# An Analysis of the Nonce－Words of Dr．Seuss 

Daniel TEUBER ${ }^{\dagger}$


#### Abstract

The books of children＇s author Dr．Seuss are filled with nonce－words－novel word formations that can only be understood within the context of the books．This paper is an attempt to analyze a subset of these nonce－words and their phonological and orthographical structure．A database of 377 words from 33 books was created and the words were analyzed in terms of their internal structure as well as in their context in the books．The author found that a significant amount of these neologisms were likely influenced by the poetic constructs of rhyme and alliteration．In addition，certain characteristics of the nonce－words were examined，and possible reasons are given to explain their use．These characteristics include unusual word－final double consonants， and the extensive use of the letter $z$ ．


## 1．Introduction

Dr．Seuss（1904－1991），whose real name was Theodor Seuss Geisel，was a writer and illustrator of over forty books for children，and a pioneer in books for beginner readers．His works are highly imaginative and often feature fantastic places，strange creatures，and impossible contraptions．This paper is an examination of a subset of nonce－words found in his works．Nonce－words，informally called nonsense words，but also known as neologisms or coinages，are found throughout children＇s literature，from Lewis Carroll＇s Jabberwocky to J．K．Rowling＇s Muggles．Matthews defines nonce－word as ＂a word coined on a specific occasion＂（265）and neologism as＂any new word which

[^0]is introduced into a language，by whatever process＂（261）．As Bauer notes，however， the term neologism usually refers to a new word which has been accepted to some degree into the language，whereas a nonce－word has not（38－40）．Murat further defines nonce－words as＂words which cannot enter the lexicon，not because of their structural properties，but due to their heavy context dependence and lack of referential utility in the world at large＂（169）．This definition seems to be the best fit for the coinages found in Dr．Seuss，which in large part serve to name his imaginative creations，and have not become part of the standard English lexicon．（Of the hundreds of words Dr． Seuss coined，only the word grinch（from How the Grinch Stole Christmas！）has become accepted English．）This paper examines a subset of the nonce－words found in the works of Dr．Seuss，namely those whose structures are not formed by regular morphological rules．In particular，I am interested in the phonetic and orthographic motivations behind the production of his＂pure neologisms，＂as defined by Geeraerts．That is，words＂created out of the blue，without starting from existing words or word formation rules＂（420）．

## 2．Procedure

In order to analyze broad patterns among his nonce－words，a lexicon of 377 items was created from 33 of Dr．Seuss＇s books．As I was chiefly interested in those nonce－ words whose meaning cannot be understood outside of their context，I decided not to examine the following types of nonce－words（hereafter type 1 nonce－words）：
a．words consisting of existing words and morphemes（e．g．elephant－bird（Horton Hatches the Egg，53），un－slumping（Oh，the Places You＇ll Go！，18））
b．words consisting mostly of existing words or morphemes where the existing words provide the meaning（e．g．quacker－oo（Dr．Seuss＇s ABC，40），whisper－ma－ phone（The Lorax，9））
c．existing words which have been slightly altered for comic effect，often to fit a rhyme，but maintaining their meaning（e．g．SeptUmber（On Beyond Zebra，16）， corn－on－the－cobsk（If I Ran the Zoo，42））
d．proper nouns which，while unusual in their combinations，are formed from legitimate names or words（e．g．Conrad Cornelius o＇Donald o＇Dell（On Beyond Zebra，1））
e．onomatopoeia（e．g．Gloing（Bartholomew and the Oobleck，25），Grum Grum

## (Mr. Brown Can Moo! Can You?, 21))

f. a combination of any of the above types (e.g. audio-telly-o-tally-o count (Dr. Seuss's Slee力 Book, 18) )
I did, however, consider nonce-words which fall into the following categories (hereafter type 2 nonce-words):
g. proper nouns for fictitious places or characters that do not occur in English (e.g. the Desert of Zind, Jo and Mo Redd-Zoff)
h. common nouns naming fictitious creatures or things (e.g. Wocket, Borfin)
i. nonsense words as interjections or magical chants (e.g. wista fista mista-cuff)
j. adjectives or verbs (e.g. gicky, snarggle)
k. words that are combinations of nonce-words and accepted words (e.g. Kwuggerbug, Crunk-car)

1. a new meaning ascribed to an existing word (e.g. Nook, Who)

A full list of type 2 nonce-words appears in the Appendix, along with sources and page numbers. Note that capitalization in the data generally corresponds to the capitalization found in the original texts, with the exception of words that were written in all caps, and does not indicate whether the word is a proper noun.

