Text Complexity in Selected Newbery Medal Winners

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INTRODUCTION
The Barbara Bush Foundation for Family Literacy (BBFFL) says, "Populations at-risk for unemployment, low educational attainment, and lack of access to healthcare overlap with areas where low literacy rates are highest" (BBFFL, 2020, para. 2). Additionally, the average annual income of adults who reach the PIAAC's proficiency level is approximately $63,000, while those with the lowest literacy proficiency levels earn approximately $34,000 annually. There is a $2.2 trillion loss in annual income for the United States due to the low literacy level of its adult citizens (Rothwell, 2020). The economic impact to individuals, and to the nation, is significant, but it is not the only cost. Personal health outcomes are also negatively impacted by a lower literacy level, as "individuals who read at a level below proficiency are 1.5 to 3 times more likely to have adverse health outcomes" (DeWalt et al, 2004, p. 1236).

The U.S. Department of Education National Center for Education Statistics reports that 54 percent of adults between the ages of 16 and 74 years old read below a sixth-grade level (PIAAC, 2017). Many would agree that there is significant room for improvement in reading proficiency rates in the United States. However, there are presently no clear answers as to why proficiency rates are so low. Text complexity is one factor that educators and researchers are currently investigating. This is being done in an attempt to gain a clearer understanding of how readers engage with text as they grow toward proficiency.

In 1984, the National Institute of Child Health and Human Development (NICHD) began funding the text complexity research of MetaMetrics, Inc. After ten years of funding and testing, the *Lexile Framework for Reading* was adopted by Scholastic; other publishers and schools quickly followed (MetaMetrics, Inc, 2021). The *Lexile Framework for Reading* was intended to better connect text assessments to reading instruction (Stenner, 1996) by "placing text difficulty and reader ability on the same scale" (MetaMetrics, Inc., 2014, p. 2). Three decades after its introduction, the *Lexile Framework for Reading* is the most widely adopted measure used in classrooms, with over 35 million students in the United States receiving a Lexile score through state testing or classroom instruction (MetaMetrics, 2014). By measuring the reading ability of the student and the complexity of the text, a Lexile number is given to each. The Lexile number serves as a guide for selecting books and keeps students within their personal "Zone of Proximal Development" (Vygotsky, 1978, p. 86). Selecting leveled texts using a Lexile measure scaffolds students, as they become stronger readers who are able to engage with increasingly complex texts. The ability to read and comprehend age-appropriate and complex text increases the likelihood that a student will succeed in college and in a career (ACT, 2006).

An additional factor when considering meta-analysis for children's reading material is the reader's interest in what is being read. While elements such as font, structure, and line spacing contribute to the reader's experience, the story itself is of great importance, specifically in relation to creating better readers (Nesi & Gardner, 2012). The Newbery Medal is awarded annually by the Association for Library Service to Children (ALSC), a division of the American Library Association (ALA), for the most distinguished American children's book published the previous year. It was the first award for children's literature in the world (ALA, 2021).

> On June 22, 1921, Frederic G. Melcher proposed the award to the American Library Association meeting of the Children's Librarians' Section and suggested that it be named for the eighteenth-century English bookseller John Newbery. The idea was enthusiastically accepted by the children's librarians, and Melcher's official proposal was approved by the ALA Executive Board in 1922. In Melcher's formal agreement with the board, the purpose of the Newbery Medal was stated as follows: "To encourage original creative work in the field of books for

children. To emphasize to the public that contributions to the literature for children deserve similar recognition to poetry, plays, or novels. To give those librarians, who make it their life work to serve children's reading interests, an opportunity to encourage good writing in this field" (American Library Association, 2021, para. 4).

The Newbery Medal is awarded annually to an author who is a resident or citizen of the United States. The book must also have been published in English, in the United States during the preceding year. Multiple authors of the same book are also eligible for the award. The book must be an original work (ALA, 1987).

Purpose Statement
The purpose of this study is to gain a historical view of text complexity in Newbery Medal-winning books by analyzing variance in Lexile scores and word counts of the selected books.

Research Questions
R1. What does the Lexile measure look like for selected Newbery Medal-winning books?

