

Loss for Words: Attrition of Nature Vocabulary Among Younger Speakers in a Montana English Speech Community

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Abstract

This research assesses the state of English nature vocabulary in Montana, defined here as words and terms relating to local species, weather, and topography. Studies have shown declining levels of nature knowledge amongst English speakers as well as a marked decrease in the usage of nature words in English popular culture throughout the 20th century, and while studies across disciplines point to a growing disconnect between humans and their environment, researchers have yet to investigate the role of vocabulary and language attrition in humans' changing experience of nature. This study develops a new survey instrument to gather vocabulary data from Montanans, aiming to gauge depth and diversity of nature terminology knowledge as well as attitudes about language and environment. Demographic information gathered in the online survey is used to analyze trends in the data based on age, community type, and other participant features. Analysis of this data is based on UNESCO's (2013) Language Vitality Assessment model, a framework designed to quantify language loss and investigate the drivers of language change; the project is also informed by research on environmental literacy and education. This paper proposes that extending the language model to nature vocabulary will cast light on how vocabulary attrition or dynamics may be compared to well-established processes of language change, thereby advancing our understanding of language attrition. The project will be the first quantitative assessment of nature vocabulary in the United States, and the survey instrument has potential for further development and use in other states.

Keywords: Nature Vocabulary, Lexical Loss, Ecological Literacy

1. Introduction

This paper explores a case of intergenerational lexical loss within the nature vocabulary of a Montana English speech community. To investigate widespread but unsubstantiated claims of an intergenerational decline in knowledge of nature lexicon in English (defined in this project as local species, weather, and topography terminology), a new survey instrument was designed and implemented to gather demographic and lexical data from Montanans, resulting in the first qualitative assessment of nature vocabulary in English.

Studies have shown declining nature knowledge among English speakers as well as a decrease in the usage of nature words in English popular culture throughout the 20th century.^{3,10} This change was first brought into the public eye when the Oxford English Dictionary removed a selection of nature words from its Junior Dictionary following a decline in usage among children, prompting outcry from the community. A letter was penned to Oxford University Press by prominent British authors, environmentalists, and thinkers claiming that the removal of the fifty-some nature-related words and names from the children's dictionary (including *blackberry*, *acorn*, *badger*, *buttercup*, *otter*, and *wren*)—and the simultaneous addition of “indoor” and technology-related terms (such as *Blackberry*, *chatroom*, *broadband*, and *cut-and-paste*)—was symptomatic of the growing divide between people and the natural world.² Further research seemed to support this concern. One study showed British children more capable of identifying Pokémon “species” than common British flora and fauna; another discovered a marked decline in the usage of nature

words in English-language texts over the 20th century.^{3,10} Though studies across disciplines point to a growing disconnect between humans and their environment, research until now has failed to directly investigate the role of language in humans' changing experience of nature, or to assess the use of nature words in a real speech community.

The survey instrument developed in this study gathered demographic information and vocabulary data, aiming to gauge speakers' depth and diversity of nature terminology as well as attitudes about language and the natural environment. The results of that survey are interpreted as an indicator of lexical attrition or change in a non-endangered language. The data point to an age differential in vocabulary knowledge that both highlights the importance of intergenerational lexical transmission on younger speakers' nature knowledge and suggests a number of pathways for future research. The primary research question investigated in this study is the following: (1) Is there an intergenerational decline in nature vocabulary proficiency among Montana English speakers? Establishing a baseline measurement of vocabulary vitality across age groups aids in proving or disproving the purported vocabulary degradation. The secondary question is as follows: (2) Can change within a particular semantic domain be compared to, and analyzed similarly to, processes of broader language attrition? The case of the English nature vocabulary is used to demonstrate that modern instruments for measuring degrees of language endangerment may be extended to the lexical domain to provide a framework for conceptualizing factors associated with attrition and assessing degrees of endangerment at the lexical level.

