

Quantifying goodness of story narratives

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Abstract

In the present study an additional measure of story narrative performance, story completeness, is evaluated. The completeness measure involves a tally of the critical story components mentioned by a storyteller. It was hypothesized that by combining organizational (story grammar) and completeness measures, story “goodness” could be quantified. Data from 46 normal adults indicated that this analysis was relatively sensitive in that it classified the story narratives of the group into four distinct categories of story “goodness”. This analysis should prove useful for the study of narrative discourse of brain-injured populations.

Introduction

Much of what we communicate on a daily basis takes the form of story narratives. Adequate production and comprehension of a story depends on the logical sequence of cognitively-based story structures. These structures guide an individual’s interpretations, expectations, and inferences about possible relationships between people and events in a story (Coelho, Liles, & Duffy, 1994). Descriptions of story structures differ, but the episode unit is central to virtually all models proposed by investigators (e.g., Frederiksen, 1975; Stein & Glenn, 1979; Thorndyke & Yekovitch, 1980). Although there are several indices of story grammar ability (e.g., number of total episodes, number of complete or incomplete episodes, proportion of T-units contained within episode structure) which have been shown to be sensitive to brain injury, story grammar alone may not completely characterize a “good” story. For example, it is possible for an individual to have high performance on story grammar measures, which reflect an individual’s ability to organize semantic content and, yet, still produce a story that is incomplete.

In the present study we evaluate an additional measure of story narrative performance, story completeness. The completeness measure involves a tally of the critical story components mentioned by the storyteller. It is hypothesized that by combining organizational (story grammar) and completeness measures, story goodness may be quantified. Normative data from 46 adults on these measures are examined.

Methods

Participants

Forty-six male, Vietnam War veterans, 55-76 years of age with no history of neurologic disease or injury participated in this study. All were native speakers of English. Years of education ranged from 12-20 years, scores ranged from 14-95 on the Armed Forces Qualification Test, 46-60 on the Boston Naming Test, and 94-100 on the Token Test.

Discourse Analysis Procedure

Task. Participants were shown a multi-frame picture story with no soundtrack on a computer screen. Upon completion each participant was instructed to “tell me that story you just watched.” Each retelling was digitally video-recorded. Recordings were transcribed verbatim and segmented into T-units.

Analyses. The story narratives were analyzed along two dimensions—organization and completeness. Story grammar analysis was used as the measure of organization. Story grammar guides comprehension and expression of logical relationships (temporal & causal) between people and events. The analysis yielded two scores: number of episodes (consisting of an initiating event, an attempt, & a direct consequence) and proportion of T-units within episode structure (T-units within episodes/total T-units in retelling).

To examine story completeness an inventory of key components (events and characters) produced in each participant’s story retelling was created. When pooled across participants in a matrix, these actions and events clustered into distinct components of the story. A total of seven components were identified. Components that were mentioned by 80% or more of the participants were considered to be critical to the story. Of the seven components, two were produced by approximately 65% of the participants and did not meet the criterion for inclusion. The remaining five components were produced by more than 80% of the participants (range: 83% to 98%). Each story narrative was reviewed for the presence of the five components. This analysis generated the completeness score, which was the total number of critical components produced in each participant’s story retelling.

Data Analysis

Correlation coefficients were calculated for the measures of story organization (proportion of T-units in episode structure) and story completeness (number of critical components). A scatterplot of the participants’ data was generated and distinct quadrants identified.

Results

Story Grammar (Organization)

Participants produced a mean of 4.43 episodes. The mean proportion of T-units in episode structure was .70 (see Table 1). In other words, seventy percent of utterances in the story retellings were framed in episodes. Figure 1 shows the frequency distribution for the proportion of T-units in episode structure.

Story Completeness

Participants referenced a mean of 4.41 of the five critical components. Sixty-five percent of participants (N = 30) mentioned all five critical story components and 24 percent (N = 11)

included four components (see Figure 2). Four percent (N = 2) mentioned three components. The remaining individuals (N=3) included only one component in their story retelling.

Story Goodness

Story goodness was quantified by pairing the participants' organization and completeness scores. Correlation coefficients were calculated for the story organization (grammar) and story completeness scores. A moderate correlation between the two measures was noted (.531, $p = .01$).