R2. How does the word count of the selected Newbery Medal-winning books vary?

Definitions
Leveled texts: "are designed to provide students with reading materials that range from very simple to gradually more complex and challenging" (Davidson, 2014, p. 5).

Lexile measure: "indicates a learner's independent reading level; indicates the complexity of the reading material. Texts are measured using an algorithm that examines the semantic and syntactic features of the text" (Lexile Quantile, 2019, para. 1).

Text complexity: "refers to the level of relative difficulty in reading and comprehending a given text. (Massachusetts Department of Elementary and Secondary Education [MDESE], 2017, para. 1).

Delimitations
This study focuses on selected John Newbery Medal winners from 1922 through 2022. Newbery Medal winners without a Lexile score were not used in this study. Newbery Honor books were not included.

Assumptions
This study assumes that the American Library Association's (ALA) list of Newbery Medal winners is complete and accurately dated. This study assumes that the *Lexile Find-A-Book* tool   gives accurate and consistent results. This study assumes that the *TeachingBooks.net* Lexile score and word count data are accurate.

Importance of Study
Children who read for pleasure, as well as for information, do so because they have first learned the simple mechanics of reading. Once the mechanics are in place, children seek out stories that are of interest to them. Reading engaging materials holds the interest of children. As readers encounter increasingly complex reading material, their comprehension and reading abilities increase. It is important that children's literature is not only entertaining, but also complex in age-appropriate ways (Juel, 1988).

This study looks at the text complexity of Newbery Medal winners. The books selected for this study cover a 100-year period (1922-2022). The study should be helpful to teachers and librarians in recommending Newbery Medal books based on text complexity. Educators and librarians may use award-winning book lists as suggested reading without regard to the complexity of text. This research highlights the variation found within one list.

LITERATURE REVIEW
Accurate methods for determining the complexity of reading materials for children have been a matter of debate for decades. Prior to the use of text analyzers, educators and librarians recommended books to children based on their personal observations and quality book lists, such as the list of Newbery Medal winners. In time, educational reform brought in new standards, and along with those standards came new ways of gauging the text complexity of children's books. The following literature review reveals some of the struggles that researchers and educators have when attempting to come up with simple, accurate ways of determining the text complexity of books. The review will also look at simpler ways of ascertaining text complexity –using the Newbery Award list –and changes in complexity over the past 100 years (Broemmel et al., 2014).

Text Complexity and Cultural Influences

Culture and cultural changes have been shown to impact text complexity (Fleming & Parker, 2013; O'Brien & Ali, 2013). When the changes in culture shift foundations, the impacts are usually felt throughout the entire culture. Reviewed studies show that culture, and cultural changes, do affect how individuals and groups relate to text. According to the research by Fleming and Parker (2013), this is precisely what is reflected in Newbery Award-winning books throughout Newbery's 100-year history. The authors performed a quantitative analysis of Newbery Award-winning books. Their focus was on character and virtues, both positive and negative. Eighteen Newbery books were selected from an 80-year period. The authors compared books by using Biblical fruit of the Spirit traits as their basis for positive, virtuous traits, and the opposite traits for negative, in Newbery books. In the end, it was discovered that the trend in Newbery books has moved steadily away from the Biblical standard of positive traits and more toward traits that have been traditionally viewed as negative.

Cultural views also influence learning throughout life. The impact of cultural views is seen in approaches to learning as well as expectations of outcomes. Online surveys were used to gather qualitative data from university students ages 17 through 24. The study's results indicate that students' education is considerably influenced by culture. While they may personally engage with ideas, they do not necessarily engage effectively with the ideas in texts being read. The cultural views and beliefs around them were the biggest influencers in their engagement with reading and their schoolwork (O'Brien & Ali, 2013).

Text Complexity and Meta-analysis Systems

Emerging research often points to multiple factors that should be used when determining the complexity of text. Hiebert (2012) stated that that there are three factors which determine text complexity: qualitative, quantitative, and readability measures. A tripartite view of determining text complexity should also include factors such as a reader's motivation, considering that assessments can vary considerably at times with the same student. Hiebert reported this method of determining text complexity to be superior to Lexile and other formulaic methods because it considers more variables. The researchers conceded that teachers do not often have the resources to analyze text.