2. Methodology

2.1 Participant Demographics

As previous studies have not attempted to assess nature vocabulary in terms of real language use in a speech community, it was necessary to invent a method of measuring the lexicon in its current usage among Montanans. An online anonymous survey instrument was developed to gather vocabulary data from participants through a naming task, as well as collect demographic data and additional participant information such as nature experiences and feelings about nature. The survey was conducted using Qualtrics and circulated for a period of three weeks. An earlier version of the complete survey was piloted on a test group of ten participants representing different age groups and backgrounds, who were also invited to take the final survey upon its publication. Excluding the pilot survey, 142 responses were recorded in total, though the sample was reduced to 83 participants after the application of several constraints listed below. Gender and ethnicity were not equally represented in the participant pool, which was largely female (around 77% of the sample) and white (95%). To be counted in analysis, the participant must have completed the survey in its entirety, and have met the following criteria:

- a. Birth year indicated
- b. L1 English speaker
- c. Montana resident (at some point in lifetime)

As the participant pool was self-selecting and the survey used non-probability sampling, the population represented in the survey is not a random sample and therefore does not perfectly reflect the demographics of the larger Montana English speech community. Furthermore, the survey potentially attracted more environmentally inclined participants due to its subject matter, and the sample may have been biased toward those with a more developed nature vocabulary because of this appeal. Finally, some demographics may be underrepresented due the electronic format of the survey, which could deter participants less comfortable with computers and cellphones or those without access to Internet devices.

Though other information was collected for future research and correlation with existing research in related fields, the only demographic factor analyzed in this study was participant age. Three points of apparent low statistical significance were located in the sample due to the self-selecting nature of the population. Participant birth year ranged from 1939 to 2001, and participants were divided into age cohorts by birth decade. With only one participant born in the 1930s, only two participants born in the 2000s, and only three participants each in the 1970s and the 1980s, these three points often appear as outliers in the data. I suggest this pattern may be at least partly explained by the relative dearth of respondents for these age groups, and anticipate that those anomalous data points would fall closer to the trend line if more participants were recruited.

2.2 Survey Instrument

The survey consisted of 95 multiple-choice, Likert-type, and open-ended question items divided into four sections: 1) Demographic Questions, 2) Identification Questions, 3) Experiences, and 4) Attitudes. The fifteen demographic questions targeted factors known to affect ecological literacy such as age, ethnicity, level of education, and gender.¹ This section also included questions regarding community type (rural, semi-rural, or urban/suburban), history of employment or education in environmental sectors, and number of years the participant lived in Montana. The key demographic factor in this study is age, but because the study was the first of its kind to be conducted on an English speech community, additional information was collected to serve as a baseline study for future research and for correlation with existing research on ecological literacy.

The second and largest section consisted of a 56-question naming task designed to elicit word lists and simple one-term or short-answer responses prompted by textual, visual, or aural stimulus. Items for identification in the naming task were selected based not only on their commonness in diverse Montana environments but on their salience to Montana English speakers. Plant, tree, animal, bird, insect, and fungus species were chosen to cover the bases of general nature knowledge. Species were selected with input from a biologist with expertise on Montana wildlife to ensure that the species selected were known and likely to have been seen by rural- and urban-dwelling Montanans alike, and that the species were distributed in habitats across the entire state to counter geographical bias (D. Emlen, personal communication). Each question in the naming task was chosen to reflect one or more of three specific aspects of nature vocabulary proficiency identified early in the research: (1) awareness of referent, (2) diversity of terms, and (3) depth of specialized knowledge. The first of these elements draws upon the theory in environmental education and ecoliteracy research of general awareness as the base of ecological literacy,⁵ in this case extending the role of awareness into the linguistic domain where it may represent a necessary base for the development of a complex nature lexicon. The second component is diversity of terms, defined as the number of different terms in a participant's vocabulary for a given local species referent: is more than one word in use for a single referent, and if so, how many of those terms can the participant supply? Does a greater diversity of names come from a certain age cohort, or are there any other correlations between the number of names provided per referent and performance on other sections of the test? Research on folk taxonomy and classification of natural kinds has shown that greater cultural, economic, or utilitarian value placed on a referent can be reflected by a greater number of names.⁶ The third and final aspect of vocabulary proficiency identified is depth of specialized knowledge, which refers to the degree to which participants can differentiate within a given category: does the participant's vocabulary permit them to distinguish (linguistically) between different species of conifer, or restrict their naming capacity to the generic category "pine tree" for both Ponderosa pines and Douglas firs?