Many of Dr. Seuss's books follow a similar style of storytelling in which there is little plot, but instead showcase various creatures of Dr. Seuss's own invention. These books necessarily contain a large number of type 2 nonce-words. Books which fall under this category include On Beyond Zebra (47 such nonce-words), If I Ran the Zoo (37), There's a Wocket in My Pocket (34), and Did I Ever Tell You How Lucky You Are? (31). On the other hand, several of Dr. Seuss's "Beginner Books," including The Cat in the Hat and Green Eggs and Ham, as well as the books he wrote under the pseudonym Theo Lesieg have no instances of such nonce-words, and therefore were not included in this study. Although an extensive list, it is not an exhaustive list. First, not all of Dr. Seuss's books containing nonce-words were considered, nor were any of his early magazine publications or work in advertising. In addition, I may have inadvertently omitted nonce-words appearing in the works that were considered. Finally, it was often difficult to determine whether or not to include certain proper names, and as a result, proper names were often omitted.

In analyzing the data, I looked at several aspects of the nonce-words, including
the part of speech，the number of syllables and stress pattern，the orthography of the word，in particular unusual spelling combinations，as well as the context of the words， including whether the word was a part of an alliteration or rhyme．I considered looking at sound symbolism as a possible motivating factor，but after initially finding a lack of supporting data，decided in the end to forgo such an analysis at this time．

## 3．Results

Before looking at the motivating factors behind the type 2 nonce－words，and what factors influenced Dr．Seuss＇s word formations，I would like to examine some basic characteristics of the words．First，do his nonce－words belong to certain parts of speech more than others？This question is explored next．

## 3．1 Parts of Speech

Of the words chosen，most were nouns，with common nouns accounting for 61 percent of the words and proper nouns accounting for 27 percent．Figure 1 below shows the distribution of the words．


Figure 1．Distribution of nonce－words by part of speech．

Generally，Seuss invented words for his new creatures，places or things，but refrained in large part from coining new verbs and adjectives．When he did，he often made a simple vowel change to a word already in the passage，as in the nonce verbs strutch and streech from the verb stretch（Kwuggerbug，27），which I have decided to classify as type 1 nonce－words，and did not include in the data．For these reasons，verbs and adjectives may be slightly underrepresented，although nouns derived in this way（e．g．swampf
(Zebra, 23)) were also not included in the data. The short list of verbs, adjectives, and interjections in the data are given in table 1 below. Again, a complete list of all the words in the data is given in the Appendix.

## Table 1

Complete List of Verbs, Adjectives, and Interjections in the Data

| Verbs | Adjectives | Interjections |
| :--- | :--- | :--- |
| berk | bummbeling | Balber |
| bipping | cruffulous | fista |
| gleap | duddled | Fotichee |
| glump | flubbulous | Klay |
| klonk | gicky | Malber |
| puffle | Grinchy | mista-cuff |
| shlump | gruvvulous | Screebees |
| slupp | piffulous | Tidder |
| snarggle | punkerish | Tinkibus |
| spuggle | rippulous | Tudd |
| wub | smogulous | Winkibus |
| zoop | smoke-smuggered | wista |
| zum | snergelly | yopp |
|  | Soobrian |  |
|  | wubble-some |  |
|  | wuddled |  |

Under the category of interjections, 11 of the 13 words are found in magical chants by the King's royal magicians in the books The 500 Hats of Bartholomew Cubbins and Bartholomew and the Oobleck. These words appear above as separate entries, but they really belong together, as the word choice is influenced by rhyme and alliteration. I provide the context below:

Mix and mold the mystic mud
Malber, Balber, Tidder, Tudd.
Winkibus, Tinkibus, Fotichee, Klay,
Hat on this demon's head, Fly far away! (500 Hats, 31)

Shuffle, duffle, muzzle, muff
Fista, wista, mista-cuff. (Oobleck, 10)

### 3.2 Blends

A blend is a "word formed by joining the beginning of one word to the end of
another＂（Matthews，42）．Examples include smog（from smoke and fog），and brunch （from breakfast and lunch）．More so than compounds，blends require a certain amount creativity to form them，and may not be understood immediately，especially outside of context．It is also difficult to ascertain if a particular nonce－word is a blend or not，as the structure of a blend，by definition，only includes a small part of each combined word．Of the 377 words in the data，I found only four words which could be considered blends． They are given here in their context：

And that spot was so sticky．．．It was gummy and gicky．（Bippolo，48）

You＇re making smogulous smoke！（Lorax，40）
．．．a Stroodel，who＇s sort of stork，but with fur like a poodle．（Eggs，18）

A Thneed＇s a Fine－Something－That－All－People－Need！（Lorax，18）
The first，gicky，could be a blend of gummy and sticky（or possibly icky），or Seuss could have simply chosen the word to rhyme with sticky and alliterate with gummy．As for meaning，we can only surmise from the context that it is somehow unpleasant．The second word，smogulous，seems to be a blend of smog and ridiculous．As it contains the entire word smog，however，it may not technically be a blend．The third，Stroodel，is an imperfect blend of stork and poodle，with the $r$ of stork joining the consonant cluster at the beginning of the word，giving it the same pronunciation as the German pastry Strudel．Finally，Thneed is likely a blend of thing and need．This word is also interesting in that the consonant cluster thn does not occur in English．All in all，it seems that Seuss preferred compounds over blends，and even these four blends are not entirely transparent in their structure．

