For example, the SAS contains an improved list of optional categories for describing scenes and settings (cf. Gibson, 1979), categories which are not emphasized in contemporary grammars. The SAS also includes more specific and varied categories for describing character attributes, action types

and sequences (cf. Schank, 1975b), and goal types (cf. Murray, 1943). Finally, the present grammar provides a means of describing degrees of incongruity (e.g., unlikeliness or impossibility) of all the constituents and interrelationships assessed by the SAS categories.

The SAS may be used to describe many types of verbal report, including prototypic story forms, loosely connected children's fantasy protocols (cf. Stein & Trabasso, 1982), stories with discontinuous components (e.g., Black & Bower, 1980), as well as dreams. The aim of the present research is to use SAS indices of three levels of narrative organization to determine which describe dreams' storylike quality. First, dreams may be like stories simply because they are composed of propositions describing any hallucinatory story components, i.e., particular states (scenes, objects, or characters) or events (physical state changes or character actions). Second, at a level of greater coherence, dreams' storylike quality may be a particular aggregate of co-occurring story components (characters acting in concrete scenes). Finally, dreams' distinguishing story quality may be the connectivity of story components by causal relationships (episodes).

Hypothesis One

As a test of these three possibilities, stage REM reports, which typically include more 'dreamlike' mentation (Foulkes, 1966), were compared with stage 2 reports, which typically include more 'thoughtlike' mentation (Foulkes,

1966). The first index used in these comparisons reflected a low level of narrative organization. Specifically, it was an assessment of whether any hallucinatory story components were depicted in the narrative, regardless of their sequence or relation to each other. Depiction of story components in the report was defined as reference to any of the following: scenes, objects, or characters. A scene was defined as reference to any location identifiable by spatially and temporally invariant features. An object was similarly defined as any inanimate element identifiable by spatially and temporally invariant features. A character was defined as any animate element, including humans, animals, animated objects, and mythic characters.

These definitions of story components give credit to one basic story characteristic, specifically, that story propositions refer to particular states or events, rather than to generalized states or events. In other words, stories describe particular characters, particular actions, and particular scenes. When generalized states or events are referred to in a story narrative, they typically are summarized classes of such particular states or events (e.g., a particular set of houses) rather than a more generalized class (e.g., houses generally).

It was hypothesized that, consistent with prior studies demonstrating that hallucinatory quality is a function of sleep stage (e.g., Herman, Ellman, & Roffwarg, 1978), hallucination of particular scenes, objects or characters

would be more characteristic of stage REM than stage 2 protocols.

Hypothesis Two

The second index used reflected a degree of narrative organization more complex than mere presence or absence of particular hallucinatory content. Specifically, it assessed whether a protocol included a specific combination of story components: a character, an action, and a single scene. Thus, the co-occurrence of the following features was required to meet this criterion:

a) The report describes events, i.e., objects or figures represented as changing over time;

b) At least one of the represented events is the overt action of an animate character or animated object; and

c) This overt action is described as occurring within an identifiable scene.

These criteria give credit to three characteristics of stories which seem basic. First, they acknowledge that stories are time-factored, i.e., they are descriptive of events which by definition are temporally unfolding state changes. Complex combinations of events, or events and states, may be described as being connected by enabling or causal relations, (cf. Rumelhart, 1975; Stein & Glenn, 1979) suggesting factors beyond the temporal one alone, but the minimal requirement is representation of at least one event.

Second, these criteria specify the nature of the event to be the actions of figures to which we can attribute some

degree of purposeful behavioral coordination (cf. Stein & Glenn, 1979). Humans, animals, animated objects, and mythic figures are basic ingredients of stories.

Third, these criteria specify that the actions of a story are localizable in a particular physical and temporal context. That is, the context for action must be represented as a coherent, spatially and temporally concrete scene. It is noteworthy that the function of scene information in story grammar research has not been elaborated to the same extent as the functions of characters and their goals and actions, despite the paramount importance of narrative context in facilitating comprehension and recall of discourse (e.g., Carpenter & Just, 1977; Trabasso, 1981).

The preceding criteria are necessary but not sufficient for identifying story episodes. Furthermore, examples of narration meeting these criteria may not be of any great interest, e.g., 'It was raining hard outside and I was putting on my galoshes'. Nonetheless, these criteria specify a particular kind of coherence among story components and permit a test of the hypothesis that stage REM content reports more frequently include these co-occurring story components than stage 2 content reports.

Hypothesis Three

The final index reflects a relatively complex degree of narrative coherence: whether the report includes episodes of the kind defined by Stein and Glenn (1979). Stein and Glenn's definition specifies that character actions are

connected to other story states or events by causal relations. That is, beyond mere sequentiality, story events are connected by sometimes complex causal (or enabling and causal) relations. Such episodic progression may be responsible for the 'dramatic' quality of dreams. Consequently, it was hypothesized that stage REM content reports would contain at least one episode more frequently than stage 2 content reports. This means that the stage REM reports were expected to more frequently contain depictions of at least one character's action (or action sequence) for which both the initiating event(s) and consequence(s) were described.

II. Method

A. Subjects and Procedure

Twenty-four college students between 18 and 25 years of age contributed verbal reports of their nocturnal mental experiences. These were obtained after controlled arousals from sleep in the Carlton University Dream Laboratory. Volunteers were given a questionnaire designed to determine their normal frequency of dream recall. From this index, two groups (one male, one female) of high frequency dream recallers (recalling at least 5 dreams/week), and two groups (one male, one female) of low frequency recallers (recalling at most one dream/week) were selected, providing four groups of subjects with six subjects per group. The differentiation of high and low frequency recallers was related to the goals of another study for which this data was collected. Although not basic to the hypotheses of the present study, this differentiation was maintained as an independent variable in the design.

Each subject spent four nights sleeping in the laboratory unless equipment failure necessitated a stayover of one additional night. Standard polysomnograms were collected from all participants on all experimental nights using Beckman Ag/AgCl electrodes affixed with Grass EC-2 paste and adhesive discs. EEG recordings were taken from sites C3 and C4 (with combined ear reference), EOG

recordings from sites E1 and E2, and EMG recordings from submental muscles. Records were scored for sleep stage following the standardized Rechtschaffen and Kales (1968) procedures with minor modifications.

When possible, awakenings were made 4 times each night, with 2 awakenings occurring during the first 4 hours of the night (early) and 2 awakenings occurring during the second 4 hours (late). For all awakenings, a minimum duration of ten minutes into the target sleep stage had to elapse before an awakening could occur. The first awakening always took place early in the night during the first stage 4 period meeting the ten-minute criterion. Following this, a constant one hour period elapsed in which no awakening occurred. Then, still in the early half of the night, the first awakening of a pair of stage REM - stage 2 awakenings was made; the choice of which type of awakening to perform first on each night was counterbalanced across the 4 nights. The second awakening of this pair was then made during the late half of the night. This late night awakening was always followed by a second uninterrupted hour of sleep, after which the final awakening - determined by the wake-up requirements of the participant - was made. This final awakening was independent of the ongoing stage of sleep, although the stage from which the participant was awakened had to be of at least 10 minutes duration. In addition, protocols were collected following unscheduled, spontaneous awakenings and classified according to the sleep stage which preceded them. Thus, over

the 4 successive nights each participant received a total of 16 experimental awakenings: 4 from stage 4 sleep, 4 from stage REM sleep (2 early, 2 late), 4 from stage 2 sleep (2 early, 2 late), and 4 from any of the preceding three sleep stages occurring before the final morning wake-up.

Sleeping participants were aroused by the experimenter stating 'Keep your eyes closed and don't move; I'm going to turn on the lights.' They were then asked to lie still and attempt to recall any mental experiences which occurred before the call (for complete instructions, see Appendix 1). A 4-minute delay between the awakening and the experimental interview occurred; during this time the psychophysiological monitoring continued. If subjects showed signs of returning to sleep during these 4 minutes, they were called again. Following this 4-minute delay there occurred a free recall period initiated by the instruction to 'describe any experience that you had before you heard me call your name.' If subsequent calls were necessary to reawaken the subject during the 4-minute delay interval, 'for the first time' was appended to the above instruction. Following the free recall period, the experimenter administered a structured set of questions; the content of these questions varied depending upon whether any pre-awakening experience could be recalled.

If no experience could be recalled, the subjects were probed for a subjective estimate of 'depth' of sleep, 'distance' from the previous experience, present motivation to recall, and body position (Appendix 1, instruction 3a).

If minimal experience could be recalled, the subjects were also queried about specific experiential content such as presence of speech, emotion, colour, control, judgement, an estimate of how easy the content was to recall, and so on (Appendix 1, instructions 3a and 3b). All free- and cued-recall reports elicited in this manner were tape-recorded and transcribed.

B. Protocol Selection and Preparation

Prior to scoring by the judges, the protocols for which there was no explicit denial of prearousal mentation (45% of the total sample) were randomly ordered and coded to obscure information about either subjects or arousal conditions. Eight awakening reports were lost due to equipment malfunction while another class of reports, described by both the subject and the rating judge to consist of two separate dream experiences, contributed a total of 4 additional reports to the sample. Thus, a total of 380 awakening reports formed the data set for this study.

Reports of prearousal mentation were randomly selected from this set for purposes of reliability scoring. From a separate collection of reports (obtained under similar experimental conditions), 10 protocols were chosen as a sample on which judges practiced before beginning to score a new category of the SAS grammar. Practice ratings of the judges and those of the author were compared to ensure that the judges clearly understood the nature of their criteria

and the procedures for applying them.

C. Scoring of Simple Story Constituents

Identification of actions

The first step in the analysis was to identify individual actions in the protocols. This was done by delimiting with brackets (see Appendix 2) phrases or clauses containing basic agent-action or agent-action-object constituents (see Appendix 3). Individual actions are very often simple in nature, i.e., the concepts (verbs) depict only brief or discrete muscular exertions (e.g., The man squeezed my arm) but are sometimes quite complex (e.g., I was preparing breakfast) (see Appendix 3). The most problematic actions to score are verbs phrased in slang (e.g., 'We buzzed off.'), summaries of action sequences (e.g., 'I made up to her.'), and descriptions of indefinite action combinations (e.g., 'He was having a hard time with the lawn mower.').

One judge bracketed individual actions in the sample of 172 content-bearing protocols; for reliability, a second judge scored a randomly chosen subsample of 50 protocols. Interjudge agreement for detection of all actions was 75%. Most disagreements were due to the second judge's conservative use of the criteria in scoring slang-phrased, summarized and indefinite verbs. Since the criterion for co-occurrence of story constituents examined in this study required only the occurrence of a single action in the

protocol, inter-judge agreement on the occurrence of at least one simple action per protocol was assessed. Proportion of agreement on this measurement was 90%.

Identification of scenes

The second step in the analysis was to identify and bracket 'simple scenes' of the narrative (see Appendix 2). Simple scenes are concrete depictions of locations, e.g., 'We were in my living room.' (Although certain circumstances allow scene inference in SAS, the present analysis relied only on explicit reference to scenes in the protocol.)

Proportion of agreement on the identification of identical concrete scenes between two judges on a subsample of 50 protocols was 68%. However, the Pearson correlation co-efficient between the total number of scenes identified per protocol by the two judges was .76. In the present report, the co-occurrence of constituents criterion required agreement only on the occurrence or non-occurrence of at least one concrete scene per report. Proportion of agreement between two judges on the presence of at least one scene in a subsample of 40 reports was 95%.

Presence or absence of objects (which are scored as a subcategory of scenes in SAS) was also required to determine the recall of story constituents criterion. Agreement on the presence of objects between two judges in a subsample of 40 reports was 90%.

Identification of characters

Every reference to a character in the protocol was identified and numbered. Undifferentiated groups of characters (e.g. 'we') and animated or personified entities (e.g. cartoon characters, active toys) were also scored as individual characters. References to characters not depicted in the protocol (e.g., 'I was talking about something Mary had said.') were not scored.

Two judges scoring the entire sample agreed on the exact identification of characters in 97% of the reports. Discrepancies in agreement usually occurred with respect to characters who were associated with undifferentiated groups.