The final two sections of the survey collected data on participants' personal relationship with nature. The 11 questions of the Experiences section gathered information about participants' interactions with nature both in daily life (for example, the location of the participant's home in an urban versus rural setting, amount of time spent in nature, and satisfaction with that time) and over the course of their lifetime (time spent in nature during childhood, and perceptions of when and from which sources nature words and knowledge were acquired throughout their lifetime.) The final Attitudes section of the survey prompted participants to reflect on their attitudes toward the environment and conservation, feelings of nature connectedness, and the personal significance of naming and identification of nature; this section also elicited responses concerning participants' perceptions of younger and older speakers' nature vocabulary. These were the only questions on the survey to directly enquire about language ideologies. The ten items in the Attitudes section were formatted as a statement, and participants indicated the degree to which they agreed with each statement on a five-point Likert scale from "strongly agree" to "strongly disagree". Data from these sections were not analyzed in conjunction with data from the naming task, but remain an area for future research.

3. Data

Analysis of the survey data focused on scores from the naming task correlated with participant age. The data was analyzed in Excel, with birth decade as the independent variable to evaluate the hypothesis that age positively correlates with nature vocabulary proficiency. The three types of identification questions in the naming task (listing, simple identification, and complex identification questions) were each scored according to a different system, assigning positive and negative number values for correct and incorrect terms provided by participants, as well as

fractional values assigned to hypernyms and generic names to reflect depth of specialized knowledge. The scores were then plotted by birth decade to observe overall trend lines for each question.

The result was a consistent positive association between age and naming ability across all three question types, confirming the hypothesis that younger speakers are less proficient at naming and identifying items in their natural environment than older speakers. Nearly all questions exhibited a decrease in lexical proficiency, lexical productivity, and general awareness as age decreased. Most graphs showed an abrupt drop or spike in performance around the birth decade of the 1970s and 1980s, and occasionally in the 1930s and 2000s as well; as discussed in Section 2.1, I suggest this can be at least partially attributed to the relatively small sample size for those groupings.

Aside from this anomaly, nearly all questions in the naming task showed a consistent downward trend in vocabulary proficiency as age decreased. In the listing questions, the data showed that younger participants were considerably less productive on average than the older participants, able to list fewer names for each given category. Where fewer participants were represented for the 1970s-80s, most graphs showed that vocabulary proficiency either lay close to the trend line or dropped dramatically. In this section, all questions showed a marked downward trend in naming ability as age decreased, with one exception (Q3.7, “What kinds of snakes are found in your area?”) showing no significant trend. Figure 1 below shows an example of the trend most often observed in the listing questions, representing number of terms provided by birth decade:

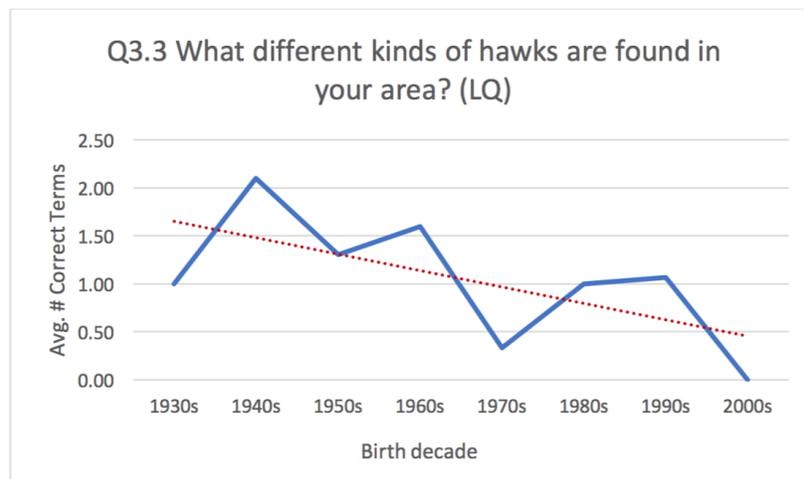


Figure 1. “What different kinds of hawks are found in your area?”

