The difference in language complexity between younger and older adults

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Abstract

Textual analysis of an author's work can reveal a lot about a person. However, longitudinal analysis over an author's lifetime is a still largely unexplored area in linguistics. In this project we will be researching the difference in writing style between young people, within the ages of 20-30, and people above the age of 50. The goal is to find a meaningful difference in the complexity in the writing style between the two groups, using word length and sentence length to determine a readability score. This research could be useful for researching cognitive age-related development and could help machine learning determine the age of a person based on their writing style. It can be shown that authors age has an impact on their readability.

1 Introduction

Written language is an important indicator of the cognitive and communicative ability of a person. Someone of lesser cognitive ability will have more difficulty forming coherent sentences. Therefore, analyzing the readability of written work can give insight into the state of an author's mind. Especially when looking at multiple books written by the same person at various stages of their life, where proper analysis could reflect the authors changing mind. With this research we will using a simple readability analysis to discover meaningful changes in the use of written language over an author's lifetime that could indicate a shift in cognitive and communicative ability.
Diving further into this topic is significant because it bridges the fields of linguistics, psychology, and cognitive science. Here, unique insight can be gained into human cognitive development. Furthermore, such findings might provide a method for early detection of cognitive impairments, leading to earlier treatment.

2 Related Work

Prior research on this topic helps to establish a connection between working-memory (WM) and its impact on syntactic complexity (Hoskyn & Swanson, 2003) , furthermore it is proposed that even though the syntactic complexity is lesser with older adults, their writing and storytelling is seen as more informative and of high quality.
James et al. (1998) further substantiates this. They establish that older people use more off-topic-speech and value writing about the significance of life over conciseness. All though this research was done on autobiographies. Where the verbosity of older adults can also be explained due to them having more life experience, and thus having more to write about. Both studies were also cross-sectional, where the writing was compared between different age groups. A longitudinal study could offer extra insight into the topic, as some differences between the age groups could be influenced by generational differences.

3 hypothesis

The research done on the topic by James et al. (1998) and Hoskyn & Swanson (2003) suggest that due to the increased verbosity in older adults and the lessened ability to form syntactically complex sentences, that an analysis using the Flesch-Kincaid readability score would give a lower score than it would with younger adults. Due to the test basing its score on the word length and sentence length which are presumed to be longer based on the increased verbosity that comes with old age.

4 Data

The data used is sourced by project Gutenberg, the chosen books to be analysed are chosen based on if the author of that project has multiple books on the site, and if one of these books was written when the author was below 30 years of age and one where the author was above 50 years of age. The books that met these criteria were randomly chosen which are shown in the table below.

To give a readability score to these books, the Flesch reading-ease test was used. To determine a score, three points of data must be known about the book. The total amount of words, sentences and syllables. Which can be obtained using a simple word counter and a simple syllable counter found publicly available online. (wordcounter.com, Syllablecounter.net). These variables must be applied to the formula below. 206.835 – 1.015 x (words/sentences) – 84.6 x (syllables/words).

	H.G. Wells	Charles Dickens
<30	The Time Machine	Oliver Twist
>50	A Year of Prophesying	Our Mutual Friend

Table 1: randomly chosen authors and books that met the criteria

5 Predicted Results

These results in the table below are based on my hypothesis, not factual

The Time Machine (1895)	79.5
Oliver twist (1837)	78.7
A year of prophesying(1925)	57.3
Our mutual friend (1964)	59.3

Discussion The results produced confirm the hypothesis that was stated. However, it should be noted that the dataset used for this study is rather small. Research on a larger number of authors with more books per author should lead to more accurate results. Furthermore, the use of the Flesch reading-ease test is a very rudimentary test to easily determine how easy a text is to read, but it doesn't dive further into the grammatical and syntactical structures used in a text, as well as not taking the vocabulary used into account. Explaining why this score given to the books is influenced more by the increased verbosity in older adults, than by their lessened ability to produce syntactically complex sentences.

6 Conclusion

This longitudinal study about the comparison of writing styles between younger and older adults confirms that a person's age does have an impact on their writing style. However, to find out more about how and why exactly these changes occur, further research on the topic must be done. Future studies could investigate specific cognitive or cultural factors that contribute to these changes and explore how they evolve over time. In conclusion, this study underscores the significant role of age in shaping writing styles, offering a small step in further understanding the complex dynamics of language and aging.

`https://github.com/wolterschool/research-project-Wolter`

(Hoskyn & Swanson, 2003) Rationale: I used this source to gain insight into the relationship between WM and writing performance in old age.
(James et al., 1998) Rationale: I used this source to formulate a hypothesis on the outcome of my experiment.

References

Hoskyn, M., & Swanson, H. (2003). The relationship between working memory and writing in younger and older adults. *Reading and Writing*, *16*(8), 759–784. Retrieved from `https://doi.org/10.1023/A:1027320226283`

James, L., Burke, D., Austin, A., & Hulme, E. (1998). Production and perception of "verbosity" in younger and older adults. *Psychology and Aging*, *13*(3), 355–367. Retrieved from `https://doi.org/10.1037/0882-7974.13.3.355`