Identification of initiating events and consequences

Every action in the protocol was independently assessed for whether it was caused or enabled by an initiating event, i.e., by an immediately preceding event or group of events. This means that an action was scored as having been caused by an initiating event in some cases even when the causal event was not the immediately preceding event, but a group of preceding events which together caused the action. The proportion of agreement between two judges independently scoring the same category of initiating events on a sample of 20 reports was 67%.

Each simple action was also assessed for whether it caused or enabled a consequence, i.e., an immediately following event. Proportion of agreement for the same 2 judges for all consequences was 68%.

Criterion one: Story Constituent Recall

Recall of story constituents was defined as recall of hallucinatory characters, scenes, and/or objects. Failures to recall story constituents included reports of no recall of any prearousal mentation, reports that there was prearousal content but no recall of that content, and reports without hallucinatory characters, scenes, or objects. Thus, thoughts about nonhallucinatory states or events (e.g., "I was thinking about reading books."), and reports of isolated sensations (e.g., "I felt like I was floating") were regarded as failures to recall story constituents.

Criterion two: Co-occurrence of Story Constituents

Recall of co-occurring story constituents was defined as the co-occurrence within a protocol of at least one character, at least one action, and at least one scene. Such reports were sometimes quite simple, for example, "There was a man walking in a hallway". At other times, they were very complex combinations of these constituents, with numerous characters, scenes, and actions.

Criterion three: Episodic Progression

Episodic progression within a protocol was defined as the occurrence of at least one character action for which both the initiating event and consequence were also identified. Episodic progression could be quite simple, for example, "A fellow sat down at our dinner table. I asked him about his trip. He said he had discovered a religion of some kind.". Of course, in other instances very complex sequences

of interlocking action sequences and episodes were described.

III. Results

Statistical analyses related to each of the three hypotheses are summarized in the following sections. First, differences in recall of story constituents were related to sleep stage and individual differences in self-reported frequency of recall. Second, differences in reported co-occurrence of story constituents were related to sleep stage. Third, differences in recall of narratives with episodic progression are related to sleep stage.

A. Recall of Story Constituents

The proportion of arousals accompanied by recall of story constituents, calculated for each subject, was submitted to a 2 X 2 X 2 X 2 X 2 analysis of variance with self-reported frequency of recall (high vs. low) and subject sex (male vs. female) as between subjects variables and sleep stage (stage REM vs. stage 2), order of awakening (stage REM first vs. stage 2 first), and experimental night (first two nights vs. last two nights) as within subjects variables. When there were missing observations due to equipment malfunction, the overall mean for the affected subject was inserted as the data point. This occurred for 5 subjects (6 observations), and, since the analysis excluding these subjects produced essentially the same results, only those results for the completely balanced design, including all subjects, will be reported here.

The difference in proportion of story constituent recall between self-reported high and low frequency recallers was marginally significant. That is, high recallers (M=.44) tended to recall story constituents only slightly more frequently than low recallers (M=.28; $F(1,20)=3.17$, $p<.09$). Also, the main effect for sleep stage was only marginally significant, with stage REM arousals (M=.44) providing more reports with recalled constituents than stage 2 arousals (M=.28; $F(1,20)=4.09$, $p<.06$). There was, however, a significant difference for order of awakening such that, when stage 2 awakenings occurred first and stage REM second, story constituent recall was more likely (M=.45) than when stage REM awakenings occurred first and stage 2 second (M=.27; $F(1,20)=9.83$, $p<.005$). No other main effects or interactions in this analyis attained statisitical significance.

The preceding differences may be better understood by examination of interactions among these variables. First, a significant two-way interaction between sleep stage and order of awakening ($F(1,20)=4.62$, $p<.05$) indicated that stage REM arousals provided much more recall of constituents than stage 2 arousals when stage REM awakenings occurred second and stage 2 awakenings first (M=.58 vs. M=.31), whereas this difference between stage REM and stage 2 arousals was markedly reduced when stage REM arousals occurred first and stage 2 second (M=.29 vs. M=.25). Moreover, a significant three-way interaction ($F(1,20)=6.95$,

$p<.02$) indicated that the preceding two-way interaction is characteristic of self-reported high frequency recallers but not low frequency recallers. As seen in Table 1, High recallers more frequently provided story constituent recall from stage REM arousals late in the night, whereas low recallers provided uniformly low levels of constituent recall under all awakening conditions.

One further interaction was significant in this analysis. An interaction between subject sex, sleep stage, order of awakening, and early vs. late experimental nights ($F(1,20)=15.21$, $p<.001$) indicated that, during the last two experimental nights, males showed a sharp decline in stage 2 constituent recall (M=.58 vs. M=.00) when stage 2 arousals occurred first and a substantial increase in stage 2 recall (M=.08 vs. M=.33) when stage REM arousals occurred first. Female subjects showed relative stability in their recall rates from early to late experimental nights. This pattern bears no obvious relationship to the hypothesized differences in recall as a function of sleep stage and self-reported recall.

In summary, the hypothesis that stage REM arousals would be accompanied by more frequent recall of story constituents is confirmed but only for arousals occurring late rather than early within the night. Furthermore, this result is markedly more clear for high frequency recallers than for low frequency recallers. It may be noted that the overall level of stage 2 recall in the preceding analysis is

Table 1. Proportion of content recalled by sleep stage, awakening order, and self-reported frequency of recall.

LOW RECALLERS

	REM 1st	REM 2nd
STAGE REM	.250	.375
STAGE 2	.167	.333

HIGH RECALLERS

	REM 1st	REM 2nd
STAGE REM	.333	.792
STAGE 2	.333	.292

virtually identical to that provided after stage 4 arousals (M=.28 vs. M=.29), suggesting that the high levels of content recall associated with late night stage REM arousals could be contrasted with stage 4 equally well.

Finally, it may be noted that the obtained difference between stage REM and stage 2 levels of story constituent recall generalizes to morning awakenings as well. Specifically, an analysis of variance was conducted in which high vs. low frequency of self-reported recall was a between subjects variable and stage REM vs. stage 2 and experimental (i.e., counterbalanced) vs. morning awakenings were within subjects variables. (Only those 16 subjects with both experimental and morning arousals for both sleep stages were considered.) The difference in constituent recall due to sleep stage was significant ($F(1,14)=4.71$, $p<.05$) and of roughly the same magnitude for morning (dif.=.12) and experimental (dif.=.14) awakenings, although the level of content recall was greater for morning (M=.56) than for experimental (M=.30) arousals ($F(1,14)=10.56$, $p<.006$). These data suggest that, for both morning and experimental

awakenings, there were more frequent content reports after stage REM arousals than after stage 2 arousals.

B. Co-occurrence of Story Constituents

To assess the hypothesis that stage REM content reports would more likely include co-occurring story constituents than stage 2 content reports, an analysis of variance was conducted using both morning and experimental protocols for which content was recalled. To control for presence or absence of story constituent recall between stage REM and stage 2, only those 20 subjects with either an experimental or morning instance of story constituent recall for both sleep stages were considered. The 2 X 2 X 2 analysis of variance included sex of subject and self-reported frequency of recall as between subjects variables and sleep stage as a within subjects variable. The dependent variable was the proportion of protocols, calculated for each subject, in which at least one character was represented as acting at least once in at least one scene.

None of the effects were significant in this analysis, failing to confirm the hypothesis that stage REM content reports would more frequently include co-occurring story components than stage 2 reports.

C. Episodic Progression of Story Constituents

The same protocols as described in the preceding analysis were further examined to assess the hypothesized relationship between sleep stage and the presence of episodic progression in the reports with hallucinated story constituents. The 2 X 2 X 2 analysis of variance again included sex of subject, self-reported frequency of recall, and sleep stage. The dependent variable was the proportion of protocols for each subject in which at least one instance of episodic progression was scored. Episodic progression was defined as a character action within the protocol for which there were both identifiable initiating events and consequences.

As predicted, stage REM reports more frequently included episodic progression ($M=.66$) than stage 2 protocols ($M=.43$; $F(1,16)=4.77$, $p<.05$). A marginally significant sleep stage by self-reported recall interaction indicated that the difference between stage REM and stage 2 content reports is negligible for low frequency recallers ($M=.58$ vs. $M=.58$), whereas for high recallers the stage difference is substantial ($M=.74$ vs. $M=.28$; $F(1,16)=4.43$, $p<.06$). No differences were obtained as a function of subject sex.

In sum, stage REM protocols, particularly for high frequency recallers, more frequently included episodic progression than stage 2 protocols.

IV. Discussion

The sense in which dreams are stories is clarified by the present research. First, the present study provided limited confirmation of the traditional assertion that recall of visual hallucinatory mentation (particular characters, objects, scenes) is more frequently associated with stage REM than with stage 2 arousals. Second, stage REM and stage 2 content reports were not differentiable when an index specifying only the co-occurrence of characters, actions, and scenes was used. Third, compared with stage 2 mentation, stage REM content reports more frequently possessed a propositional structure in which certain events caused a character's action and the latter in turn caused certain consequences. Thus, stage REM reports more frequently manifested the same episodic organization that characterizes 'well-formed' simple stories.

A. Dream Recall

Previous research has demonstrated that reported "dreaming" following arousals from stage REM sleep is more frequent than following arousals from stage 2 sleep (see Herman, et al., 1978, for review). More specifically, prior research has indicated that stage REM mentation is more likely to involve visual hallucinatory content than stage 2 mentation (Foulkes, 1966). Similarly, the present data reveal more frequent recall of story constituents (particular scenes, objects, or characters) following stage

REM, but this relationship was limited to a) arousals performed late, but not early, in the night, and b) self-reported high, but not low, frequency dream recallers. Also, prior research has indicated that mentation recalled from stage REM sleep is more likely than mentation from stage 2 sleep to manifest dramatic progression (Hobson, Goldfrank, & Snyder, 1965). In a similar but more specific vein, the present data reveal that stage REM hallucinatory mentation is more likely to show episodic progression than is stage 2 hallucinatory mentation, although again this difference is specific to self-reported high frequency dream recallers.

Although REM reports were found to be like stories more frequently than stage 2 reports, even when recall of hallucinatory content was held constant, this does not necessarily indicate that stage REM mentation and stage 2 mentation are qualitatively different. An alternative explanation is that the two types of prearousal mentation are identical and that observed differences in episodic progression reflect differences in processes responsible for accurate recall of the mentation (cf. Pivik & Foulkes, 1968). However, the data from the present study indicate that, if differences between stage REM and stage 2 protocols are attributable to differences in recall of essentially the same kind of storylike prearousal mentation, those differences must be due to memory processes subtle enough to account for a) the virtual equivalence of recall of

co-occurring story components, and b) the significant differences in recall of episodic progression. That is, recall following stage 2 arousals is not consistently 'poorer' on all recall criteria than recall following stage REM arousals. Rather, recall following stage REM and stage 2 arousals is equivalent for co-occurrences of characters, actions, and scenes, but recall following stage 2 arousals is selectively poorer than recall following stage REM arousals for episodically organized constituents. Either the recall processes are not only 'poorer' but different (i.e., 'selective') following stage 2, when compared to stage REM, or the differences in recall are attributable to differences in the prearousal mentation per se.

Regardless of whether stage differences are a function of content differences or of memory process differences, some features of the present data deserve comment. First, in comparing the present results with other research on dream recall it should be noted that mean recall rates were atypically low compared with those previously reported (cf. Herman, et al., 1978, pp. 74-75). For example, the present overall proportion of stage REM recall for experimental awakenings of 44% is well below the range of 74%-100% (M = 81.7%) reported in a review by Herman et al. This may be a function of the four minute interval which the subjects were required to use to recall and/or rehearse their verbal reports. The interval might have induced a protracted, incomplete, or distracting arousal and prevented

consolidation of the pre-awakening mentation. Gradual awakenings have been shown to lead to poorer recall than abrupt awakenings (Goodenough, Lewis, Shapiro, Jaret & Sleser, 1965) and distractions occurring after awakening (which would be more likely during a 4 minute interval) also lead to the forgetting of dreams (Goodenough, 1978).