Analysis of data from the simple identification questions confirmed the trends observed in the listing questions. Correctness and number of correct terms both decreased with later birth decades, this time indicating decreasing awareness among younger participants as well as decreased productivity. On average, older participants were more able to correctly identify the referent described in the definitional prompt than younger participants. The 1970s-1980s anomaly was very pronounced in this dataset, falling considerably below the trend line. The graph below in Figure 2 illustrates correct responses to Q3.12, “What kind of tree produces acorns?”, by birth decade:

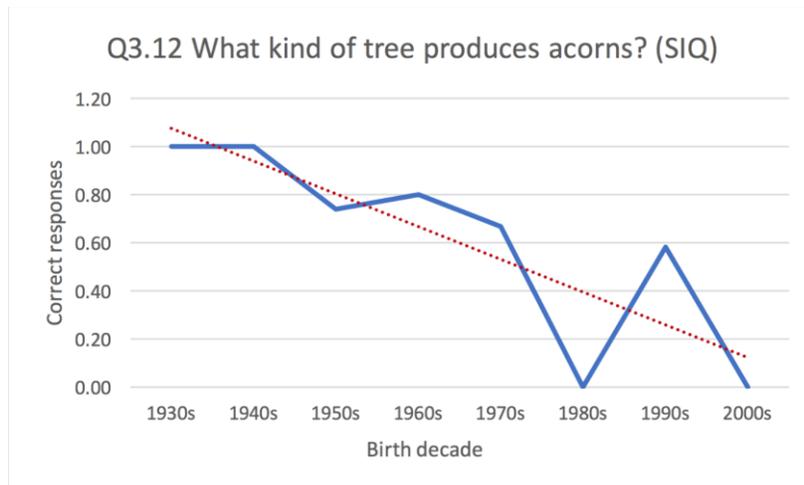


Figure 2. "What kind of tree produces acorns?"

Complex identification questions were scored and graphed separately for each of the two components, CIQA (recording awareness of referent) and CIQB (measuring naming ability). Analysis of the CIQB data once again showed an overall positive correlation between age and vocabulary proficiency. This section showed the greatest number of inconsistencies of any of the question types, with the trend line in certain questions running contrary to the pattern observed throughout the rest of the dataset, indicating a negative correlation. Where the outliers in the 1970s-1980s were considerably distanced from the trend line, they usually fell beneath the rest of the scores. In general, CIQA trends paralleled trends in the identification scores, although in some situations the two trends opposed one another, illustrating an interesting disparity between awareness (perception of having seen/been exposed to the referent) and identification (knowing what the referent was). Generally, CIQA trends indicated a positive correlation between age and awareness of referent.

Identification trends were inverse for great-horned owl and sandhill cranes (although the rising identification trend for sandhill cranes did not appear significant.) For these two examples, younger participants averaged more correct answers than their older counterparts. Awareness trends were inverse for the following referents: spotted knapweed, morel, mourning cloak, sandhill cranes, coyotes, and elk. For these examples, young participants indicated having seen or heard the referent more than older participants on average. Interestingly, these exceptions to the general trend show that for knapweed, morel, mourning cloak, coyotes, and elk, younger participants reported having been exposed to the referent, but could not name it. Figures 3 and 4 below represent the respective Awareness and Identification trends in responses to an image of bindweed:

