

An Analysis of Changes in the Environmental Content of Caldecott and Newbery Medal Winning Children's Books, 1922-2016

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ABSTRACT

Raising environmentally conscious citizens is crucial to promote environmentally sustainable actions. Environmentally themed children's literature is one tool to develop lifelong environmental responsibility. Ecocritical analyses of children's literature in the United States primarily examine single works, and the few existing large-scale environmental content analyses suggest conflicting historical trends. This study examines several environmental content variables (characters, plot, and overall message) found in 735 Caldecott and Newbery medal winning children's books in the United States from 1922-2016. It analyzes the total quantities of environmental content found in these books, as well as how the frequencies of the content changed over time. We found that less than 50% of the books contained environmental content and that there were dominant content types prevalent in both samples. Additionally, 15 of the 19 variables showed significantly ($\alpha=0.05$) lower levels from 1956-2016 compared to 1922-1956 levels. The limited quantities and scope of environmental content found in these children's books might not support broad environmental understanding, especially for children growing up after 1956. These findings suggest that U.S. children's literature may not be optimized to develop environmentally responsible citizens, which is concerning considering the environmental challenges we face today.

KEYWORDS

children's literature, environmental, ecocriticism, content analysis, longitudinal

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Introduction

Active and environmentally aware citizens are arguably a key element if we want to successfully address the environmental issues we face today. Since adult environmental awareness and behaviors are formed – at least partly – in childhood (Chawla 2009; Wells and Lekies 2006), one way to encourage adult environmental responsibility is to expose and educate children about the environment. Teaching children about the environment not only enhances their

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individual environmental consciousness that they can maintain as they age, but can also impact their parents through intergenerational knowledge transfer (Ballantyne, Connell, and Fien 1998). In fact, parental knowledge of environmental issues can increase after their children study these subjects at school and can result in changes to household environmental behavior (Damerell, Howe, and Milner-Gulland 2013; Evans, Gill, and Marchant 1996). Therefore, educating children about the environment potentially impacts (a) immediate decision-makers (i.e., the parents), and (b) future leaders (i.e., the children).

Among the media available to children today (e.g., television or internet), books can foster positive long-term relationships with the environment that can promote lasting environmental attitudes (Eagles and Demare 1999; Wells and Lekies 2006). As suggested by Monhardt and Monhardt (2000), children can relate the content of environmentally themed books to their own worlds and begin to draw connections between themselves and environmental problems. Childhood connections to the environment are a foundational component of individual environmental identity, which influences pro-environmental attitudes and behaviors in adults (Chawla 2009). Further, books can also convey natural concepts (Ganea, Ma, and DeLoache 2011; Sackes, Trundle, and Flevaris 2009) and basic mathematical concepts (Casey et al. 2008; Van den Heuvel-Panhuizen and Elia 2011) to children, which are important components in environmental education. Thus, since books can both strengthen emotional environmental bonds and enhance factual environmental knowledge, they arguably represent ideal tools to support the development of an environmentally conscious population.

Based on the premise that children's literature can shape how adults interact with the environment, ecocritical analysis of children's books can help to describe how children's books portray the environment. Ecocriticism is an interdisciplinary approach that examines how texts construct nature and the environment (Glotfelty 1996; Waldron and Friedman 2013). For example, Marriott (2002) examined 1,074 U.S. children's picture books and found that instead of containing realistic environmental characters, the books primarily showed domesticated and anthropomorphized animals. Further, Williams et al. (2012) found that the presence of wild and domestic animal characters decreased from 1938 to 2008 in Caldecott picture books, while the presence of human built environments increased. Additionally, Williams et al. (2012) found that portrayals of humans interacting with animals and the environment have decreased since the 1970s, and they suggest that modern day readers are less exposed to environmental concepts than previous generations. In partial contrast to Williams et al. (2012), Kirk and Karbon's (1986) study of 72 award-winning children's books published between 1960 and 1982 found an increasing trend in the presence of environmental messages in children's literature after 1970. Nonetheless, Kirk and Karbon (1986) also found a lack of environmental themes and animal characters, and complete lack of plant characters, in their sample.

Many of the existing ecocritical analyses of children's literature often focus on a narrow selection of works, rely on qualitative analysis, and rarely explore how the environmental content of books changes over time. Accordingly, Williams et al. (2012) acknowledged that there is a gap in existing large-scale

quantitative analyses of children's literature since only a few studies focus on environmental elements. While single-work ecocritical analyses can be useful, they do not necessarily offer insight into the trends of children's literature.