A scatterplot of the participants' scores for the two measures was examined. A cut-off score at .50 (approximately one standard deviation below the mean for the group, .70) was set for story organization (proportion of T-units in episode structure). Values above the cut-off indicated that the majority of an individual's utterances were organized into episodes. The cut-off score for this measure was set at 3.34 (approximately one standard deviation below the group's mean of 4.41). Using these cut-off scores, the "goodness" of the participants' story retellings could be quantified and their performance plotted within quadrants (see Figure 3).

Quadrant 1 was defined by a story grammar (organization) score greater than .50 and a completeness score of 3.34 or less critical components. Only one participant fell in this quadrant; he retold a relatively organized but incomplete story. Seventy-eight percent of participants (N=36) clustered in Quadrant 2, with story grammar (organization) scores above .50 and producing 4 or more of the critical story components. These participants produced the best stories. Their retellings were organized and complete. In Quadrant 3 were poorest storytellers (N=5). Their stories were disorganized (organization scores of .50 or less) and incomplete (completeness scores of 3.34 or less). Clustered in the Quadrant 4 (N = 4) were those participants whose stories were characterized as relatively complete (4 critical components or more) but poorly organized (story grammar score of .50 or less).

Discussion

Results will be discussed with regard to the following:

- 1) The story completeness measure described in this paper supplemented the story grammar measure and more completely delineated the participants' story narrative performance. These findings support the notion that by combining measures of story organization and completeness, story "goodness" can be quantified.
- 2) This analysis proved to be sensitive in that it classified the story narratives of 46 normal adults into four distinct subgroups of story "goodness".
- 3) The increased sensitivity of the story "goodness" measure will facilitate the identification of subgroups of brain-injured speakers and more distinct discourse deficits. This will increase understanding of narrative discourse processes. In addition, this measure will assist in the development of more effective discourse level interventions. For example targeting semantic content in some individuals, and organization of content in others.

Tables and Charts

Table 1: Descriptive statistics for participants on measures of story grammar (organization) and story completeness		
Measure	Mean (range)	Standard Deviation
Story grammar (episodes)	4.43 (1-9)	2.18
Story grammar (proportion of T-units in episodic structure)	.70 (.02-1.00)	.21
Story completeness	4.41 (1-5)	1.07