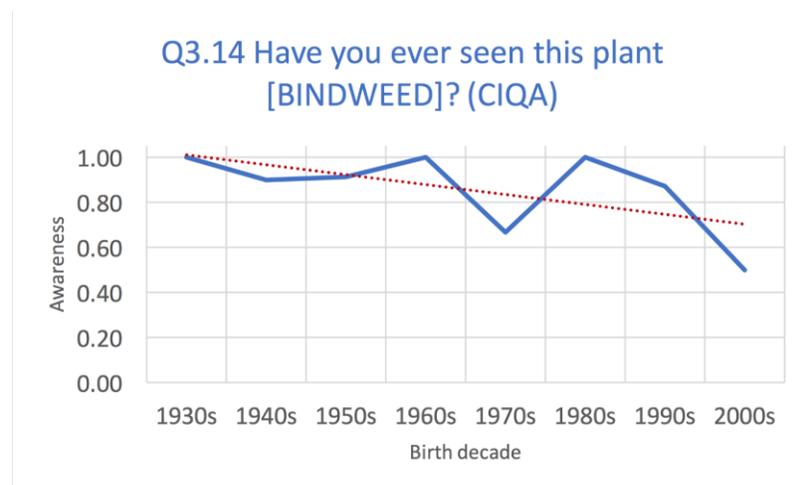


Figure 3. Awareness score (Q3.14)

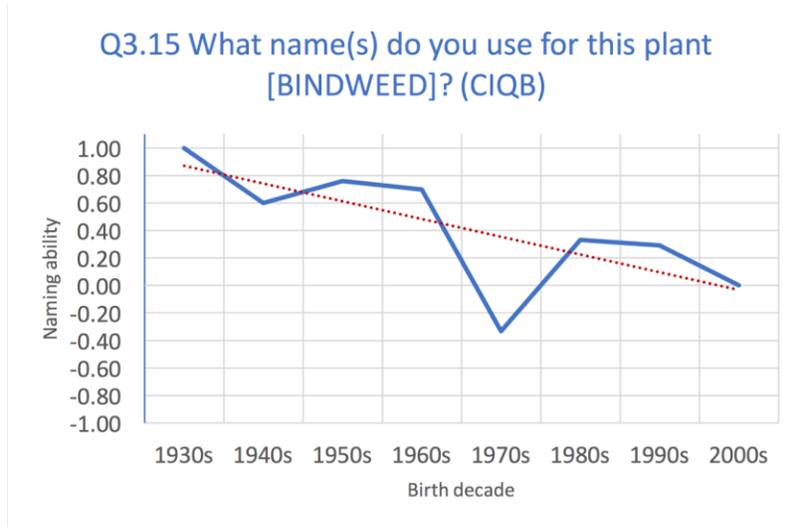


Figure 4. Identification score (Q3.15)

Analysis of the combined average scores across all questions in the listing section of the naming task yielded a view of what appears to be a sudden and very dramatic drop in vocabulary proficiency and productivity between the groups of participants born before and after the birth decade of the 1970s, with scores appearing to decrease by nearly half of what previous generations had demonstrated (Figure 5 below).

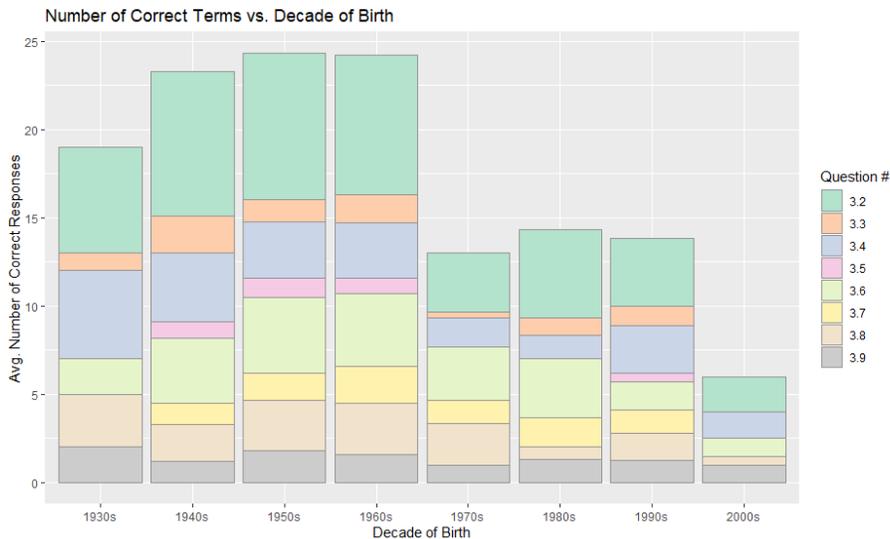


Figure 5. Average responses to listing questions by birth decade.