However, the overall low REM recall rate in the present data is more parsimoniously attributed to the fact that REM reports were collected from both early and late times of night in a counterbalanced fashion, and that the effect of the low rate of recall from the early part of the night was to depress the overall mean recall rate. In the present data, if only figures for late night REM arousals are considered (high recallers = .79; low recallers = .42), recall performance is comparable to that in other studies. This suggests that previously documented rates of recall may be based on dream samples collected primarily following late night awakenings. Late night awakenings might easily be preferred since REM periods in the first half of the night are briefer and possibly harder to detect than in the second half of the night. This possibility is corroborated by Herman, et al. (1978):

> Unless carefully controlled, it would be easy to conduct a study of REM-NREM recall in which a majority of the REM awakenings occurred later in the night. . .Most studies have not described how their awakenings were distributed throughout the night, and of those that have, very few matched the REM and NREM reports by time of night. (p. 77)

Finally, it is noteworthy that among the present findings, stage-related differences in recall and story organization of mentation were obtained only for self-reported high frequency dream recallers. That is, only high recallers showed greater recall of hallucinatory REM content late in the night and more frequent occurrence of episodic progression in REM reports. Further research is necessary to clarify the nature of content and memory process differences in sleep mentation by assessing differences between high and low frequency dream recallers in other memory tasks (e.g., differences in the ability to recall stories).

B. Dreams as Stories

That, compared to stage 2 reports, stage REM reports ('dreams') more frequently contained at least one simple story episode, confirms the informal observation that dreams are like stories (e.g., Jones, 1979; Rechtschaffen, 1978). These results are also consistent with research in which stage REM and stage 2 reports have been compared on attributes similar to, but not as precise as, episodic progression as measured in the present study.

For example, Hobson, Goldfrank, and Snyder (1965) considered dreams sufficiently storylike to define the occurrence of a dream (i.e., dream recall) as whether the subject had experienced 'complex visual imagery which had undergone dramatic development' (p. 82). This definition was

more frequently descriptive of REM reports than NREM reports. Similarly, Kamiya (1961) used a definition of dreaming which echoes the quality of causal connectedness in the episodic progression index. A dream was defined as 'short but coherent . . .the parts of which seem related to one another' (p. 169). Kamiya also reported an association between this index of dreaming and stage REM reports. Snyder's (1970) assessment of dream 'coherence' in a large sample of REM reports explicitly included consideration of story quality, i.e., how well the report 'hung together' as a story. Snyder defined dreaming according to two minimal criteria: a) the experience reflects complex and organized perceptual imagery, and b) the imagery must have undergone some temporal progression or change, i.e., dramas were accepted as dreams, tableaus were not (p. 129). Seventy-five percent of REM reports conformed to this minimal definition of dreaming (p. 130). In Snyder's sample there was little evidence supporting the common belief that dreams are incoherent. Rather, he reported that 'extremely few were really disjointed or mixed up, and by far the largest number were about as coherent as we might expect from descriptions of real life events' (p. 142).

In sum, the significant difference between stage REM and stage 2 storylike quality observed in the present study is consistent with previous research which has demonstrated a difference between stage REM dreams and other types of sleep mentation in terms of dramatic development and

coherence. The episodic progression index differs from these other indices of story progression, however, in that the microstructural criteria comprising it are clearly specified.

Although episodic progression in dreams suggests their organizational integrity, dreams frequently have been distinguished from other types of mental experience by reference to their bizarre content (cf. Antrobus, Fein, Jordan, Ellman, & Arkin, 1978; Foulkes, 1966; Hunt, Ogilvie, Belicki, & Belicki, 1980). However, research has frequently depended upon less than clearly specified indices of bizarreness. For example, scales for dreamlike fantasy (Pivik & Foulkes, 1968) and for dreamlike quality (Antrobus, et al., 1978) require judgements about the general nature of bizarreness which are difficult to differentiate from judgements about dramatic quality and dream recall.

Hunt, et al. (1980) have attempted to present more precise criteria for dream bizarreness. Their criteria require judgements of bizarreness relative to the dream's 'everyday' context. There may be parallels between their attempt to judge departures from the 'everyday' structure of experience and the potential use of story grammars to determine departures from 'well-formed' stories. However, the Hunt, et al. analysis does appear to mix micro- and macrostructural criteria for bizarreness. Specifically, judgements of visual intrusions may either include extraordinary physical appearances (e.g., 'a character was

missing an arm') or discontinuous scene progressions (e.g., 'suddenly I was in . . .'). Without denying microstructural anomalies, it may be useful to ask whether it is not macrostructural organization, dependent upon the integrity of an underlying episodic structure, which determines dreams' bizarreness and thus their novel flavor. Consistent with this possibility, Dorus, Dorus, and Rechtschaffen (1971) reported evidence that, despite the mundane nature of elements within the dream, judgements of the overall character of the dream emphasize their unique and discordant novelty. These authors suggested that

> Dreams may have attained their reputation for being strange not so much from the novelty of their individual constituent elements, but from the unique combinations and relationships among these elements.

This account of dreams' strangeness suggests that anomalies of macrostructural organization rather than microstructural organization may account for the bizarreness of dream content.

In fact, to indicate how dreams are bizarre may be to specify how dreams deviate from some characteristic episodic macrostructure. For instance, since depiction of repetitive lower limb activity is frequent in REM dreams (McCarley & Hobson, 1979), REM dream episodes, when compared with other simple story episodes, may more frequently be of the type in which a sequence of repetitive attempts to achieve an invariant goal occur. This repetitive quality may contribute to the impression of novelty or strangeness. Other variations of this form may also be bizarre. For example, if

repetitive attempts to achieve a common goal do not lead to attainment of the goal, the impression of extraordinarily ineffectual movement may result.

To summarize, the present study indicates that dreams possess story organization, suggesting a reappraisal and specification of the concept of dream bizarreness. Since dreams are organized narrative structures, the lingering impression of their bizarreness may best be accounted for by identifying anomalies of that structure. This may mean that the structure of particularly impressive dreams corresponds to familiar story genre or to idiosyncratic variations of these genre. These and other possibilities invite further exploration into the structures of stories which assail and intrigue us during sleep.

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Appendix 1: Awakening Procedure

Instruction 1: "Keep your eyes closed and don't move; I'm going to turn on the lights."

Instruction 2: "During the next four minutes, pleases try to lie still and recall any experiences you were having before I called your name. After the 4 minutes I'll ask you to describe them, if there were any." (WAIT FOUR MINUTES) "Describe any experience that you had before you heard me call your name." (If any warnings add "for the first time.")

Instruction 3: (For the first arousal only:) (1) "Do you feel that you have been asleep?" "If yes, for how long?" (2)"Estimate time from lights out to sleep." (If no recall, go to Section A; if there is recall, go to Section B)

SECTION A

1. "On a scale from 1 to 9, where 1 is deep asleep and 9 is wide awake, rate where your are now."
2. "On a scale from 1 to 9 where 1 is a little and 9 is a lot, rate the distance from where you were before I called you to where you are now."
3. "On a scale from 1 to 10, where 1 is uninterested and 10 is extremely determined, rate your motivation to recall any experience this W-U, and then your motivation to recall any experiences when I wake you next."
4. "What body position were you in when I called your name?" (R L F B Other)
5. "Is there anything you wish to add?"

6. Lights out: "Thank you, that's all for now. I'm going to switch off the lights."

SECTION B

7. "Was there any speaking or talking in your experience?" If no, go to next question. If yes: "Can you tell me the words?" If no words: "Can you give me an idea of what was said?"
8. "On a scale from 1 to 9 where 1 is easy and 9 is difficult, rate the ease or difficulty you had in describing your experience."
9. "On a scale from 1 to 9 where 1 is deep asleep and 9 is wide awake, rate where you are now."
10. "On a scale from 1 to 9 where 1 is a little and 9 is a lot, rate the distance from where you were before I called you to where you are now."
11. "On a scale from 1 to 10 where 1 is uninterested and 10 is extremely determined rate your motivation to recall any experience this W-U."
12. "What position were you in when I called your name? (R L F B Other)
13. "Were you experiencing any emotion?"
14. "Was the experience vivid and striking, normal and ordinary, or vague?"
15. "Was the experience unlikely and unusual, possible but unlikely, or credible?"
16. "Was the experience one continuous scene, or many

scenes?"

17. "Were you watching the experience actively participating, or a mixture of the two?".
18. "Was there any colour in your experience?" "What colours?"
19. "Was the pace of activity fast, slow, or in between?"
20. "Comment on your ability to act in the experience. Were you able to act easily, with difficulty, or not at all?"
21. Were you able to pay attention to the experience?"
22. "Did you exercise judgement or choice in the experience?" "If yes, in what way?"
23. "Did you exercise any control over content or sequence of the experience?" "If yes, in what way?"
24. "Did the action occur in the past, present, or in the future?"
25. "Is there anything you wish to add?"
26. "On a scale from 1 to 10 where 1 is uninterested and 10 is extremely determined, rate your motivation to recall any experiences when I wake you up next."
27. "Thank you, that's all for now. I'm going to switch off the lights."

Appendix 2: Example of Scored Protocol

Protocol

[I^{0} had been at a performance with my wife^{1}.] [Now I was not with her but standing around a pool table watching some despicable men^{2} shooting pool. I remembered suddenly that I had agreed to meet my wife in the adjoining restaurant and was late.] [(I ran) anxiously for the door and (went into the restaurant.)] [(I walked up to a table) where two friends^{3} were sitting.] [(They told me) that my wife had left only minutes earlier.] [Next (I am running) down the street toward my parent's home, knowing that my wife was on her way there and if I hurried I could arrive at the same time. Suddenly (I am running) over a huge pile of fat green wine bottles. They slow my progress. I remember also (stepping on) flattened beer cans and (picking up one of these) and (examining it). It was beige-coloured.] [Then I am in an apartment (going down) some stairs. (My wife and I embrace) on the stairs. (She starts to talk) about finances.]

Symbols

Square brackets = [[= scene boundaries

Round brackets = () = action clauses and phrases

List of characters

0=narrator

1=narrator's wife

2=men (undifferentitated)

3=two friends (undifferentiated)

List of scenes

1=a performance (historical scene)

2=pool room

3=restaurant (transitional scene)

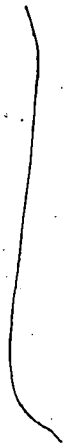
4=restaurant

5=street

6=apartment stairs

Appendix 3: Structural Analysis of Stories

(Don L. Kuiken & Tore A. Nielsen)



Structural Analysis of Stories

Analysis of story structure can only occur when the basic protocol to be analyzed is indeed a story. For the purposes of the present analysis, a story narrative is defined as a verbal protocol meeting the following criteria:

A. The report describes events, i.e., objects or figures are represented as changing over time;
B. At least one of the represented events is the overt action of an animate character or animated object; and
C. This overt action is described as occurring within an identifiable scene, i.e., a location identifiable by spatially and temporally invariant features.

This definition gives credit to three features of stories which seem basic. First, it acknowledges that stories are time-factored, i.e., they are descriptive of temporally unfolding state changes or actions. In any particular narrative, complex combinations of events, or events and states, may be described as connected by enabling or causal relations, suggesting factors beyond the temporal one alone, but the minimal requirement is representation of change over time. Second, this definition acknowledges that stories involve the actions of figures to which we can attribute some degree of purposeful behavioral coordination. Humans, animals, animated objects, and mythic figures are a basic ingredient of stories. Third, this definition specifies

that the actions of a story are localizable in a particular physical and temporal context. That is, the context for action must be represented as a coherent, spatially and temporally concrete scene. When the preceding three definitional criteria are met anywhere in a protocol, the story analysis may proceed. On the other hand, when the protocol describes only temporally static imagery, relations among physical objects, or abstractions about character actions, the story analysis described here is inapplicable.

Unstoried, temporally static imagery may take two forms. The first is static inanimate imagery, such as a tableau. For example:

"It was warm and sunny and the leaves were beginning to show the yellow of fall."

The second is static imagery involving inactive animate characters. For example:

"There was a dog sitting on the back porch, looking tired and sad."

The preceding forms of static imagery do not constitute story narratives, and neither does the mere description of temporal relations among physical states or events. For example:

"At first it was raining hard but then the sun began to glow from behind the clouds."