Our study uses ecocritical concepts as a foundation to analyze how the environment has been portrayed in award-winning U.S. children's literature between the early 1900s and today, with the goal of offering insight into the development of environmentally responsible U.S. citizens over time. We analyzed the total quantities of environmental characters, conflicts, and messages in Caldecott and Newbery medal winning books to understand what environmental aspects children have been exposed to over the last century. Assuming that authors are influenced by the environmental discourse of the time period in which they are writing, we then used our results to examine if the environmental values contained in the texts changed between the conservationist (pre World War II) and environmental (post World War II) time periods in the United States (see Hays 1982:17 and Methods).

Methods

Books Analyzed

We analyzed the 735 books that have received Caldecott and Newbery medal awards in the United States from the awards' inception in 1938 (Caldecott) and 1922 (Newbery) through 2016. Two annually rotating 15-person committees of The Association for Library Service to Children (ALSC) members select the award winners independently. Once nominated by the public, books must meet several criteria in order to be eligible for an award: they must have been published within the preceding year, written by a U.S. author(s), and demonstrated excellence in plot, character, storytelling, and illustrative artistry (if applicable) (Association for Library Services to Children 2009a, 2009b). Caldecott awards may only be given to picture books, while Newbery awards can be given to any book targeting children up to age 14, picture books included (Association for Library Services to Children 2009a, 2009b). The awards are not given based on the book's educational intent.

Each year, one book wins the gold medal for each award but the committees may choose to award silver honors medals to notable books. For context, in 2011 there were 20,127 children's books published in the United States but only 3 Caldecott awards and 5 Newbery awards given (American Library Association 2017). A summary of the two medals can be found in **Table 1**.

Books receiving Caldecott or Newbery medals gain social and economic advantages. Medaled books often become popular with the public and are purchased specifically by libraries and schools, giving them a wide audience reach (Maughan 2011; Silvey 2008). As a result, book sales increase strongly (Maughan 2011) and can remain strong decades after publication (Silvey 2008) since medal receipt almost guarantees that the book remains in print (Donovan 1991). Overall, Caldecott and Newbery medal winning books become part of the U.S. children's literary canon and influence the genre on the whole (Maughan 2011). Caldecott and Newbery books have been examined in previous children's literature content analyses (Leininger et al. 2010; Williams et al. 2012) due to

their high quality and sales volume, expansive reach, and literary influence. As such, Caldecott and Newbery books represent a viable sample for our analyses.

Table 1 Overview of Caldecott and Newbery medals.

	CALDECOTT	NEWBERY
First Awarded	1938	1922
Book Type	Picture books	Children's literature and picture books
Target Audience Ages	0-6	0-14
Total Awarded Books	332	403
Winners Gold Medals	79	95
Honors Silver Medals	253	308

Variables Examined

We examined three literary components of the books for their relationship to the environment: primary characters, plot/conflict, and overall message. If any of these components were environmentally related, we then coded them under the 14 content types described in **Table 2** following a standardized coding system – such as those used in Hamilton et al. (2006), Kirk and Karbon (1982), and Williams et al. (2012).

Environmental characters were defined as non-human characters, whether living or non-living, and were coded as being an animal, landform, natural object, or natural process (see **Table 2**). Each character was then coded under one of four types: wild, domestic, anthropomorphic, or fantasy/folklore (see **Table 2**). The choice to examine environmental characters is built upon Marriot's (2002) and Williams et al.'s (2012) studies examining depictions of the natural world in children's books. Marriot (2002) examined animal and plant characters found in picture books, the characters' relationship to humans (ex: domesticated or wild), their "transformation" as anthropomorphized versions of humans, and the overall way the author conveyed information about nature. Similarly, Williams et al. (2012) analyzed animal characters in Caldecott books and classified them – as we did – as domestic, wild, or anthropomorphic. To account for books containing multiple, equally important protagonists, we allowed each book to have up to two primary environmental characters. When this occurred, the characters were evaluated independently.