The occurrence of this gap roughly coinciding with the 1970s-1980s anomaly observed throughout the data sets could imply that the decrease is due to sampling error, though this seems unlikely as the scores for succeeding age groups did not return to higher scores closer to the trend line, as usually occurred following the anomalous data point in the graphs. Additionally, a small number of questions were excluded from data analysis, in cases where (a.) all or nearly all participants correctly identified the referent (for example, the unanimous successful identification of a bighorn sheep), or (b.) responses were so inconsistent as to indicate that the referent was not salient or recognizable to most participants (such as perceiving the difference between a yellow jacket and a wasp).

4. Discussion of Nature Word Loss in a Language Change and Endangerment Context

Analysis of the data gathered in this research substantiates claims of attrition in the semantic domain of nature vocabulary for the Montana English speech community. The data indicate an intergenerational gap or decline in the transmission of the nature lexicon from older speakers to younger speakers. What factors could be responsible for this lexical shift, and what kind of social or linguistic processes might be negatively impacting vocabulary vitality in this domain? According to the UNESCO 2003 Ad Hoc Expert Group On Endangered Languages, “a language is in danger when its speakers cease to use it, use it in an increasingly reduced number of communicative domains, and cease to pass it on from one generation to the next.”¹⁹ While the English language is in no danger of becoming extinct in the immediate future, the data revealed in this study indicate that the same may not be true for the nature words embedded within it. What is the fate of a lexicon whose speakers cease to use it, use it in increasingly fewer domains, and cease to pass it on to younger generations?

UNESCO’s (2003) framework “9 Factors for Language Vitality” is one of the most comprehensive instruments for measuring degrees of language vitality or endangerment. The framework identifies nine major factors for evaluation which are analyzed together to produce a measure of vitality:

Factor 1. Intergenerational Language Transmission

Factor 2. Absolute Number of Speakers

Factor 3. Proportion of Speakers within the Total Population

Factor 4. Trends in Existing Language Domains

Factor 5. Response to New Domains and Media

Factor 6. Materials for Language Education and Literacy

Factor 7. Governmental and Institutional Language Attitudes and Policies, Including Official Status and Use

Factor 8. Community Members’ Attitudes toward Their Own Language

Factor 9. Amount and Quality of Documentation¹⁹

The above criteria should cooperate to yield the most integrated classification of endangerment status; a language’s degree of vitality cannot be determined based on the analysis of one factor alone.¹⁹ While using this system to assign an exact grade to the vitality of a semantic domain was not feasible within the scope of this study, in this section I propose that the factors outlined above may prove useful in understanding the underlying causes, agents, and indicators of systematic lexical loss in the situation of nature words among Montana English speakers. Additionally, it is important to note that the precarity of nature vocabulary in English, a large and influential language in no danger of extinction, does not remotely approach the massive and irreversible loss that the extinction of the world’s linguistic diversity poses to collective knowledge and Indigenous cultural identity. Nature vocabulary in English is still well documented and preserved, as discussed in Section 4.3 below, unlike lexica in many undocumented endangered languages.

4.1 Intergenerational Lexical Transmission

The most critical element for measuring degrees of language endangerment is intergenerational transmission, which is both an essential factor for language vitality and crucial indicator of language shift. Studies have shown that parents play one of the most significant roles in teaching children about nature and modeling nature engagement, and that people who reported parents or relatives as the primary source of ecological knowledge are among the most successful in identifying plants and animal species.^{9,16} This evidence for the importance of intergenerational knowledge transmission implies that a generational decline in usage of nature words certainly bears an effect on succeeding generations’ acquisition and knowledge of the nature lexicon. With younger participants falling considerably behind their older counterparts in naming ability, the data revealed in this study clearly indicate an intergenerational decline in nature vocabulary in the Montana speech community that points to decreasing transmission of nature words. As the passing down of knowledge and attitudes about nature has been shown to be one of the most important factors determining the acquisition of natural knowledge and ways of engaging with and knowing nature, and as language and nomenclature encodes this knowledge, previous generations’ usage and transmission of nature words to

succeeding generations can certainly be identified as a factor of the decreasing trends in connectedness with nature and natural naming proficiency.