In contrast, when the temporal relations involve even the simplest sequence of temporally related events, the story

analysis may be applied, as in this example:

"I picked up the cup and put it in the kitchen cupboard."

Note, however, that abstract generalizations about the same actions would not be identified as a story narrative. For example:

"I often pick up cups and put them in kitchen cupboards."

For most purposes in which story productions are to be studied, the narrator's description of his/her own mental processes while producing the story will also not suffice as a story. For example:

"I was thinking about how to make this interesting."

"I wonder what others will think of this story when they read it."

Part I: Basic Units of Analysis

When a protocol has been identified as a story narrative, analysis begins by segmenting the protocol into useful units of analysis. What is useful, of course, depends upon the objectives of the analysis. Some analyses have divided story narratives into episodes, i.e., more-or-less 'well-formed' action sequences and their related causes and consequences (cf. Rumelhart, 1977; Stein & Glenn, 1979). Although potentially useful for studies of comprehension, such an approach is obviously not

satisfactory when a basic question is whether a story production manifests the features of 'well-formed' episodes. Rather than divide the protocol according to a definition of episodes, the goals of the present analysis require division of the story according to more primitive criteria.

Identification of narrative units

One basic unit of story narratives is defined as an overt action (or coherent overt action sequence) which occurs within a single coherent scene (or sequence of such scenes). This definition requires step-wise definition of its components:

A. Definitions: Overt actions. Basic to the definition of narrative units is an understanding of what constitutes overt action. Overt actions are concrete behavior changes which are commonly understood as coordinated responses to other states or events. Agents of overt actions may be humans, animals, animated objects or mythic characters. The following guidelines enhance the reliability of this otherwise common sense concept:

1. Overt actions are those which are concrete and observable. This, of course, differentiates overt from covert actions, such as thinking, hallucinating, etc. Sometimes, however, verb forms are ambiguous and may be understood as concrete although not necessarily so. For example:

"I went to see my friend."

Going to see a friend may involve a concrete action, e.g., walking, but this same wording may be paraphrased as "I was visiting my friend" which suggests no concrete behavioral event. Thus, when verbs describing actions are ambiguous, i.e., interpretable as concrete actions but not necessarily so, they are only judged as overt actions when they occur in a concrete, coherent scene. Thus, the following would be judged an overt action:

"I went down the street to visit my friend."

2. Although the events or states to which actions are responses need not be explicitly described, an event is only an action when it is plausibly a behavior change in response to such states or events. Consider this example:

"The driver did not see the intersection."

Since failing to perceive the intersection is not a behavior change in response to the intersection, the sentence fails to satisfy the criterion for identifying an action.

3. Verbs of position, e.g., "John was sitting on the sofa", are not behavior changes and, therefore, not actions, although related verbs of transition to position are, e.g., "John sat down on the sofa".

4. Coordinated effort rather than movement per se is necessary for identification of actions. Effort

expenditure in unsuccessful or incomplete actions, e.g., pushing against an immoveable object, is still regarded as an action. On the other hand, movement without coordinated effort, e.g., falling, is not sufficient to identify an action. Similarly, orienting acts of perception, e.g., looking, listening, identify overt actions whereas 'passive' registrations of information, e.g., seeing, hearing, do not identify overt actions.

B. Definitions: temporal, enabling, or causal relations. Also basic to the definition of narrative units is an understanding of what constitutes a coherent action sequence. Since coherence is defined in terms of temporal, enabling, and causal relations among elements, preliminary definition of these terms is required.

1. The most elementary of these relations is when states and/or events are temporally related, i.e., one element precedes another but does not also enable or cause it. For example:

   "John kicked the ball. Then he walked off the field."

2. States and/or events are connected by an enabling relation when an event provides the necessary but not sufficient conditions for the occurrence of a subsequent state or event. The most common enabling relation occurs when a transition action

provides a necessary condition for execution of another action. For example:

"I walked into the room and found an empty cigar box."

Here an act of perception is enabled by a transition action, i.e., walking into the room. Note that physical events may also enable actions:

"The door fell off its hinges and the chickens escaped."

Note also that states alone cannot enable other states or actions. For example, the following does not constitute an enabling relation:

"I was standing at the top of the stairs when I called down to my sister."

3. States and/or events are regarded as connected by a causal relation when an event provides the necessary and sufficient conditions for a subsequent state or event. The simplest form of causal relation is when a physical event causes a subsequent physical event, as in the following simple causal sequence:

"The wind blew the door off. When it fell, it broke the bottles below."

Psychological causal relations are those that connect psychological states or involuntary actions with prior causal events. For example:

"He took the potion and began to hallucinate."

"John's sarcastic comment made me angry."

Motivational causal relations are those that connect purposive covert events (e.g., plans) or voluntary actions with prior causal events. For example:

> "The sherriff rode up to the cabin. The outlaw inside hurriedly looked for his rifle, thinking of how he could escape."

Here the arrival of the sheriff motivates purposive cognitive activity and a voluntary action.

Sometimes elements connected by temporal or enabling relations combine with other elements to cause a subsequent state or event. For example:

> "John climbed down the ladder and, when he stepped on the bottom rung, it broke. He fell on his head knocking himself dizzy."

Here the actor's descent of the ladder enables him to step on the bottom rung. Doing so physically causes it to break which physically causes him to fall which psychologically causes dizziness.

Two features of causal analysis require special consideration. First, all overt actions by characters within a protocol are regarded as caused, although those causes are not always explicitly described. Second, covert states (emotions) or events (thoughts about plans or goals) are not <u>by themselves</u> sufficient conditions

for overt actions to occur (Omanson, in press), although they may interact with other elements to cause or alter the form of subsequent actions, as in this example:

"I was mad as I entered the room. When he told me I was late, I just blew up at him."

C. The preceding relations can now be used to define coherent action sequences. Several factors define coherence among clusters of overt actions.

1. Sometimes several actions by a single character are coherent in that they are analogous attempts to achieve the same purpose:

"John decided to raise funds for crippled children. He telephoned oil company executives for their donations. He wrote pleading letters to professional societies. And, he asked community leagues to begin door to door campaigns."

Here each action is an analogous component of a series of actions with a similar purpose. Although the narrator does not describe the causes of John's decision and subsequent actions, it is easy to imagine addition of the clause, "When Bill asked him to become involved in a worthwhile cause" to the first sentence in the example. In this case the coherence of the analogous actions is reinforced in that they are connected as a whole to

that prior event by a causal relation.

Coherence of action is based upon a slightly different principle when several analogous actions are the different attempts to solve a problem. For example:

> "The elephant began to charge. The hunter reached for his gun but it was jammed. He shouted to his partner to shoot but his partner could not hear him. Finally, he avoided the raging animal by running behind a large tree."

Here the elephant's charge causes an action whose consequences, in conjunction with the original charge, cause the hunter to choose another course of action, and so on. The analogous actions are again connected as a whole to the original event by causal relations, but the original event alone does not cause the selection of different attempts to solve the hunter's problem.

In summary, action sequences may be coherent in that they are analogous attempts to achieve the same purpose

Sometimes several actions by a single character are coherent in that the component actions are connected as a whole to a prior event or state by a causal relation and they (the component actions) are connected to each other by enabling relations. This commonly occurs when the consequence of one

action is a subgoal which enables an action whose consequence is a superordinate goal. For example:

> "The bell on the approaching ice cream wagon made Mary hungry, but she didn't have any money. Quickly she ran to her room, broke open her piggy bank, and, money in hand, was just able to get back to the street in time to meet the ice cream wagon and buy a vanilla cone."

Here again the sequence of actions is connected as a whole to a prior event by a causal relation. Also, the sequence of events has a singular purpose or goal, but the component actions are directed toward subgoals whose achievement eventually enables attainment of the superordinate goal Specifically, running to her room produces a chang in location that enables her to open her piggy bank. The consequence of that action is the acquisition of money that enables purchase of the ice cream This type of action coherence involves an apparent plan with an a priori sequence of subgoal goal relations.

A slightly different principle applies when unanticipated states or events disrupt an action or action sequence and the disruption must be removed or circumvented before the original purpose can be pursued. For example:

"I was driving down a muddy road that was so slippery I decided to look for a place to pull off on the shoulder. I finally found one but an old woman was carefully stacking hay near the only safe spot. I asked her whether she would step aside while I parked nearby. She agreed and I was able to pull off safely."

The unanticipated obstacle in this example prompts an action whose consequences enable completion of the original action. Note that the component actions are connected as a whole to the initial event (driving on a slippery road) by causal relations, but that event alone is insufficient to cause the action removing an obstacle. The emergence of the woman is also a cause for that component of the action sequence.

In summary, action sequences may be coherent in that they are connected as a whole to prior elements by causal relations and to each other by enabling relations. Note the principles of this and the preceding sections are generalizable to define coherence in the elements of dialogue between characters as well.

Finally, basic to the definition of a narrative unit is the requirement that an action or coherent action sequence occur within a single scene or sequence of scenes. A scene is defined as an identifiable context

i.e., a location identifiable by spatially and temporally invariant features; these invariant features are normally visually accesible to an observer (hypothetical or real) who is not moving other than to reorient him/herself within that location. This occurs when temporally related events occur within a simple scene. For example:

"The clouds were light and fluffy against the sky. A boy looked out of his open window. Then he closed the window. The wind started to blow."

The invariant presence of the clouds, sky, and window for the duration of the boy's temporally related acts of looking and closing the window identify the scene coherence in this narrative segment.

1. A more subtle case is when an observer's continuous change of location occurs within a transition environment the attributes of which are nonetheless qualitatively invariant. For example:

"I was hiking down an isolated trail. As I walked, I sang my favorite folksongs. Then I sang some hymns that I remembered from childhood."

The absence of described change in the features of the continuously changing physical location along the trail suggests its sameness and identifies the scene of this narrative segment.

2. Sometimes the invariant features of a scene are not explicit but the concrete nature of the overt actions supports the inference that these events transpired within a particular location. For example:

"I was waiting for a friend. I paced back and forth, looking at my watch."

Concrete actions are usually described by verbs used in the present tense (e.g., I am walking) or in the past tense (e.g., I was walking) but not usually by verbs used in the past perfect tense (e.g., I had been walking).

3. Verbs used in the past perfect tense specify historical actions and therefore an historical scene since the identifying attributes of the scene were observed in the past and are thus presumably no longer completely reportable by the narrator.

4. The identifying features of a coherent scene may also be inferred because of the concretely depicted presence of other characters. For example:

"I came across some people who were talking enthusiastically to each other."

5. A scene may also be indicated by indefinite references to unspecified locations. For example:

"We were in some unrecognizable place when it started to storm."

It may not be obvious that not all concrete story actions are described as occurring within specific scenes, but consider the following example:

"I had talked with my psychology professor about my theory of dream function before. This time I had written a paper of which I was especially proud. I was in this same professor's home. I told him I wanted his honest evaluation."

Note that the narrator's prior discussions and paper writing have no identifiable location. Furthermore, the use of past perfect tense in the sentences describing these actions confirms that these actions are in fact history, i.e., their occurrences are completed past events. Thus the scene is historical. In contrast, the requested evaluation does occur within a concrete location, the professor's home. The latter action may be considered a basis for identifying both a concrete scene and a narrative unit.

6. A similar case occurs when overt actions do have an identified spatial location but only an unspecified historical temporal location. That these actions are historical rather than occurring in a story scene is typically suggested by use of past perfect tense:

"We had left home to take a vacation and were driving on the road to Vancouver."

Here the action of driving is preceded by an historical enabling action, i.e., leaving home. The latter activity, then, is not regarded as a basis for identifying a narrative unit or a concrete scene.