By examining only non-human characters as primary characters we assume that humans are separate from nature and so perpetuate society's dominant anthropocentric viewpoint (Rae 2014). However, by doing so we follow precedent set by other studies (Marriott 2002; Williams et al. 2012) in acknowledgment that children's literature tends to partake in the anthropocentric perspective. The goal of this study is to gain a broad overview of the environmental elements found in Caldecott and Newbery books. Future

studies can expand on how the human-nature binary is fully presented in these works.

Table 2 Definitions of the variables used in this study.

VARIABLE	DEFINITION
Primary Character(s)	A story's protagonist, typically undergoes change, is present in the majority of the book or illustrations; maximum of 2 per book
Animal	Non-human animal, living or extinct
Landform ¹	A naturally occurring geological feature on Earth
Natural object ¹	A living or non-living, naturally occurring object that could be argued to have the right to be left alone from human interference; ex: rocks, plants
Natural process ¹	A naturally occurring event or process; ex: tornado, soil erosion
Wild	Portrayed accurately as would be found in nature
Domestic	A character portrayed as domesticated by humans; ex: sheep, dogs
Anthropomorphic	A character displaying human attributes; ex: wearing clothes, going to school
Fantasy/folklore ¹	A character displaying abilities that are impossible in reality; ex: magic powers
Environmental Conflict	If the main plot of the book, often summarized on the publisher's description, is related to the environment
Human induced	Directly attributable to human interaction with the environment
Naturally occurring	An environmental conflict arising in nature without human interference but that may cause harm to humans; or a plot dedicated solely to detailing a natural element; ex: a tsunami or a book describing snow as a phenomenon
Human survival ²	Focuses on the human struggle to survive in the environment, anthropocentric
Fantasy/folklore	A conflict involving environmental elements that is impossible in reality
Environmental Message	The overall message the reader receives from reading the book
ENV	Environment is used only as a plot device, anthropocentric, non-instructive, and/or does not challenge social thinking about the environment
ECO	Actively educates the reader about the environment or environmental issues, challenges social thinking about the environment, inspires audiences to take action, and/or contains non-anthropocentric discourse

¹ Dropped from historical analysis

² Not present in Caldecott books

Our classification of environmental conflict types was built upon Kirk and Karbon's (1986) study where they analyzed multiple categories of overall

environmental themes and messages, such as “self-sufficiency and survival.” In our study, environmental conflicts could be human induced, naturally occurring, focused on human survival, or unrealistic events (**Table 2**).

When environmental conflict was present, the book was subsequently coded for its environmental message. Building upon Paula Willoquet Maricondi’s (2010) distinction between eco- and enviro-cinema, we coded the books as having an ECO or an ENV message. ECO messages were defined as ones that support the environment and promote activism while ENV messages use the environment as a background or plot device. For example, an engaging book covering the merits of recycling or the process of forming a rainstorm would likely have an ECO message, while a book about a child’s trip to the zoo, where the focus is the child, would likely have an ENV message.

To understand the process of variable coding, we can use the 2003 Newbery silver medal winning book *Hoot* by Carl Hiaasen as an example. The book centers on a boy named Roy who becomes involved in a fight against the construction of a pancake house on top of endangered burrowing owls habitat. When coded, the owls represent an animal primary character. Since the owls are wild, they fall into the wild character type. The fight against the human’s planned destruction of nature is a human induced conflict. Due to the children’s passion and activism, the book conveys an ECO message.

We understand that the selection and coding of primary characters and character type, environmental conflict, and overall message, was arguably subjective. Yet, as previously described, we followed examples set forth in existing literature whenever possible. Our coding selections were necessary in order to conduct our study. Additionally, we coded the books without considering their relation to the societal norms at the time of their publication, which may inadvertently trivialize books that were considered “progressive” upon publication. We excluded considering the books’ historical social relationships because current readers can still access older books and will judge them based on today’s environmental standards. Last, the coding took an adult perspective and does not account for potential differences in content processing between adults and children.

Historical Periods

We analyzed content levels between what environmental historian Samuel Hays (1982) has termed the “conservationist” and “environmental” attitude periods occurring during the 20th century in the United States. The shift from conservationist to environmental attitudes occurred sometime after World War II (Hays 1982). We selected 1956 as the year representing this change because in 1956 there were legislative pieces that highlighted the shift away from harnessing natural resources for human benefit towards protecting the environment for human consumption. These legislative pieces include the failure to pass the Echo Dam project and subsequent protection of parks and monuments as outdoor recreation spaces (Petulla 1988), the Mission 66 plan for national park development, and the Federal Water Pollution Act supporting clean drinking water (Nash 1990).