4.2 Domains of Usage and Response to New Media

Ecological knowledge is “acquired through frequent interaction with the local environment driven by a need to pursue daily subsistence strategies for food and economic provision.”¹⁵ With over half of the global population living in cities and a projected increase in urbanization in years to come, it is no surprise that nature knowledge plays a less prominent role in many English speakers’ lives.²⁰ Analysis of the 2017 Nature of Americans Report found the most popular outdoor activities among American children to be recreational; among the least popular activities were hunting and fishing, growing indoor plants, and helping with yard work.⁹ These statistics suggest that children may conceptualize nature as recreation rather than subsistence. Naming of natural species develops much more elaborately when people rely on those species for survival.⁶ With fewer people depending directly on the earth and natural systems for subsistence (i.e. subsistence farming, hunting, and other land-based livelihoods), it follows that the lexicon of those domains should become nonessential.

Another domain which seems to be undergoing lexical shift is the domain of child play. Children are leading increasingly indoor childhoods, and list the draw of TV and video games among the reasons they do not play outside.¹² While the present study did not assess the vocabulary of participants under the age of eighteen, some inferences may be drawn based on existing research on natural childhood and ecological literacy among children. Some studies support the oft-suggested correlation between technology usage and decline of nature play.^{8,12} Studies show that gaming words and names may be more prevalent than nature names among children³; subsequently, the Oxford Corpus summary of recent children’s writing found that themes of social media and internet fame have risen, reflected by the constant addition of new technology and gaming words.¹⁴ These data suggest that nature vocabulary, once stable in the domain of child play, may be falling out of use as a response to the influence of new, dominant lexicon for technology, gaming, and other indoor play.

4.3 Institutional Attitudes and Materials for Literacy

The most severely endangered languages lack written materials or an orthography available to the community, while languages considered stable or safe generally have an established orthography used in administration and education as well as media and materials for education and literacy.¹⁹ There are certainly many resources available for nature name-learning: dictionaries and encyclopedias, identification manuals, and educational children’s books, to name a few. However, children’s early picture books frequently feature exotic, non-local animals iconized in children’s taxonomic imagination from a young age in place of the local flora and fauna the child will observe and interact with near home as their naming skills develop. Similarly, much early species-education literature for children features cows, pigs, horses, chickens, and other typical farm animals with which many urban children may never interact. Because of the unequal ratio of place-based educational materials to place-generic education materials for children, young speakers may learn to name iconized animals such as lions and tigers before more unassuming local species like the wren. It is worth noting one educational resource directly addressing the removal of nature words by the *Oxford Junior Dictionary* mentioned earlier in this paper. Robert Macfarlane’s *The Lost Words* is an illustrated children’s book weaving a poem-like “spell” for many of the animal and plant names removed from the dictionary, intending to bring local, place-based wild words back into children’s vocabulary.¹¹ There is no dearth of written materials containing nature words in English, and the removal of nature words from the dictionary does not mean those words do not appear in centuries’ worth of other texts. However, the removal of those words from the children’s dictionary may indicate the beginning of a trend toward fewer easily accessible children’s educational materials.

4.4 Lexical Ideologies

Research on the lexicon of biosystematics in Indigenous endangered-language communities observes that speakers often consider their language as the sum of its words, and thereby conceptualize language loss as the disappearance of those words from the local culture and tradition.⁷ Words play a key role in constructing identity in Indigenous communities. Are similar sentiments towards special words felt in a community whose language is in no danger of becoming lost? It seems that, at least for the community members behind the letter to Oxford University Press², the answer to this question is “yes”. Anecdotally, in my interaction with Montanans over the course of my research, I observed that many friends, relatives, and acquaintances seemed to express embarrassment or shame surrounding their

ability to name things in nature, as though they felt that their underdeveloped natural lexicon reflected poorly on them in some way. While not recorded with any quantitative measure, this common reaction I observed of embarrassment for lack of naming proficiency seems to show that there is value placed on these words in the speech community.