Pragmatics of narrative unit identification

The first concrete step required for identification of narrative units is the delineation of a more basic textual unit, the simple sentence. This step is required because particular combinations of simple sentences define narrative units and because assessment of all simple sentences within a protocol is useful as a criterion for completeness of the narrative analysis. The analysis begins, then, by listing, in order, all of the simple sentences that make up the protocol. A simple sentence contains a stated or implied grammatical subject and predicate and is never larger, although typically smaller, than a complete sentence. The following guidelines should allow reliable identification of these simple content units:

A. Simple sentences include agent-action-object sentences, e.g., "I kicked the can along the street" or "I gave Mary a ruby"; agent-action sentences, e.g., "I walked along the street" or "I worked hard"; object-relational sentences, e.g., "I want a diamond ring" or "He dislikes John"; or identification/characterization sentences, e.g., "He is a logger" or "The water feels warm" or "I stood near the light".

B. When infinitive or participal phrases are used as noun phrases, e.g., "I watched the changing of the guard", or as identifying modifiers of noun phrases, e.g., "The boy changing clothes was dirty", the sentence is a

single content unit. However, if the infinitive or participial phrase is an elaborative rather than identifying phrase, it is scored as a separate unit, e.g., "Looking carefully through the microscope, I saw the mites". Analogously, complex sentences constitute a single content unit when the subordinate clauses are noun phrases, e.g., "When you go is of no concern to me", or when they are identifying modifying phrases, e.g., "The house that he sold was a wreck". However, when the subordinate clause elaborates rather than identifies a noun, it is a separate unit, e.g., "The boy, whose hair was blowing in the breeze, climbed onto his bicycle". Note, however, that complex sentences with an infinitive or participial phrase or a subordinate clause as an identifying modifier may sometimes portray an event that clearly meets the criteria for an overt action that is not represented elsewhere in the protocol, e.g., "We walked to a place where we could talk without interruption . . ." In this case two content units are noted.

C. Compound sentences joined by coordinating or correlative conjunctions, e.g., and, but, either . . . or, are always more than one content unit. Sentences with compound predicates constitute multiple content units unless one verb phrase clearly refers to the same action, e.g., "I spoke up and said . . .".

The listing of simple sentence content units according to these criteria also provides the opportunity for removal of protocol sentences that depict the narrator's reactions to the task or the narrator's evaluations or interpretations of other protocol content. This procedural step is critical when narrator commentary about the task, etc., may provide the judge with information about experimental conditions to which he/she should be kept blind.

The analyst's second step is to locate and mark narrative units, i.e., any content units that depict overt actions or components of coherent overt action sequences. These are sequentially numbered, with each component of a complex action sequence given the same number.

Identification of setting units

A second basic unit of story narratives is the setting. A setting is defined as a scene or cluster of adjoining scenes which provide a context for story events. The concept of scene was defined as a location identifiable by spatially and temporally invariant features. Also, scenes may be inferred from indefinite, summarized or historical information. Story events may be understood as any concrete state changes described in the narrative. However, the meaning of "adjoining" in this definition requires further specification.

Adjoining scenes are basically of three types. The first is identifiable solely by virtue of spatial proximity of scenes which are components of a larger integral unit, e.g., rooms in a house, blocks in a city, cells in a prison, etc. As the examples indicate, adjoining scenes are typically identifiable because they are analogous components of a single, larger enclosing structure. At other times they are analogous components of a geographically defined integral area.

The second type of adjoining scenes is identifiable by virtue of the component scenes' spatial contiguity, acknowledged by descriptions of concrete actions which transport a character from one scene to the other. For example, "I walked out of my front porch into my front yard." Here, the component scenes (porch and yard) are identifiable as adjoining components of a single, larger

setting because they are joined by the transporation action of walking. The actions of transportation or conveyance must be concrete and overt to warrant designating two scenes as adjoining. Moreover, continuity of the between-scene transportations in a normal temporal sequence must be maintained for scenes to be scored as adjoined, i.e., the actions must occur in real time. References to events which are impossible in real time (e.g., historical summaries), do not specify scene adjoinment. Transition scenes depicting transportation or conveyance, then, may specify scene adjoinment if the actions are overt, concrete and 'real'.

The third type of adjoining scene depicts ongoing transition, i.e., concrete, overt and real-time changes of location by transportation or conveyance (e.g., 'I walked down my front steps, across the lawn and along the street.') Note that summarized transportations (e.g., We went to the show and home again) do not identify ongoing transition scenes because they do not depict 'real', overt actions in an actual spatio temporal location.

Pragmatics of Setting Identification

The analyst's next step is to locate and mark scene changes within the protocol. These are sequentially numbered with each component of a setting (two or more adjoining scenes) given the same number.

Part II: Feature Analysis of Settings

Although a wide range of setting features may be assessed, the following selection is basically an adaptation of Gibson's (1979) theory of ecological optics. Also, several new variables are described here for the first time.

The basic procedure for each of the following assessments is to determine the presence and anomalous quality of certain optional features of the setting in a scene by scene analysis. When only the presence or absence of a particular scene feature is assessed, a score of 0 indicates that the feature is not present in the scene and a score of 1 indicates that the feature is present. This format is indicated by the parenthetic notation (0;1).

Most variables are also scorable for their anomalous quality and these require three additional categories. A score of 2 indicates that the feature is present as an ordinary, everyday or mundane state or event, yet is also inappropriate, incongruous or incorrect as determined by information privy to (and provided by) the dream narrator. For example, the anomalous quality of elements in the

statement "I looked through a window in my bedroom wall" is scorable only if the dream narrator provides the information that no such window actually exists in the bedroom. Thus, this category is often (but not exclusively) indicated by statements which qualify states and events familiar to the dreamer, i.e., by statements which employ terms such as but; yet, although, still, however, etc., in conjunction with everyday situations.

A score of 3 indicates that the feature is present in the scene as an unlikely occurrence by objective standards, i.e., by the judge's knowledge of the likelihood of such an occurrence. For example, "The wall housed a 70-inch television screen." suggests an objectively unlikely situation even though such a situation is possible.

A score of 4 indicates the feature is present as an objectively impossible occurrence. For example, "The walls were wood but I could still see through them." is objectively and physically impossible.

Note that for some anomaly categories throughout the grammar, the above three options are described in greater detail; specific considerations and examples for these categories are enclosed in square brackets e.g., '[Anomalous environmental mood (the kitchen was dark and suddenly more horrifying), etc.]' The format for all variables employing the above three anomaly options is indicated by (0,1,2,3,4).

Some variables are, however, scorable only for particular types of anomalies in addition to the normal presence or absence of the feature. The scorable categories are indicated in parentheses, e.g., (0,1,2), (0,1,2,3).

The values for continuous variables are also specified in greater detail in the descriptions of those features in the grammar (see e.g., sec.B,14,c); continuous variables require a 7-point scale indicated by the notation (1-7). Where anomaly options exist for continuous variables, a separate scoring category, utilizing only the anomaly categories 2, 3, and 4 described above, is provided and is indicated by the notation (2,3,4).

A. Narrator perspective.

The narrator is represented as some form of protagonist in the story. This means that:

1. The narrator may be one of the story characters (i.e., he refers to self in the narrative using the personal pronouns "I", "me", etc.) and is represented as an "observer" of the narrative events. The narrator may be an observer physically present in the dream, e.g., inactive bystander, member of an audience, (score=1) or an observer who is omniscient yet not physically represented in the narrative, e.g., an 'invisible' presence with knowledge of the thoughts and/or motives of other characters (score=2). Alternatively, the narrator may be neither physically nor omnisciently present in the narrative (score=0) (0,1,2).
2. The narrator may be depicted as a single story character engaged in overt actions (score=1) or as two or more characters engaged in overt actions, i.e., as multiply represented (score=2) Alternatively, no action of the narrator(s) may be depicted (score=0) (0,1,2).
3. The narrator is the story character whose overt actions, including speech, are more frequently described than those of any other character, i.e., the character whose simple actions (prior to their clustering as complex action sequences) are most

frequently portrayed (0,1). Note that overt actions described as historical events are counted in making this decision.

4. The narrator is the story character whose internal responses, including internal reponses related as historical, are most frequently described independent of their manifestation in overt actions, including speech (0,1). For example, "I was pleased" is an internal response not made manifest in an overt action. On the other hand, "He said that he was very much pleased" indicates an actor's internal state but not independent of the overt act of saying something about the state. The latter is not an internal response for the purposes of this decision about narrator perspective.

B. Setting Attributes.

The next task for the judge is to describe variations in scene information within the setting. Each scene is scored for the features listed in sections 1-13 below. When multiple scenes are presented in the narrative, each subsequent scene is analyzed and scored according to these same criteria.

1. General scene descriptions: identification

a) The environment is identified by reference to <u>personal association</u> to any of the following:

1) narrator (0,1,2,3,4).

2) protagonist (0,1,2,3,4).

3) any other character(s) in the scene (0,1,2,3,4).

4) any other character(s) not in the scene but in the story (0,1,2,3,4).

5) any other character(s) not in the story (0,1,2,3,4).

Scenes which are only remotely associated to any of the above are nevertheless scored if mention of that association contributes to identification of the scene as in the following example:

"We were camping out in the willows near my uncle's land."

[Anomalous personal association (my uncle's farm but here someone else owned it); unlikely personal associations (in this woman's coal mine);

impossible personal associations (my cat's coal mine)].

b) The environment is identified by reference to proper nouns, names, or labels (e.g., city names). Environments with only remote references to names or labels e.g., "a motel outside of Edmonton", are also scored (0,1,2,3,4).

[Anomalous names (Edmonton only it was called Vancouver); unlikely names (Siberia); impossible names (fictitious or unpronouncable names)].

c) The scene is either an <u>outdoor</u> environment, i.e., a location where open sky is the predominant overhead surface (score=0) or an <u>indoor</u> environment ('enclosure'), i.e., a location where a ceiling is the covering surface of the scene (score=1). Note that walls <u>per se</u> do not necessarily determine an indoor environment unless they are normally understood to support a ceiling (e.g., walls of a house).

d) The scene is <u>inferred</u> by any of the following:

1) concrete protagonist actions (0-4).
2) concrete actions of other characters (0-4).
3) indefinite descriptions (0-4).
4) historical actions of the protagonist or other characters (0-4).

e) The scene is static (score=0) or transitional (score=1) or anomalous by virtue of summarization (e.g., I took a trip to the farm.) (score=2-4).

f) Environmental formations are wholly or partly

1) natural in origin, e.g., plains, mountains, caves, cliffs (0,1,2,3,4).
[Anomalous natural formation (on the back lawn only it was where the garden should be); unlikely natural formations (a huge cave); impossible natural formations (a glacier in the jungle)].

2) constructed (i.e., man-made), e.g., outdoor stadiums, city centres, highways (0,1,2,3,4).
[Incongruities of constructions (a gravelled road that is known to be paved); unlikely constructions (a house built on an angle); impossible constructions (a dome covering the entire city)].

g) The general 'mood' of the environment is characterized by any of the following qualities:

1) affiliation (e.g., a night club) (0,1,2,3).

2) aggression or threat (e.g., a jungle) (0,1,2,3).

3) nurturance (e.g., a restaurant) (0,1,2,3).

[Anomalous mood (the hallway was dark and suddenly more horrifying); unlikely moods (a haunted house)].

2. General scene descriptions: connectivity.

The following criteria define the relationships between temporally adjacent (but not neccesarily adjoining) scenes in the narrative, i.e., between the scenes as they are introduced into the narrative. The scene may be part of a more inclusive setting by virtue of:

a) membership in a larger integral setting as one component connected by spatial proximity to another (0,1).

b) membership in a larger integral setting as one component connected to another by real-time actions of transportation or conveyance (0,1).

c) membership in a larger setting as an ongoing transition scene, (0,1,2,3,4).

3. General scene descriptions: objects.

The following features are scored for any objects occurring within an outdoor environment or an enclosure. Where enclosures are not the focus of story events but nevertheless occur in an outdoor scene, they are scored as objects in that scene.

a) Objects are identified by reference to personal ownership by any of the following:

1) narrator (0,1,2,3,4).

2) protagonist (0,1,2,3,4).

3) any other character(s) in the scene (0,1,2,3,4).

4) any other character(s) not in the scene but in the story (0,1,2,3,4).

5) any other character(s) not in the story (0,1,2,3,4).