Due to the ongoing difficulties in determining the validity of meta-analysis tools in text complexity matters, other researchers have resorted to a less technical and fractured method of gauging reading levels and comprehension. Vanderbilt University researchers, Saha and Cutting, stated that to overcome issues seen with misleading Lexile scores, the multiple variables necessary for a true indication of text complexity should be viewed independently of each other. This would render the synergistic relationship of the variables useless in determining text complexity (2019). Saha and Cutting proposed borrowing from the medical field by using Network Meta-Analysis (Lumley, T., 2002). This method pools the correlations in a text with the students' Oral Reading Fluency. Saha and Cutting's (2019) research indicated a stronger correlation than other methods currently in use. This method also uses a combination of technology and teacher observation. Sheehan's study (2017) looked at factors similar to Saha and Cutting (2019) and Hiebert (2012). Sheehan's research indicated that part of the difficulty of analyzing multiple variables within multiple frameworks may be due to the decision not to reject the null hypothesis of no differences among measures. Sheehan theorized that the empirical text complexity scores used were expressed in a new way, on a common vertical scale (2017).

Similar to Cunningham and Hiebert 's (2018) banded-tripartite quantitative and qualitative method of determining text complexity, another study analyzed Newbery Medal and Honor winners. Broemmel factored in reading levels, word counts, genres, and gender and cultural issues. The final observation was that while the Newbery Medal Award booklist does have some issues in regard to primarily targeting fourth and fifth grade reading levels, children of varied abilities and backgrounds were able to find books that they enjoyed and that encouraged them to go back to the Newbery section in the library. This study most closely aligns with previous studies and this current research, all factors considered (Broemmel et al., 2014).

Similar Methodology Studies

The current study on Newbery Award winners and text complexity is similar in methodology to a study that looked at Newbery Award-winning books and

included word counts, along with other non-Lexile measures, and complexity factors (Broemmel et al., 2014). Continuing where the previous study left off, this study looked for consistent shifts in text complexity through the 100-year history of the Newbery Medal Award based solely on Lexile measures and word counts.

A second study looked at 18 selected Newbery Medal winners, in five-year groups. It looked at how "the frequency of the specific positive Biblical virtues and paired opposite traits conveyed in Newbery Medal books changed over the course of 9 decades" (Fleming & Parker, 2013, p. 266). Unlike the study looking at content characteristics, this study looked at Lexile scores and word counts of 92 selected Newbery Medal winners.

Most similar to the current study, a third study looked at all Newbery Medal-winning books through 2010; there were 88 in total. It used various meta-analysis systems to determine the selected books' text complexity measures. Lexile scores were included in the study, as were word counts. The current study differed from Stevens' 2010 study in that it only used Lexile scores as a meta-analysis measure.

The current study looked at a 100-year span of selected Newbery Medal winners. This offered a broader view of the potential changes in text complexity than any of the previous studies by an additional 12 years. Three studies in the literature were similar in that they looked at Newbery Medal winners and changes in complexity or general traits from a minimum of eight decades (Broemmel, et al., 2014; Fleming and Parker, 2013; Stevens, 2010). All remaining studies focused on various aspects of meta-analysis, Lexile in particular, and what factors impact a score on these scales. These studies were similar to the current study in that they were considering complexity in texts for the benefit of children's literature and literacy-related issues. They differed in that their focus centered on the overall strength of a particular system's ability to predict text complexity. The current study did not focus on validity or predictability issues related to these systems.

METHODOLOGY
The study used quantitative measures to analyze the Lexile measure and word count in Newbery Medal-winning books. Selected Newbery Medal winners from 1922 through 2022 were selected. Nine Newbery Medal winners were removed from the full current list consisting of 101 Newbery Medal winners. The nine Newbery Medal winners which were removed from the full list were winners from the following years: 1932, 1935, 1940, 1982, 1989, 1998, 2008, 2013, and 2020. The removal of these winners was due to the inability to gain an accurate Lexile score using Lexile's prepared text recommendations. For an accurate Lexile score, Lexile's algorithm does not measure books of poetry, plays, letters, or books with unusual sentence structure or lack of punctuation (MetaMetrics, 2022). In total, 92 Newbery Medal winners were selected for this study. Text complexity factors considered in this study were Lexile scores and word counts.

