

# Parsing and Standardizing Data Units for a Video Observation Studying Episodes of Lucidity in Dementia



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## What we learned: Parsing and characterization of audiovisual recordings of people living with dementia reduces second-by-second coding time and provides multi-level evaluation of episodes of lucidity in dementia

### BACKGROUND

- Episodes of lucidity (EL) are generally characterized by a spontaneous and unexpected return of abilities in individuals with Alzheimer's disease and related dementias (AD/ADRD)
- Due to the transient and rare nature of ELs, longitudinal audiovisual observation of people living with AD/ADRD may prove invaluable to advancing research into the phenomenon
- Provided the quantity of video data, approaches are needed to standardize segmentation of data in ways that retain salient contextual data to facilitate multilevel evaluation of sequential data units through hierarchical and nested modeling

### OBJECTIVE

- To describe our methodology for parsing and characterizing audiovisual data of people living with AD/ADRD into Standardized Data Units (SDUs)

### METHODS

- Participants included patients living with AD/ADRD (N=5) video recorded in an inpatient hospice setting
- Parsing involves the removal of negative data units, or time periods with limited detectable verbal or non-verbal activities
- Iterative piloting of conceptual definitions for SDUs guided operationalization of SDU creation in a way that maintains flexibility across unit duration and enable retention of the environment and context of the video
- The SDU definition was further refined through regular study team meetings and defined as video segments between 1-10 minutes characterized based on features of the observation, including the presence of other people in the video, verbal output, and stimulation of the participant
- After SDU characterization, SDUs are triaged for timed-event and verbal output-based coding measures

### RESULTS

Total Data	Codable	Minimal Stimulation	Negative	Verbal Output
103 Obs	43.6%	18%	37.9%	294 SDUs
280.3 Hours	122.48 Hours	50.67 Hours	157.48 Hours	---

#### List of Categories Used During Video Parsing and Characterization

SDU Length	Summary	Classification	Verbal Output	Presence of Others	Stimulation Classification
MM:SS	One sentence description	Codable MS Negative	Yes/No	Yes/No	Directed Active Passive Feeding

#### Steps for SDU Development

**Immersion**  
Examined raw video data of hospice patients living with AD/ADRD to gain a basic understanding of the social situation and environment

**Initial SDU Development**  
Summarize relevant attributes of observations **AND** Structured review of video segments  
*Developed an initial list of relevant SDU rules by piloting the SDU scheme*

**SDU Definition Refinement**  
*SDU definition iteratively refined through team meetings ensuring definition is consistently applied*

- Reduced the amount of maximum length of time for an SDU from 20 minutes to 10 minutes
- Refined definitions for codable, minimal stimulation, and negative data to ensure consistency
- Included verbal output capture in SDU definition to improve triaging data for verbal-output measures
- Reduced amount of time for high activity moments to 2-3 minute SDUs to reduce coding fatigue

**SDU Definition**  
A video segment between 1-10 minutes in length in which the participant is mostly or intermittently alert and demonstrating verbal or nonverbal expressions that can be coded