Analyses Used

In order to examine the environmental content that children are exposed to as they grow up, we compared the overall quantities of environmental primary characters, conflicts, and messages found in the books between the two medals since the medals target different audience age groups. Based on the total quantities of the variables, we then built cumulative relative frequency graphs that allowed us to visualize how much each year contributed towards the total quantities of the variables we analyzed.

For each variable examined, we used student T-tests to test for significant ($\alpha = 0.05$) differences in content level quantities between the pre-1956 and post-1956 periods. We calculated the average slope value of 10 randomly selected 5-year spans per period and tested for significant ($\alpha = 0.05$) differences between average slope values. When we found significant differences in content level quantities between the conservationist and the environmental periods, we then compared the periods' slopes to determine which period had greater quantities of environmental content.

Four content types were excluded from statistical historical analysis due to low occurrence in the books- the landform, natural object, and natural process primary characters, and the folklore/fantasy character type. Additionally, the human survival conflict variable was not present in Caldecott books and so was excluded from some analyses. Due to these exclusions, this study examined a total of 19 content variables.

Results

Overall, less than 50% of the books in each sample contained environmental characters (**Table 3**). Animal characters represented more than 75% of the total environmental characters portrayed in each sample, and the wild animal character type was the most represented type in both medals (**Table 4**). Qualitatively, Caldecott books showed a more balanced variety of character types compared to the Newbery books, which focused on wild and domestic animals (**Table 4**).

Table 3 Number of books containing environmental content.

	Caldecott	Newbery
Total books in sample	332	403
Books containing environmental characters	164	106
Books containing environmental conflict	73	82
Books containing environmental messages	73	82

Both samples primarily portrayed naturally occurring environmental conflict (**Table 4**). Newbery books contained all possible conflict types while Caldecott books did not contain the human survival conflict type (**Table 4**). Both samples contained more ENV messages than ECO messages, with ENV messages representing 57.5% of Caldecott messages and 54.9% of Newbery messages (**Table 4**).

The frequency of environmental content found within the samples generally increased most during the mid-1900s (**Figure 1**). For 15 of the 19

variables there was a significant ($\alpha=0.05$) difference in the quantity of environmental content between the pre-1956 (conservationist) and post-1956 (environmental) periods (**Appendix 1**). All 15 variables had greater levels of environmental content during the pre-1956 conservationist period (**Appendix 2**).

Table 4 Summary counts of the environmental content types portrayed in the books sampled.

	Caldecott	Newbery
Animal characters portrayed		
Wild	58	40
Folklore	50	9
Anthropomorphic	40	16
Domestic	34	38
Total animal characters portrayed	182	103
Environmental conflict types		
Natural	46	27
Human survival	0	26
Human induced	14	25
Fantasy	13	4
Total conflict types portrayed	73	82
Environmental message types		
ENV	42	45
ECO	31	37
Total messages portrayed	73	82