Note: unlike the case of environments and enclosures, objects must be identified by <u>explicit</u> reference to ownership, for instance, by the use of possessive nouns or pronouns (e.g., "Jim's book', 'her plant"). Ownership of an object may not be assumed by that object's presence in an environment 'owned' by a character. In the example, "I turned on the TV in my living room", the narrator has <u>not</u> made an explicit reference to ownership of the television.

b) Objects are identified by reference to commonly known features, independent of the internal responses of characters, which evoke any of the following moods:

1) <u>affiliation</u> (e.g., gifts, currency) (0,1,2,3).

2) <u>aggression</u> (e.g., weapons) (0,1,2,3).

3) <u>nurturance</u> (e.g., food, clothing, medical supplies) (0,1,2,3).

c) Objects display an explicit or inferred relationship to the outdoor environment, enclosure, or surrounding medium by any of the following features:

1) attachment to some surface. In outdoor environments, objects are usually attached to the ground (e.g., tree, light standard), in enclosures, usually the floor, ceiling, or walls (e.g., telephone, car radio) (0,1,2,3,4).

2) detachment or potential freedom of movement. Any object resting on or leaning against a surface (e.g., driftwood, kitchen chair) is detached (0,1,2,3,4).

3) independent or environmentally induced movement (0,1,2,3,4).

d) Objects form part of the focus of story states and events, i.e., they are the focus of a character's actions or internal responses (e.g., concrete instruments, obstacles, topics of conversation, etc.) (0,1,2,3,4).

4. Specific scene descriptions: gross surface layout. Information in the description of the scene, excluding information about movement, whether outdoor environment or indoor enclosure, explicitly includes any of the following global features:

a) Surfaces

1) Horizontal (e.g., the ground, a floor) (0,1,2,3,4).

2) Vertical (e.g., canyon walls, bedroom walls) (0,1,2,3,4).

3) Concavities (e.g., valleys, grooves, depressions) (0,1,2,3,4).

4) Convexities (e.g., hills, bumps in floor, bulging walls) (0,1,2,3,4).

[Anomalous surface (our backyard was sloped at more of an angle than it is usually is); unlikely surfaces (the wall of the building was buckled severely in several places); impossible surfaces (a mountain standing on end)].

b) Apertures (e.g., cave openings, holes, windows, doors) (0,1,2,3,4).

[Anomalous apertures (the front door had the backdoor knob on it); unlikely apertures (a round opening in the wall of the sleep lab); impossible apertures (a circular opening in the sky)].

c) Paths, i.e., surfaces relatively free of obstacles and which suggest sidelong boundaries. Simply walking or driving 'along' does not define a path. Three types of path are scorable according to their use in ongoing story events. They may be used for:

1) horizontal passage (e.g., level roads,

sidewalks, hallways) (0,1,2,3,4).

2) ascent (e.g., ladder, escalator, crane) (0,1,2,3,4).

3) descent (e.g., elevator, rope, stairs) (0,1,2,3,4).

Paths not explicitly denoting ascent or descent by the story context (e.g., "Our bus drove along the highway to Banff.") may be inferred to be horizontal.

[Anomalous paths (our hallway stretched into an unfamiliar wing of the house); unlikely paths (a moving sidewalk); impossible paths (a stairway leading to the clouds)].

d) Barriers - i.e., obstacles to overt action in the narrative including brinks and water margins. Two types may be scored according the requirements of the story events. Barriers may obstruct:

1) action (e.g., wire fence, glass, wall) (0,1,2,3,4).

2) vision (e.g., clouds, smoke, trees) (0,1,2,3,4).

Note: i) and ii) are not mutually exclusive.

e) Presence of water, excluding references to water in the medium (e.g., rain) (0,1,2,3,4).

f) Presence of fire (0,1,2,3,4).

5. Specific scene descriptions: characteristic object

shape.

Information in the scene describes the coarse structure of objects (including enclosures as objects) mentioning any of the following defining features:

a) Faces (e.g., cubical, circular, square, 'odd-shaped') (0,1,2,3).

b) Edges (e.g., rounded, razor-sharp, blunt) (0,1,2,3).

c) Vertices (e.g., pin-headed, corners, elbows) (0,1,2,3).

[Anomalous shape (our fridge was shorter and narrower than it normally is); unlikely shapes (a 12-sided object)].

6. Specific scene descriptions: composition.

Information in the scene describes aspects of the material or chemical composition of surfaces or objects by reference to either:

a) Inorganic composition (e.g., steel, concrete, plastic, glass) (0,1).

b) Organic composition (e.g., cedar, paper, flesh, feces) (0,1).

[Anomalous composition (my desk was made of stone); unlikely composition (a trunk made of paper); impossible composition (a 'bionic' hand)].

7. Specific scene descriptions: physical texture and consistency.

The properties of any surface or object in the scene are revealed by reference to any of the following features. Note that properties of the medium are not scored here (see section 10).

a) "Tactual" surface texture (e.g., soft, smooth, grainy, hot, sticky, greasy) (0,1,2,3,4).

b) Fluid resistance to gravity: viscosity, rate of flow (e.g., swampy, oozy, splashing, dripping, pouring) (0,1,2,3,4).

c) Material resistance to deformation: flexibility, rigidity, malleability (e.g., rubb[illegible] stiff, gummy) (0,1,2,3,4).

d) Mate[illegible]r resistance to disintegration: tenacity, breakability, brittleness (e.g., chip, tear, shatter, carve) (0,1,2,3,4).

[Anomalous texture and consistency (my cat's fur seemed strangely coarse and matted); unlikely textures and consistencies (a golf club made of rubber); impossible textures and consistencies (an unbreakable egg)].

8. Specific scene descriptors: optic structure. The scene is described with reference to any visual terms including:

a) Pure color (e.g., red, pink, beige) (0,1,2,3,4).

b) Color patterns (e.g., checkered, spiral latticework, striped) (0,1,2,3,4).

Note: color patterns are differentiated from human artworks (see section 13.b) in that they provide no meaningful information other than their aesthetic appeal. For example, orange dappled wallpaper is patterned, whereas flowerey orange wallpaper denotes artwork.

c) Differential brightness or whiteness such as mention of achromatic color (black, grey, white), or differential shading, shadows, contrasts, etc. (0,1,2,3,4).

[Anomalous optic structure (her eyes were now green and not blue); unlikely optic structure (he was dressed in a purple flourescent tuxedo); impossible optic structure (the sun was emitting green light)].

9. Special scene descriptions: medium.

Information in the narrative may refer specifically to aspects of the medium, i.e., the atmosphere surrounding the scene, independent of outdoor environment or enclosure surfaces or objects.

a) The unchanging consistency of the medium is described, including any reference to existing weather conditions (0,1,2,3,4).

b) The consistency of the medium is transformed in quality or intensity (e.g., "It started to snow", "The smoke became thicker") (0,1,2,3,4).

c) The consistency and transformations of the

medium are experienced by the story characters in any of the following sensory modes:

1) visual (e.g., "I stared into the fog") (0,1,2,3,4).

2) Kinesthetic (e.g., "The heavy wind made it impossible to run") (0,1,2,3,4).

3) thermal (e.g., "It grew hotter") (0,1,2,3,4).

4) olfactory (e.g., "An unpleasant odor emanated from the sink.") (0,1,2,3,4).

[Anomalous medium (my office was unusually smoky); unlikely mediums (the air was filled with noxious gas); impossible mediums (the house was a total vaccuum)].

10. Special scene descriptions: visual surfaces. Surfaces or objects in the scene display any of the folowing special features:

a) Independent illumination (e.g., astral bodies, car and house lights) (0,1,2,3,4).

b) Transforming properties such as refraction (e.g., lenses, rainbows), reflection (e.g., mirrors), translucence (e.g., lampshade, cloudcover), etc.(0,1,2,3,4). [Special visual incongruities (the light from the fridge was much brighter than usual); unlikely visual effects (the room was full of mirrors casting images of tunnels everywhere); impossible

visual effects (intersecting rainbows)

11. Special scene descriptions: movement.
Surfaces or objects, excluding story characters, display any of the following movement features:

a) Independent movement of the environment such as repetitive events (e.g., waterfalls, geysers), catastrophes (e.g., earthquakes, lightning, wind), and apparently uncaused events (e.g., falling boulders) (0,1,2,3,4).
[Anomalous movement (Somehow there was a weathervane spinning on our roof); unlikely movement (A geyser erupted in the schoolyard); impossible movement (The door 'magically' opened)].

b) Animation of normally inanimate objects (e.g., two rocks conversing) (0,1).

c) Personification of nonhuman characters (e.g., emotional expression or speech by animals) (0,1).

12. Special scene descriptions: human displays.
Surfaces and objects may provide meaningful information in addition to their normal features of shape, composition, texture, etc. because of human manipulations or processing. Human displays portrayed in the narrative may include:

a) Artworks (e.g., sculptures, paintings, crafts, scrawls, etc.) (0,1,2,3,4).

b) Illuminated images (e.g., T.V., movie screens,

photographs) (0,1,2,3,4).

c) Symbolic language (e.g., letters, books, hieroglyphics, etc.) (0,1,2,3,4).

[Anomalous displays (a painting of mine done somehow in someone else's style); unlikely displays (a 7-foot T.V. screen); impossible displays (a life-size statue carved from solid diamond)].

13. Special scene descriptions: perceptual reduction.

a) Attributes of the depicted scene, other than changes in the surrounding medium, produce a reduced perceptual clarity of the scene and events. (e.g., "The thief's outline was nondistinct against the dark wall.") (0,1,2,3,4).

b) Attributes of the protagonist produce a reduced perceptual clarity of the scene and events (e.g., "My body was insensitive to the pain.", "I missed the action because my eyes were closed.") (0,1,2,3,4).

[Anomalous perceptual reduction (my vision was blurry); unlikely perceptual reduction (he moved so quickly that I could not identify him); impossible perceptual reduction (she started to turn invisible)].

14. Temporal description

a) Information referring to the time of day whether by natural means (e.g., sun, shadows)

or by timepieces, is rated on a 7-point scale where 0 = no explicit temporal information to 4 = moderately explicit temporal information to 7 = explicit temporal information (1-7).

b) Temporal description anomalies (crossing time zones, hypersensitivity to time) (score=2); unlikely temporal occurences (coincidences, unexplained strokes of luck) (score=3); impossible temporal ocurrences (acceleration/deceleration of time, telling the time from objects other than timepieces) (score=4) (2,3,4).

c) Information identifying the temporal sequence of the various events within the scene is rated on a 7-point scale from 1 = complete ambiguity of the temporal order of events in the scene to 4 = moderate clarity about the temporal ordering of events to 7 = complete clarity about temporal ordering of events in the scene. Temporal ordering increases to the extent that temporal sequential relations are explicit in descriptions of events in the scene.

1) If minimal temporal ordering information is provided, i.e., the preceding score = 2 to 7, the temporal sequence is rated as either continuous (score = 0) or discontinous (score = 1). The latter occurs when gaps

in time are explicitly mentioned, e.g., phrases like "later on", "a little later", etc. denote discontinuous shifts in temporal locus. Note: the scene must remain constant for temporal discontinuity to be scored; otherwise a scene change is scored (0,1).

2) Temporal ordering anomalies (large temporal gaps betwe events) (score=2); unlikely orderings (concurrent events) (score=3); impossible orderings (age regression) (score=4) (2,3,4).

Part III. Feature Analysis of Characters.

Characters, including the protagonist, are considered a part of the scene independent of whether they are depicted as engaging in overt actions. Any animate story figure (or group of undifferentiated figures) is regarded as a character and each is identified and rated according to the following procedure. First, when rating the initial scene, the judge should also list on the protocol all of the characters represented in any part of the narrative. The protagonist of the story is defined as that character whose overt actions, including speech, are more frequently described than those of any other character. If this criterion is insufficient to identify a protagonist, the protagonist is that character whose internal responses to narrative events are most frequently described independent of their manifestation in overt actions, including speech. It should be obvious from section A that the narrator may depict him/herself as the protagonist. Beginning with the protagonist, each character is assigned a number corresponding to the order in which the character was introduced into the narrative (the protagonist is always assigned '0'). The following categories are then scored scene-by-scene for each character until all the scenes in the narrative (including the scenes in which the character is absent) have been scored.