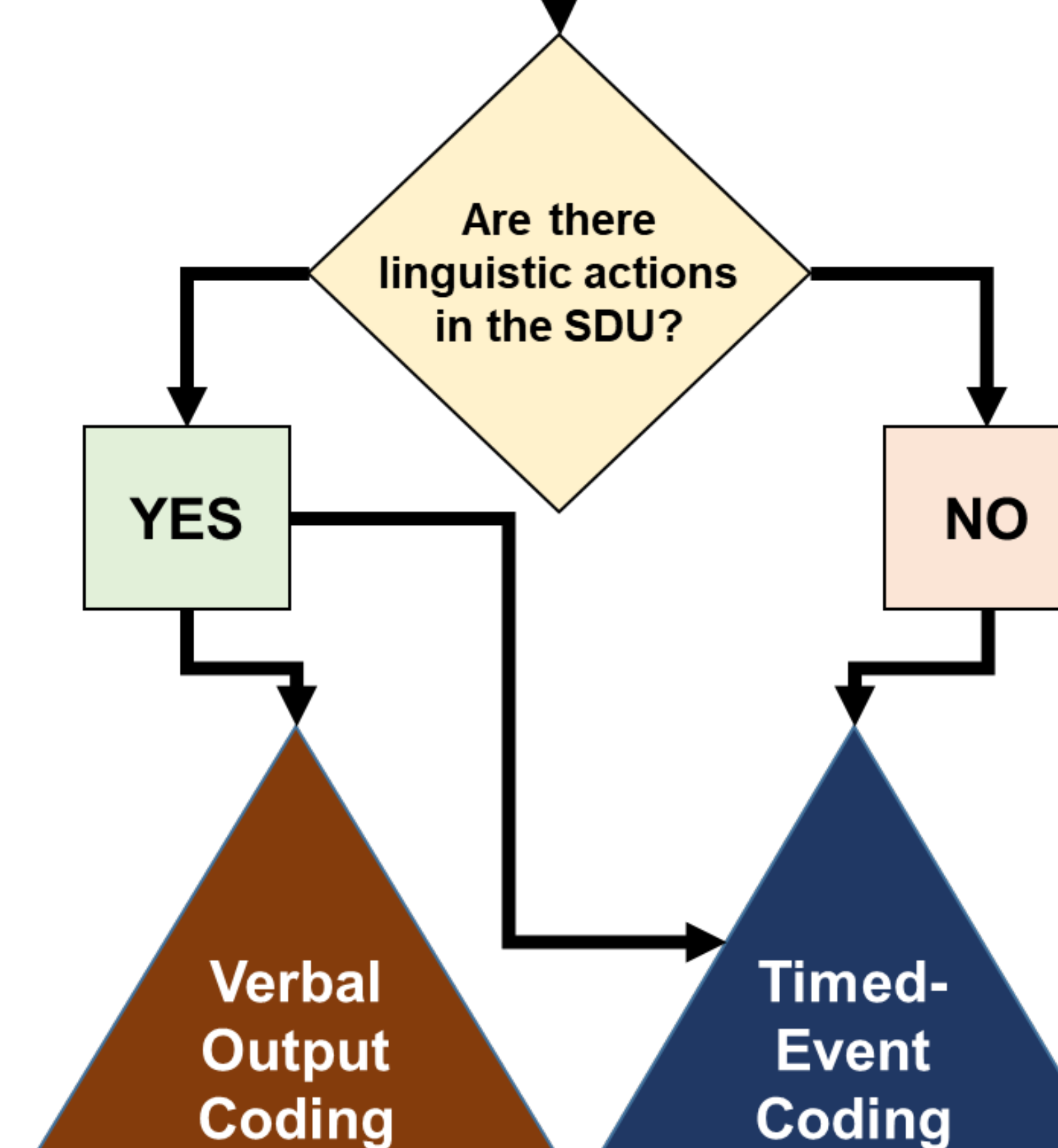
#### SDU Process

**Data Collection**  
Audiovisual of people living with AD/ADRD in a hospice setting is collected

**Parsing**  
Scan entirety of observation for codable events based on definition for codable and negative time periods

**Negative Data Units are not Coded**

**Characterization**  
Generate 1-10 minute codable SDUs and characterize each section based on linguistic actions, stimulation type, or presence of potential episode of lucidity



### DISCUSSION

- SDUs successfully maximized efficiency of coding, integrated observational windows in interpretively useful ways by relating SDUs to events or stimuli presented in the broader social environment, and provided a uniform data unit that temporally links timed-event and verbal output-based coding measures
- Vast differences in the typical activities of the people living with AD/ADRD adds complexity to our techniques, for what is deemed a "codable" behavior for one participant does not always apply to other participants
- Parsing and characterization process can be a time-intensive task, having an average of a 1:1 time-to-task ratio
- This method is also prone to human error given the large volume of audiovisual data
- Integration of automatic screening techniques may help to further alleviate time burden

### CONCLUSIONS

- Parsing long (3-7 hour) observations of people living with AD/ADRD is a useful method for reducing second-by-second timed-event and computational linguistic coding
- Characterization of audiovisual data into SDUs provides a multi-level evaluation of sequential data units to allow for broader, higher level interpretation of data units regarding ELs in people living with AD/ADRD
- Future research should consider the use of parsing and characterization for dissecting large audiovisual observations

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