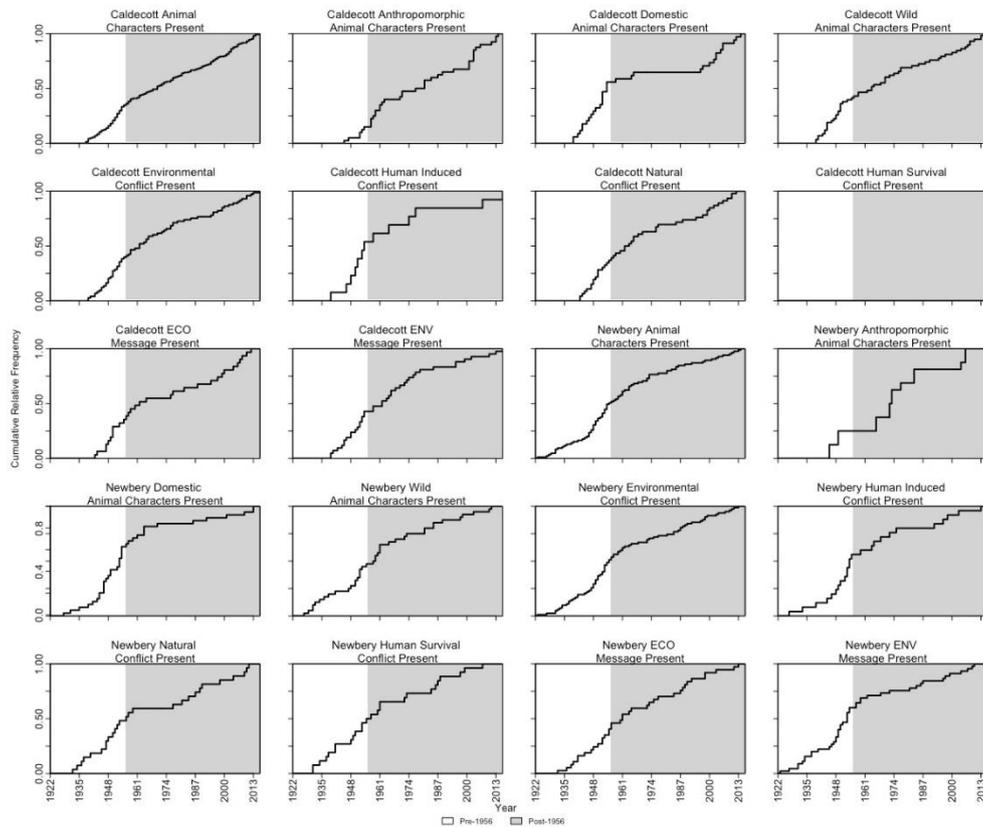


Figure 1 Cumulative frequency graphs showing how quickly the content levels of environmental variables increased over time.

Discussion

Environmental Content in Caldecott and Newbery Medal Winning Books

We found low quantities of environmental content in Caldecott and Newbery books overall and prominent preferences for specific content types. Less than 50% of Caldecott and 30% of Newbery books contained environmental characters, and less than 25% of books in each medal contained environmental conflict and messages (Tables 3 and 4). The low quantities of these environmental elements found in award-winning books are worrisome since they suggest that these books have given only a limited contribution to the development of children's environmental awareness. Understanding that early exposure to environmental ideas through children's literature can enhance long-term environmental relationships (Eagles and Demare 1999), high quantities of environmental content in children's literature are a key element to support developing environmental awareness.

If we plan to use children's books as a tool for factual environmental education, some types of literary content are arguably better than others. According to environmental educators and researchers, literary environmental portrayals should be factually accurate and realistic if we want to use literature to promote environmental education (Ganea et al. 2014; Rule and Atkinson

1994; Wells and Zeece 2007). Within our study, domestic and wild characters, as well as human induced, natural, and human survival conflict, would be considered environmental portrayals that support environmental education. We found that Caldecott and Newbery books primarily portrayed wild animals and natural conflict (**Table 4**).

While the prominent presence of wild animals and natural conflict likely works to increase accurate environmental understanding that children may carry into adulthood, the dominance of wild animal characters and natural conflict in both medals is also concerning. In fact, by being exposed primarily to these two types of content, children are not being exposed to other facets of the complex human-nature relationship. As a consequence, children can only gain a shallow understanding of the complex environmental and socio-environmental issues we face today. Researchers have found that children often have limited knowledge of how humans, nature, and science relate to each other. A study by Littledyke (2002) found that children often lack broad environmental understanding as they cannot easily contextualize their knowledge of the environment to social and natural problems, and that their primary environmental concerns relate to animals. Additionally, children often do not fully understand other non-animal environmental aspects, such as earth science concepts (Dove 1998). Children's literature could help bridge these gaps, however the dominance of wild animal characters and natural conflict does not support such efforts.

Certain types of environmental content may weaken or lead to incomplete environmental understanding. For instance, anthropomorphized animals and language can reduce children's ability to learn animal facts (Ganea et al. 2014), likely since anthropomorphism reduces educational tone (Burke and Copenhaver 2004). Our study found that anthropomorphic and folklore/fantasy animals composed ~50% of Caldecott animals shown (**Table 4**). While these types of animal characters may support cultural awareness, they likely do not contribute to furthering children's factual knowledge of the environment. The presence of anthropomorphic and folklore animal characters may actively weaken environmental learning and reduce opportunities for realistic animals to influence accurate childhood environmental knowledge.

