

# Does story-type affect the assessment of age-related differences in discourse production?

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## Abstract

Assessing discourse production is essential for understanding the effects of healthy aging on language across the lifespan. The choice of task for collecting speech samples is critical, as different tasks can elicit varying types of discourse. Building on prior research (Marini, 2022), we examined potential effects of story type on age-related differences in discourse production among healthy adults. Speech samples from 143 participants across various ages were collected using both single pictures and vignettes. A multilevel discourse analysis revealed age-related differences and story-type effects on measures of productivity and discourse organization. This study is relevant for clinical practice, highlighting the importance of story type in discourse production assessment.

Keywords: image; vignette; discourse analysis; story-type; cognition.

## Introduction

Discourse is a complex structure that includes several levels of processing (i.e., phonological, lexical, grammatical, and suprasegmental traits). The assessment of narrative language sheds light on aspects such as cohesion and coherence, derailments and extraneous utterances that make discourse production vague and ambiguous but that are not always detectable from structured tests (Marini et al., 2011). Different methods of language elicitation (i.e., unstructured conversation, semistructured conversation, monologue with a single picture, monologue with a sequence of pictures) can lead to variations in the type of discourse produced (Leaman and Edmonds, 2023; Schnur and Wang, 2004; Mayer and Murray, 2003). For example, when describing a story depicted on an image, people tend to produce sentences with greater syntactic complexity compared to semi-structured interviews. Conversely, during spontaneous storytelling, patients tend to produce more syntactically complex sentences compared to when they describe a story using images. However, the potential effect of story type (i.e., single picture versus sequential images) on eliciting speech samples remains unclear. Single images and sequential pictures possess distinct characteristics that may result in varying performances (Fasnacht, 2023; Cohn 2012, 2020). Single images can be interpreted independently, while vignettes are connected to one another. This suggests that single images require less cognitive effort, while describing a vignette demands identifying the elements that connect the images cohesively.

This study focused on the difference in the language sample elicited through a single picture and a sequence of pictures. Based on previous findings (Marini, 2022), we hypothesized that narrative tasks elicited through single pictures or image sequences would affect specific aspects of discourse production, i.e., the ability to generate coherent links between the utterances. This issue is highly relevant for clinical practice, as speech and language pathologists (SLPs) commonly evaluate discourse by eliciting language samples using either a single image or a vignette (image sequence).

## Material and methods

143 healthy adults formed 4 groups: 35 young adults (aged 20-39); 38 middle-aged adults (aged 40-59); 35 young-elder adults (aged 60-74) and 35 old-elder adults (aged 75-89). They all scored within normal range on the Montreal Cognitive Assessment (MOCA; Nasreddine et al., 2005) and the Naming subtest of the Aachen Aphasia Test (AAT; Huber et al., 1983). Their narrative production skills were assessed with a multilevel procedure of discourse analysis (Marini et al., 2011) applied to speech samples obtained with a picture-story description task using 2 single pictures and 3 vignettes. This analysis allowed us to obtain information about the participants' productivity levels, lexical informativeness, grammatical completeness, and discourse organization. Group-related differences were found on the level of education ( $F(3, 139)=17.789, p<.001$ ) with the oldest group showing significantly lower levels of education than all other groups (all  $ps<.01$ ).

## Results

As group-related differences were found on the level of formal education, correlation analyses were performed between this variable and the target linguistic measures. These analyses showed that this demographic variable correlated with all target variables: productivity measures (words,  $r=.342; p<.001$ ; Speech Rate,  $r=.335; p<.001$ ), lexical informativeness ( $r=.400; p<.001$ ), grammatical completeness ( $r=.376; p<.001$ ), and the two measures of discourse Patilerrors,  $r=-.286; p<.001$ ). For this reason, potential age-related and story-type differences were explored with a series of mixed ANCOVAs with age-groups as between-subject factors (1. Young adults; 2. Middle-aged adults; 3. Young elder adults; 4. Old elder adults), story type as within-subject factors (1. Single pictures; 2. Cartoon-stories) and level of formal education as covariate. Tukey's post-hoc analyses were also performed to further explore group-related differences. As for productivity, no age-related differences were found in the production of words or Speech rate. Only for words a significant story-type effect was registered ( $F(1, 138)=13.073, p<.001$ ) as in all groups cartoon-picture stories elicited speech samples with more words. As for lexical