Information Sources and Procedures
The following websites and programs were used in this study:
- ALSC: http://www.ala.org/alsc/awardsgrants/bookmedia/newbery
- ALA News: http://www.ala.org/news/press-releases/2022/01/american-library-association-announces-2022-youth-media-award-winners
- Calculator Soup Online Calculators: https://www.calculatorsoup.com/calculators/statistics
- Lexile Find-A-Book: https://hub.lexile.com/find-a-book/search
- TeachingBooks: https://www.teachingbooks.net
- Microsoft Word
- Microsoft Excel

For this study, the Newbery Medal winners were selected from a downloadable Word document list available on the website of the Association for Library Service to Children (ALSC). The original ALSC Newbery Medal list included 100 Newbery Medal-winning titles (1922-2021). The 2022

Newbery Medal winner was announced after this list was downloaded. The 2022 Newbery Medal winner, *The Last Cuentista* by Donna Barba Higuera, was added to the selected winners list for the current study.

Each selected book's Lexile score was determined by using the *Lexile Find-A-Book* tool (https://hub.lexile.com/find-a-book/search). The title of each selected book was entered into the "Quick Search" box. Next, the "Award-Winning" filter was set by ticking its box. The final action was to select the "Search" button. Once the selected book's result page was returned, the title, author, and publication year were cross-checked with the ALSC list to confirm that it was the intended book. Each book's title, winning year, and Lexile score was then entered into an Excel worksheet.

Word counts for the books in this study were obtained through a collection analysis report from the TeachingBooks website (https://www.teachingbooks.net). From the home page menu bar, "Browse" was selected, followed by "Awards & Distinctions" on the left-hand menu. On the next page, "John Newbery Medal, 1922-2022" was selected. This resulted in a collection of 351 books. At the top of the collection page, "List Analysis Report" was selected. The TeachingBooks analysis produced both Lexile scores and word counts for the Newbery Medal books.

At this point, the "Download a spreadsheet" option was chosen in order to more easily sort and remove any books that were not on the study's list of selected Newbery Medal winners. Lexile scores and word counts for the selected Newbery Medal winners were obtained from TeachingBooks' "John Newbery Medal, 1922-2022" collection analysis report. Each

book's score was then recorded in a Microsoft Excel worksheet. Also recorded was each book's title and the year it won the Newbery Medal. Lexile scores obtained via the *Lexile Find-A-Book* tool and the TeachingBooks Newbery collection analysis were compared to check for discrepancies in value; no discrepancies were found. Statistical data was calculated on both the Lexile scores and word counts using a statistical data calculator from the Calculator Soup website (https://www.calculatorsoup.com/calculators/statistics/). Data points for Lexile scores and words counts were plotted on separate line graphs in Microsoft Excel.

Limitations
Possible limitations of the study lie in the margin of error for Lexile scores when using the *Lexile Find-A-Book* tool and data reported for the Newbery collection on the TeachingBooks website.

RESULTS
R1. What does the Lexile measure look like for selected Newbery Medal-winning books?
The sum of 92 Newbery Medal winners were used in R1. The minimum Lexile score was 520; the maximum score was 1440. The 92 data points resulted in a range of 920. The mean Lexile score was 865.87; the median was 835. Three modes were produced: 810, 750, and 710. The standard deviation of results was 184.34. A Lexile score of 1440 was a statistical outlier. The Lexile line graph indicates a downward trend line for selected Lexile measures from 1922 through 2022 (Figure 1).