A. Character-scene contemporaneity.

Characters may be depicted as:

1. present at any point in the scene. Depiction of presence may be by direct reference or description (e.g., use of 2nd or 3rd person pronouns) or may be inferred from appropriate social action where presence of another character is clearly implied as an object of a known charater's action, e.g., "It was a tennis match and John was serving (to X?)." (0,1,2,3,4).
2. entering the scene or as being encountered in the scene at some time other than the onset of the scene events. Entrances must be explicit and not ambiguous to be scored as such (0,1,2,3,4).
3. leaving the scene or otherwise becoming absent from the scene at some time other than the termination of the scene events (0,1,2,3,4).
4. either entering or leaving through a specific aperture, e.g., door, open window, etc. (0,1,2,3,4).

[Incongruities of contemporaneity (talking to my father but he wasn't there physically); unlikely contemporaneity (a large Indian was sitting at the seminar table); impossible contemporaneity (a priest appeared in the room out of nowhere)]

B. Character attributes.

Identifying and elaborative attributes of the character are scored as follows:

1. Identifying information about the character sufficiently specific to allow pronominal references later in the narrative, e.g., names, identifying markings, etc. Note that identifying information must be differentiated from elaborative information. For example, "the boy from Illinois . . ." includes identifying information although, had the boy already been identifiable from prior information, "the boy, who was from Illinois . . ." would be understood as providing elaborative information. Note also that identifying information may include specific actions or transient states, e.g., "the boy who was running . . ." The presence of identifying information of the following three types is scored:

   a) Identification is enabled by use of names, initials, or pronominal references to the narrator (0,1,2,3,4).

   b) Identification is enabled by a species name, e.g., a bear, an ogre, or attributes of physical appearance, e.g., a voluptuous woman. (0,1,2,3,4).

c) Identifying state information, e.g., temperament, aptitudes, interpersonal relationships or affiliations (0,1,2,3,4).

d) Identifying action patterns, i.e., repetitive or transient actions that enable unambiguous reference to the character, e.g., "the woman who was walking up the stairs . . ." (Note: had the woman already been identified, the fact of her ascent of the stairs would be a simple action and not scored as identifying information.) (0,1,2,3,4).

[Incongruities of identifying information (my sister only called Alice); unlikely identifying information (a woman with a large tumour on her neck); impossible identifying information (a man who had the ability to see what everyone else was thinking)].

2. Beyond identifying information, elaborative description of the character includes any of the following stable features:

a) features of physical appearance, e.g., skin color, typical dress (0,1,2,3,4).

b) state information, e.g., temperament, aptitudes, enduring interpersonal relationships, enduring obligations or privileges (0,1,2,3,4).

c) characterizing action patterns, e.g., habitual or repetitive actions such as those associated with occupation or role. These descriptions may be quite abstract portrayals, e.g., "He was a baker." (0,1,2,3,4).

3. The elaborative, but not identifying, attributes of the protagonist are described as being transformed through maturation or metamorphosis at some time during the story. The transformation must involve stable attributes to be scored here.

a) The transformation involves stable features of species name or physical appearance, e.g., "suddenly his face changed to that of a hairy beast" (0,1).

b) The transformation involves stable state information, e.g., "then I seemed to change into a mathematical wizard" (0,1).

c) The transformation involves stable action patterns, e.g., "suddenly she became someone who disagreed with everyone about something" (0,1).

C. Action Characteristics

The actions of all characters are scored according to a variety of criteria described below. These ratings are complete d character by character and yet each character's ratings are coded in such a way that data can also be summarized by character, setting, scene, narrative unit or action order. Each simple action is labelled according to the following criteria:

1. Character identification number.
2. Setting number.
3. Scene order. Whether the scene is the first, second, third, etc., to occur in the protocol is indicated.
4. Narrative unit. This score indicates which simple actions are associated with complex action sequences.
5. Action order. Whether the action is the first, second, third, etc., to occur within the scene being scored is indicated.

Actual scoring of the overt actions proceeds by labelling the protagonist's first overt action within a scene according to the preceding instructions. If the character's first overt action is a simple action occurring in a single scene, it is scored according to the criteria described in sections 6-12 before going on to the character's next simple action. If the

character's first overt action is a simple action depicting scene transition, (e.g., "I was walking on a trail in the jungle; suddenly the trail becam a sidewalk in Montreal"), the action is labelled and scored twice, once for each scene. If the first character action is part of a complex action sequence, each component simple action is labelled and then scored according to sections 6-12. Then, the criteria for 6-11 (not 12) are applied collectively to the complex action sequence as a whole, substituting the phrase "coherent action sequence" for "action" where appropriate. (Note: an exception is when an embedded action by the actor is not related to other actions in the complex action sequence by causal or enabling relations. This pattern defines a subplot.) When the composite rating is complete, the judge may proceed to analyze each of the subsequent character actions in this same way. When all of the first character's (i.e., the protagonist's) actions have been rated, the second character's actions are rated in order, and so on.

6. Action type: Causal relations.

   a) A character's action may be psychologically caused (score = 0) or motivationally caused (score = 1). When causes are not explicit in the narrative, this judgment may be based upon common sense judgments about the nature of the action, e.g., riding a

bicycle is generally understood as a motivationally caused action (0,1).

b) Actions may occur in the presence of events or states that partly or completely disrupt execution of the action or prevent its purpose from being attained. The presence or absence of each of the following types of disruptive states or events is scored:

1) environmental events, e.g., icy roads prevent driving to a certain location. (0,1,2,3,4).

2) other character's actions, e.g., "He pulled me back when I tried to walk forward" (0,1,2,3,4).

3) the actor's own state or actions, e.g., fatigue, lack or coordination. Note: emotional states, e.g., fear, may be regarded as disruptive when they are described independent of any environmental events or other's actions that caused that emotion. When such events are states they are score as the disruptive events and not the emotions per se (0,1,2,3,4).

c) Actions may also occur in the presence of events or states which facilitate or enable execution of an action but do not cause it. The presence or absence of each of the

following types of facilitative states or events is scored:

1) environmental events, e.g., "The wet snow made it easier to turn with my skis" (0,1,2,3,4).

2) other character's actions, e.g., "He helped boost me up into the hayloft" (0,1,2,3,4).

3) the actor's state or actions, e.g., athletic ability, exceptional ease of movement (0,1,2,3,4).

[Incongruities of causal relation (I pulled the trigger repeatedly as if by reflex); unlikely causal relation (paralysis, weightlessness); impossible causal relation (telepathy, mind control, flying)]

7. Initiating events.

The circumstances that motivate or psychologically cause an action can be characterized according to the following criteria:

a) Certain events, although not necessarily connected by causal relations to the action, may be regarded as historical context for those actions. The presence or absence of the following types of historical events is scored:

1) transitory states is present in the character at the onset of the events depicted within the scene (0,1,2,3,4). These states may be understood as historically inspired feelings, needs, concerns, or transitory obligations and cannot have been inspired or caused by prior events depicted in the story scene per se., e.g., "I had been in the sun and was feeling warm and tired as I talked to Bob".

2) Historically inspired or caused actions which are ongoing at the onset of the events depicted within the scene and which are completed prior to onset of scene events, or which occur within "story-time" but not within the story scene. For example, "I had bought new skis and was skiing in the river valley." Again, these must be historical events and not inspired or caused by prior events occurring in the story scene per se. (0,1,2,3,4).

[Incongrous historical context (I had the feeling that I was at home although I should have been at work); unlikely historical context (We had been hiking for 5 days without a break); impossible

historical context (There had been this cosmic war)]

b) Presence or absence of each of the following types of initiating events are indicated:

1) the initiating events, in whole or in part, include environmental events, i.e., changes in the environment that are physically caused. For example, rain may motivationally cause a retreat indoors, or, a thunderclap may psychologically cause trembling (0,1,2,3,4).

2) The initiating events, in whole or in part, include the actions of other characters other than the actor, including speech as well as overt behavior. For example, a mother's command may motivationally cause cleaning up toys. Or, a lumberjack's action may physically cause a tree to lie across the road, thus motivating the actor's detour (0,1,2,3,4).

3) The initiating event, in whole or in part, includes the actions of the actor. These may be searching or orienting actions, e.g., "He looked down the road and saw someone coming.", or they may be transition actions or historical actions,

e.g., "I had been walking on the road when I tripped and fell."

4) The initiating event is itself an episode describing the actor's or another character's action and its relation to other states or events, or describing an historical action and its relation to other states or events (0,1,2,3,4). For this purpose, the episode must be a complete episode, i.e., it must contain an initiating event, an action, and a consequence where either the action or its consequence causes the actor's initial action. For example, "I accidentally stepped on my dog's foot and he bit me; so I cried and ran for help." (Note that this means that an episode may be completely historical - except for the consequence which in whole or in part causes the actor's behavior.)

[Incongruous initiating events (My mother's unexpected and frightful name-calling brought tears to my eyes); unlikely initiating events (the sight of the cat made him run for safety); impossible initiating events (I drove the bears away with mental threats)].

8. Internal reactions to the initiating event. The actor's reactions to the initiating event may include internal responses. The scoring criteria indicate the presence or absence of the following types of internal reactions:

a) The initiating event psychologically causes reported <u>affective changes</u> in the actor, e.g., insult causes anger (0,1). The reported affective changes may be represented as judgments of an omniscient narrator, e.g., "he became angry."; or as contents of overt communicative gestures, e.g., "He said he was angry", or "He waved his fist at me.".

1) If affective changes are explicitly described, the <u>degree of elaboration and expressive detail</u> is rated on a scale from 1 = no elaboration or detail to 4 = moderate elaboration and detail to 7 = very extensive elaboration and detail. If no affective reactions are reported explicitly, the score of 0 is enterd for this rating (1-7).

2) <u>Incongruities of affect</u> (What should have been laughter came out of me as an odd wail); unlikely affect (two women were shrieking continuously at the top of their

lungs); impossible affect (?)] (2,3,4).

b) The quality of explicitly reported affect is scored with a 1 in any of the 8 variables in the following scheme. If the initiating event and/or subsequent action allow ready inference of an affective response (e.g., "He insulted me and I retaliated" suggest anger), the quality of that affective response is also scored according to the scheme below except that it is scored 2 rather than 1. Absence of affect in any category is scored 0.

1) Happiness - includes all descriptions of a general state of pleasant feeling tone, e.g., contented, pleased, relieved, cheerful, glad, gratified, joyful, relaxed (0,1,2).

2) Anger - Includes annoyed, irritated, mad, provoked, furious, enraged, incensed, indignant (0,1,2).

3) Sadness - Includes all descriptions of an unhappy feeling tone, e.g., disappointed, depressed, hopeless, heartbroken, miserable, downhearted (0,1,2).

4) Fear - Includes descriptions of

discomfort in the face of threat, e.g., terrified, frightened, scared, alarmed, panicky, nervous, apprehensive (0,1,2).

5) Guilt/Shame - Includes descriptions of discomfort in the face of moral misconduct, e.g., remorseful, apologetic, regretful, ashamed (0,1,2).

6) Surprise/Startle - Includes surprised, astonished, amazed, awestruck (0,1,2).

7) Interest/Uncertainty - Includes descriptions of acceptant uncertainty, e.g., puzzled, perplexed, strange, bewildered, confused (0,1,2).

8) Disgust - Includes descriptions of revulsion, e.g., disgusted, repulsed, nauseous (0,1,2).

Note that more than one emotional quality may be represented, e.g., simultaneous anger and surprise.

c) The initiating event causes cognitive activity in the actor independent of the actor's goals or plans. This may include: 1) cognitions that "place" an initiating event by reference to other specific and similar situations, e.g., "This was like

the time that I . . . .", or associated memories, e.g., "The gambler remembered that he still owed me $100." (0,1,2,3,4).

2) cognitions that reflect inferences or beliefs about the initiating events, e.g., "I thought he wanted to hurt me", or abstract statements that are related to the initiating events as an instance, e.g., "I thought he was the type of person who could not be trusted." (0,1,2,3,4).

3) cognitions that reflect explicit moral evaluations, e.g., "What he did was bad (wrong)." (0,1,2,3,4).