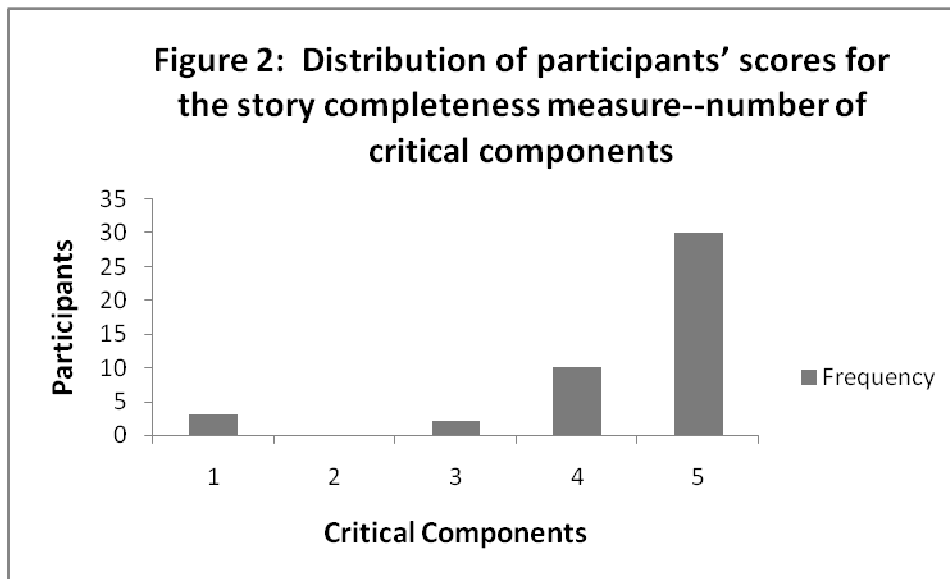
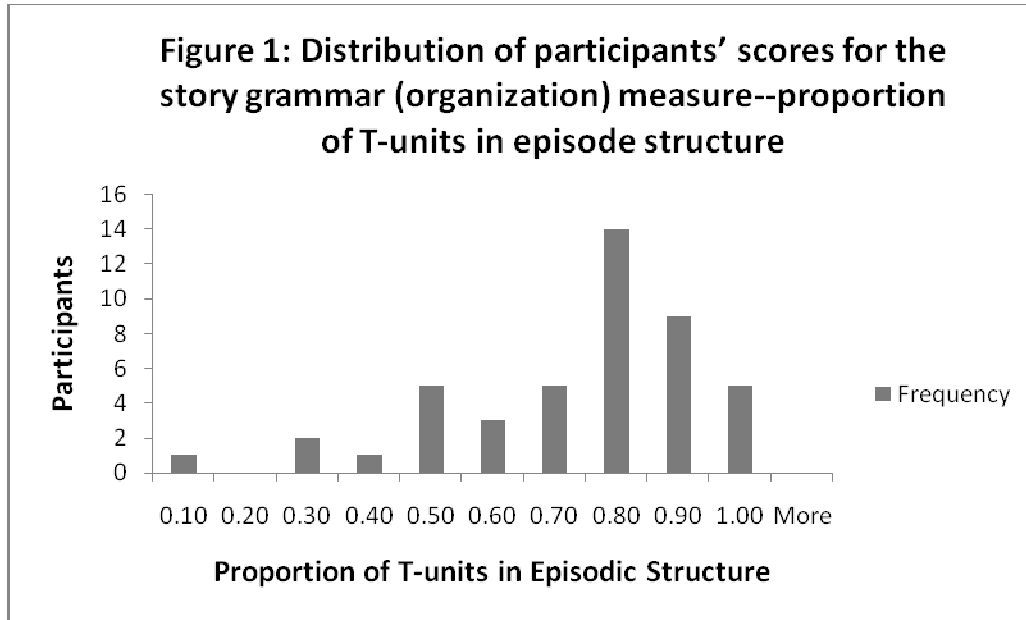
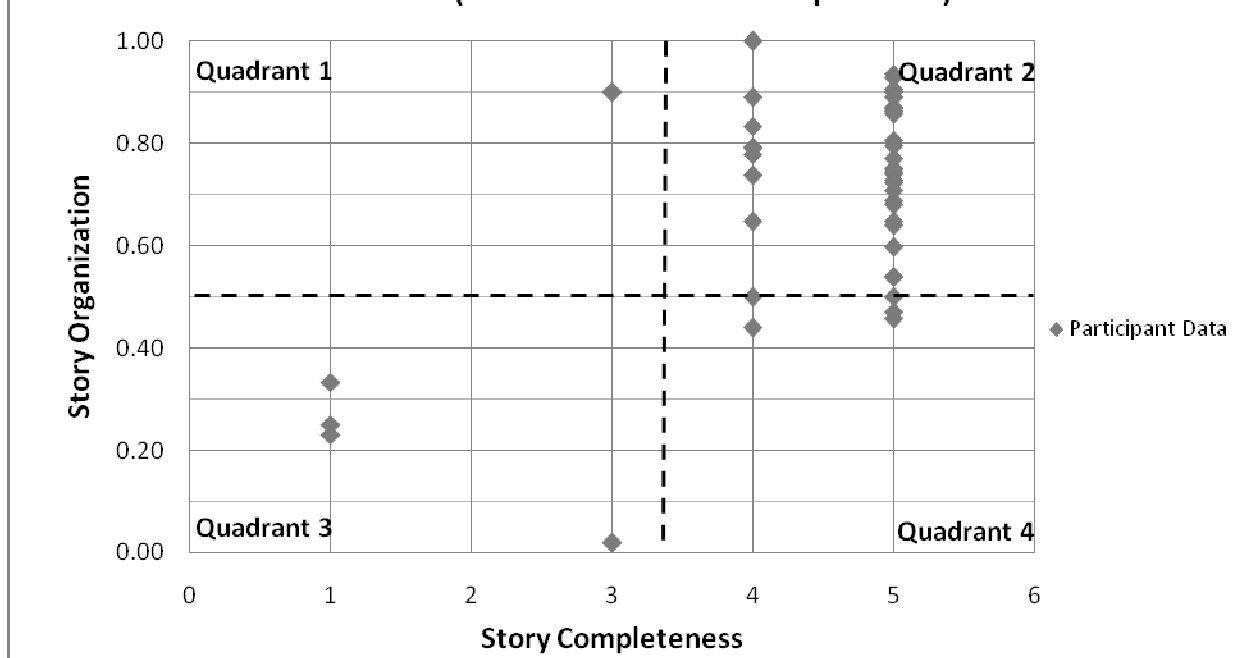


Figure 3: Quantification of story goodness as reflected in the participants' scores on measures of story organization (proportion of T-units in episodes) and story completeness (number of critical components)



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