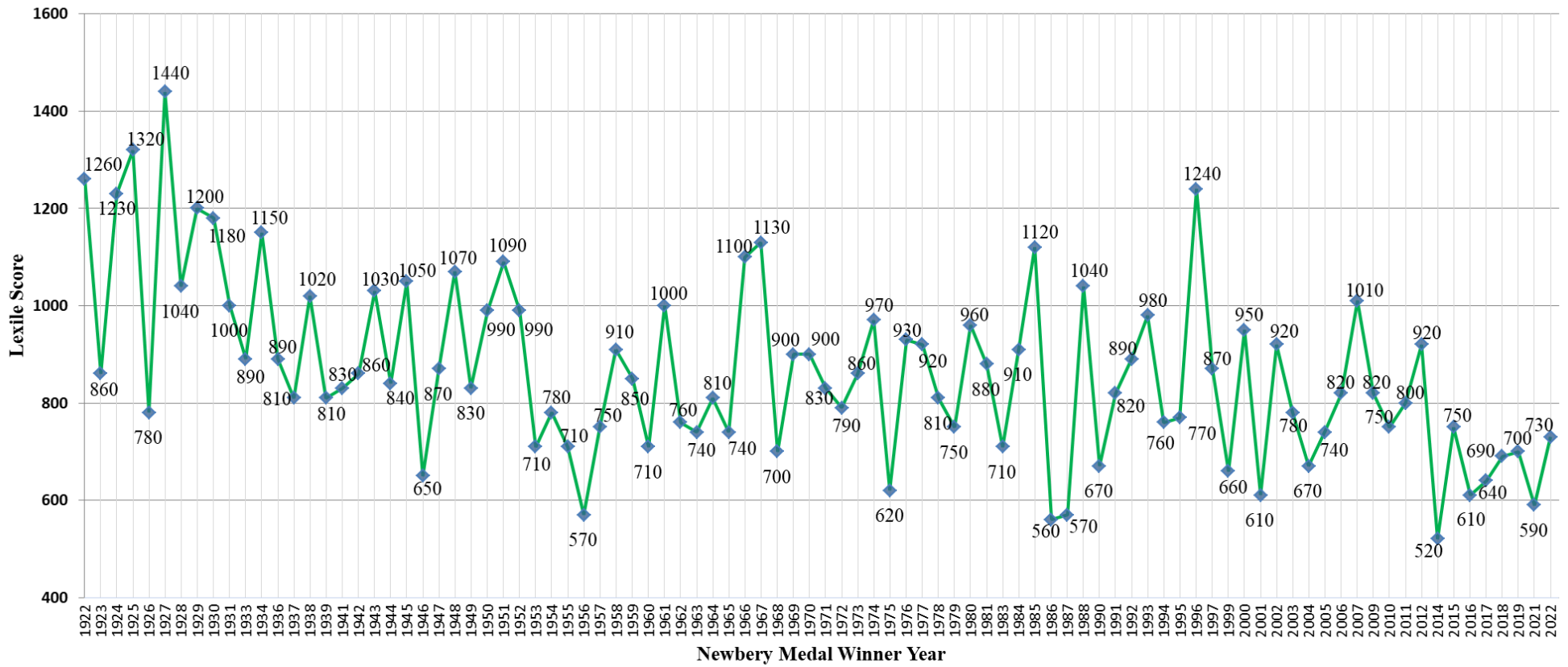Figure 1.
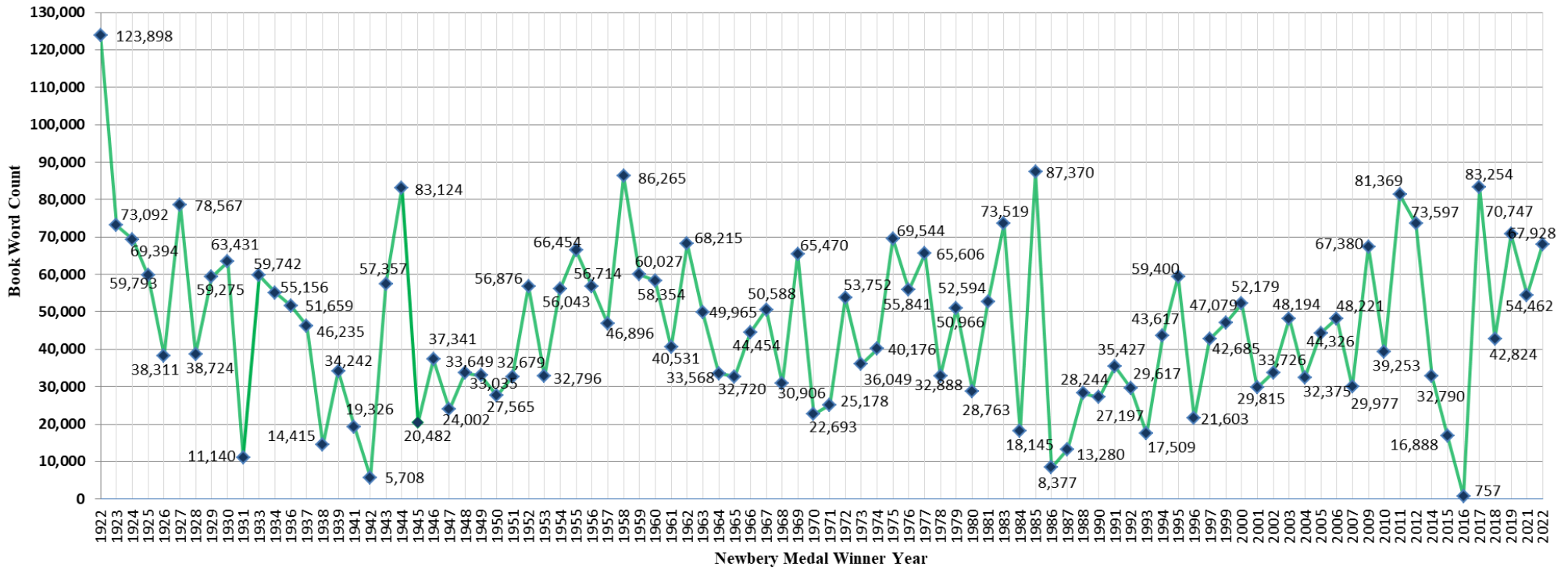Lexile Scores of 92 Selected Newbery Medal Books