A small selection of questions was included in the survey to record participants' ideologies surrounding the nature lexicon. The first of these questions asked the participant to rate their agreement with the following statement: "The ability to identify and name things in nature is important to me." Analysis of the responses to this item by age group showed that on average, the older the participant, the stronger the agreement with the statement: older participants considered the ability to name and identify things in nature more important than younger participants. In a subsequent question probing participants' thoughts about generational differences in vocabulary, a corroborating trend was observed: younger participants indicated that they believed older speakers to be more proficient at naming and identification than people of their own generation. These trends and the anecdotal evidence described above indicate that the value Montanans place on nature words is greater among older speakers, and that this value placement is reflected in their speech; not only this, but younger speakers seem to be aware of their relatively smaller nature vocabulary and may experience shame surrounding it.

5. Implications for Naming, Cognition, and Human Ecology

Countless vast systems of knowledge are encoded in the world's diverse languages, and with language as the main agent in cultural transmission, immense bodies of knowledge are lost when a language disappears.^{13,6} Research on ethnobotany, folk taxonomies, and other forms of traditional knowledge in Indigenous communities has found that irreplaceable value is embedded in specialized domains such as plant and animal taxonomies, and that this same value is lost when languages cease to be passed on from one generation to the next.^{4,6,21} Many Indigenous languages whose communities rely heavily on certain species or environments for subsistence develop incredibly complex and highly specialized lexical systems to categorize them; however, as urbanization advances and humans disconnect from nature, this environmental knowledge is lost.⁶ As discussed in Section 4.1.2, the decreasing lexicon for the natural world in English is likely a symptom of our growing disconnection from it. If words for nature are systematically disappearing from the English vocabulary, what will happen to the knowledge they encode? What implications might this vocabulary loss have on the way English speakers conceive of and act toward their natural environment? This question is perhaps more eloquently and provocatively phrased by American lepidopterist Robert Michael Pyle: "What is the extinction of a condor to a child who has never seen a wren?"¹⁷

In light of the vocabulary trends observed in this study, one might ask a slightly different question: What is the extinction of a condor to a child who has never *heard of* a wren? Language is "part of a complex ecology that must be supported if biodiversity is to be maintained".¹³ Childhood connection to nature and outdoor play has been shown to correlate with attitudes toward environmental stewardship.¹⁶ Considering this relationship, will generations with a depleted lexicon for nature form different attitudes toward the land and its management? As studies have shown that nature knowledge is best transmitted orally, the intergenerational transmission of vocabulary for nature may be crucial to the future of conservation: people are more likely to be aware of and care about those species with which they are more familiar.¹⁸ What are the consequences of a diminished lexicon for nature on future generations of conservationists and environmental stewards?

6. Conclusion

This study confirmed claims of a loss of nature lexicon among younger speakers in a Montana English speech community. A new survey instrument measured vitality within the semantic domain of nature vocabulary, collecting data on participant demographics, naming ability, and personal experiences with and attitudes toward nature. The resulting data proved that vocabulary proficiency positively correlated with age, with younger participants generally less able to correctly identify salient Montana species than their older counterparts and able to list fewer terms for a given category when prompted. Moreover, observations suggest that older speakers place more value on this lexicon than younger speakers, and, informally, that younger speakers are aware of this disparity and may be insecure about their performance. The results of the survey were interpreted using a framework for assessing degrees of language vitality in an experimental application of language loss measurement on lexical attrition. The intergenerational transmission of nature vocabulary among Montanans, shown in this study to be in decline, is crucial to its vitality, and may have implications for studies of language change. With generations becoming increasingly more distanced from

the environment and natural ways of life due to a variety of factors including urbanization, industrialization, use of technology, and “de-natured” childhood, younger speakers may change the way they conceptualize, categorize, and interact with the natural world, with potential implications for future environmental conservation.

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