informativeness, a significant group-related effect was found ( $F(3, 128)=24.852$ ,  $p<.001$ ) with no story-type effect. Post-hoc analyses showed that the oldest group produced significantly fewer informative words than all other groups (all  $ps <.001$ ). Similarly, group differences were found in the % of grammatical completeness ( $F(3, 128)=5.638$ ,  $p<.001$ ) with no story-type effect. Post-hoc analyses showed that the oldest group produced significantly fewer complete sentences than all other groups (all  $ps <.007$ ). Finally, group-related differences were found also in the % both local ( $F(3, 128)=16.801$ ,  $p<.001$ ) and global ( $F(3, 129)=20.456$ ,  $p<.001$ ) Coherence Errors. In both cases a significant effect of story-type was found ( $F(1, 128)=4.301$ ,  $p<.040$ ) and ( $F(1, 129)=16.025$ ,  $p<.001$ ), respectively. In neither case a story\_type\*group effect was found.

## Discussion and conclusion

Our results support previous evidence of age-related differences in discourse production (Hilviu et al., 2024), highlight the relation between level of education and discourse skills, and suggest the presence of story-type effects on measures of productivity and discourse organization. Indeed, after controlling for education, older participants produced stories with fewer informative words, lower levels of grammatical completeness, and increased production of both local and global coherence errors. Furthermore, in all participants the cartoon-picture sequences triggered the production of more words and more local and global coherence errors supporting the hypothesis that different tasks elicit different speech samples from the same speakers.

In conclusion, this study highlights the need to use varied tasks to elicit speech samples from individuals with or without brain damage. Relying on a single type of stimulus may bias the results in studies involving healthy individuals and, even more critically, affect the interpretation of linguistic difficulties that patients may exhibit during clinical assessment.

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## References

- Cohn, N. 2012. Comics, Linguistics, and Visual Language: The Past and Future of a Field (pp. 92–118).
- Cohn, N. (2020). Your Brain on Comics: A Cognitive Model of Visual Narrative Comprehension. *Topics in Cognitive Science*, 12(1), 352–386.

- Fasnacht, H. (2023). The Narrative Characteristics of Images. *The British Journal of Aesthetics*, 63(1), 1–23.
- Hilviu, D., Parola, A., Bosco, F. M., Marini, A., & Gabbatore, I. (2024). Grandpa, tell me a story! Narrative ability in healthy aging and its relationship with cognitive functions and Theory of Mind. *Language, Cognition and Neuroscience*, 1–19. (in press).
- Huber, W., Poeck, K., Weniger, D., & Willmes, K. (1983). Aachener Aphasia Test (AAT). Hogrefe.
- Leaman, M. C., & Edmonds, L. A. (2023). Analyzing Language in the Picnic Scene Picture and in Conversation: The Type of Discourse Sample We Choose Influences Findings in People With Aphasia. *American Journal of Speech-Language Pathology*, 32(4), 1413–1430.
- Marini, A., Galetto, V., Zampieri, E., Vorano, L., Zettin, M., & Carlomagno, S. (2011). Narrative language in traumatic brain injury. *Neuropsychologia*, 49(10), 2904–2910.
- Marini, A. (2022). Cognitive and linguistic characteristics of narrative discourse production in healthy aging. In Coelho, C., Cherney, L., R., Shadden, B. (eds.) *Discourse analysis in adults with and without communication disorders: A resource for clinicians and researchers* (pp. 15-31). Plural Publishing, Inc.
- Mayer, J., & Murray, L. (2003). Functional measures of naming in aphasia: Word retrieval in confrontation naming versus connected speech. *Aphasiology*, 17(5), 481–497.
- Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J. L., & Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool For Mild Cognitive Impairment. *Journal of the American Geriatrics Society*, 53(4), 695–699.
- Schnur, T. T., & Wang, S. (2024). Differences in Connected Speech Outcomes Across Elicitation Methods. *Aphasiology*, 38(5), 816–837.