Figure 2.
Word Count of the 92 Selected Newbery Medal Books

R2. How does the word count of the selected Newbery Medal-winning books vary?

The sample size of 92 Newbery Medal winners produced a minimum word count of 757 and a maximum word count was 123,898. The difference between the minimum and maximum word counts resulted in a range of 123,141. The sum of the 92 Newbery winners' word counts was 4,225,365 with a mean word count of 45,927.88. The study's Newbery Medal winners produced a median word count of 44,390, The standard deviation was 21,564.02 for the data set.

Word count data points for the 92 Newbery Medal winners were plotted on a line graph (Figure 2). The data and graph indicate that throughout the history of the Newbery Medal, winning books have contained a relatively steady average of approximately 46,000 words. The lowest word count was 757 and found in *Last Stop on Market Street* (2016). The highest word count was 123,898 in *The Story of Mankind* (1922).

DISCUSSION

The data from this study point to a downward shift in the text complexity of Newbery Medal winners over the past 100 years. This is congruent with Stevens' (2010) results. The current study adds an additional 12 years to the Newbery Medal timeline. This provides further evidence of falling text complexity in the Newbery Medal-winning books. The Newbery Medal is given to books considered the best in children's literature, thus the continued decline in Lexile scores may be a cause for concern. The downward shift could be due to changing expectations of publishers. It is not necessarily pointing to a cause of lower literacy rates.

Lexile scores and word counts came from the same 92 Newbery Medal-winning books. Figure 1 indicates that the average Lexile score has decreased from 1922 through 2022. Figure 2 indicates that the Newbery word counts have remained steady during the same period. If the average word count, which is one factor in measuring text complexity, has remained steady, and the Lexile score has decreased during the same period, it may be possible to deduce that word counts are not a significant factor in measuring text complexity. Further research on the individual factors in text complexity may bring clarity.

CONCLUSION

This study's results point to the need for additional studies on text complexity, especially from a historical perspective. By using Newbery Medal winners, it is assumed that quality children's literature will be used in future research. The importance of using the Newbery Medal booklist is the 100-year history of the award, and that the books are considered superior works in children's literature. Future studies might test additional measures of text complexity, other than the Lexile score and word count. Studies might compare historical literacy rates in the United States along with historical text complexity data. Further study on various measures of text complexity may also answer the question of the significance of word count in text complexity measures.

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