Further, the fact that Caldecott and Newbery books contained more ENV messages than ECO messages (**Table 4**) perpetuates the idea that these books convey only a shallow knowledge of the environment. ECO messages likely support the development of a childhood environmental identity, which researchers suggest strengthens adult environmental involvement (Chawla 2009; Wells and Lekies 2006), whereas ENV messages use the environment as an afterthought. Therefore, we would prefer children to receive ECO messages over ENV messages in order to develop childhood environmental responsibility. Worryingly, we found that less than 25% of Caldecott and Newbery books contained ECO or ENV messages at all (**Table 4**). If children's texts rarely contain any messages that promote a sense of environmental responsibility, as we found, then adults may experience environmental detachment despite pressing environmental challenges.

Historical Events and their Influence on Environmental Content

Our finding that environmental content levels were significantly ($\alpha = 0.05$) lower after 1956 compared to earlier levels (**Appendix 1 and 2**) may support environmental historians who propose that a change in U.S. environmental attitudes occurred in the mid-1900s. As technology shifted the U.S. standard of living, people focused on improving their quality of life instead of on their basic survival (Hays 1982). This change in lifestyle expectations was reflected in increasing suburban sprawl (Rome 2001), outdoor recreation (Petulla 1988), and concern for harmful pollutants (Council on Environmental Quality 1970; Petulla 1988). As a result, authors growing up after 1956 likely had less daily exposure to the environment compared to their predecessors, especially if they lived in the suburbs or cities. We speculate that this distancing from daily human-nature interactions is reflected in our finding that environmental content levels were lower after 1956 than beforehand.

Modern Day Implications

Overall, our results suggest that – especially after 1956 – Caldecott and Newbery books have not particularly fostered children’s broad environmental understanding since they (a) seldom expose children to environmentally-related content, and (b) convey only a shallow idea of the complex environmental and socio-environmental issues we face today. Our findings are consistent with those of William et al. (2012), who suggest that children’s books are not socializing modern day readers to environmental elements. Consequently, readers of these award-winning books may not develop strong relationships to the environment since they do not receive environmental messages through literature. This represents decades of lost opportunities to develop informed, interested, and environmentally aware citizens.

Although further research is necessary, our findings offer one explanation as to why recent U.S. leaders, who were primarily born after 1956, are often unwilling to address environmental issues in meaningful ways. For example, although the U.S. signed the Kyoto Protocol in 1998, congressional opposition ensured that this pledge to reduce greenhouse gas emissions was never ratified (Reynolds 2001). In 2017, the U.S. withdrew from the Paris Agreement designed to fight climate change by reducing carbon emissions (Erlanger et al. 2017). Recent U.S. leaders have arguably failed to reach a cohesive environmental platform, wasting valuable time in the fight against climate change. Looking ahead, given our current and forecasted environmental issues, the potential implications of continuing to have an environmentally detached populace are – to say the least – worrisome.

Books are not the only influential media that children engage with. As Caldecott and Newbery environmental content slowed, other medias such as television, the internet, and magazines were rapidly changing. These medias can also convey environmental content. In order to better quantify how well (or how poorly) we are helping our children become aware of the environment and its challenges, we urge future studies to see whether our findings and those of Williams et al. (2012) are consistent across multiple medias. Further research can also apply environmental content analyses to children’s texts found across the globe, allowing us to generate a more comprehensive understanding of how children’s literature is influencing future generations.

Children's books have the potential to positively influence children's and adult's relationships with the environment (Ballantyne et al. 1998; Chawla 2009; Eagles and Demare 1999), but harnessing this tool to promote long-term environmental interest will require the support of numerous participants. We believe that authors and publishers should be aware of the role they can play in developing environmental awareness. We are aware that it may be challenging to include accurate and meaningful environmental content in children books, but successful examples are available and such books should be favored. Further, consumers, such as parents and teachers, must also participate by selecting and engaging with environmentally related books. Every opportunity to create a strong and long-lasting relationship between a child and his or her environment must be used to its fullest potential if we want to successfully address the environmental challenges of today and the foreseeable future.

Conclusion

Laying the foundation for environmental responsibility in childhood through literature is a crucial step towards developing a populace that actively supports environmental sustainability. Our analysis of Caldecott and Newbery children's literature suggests that we have not taken advantage of this opportunity, especially over the past sixty years. The lack of environmental content in Caldecott and Newbery books in the United States, and perhaps in children's literature on the whole, offers one potential explanation as to why we currently face environmental challenges and why the U.S. often fails to act in an environmentally sustainable manner. If we want to overcome the pressing environmental issues that we face today and will face in the coming decades, then we must recognize the role of children's books, and possibly other medias, in shaping long-term environmental behaviors. We will likely need to reorient the environmental content that children are exposed to in order to develop citizens who are willing to tackle environmental challenges.