[Incongruous cognitions (I remembered a promise I had made to her although it was somehow different); unlikely cognitions (I thought that I had discovered the secret principle of dreaming); impossible cognitions (thinking comprehensibly in an unknown foreign language)]

d) The initiating event causes considerations of goals, i.e., cognitions indicating prior awareness of the goals of the ensuing action. This may include:

1) explicit acknowledgment of goals, such as in statements about needs, wants, desires, e.g., "I wanted to scare her."

(0,1,2,3,4).

2) prior consideration of different means to an end, i.e., statements about plans or alternate means to the desired end (e.g., "I thought I could get help by screaming even louder.") or statements about choice or decision making which imply consideration of alternative actions (e.g., "I decided to go visit my friends") (0,1,2,3,4).

[Incongruous goals (I wanted to finish my degree only in music); unlikely goals (John planned to shovel the snow off the entire front street); impossible goals (We intended to travel to one of Jupiter's moons)]

e) If 1 has been scored in the previous category, the nature of the explicitly stated goal of the action is scored 0 or 1 on each of the 14 variables in the following scheme. In addition, if the initiating event and/or subsequent action allows ready inference of the goal or goals of the action, the nature of the goal(s) is also scored according to the scheme suggested above except that each implicit goal is scored 2 rather than 1. Note that

more than one goal may be represented in the same act.

Social goal types

1) Affiliation - Actions designed to form or further a mutually harmonious and friendly relationship with another character (0,1,2). The actions include:
- establishment of a long-term close relationship with a character (proposing marriage, being married, expressing love, with or without sexuality).
- socially acceptable forms of friendly physical contact (shaking hands, dancing, kissing, or embracing).
- requesting a character to share in a pleasant social activity (dating, visiting).
verbal or gestural expression of friendliness (greetings, waving hello or goodbye, smiling, telephoning or writing someone for a friendly purpose).
- non-exploitive helpfulness, rendering of favors, or gratification of others' needs.
2) Aggression - Actions designed to annoy,

harm, or overcome another character (0,1,2). These include:

- killing, physically harming, or (verbally or physically) threatening these.
- physically or, with threats, verbally coercing a character into performing an act.
- theft or destruction of possessions belonging to a character.
- accusations, insults, or criticism of another character.

3) Rejection - Actions which have as their goal, separation, exclusion, or abandonment of another character (with or without aggression) (0,1,2). These include:

- avoiding, abandoning, or withdrawing from another character (divorcing, jilting, snubbing).
- verbal expression of dislike or indifference to another character.
- excluding displacing characters from dyadic, group, or institutional interaction situations.

4) Autonomy - Actions designed to resist, control or influence attempts (0,1,2). These include:

- avoiding or quitting activities

suggested, requested or prescribed by others.

- defying convention or refusing to be restricted by obligations or routines.
- escaping or defying authority or confinement.

5) Dominance - Actions designed to control the human environment by influencing or controlling the sentiments or behaviors of others (0,1,2). These include:

- attempts to command, request, suggest or persuade another character to change behavior, with or without sanctions or threatened sanctions.
- attempts to make rules, to organize, or to govern others.
- exploitive or self-serving attempts to help, nurture or otherwise gratify another's needs.

6) Dependence - Actions designed to solicit, request, or otherwise obtain the favors, skills, or assets of another character (0,1,2). These include:

- submitting to or cooperating with a character who is being dominant or nurturant.
- requesting or soliciting aid from another

character (medical aid, food, support).

- praising or expressing gratitude to another character.

Pleasure goal types

7) Sentience -- Actions which have as their goal the enjoyment of non-sexual sensations (0,1,2). These include:

- seeking or commenting on pleasure from auditory (music), gustatory (wine or food), visual (art), or kinetic (dancing) sensations.

- aesthetically organizing one's immediate environment (care of one's body, clothing, possessions or surroundings).

8) Sexuality - Actions directed toward the enjoyment of sexual sensations (0,1,2). These include:

- having, or attempting to have sexual intercourse with another, including related foreplay, fondling, kissing, and bodily contact.

- making advances, flirting, or otherwise engaging in a pleasant heterosexual interaction to further a potentially erotic

relationship.

- viewing or stimulating sexual areas of the body to produce sexual arousal.

9) Play - Actions directed toward fun or amusement withouut further purpose (0,1,2). These include:

- participation in sports, dancing, cards, or other games.
- attempting to entertain, amuse, or fascinate others (jokes, artistic performances).

10) Achievement - Actions directed toward the accomplishment of something difficult or toward judgments of competence (0,1,2). These include:

- mastering, organizing or manipulating the environment as skillfully and independently as possible (solving problems, studying, practicing skills).
- attempting to rival and surpass others' performance through the exercise of talents or abilities.
- striving to attain recognition or prestige because of one's aptitudes or skills.

Avoidance goal types

11) Blamavoidance - Actions which have as their goal the avoidance of blame or of rejection because of blame (0,1,2). These include:

- verbal or physical counteraction of other's moral censure, rebuke, or punishment (defending oneself, making amends).
- engaging in acts because of felt obligation or because of definitions of propriety or correctness (being polite).
- avoiding moral censure by covering exposed body parts, concealing wrong-doing, or escaping punishment.

12) Infravoindance - Actions designed to avoid failure or judgments of incompetence (0,1,2). These include:

- actions, including speech, to counteract belittlement, derision, or ridicule for failure or perceived inadequacy (self-enhancing descriptions, demonstrating competence).
- avoiding perceived inadequacy by concealing failure, covering deformities or ugliness, or escaping derision or ridicule.

13) Harmavoidance - Actions which have as their goal the avoidance of physical injury, illness, or death (0,1,2). These include:

- defending oneself against bodily harm or illness (retaliation, obtaining medical treatment).
- engaging in acts to enhance physical well-being (exercising, altering one's diet).
- escaping situations which threaten physical injury, illness, or death.

14) Depravoidance - Actions which have as their goal the alteration of a deprivation condition such as hunger, thirst, or fatigue (0,1,2). These include:

- acquiring and/or ingesting food or drink for the sake of sustenance (excluding, for example, purely social drinking).
- compensating for fatigue by resting, sleeping, or discontinuing trying activity.

Goals

a) Goal ambiguity. The extent to which the action may be unambiguously associated with a unique goal or subgoal as defined by one or more of the categories in the previous section is scored on a 7-point scale where 1 = unambiguous association with a unique goal; 4 = moderately ambiguous association with a unique goal; and 7 = completely ambiguous goal.

b) Goal attainment. The extent to which the action results in attainment of the inferred or explicitly stated goal or subgoal is rated on a 5-point scale where 0 = no goal inference possible; 1 = goal non-attainment; 2 = partial goal attainment; 3 = complete goal attainment; and 5 = unexpected goal termination. Note that goal attainment is scored in reference to subgoals when considering individual component actions of subgoal-goal narrative units.

Action consequences.

The presence or absence or each of the following types of action consequences is scored:

a) The consequences of actions, in whole or in

part, include environmental events. For example, the actor's pushing a door may physically cause its collapse. Or, the actor's command may motivationally cause a lumberjack to engage in actions which fell a tree (0,1).

b) The consequences of actions, in whole or in part, include the actions of other characters, including their speech or overt behavior. For example, the actor may wave a flag, motivationally causing another character to sing the national anthem (0,1).

c) The consequences may include further actions of the actor. For example, writing a paper may motivationally cause discussing it with colleagues (0,1).

d) The consequences of an action, in whole or in part, include the internal reactions to the action per se, i.e., the internal reactions are direct responses to the action itself and not to the environmental events, or actions which are referred to as consequences in a-c (0,1). For example, the actor's intrinsic pleasure in an act such as flying or the actor's thoughts about the action would be scored here.

e) The consequences of an action may be an episode, i.e., the actor's action and/or its consequences may be the initiating event in a subsequent complete episode (0,1).

[Incongruous consequences (the car made an unusual gurgling sound after I started it); unlikely consequences (I won the lottery draw); impossible consequences (the shaman's ritual brought my brother back to life).

11. Internal reactions to the consequences

a) The consequence may psychologically cause explicitly represented affective changes in the actor or these affective reactions may not be explicit but should be inferred by the judge on the basis of his knowledge and familiarity with story context.

1) When the former occurs the degree of elaboration and expressive detail is rated on a scale from 1 = very little elaboration and detail to 4 = moderate elaboration and detail to 7 = very extensive elaboration and detail. If its affective reactions must be inferred, 0 is scored (1-7).

2) Incongruities of internal reaction (there was an unusual sense of desperation intermixed with my sadness); unlikely

internal reactions (they all laughed as the casket was lowered in the grave); impossible internal reactions (?) (2,3,4).

3) Regardless of whether the consequences cause explicit or implicit affective reactions, the quality of these reactions is rated as follows. The score of 0 is given when these affective consequences are negative, as in the case of goal nonattainment. The score of 2 is given when these affective consequences are positive; as in the case of goal attainment. Finally, the score of 1 is given when the affective consequences are neutral (0,1,2).

Note: when the consequences of an action are affective reactions and these affective reactions are inconsistent with the explicit or inferred reactions to the consequences, the affective quality of the latter is scored here.

4) The consequences elicit thoughts, memories, and/or other cognitive events (0,1,2,3,4).

12. Action type: complexity.

The following three judgments are based upon considerations discussed in part I:

a) The character's action is a simple overt action (0,1).

b) The character's action is a component of a coherent action sequence which includes analogous actions with a similar identical goal (0,1). If the action type must be inferred to be analogous, score 2. Score 3 if the action implies a subgoal-goal structure. Score 4 if the action refers to subsequent acts in that narrative unit but is not merely redundant with those acts.

c) The character's action is a component of a coherent action sequence in which some action components are executed to attain or achieve a superordinate goal (0,1). If the action must be inferred to be a subgoal-goal component, score 2. Score 3 if the component implies an analogous structure. Score 4 if the action refers to other actions in the narrative unit.

Note: b and c are not mutually exclusive.

13. Action type: component actions

The simple action is classified as an instance of the following categories including optional

anomaly scores. Note that these categories are not mutually exclusive.

a) Attending - Actions attending or focusing a sense organ toward a stimulus, e.g., to listen, to look for. The description of the action must include the suggestion or implication that a reorientation of the senses has occurred and not passive reception of a stimulus. For example, listening for a sound is an attending action but passively hearing another speak is not (0,1,2,3,4).

b) Speaking - Actions of producing speech or other vocalizations (e.g., singing) for the purpose of transferring information to another character. These actions are typically motivationally caused but some instances may be psychologically caused (e.g., purring, screaming) (0,1,2,3,4).

c) Ingesting - Actions by which a character takes into his/her/its body an object or substance, e.g., to eat, smoke, drink, breathe (0,1,2,3,4).

d) Expelling - Actions by which a character expels or ejects an object or substance from his/her/its body into the environment, e.g., to vomit, sweat, spit (0,1,2,3,4).

e) Grasping - Actions by which a character grasps and/or physically holds onto an object or character. These actions involve the hands, and occasionally the feet of the character (0,1,2,3,4).

f) Letting go - Actions by which a character terminates a grasp or hold on an object or character, allowing existing forces, e.g., gravity, to exert their physical influence on it (0,1,2,3,4).

g) Pushing - Actions by which a physical force is applied to an object or character to propel it away from the actor, e.g., to kick, throw, push (0,1,2,3,4).

h) Pulling - Actions by which a physical force is applied to an object or character to propel it toward the actor, e.g., to embrace, pull (0,1,2,3,4).

i) Locomotion - Actions by which a character changes physcial location within or between scenes by transporting his/her/its entire body in acts such as running, walking, etc. Locomotion in which the character is transported by other means than these, e.g., while sitting in a car or train, are not classified here (0,1,2,3,4).

j) Transportation - When location change

occurs independent of the character's running or walking but dependent upon the exertion of other propelling forces, e.g., being driven in or driving a car. Also, scored here are location changes that are associated with allowing gravity to exert its force, e.g., falling, or those that are associated with unexpectedly efficacious actions such as flying (0,1,2,3,4).

k) Postural action - isometric activity, trying, exerting (0,1,2,3,4).