Disclosure statement

The Authors reported no competing financial interest.

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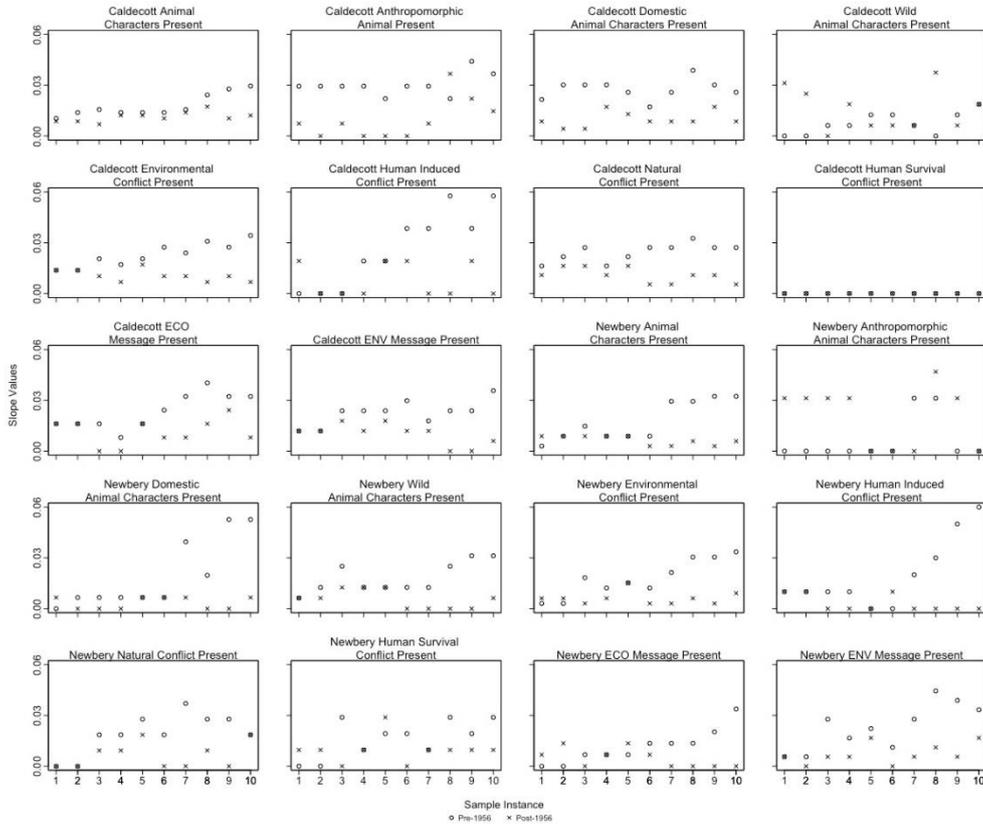
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Appendix 1

Results of student-T tests between pre-1956 and post-1956 group means to test for statistical difference in content levels between the groups at $\alpha = 0.05$.

	Caldecott t-critical value	Observed Caldecott t-value	Significance	Newbery t-critical value	Observed Newbery t-value	Significance
Animal Primary Character T/F	2.10	2.84	Yes	2.228	2.93	Yes
Anthropomorphic Animals	2.10	-1.82	No	2.228	-1.99	No
Domestic Animals	2.10	4.77	Yes	2.228	2.49	Yes
Wild Animals	2.10	7.56	Yes	2.228	3.74	Yes
Environmental Conflict Present	2.10	4.98	Yes	2.228	3.23	Yes
Human Induced Conflict	2.10	2.47	Yes	2.228	2.55	Yes
Natural Conflict	2.10	6.23	Yes	2.228	2.90	Yes
Human Survival Conflict	2.10	N/A	N/A	2.228	1.56	No
ECO Messages	2.10	2.95	Yes	2.228	1.85	No
ENV Messages	2.10	4.09	Yes	2.228	3.45	Yes

Appendix 2



Scatterplots showing the slope values between the conservationist (round) and environmentalist (crosses) periods to understand which period had greater levels of environmental content.