## 3．3 Rhyme

Next，we will look at the influence that rhyme has on the formation of Dr．Seuss＇s nonce－words．Consider the following passage from Did I Ever Tell You How Lucky You Are？：

He has to paint flagpoles on Sundays in Grooz．
How lucky you are you don＇t live in his shoes！

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Of the 33 books considered for this project, 30 were written in verse, and of the three written in prose, two contained sections written in verse which also contained nonce-words (the magical chants mentioned earlier in The 500 Hats of Bartholomew Cubbins and Bartholomew and the Oobleck). It therefore seems natural that rhyme would have an influence on the formation of the nonce-words. In fact, of the 377 noncewords, 217 (57.6\%) were attached to a rhyme. An additional 32 words (8.5\%) were rhymed with another nonce-word. This is represented in figure 2 below.


Figure 2. Percentage of nonce-words contained in a rhyme.

Without question, Seuss created many of his nonce-words to fit a rhyme. This is most easily seen in his book There's a Wocket in My Pocket, which was part of his Beginner Books series. In it, a child lists off the names of various strange creatures living in his house. Each creature's name rhymes with the place they are found:

I like the ZABLE on the TABLE. And the GHAIR under the CHAIR
But that BOFA on the SOFA ... Well, I wish he wasn't there. (16-17)
In another Beginner Book, One Fish Two Fish Red Fish Blue Fish, we can see more examples of this, as in the following:

It is fun to sing / if you sing with a Ying
My Ying can sing / like anything. (40)
It seems clear that in these examples the nonce-word is chosen to match an existing word. In other cases, it is not as clear. It is possible, though perhaps unlikely, that Seuss came up with a nonce-word that he liked and then found an existing word to rhyme with it. Consider the following, from Did I Ever Tell You How Lucky You Are?, in which an old man explains to a young man why he should feel fortunate:

And you＇re so，so，So lucky you＇re not a left sock，
Left behind by mistake in the Kaverns of Krock！（42）
Before this passage，the old man＇s examples refer to other people or creatures（and， in one case，a radish）．Here，the old man compares the boy＇s situation to that of an inanimate object，the＂left sock．＂Therefore，the argument could be made that sock was inserted to rhyme with Krock，and not the other way around．Still，in most cases of rhyming，the nonce－word seems to be formed from the existing word．

## 3．4 Alliteration

Now，consider the following passage，noting the alliteration of the b－words：
Be glad you don＇t work on the Bunglebung Bridge
That they＇re building across Boober Bay at Bumm Ridge．（Lucky，4）
In addition to rhyme，alliteration plays a role in Seuss＇s nonce－words，but to a smaller extent．Alliteration is the repetition of sounds at the beginning of a word or syllable（e．g．Mickey Mouse），and for this study I will consider alliteration between whole words（e．g．the Valley of Vung）as well as within a multi－syllabic word（e．g．Zinn－a－zu）． Of the 377 nonce－words， 107 （28\％）alliterate with another word． 14 percent of these words are also alliterations within themselves（e．g．tuttle－tuttle tree）．A further 32 of the 377 （ $8.5 \%$ ）are alliterations in themselves but not with other words．This is represented in figure 3 below：


Figure 3．Percentage of words found in an alliteration．

In a sense，rhyming and alliteration are complements of each other．In a rhyme， the ends of two words are the same，but the beginnings are different．In alliteration，
the beginnings are the same. It therefore follows that the more words are influenced by rhyme, the less they will be influenced by alliteration, and vice-versa. In practice, however, words may be influenced by both rhyme and alliteration, as the following example from There's a Wocket in My Pocket shows:

Some of them are very friendly. Like the YOT in the POT.
But that YOTTLE in the BOTTLE, Some are friendly. Some are NOT. (14-15)
Yot and Yottle rhyme with pot and bottle, and also are alliterations with each other, though a bit distant. A clearer example can be found in Dr. Seuss's Sleen Book:

At the fork of a road / In the Vale of Va-Vode (44)
Here Va-Vode is an alliteration with Vale (and within itself) and also rhymes with road. Likewise, in the example below, the alliteration Juggling Jott rhymes with not.

And you'll see in this spotlight / A Juggling Jott
Who can juggle some stuff / You might think he could not... (Circus, 18)
In fact, almost 19 percent of all the nonce-words from the data are influenced by both alliteration and rhyme. All in all, alliteration and rhyme, either working together or separately, influence roughly 84 percent of the nonce-words. This is illustrated in figure 4 below, which shows the percentage of rhyme influenced words (including rhyme with another nonce-word) and alliteration influenced words (including alliteration within a word).


Figure 4. Percentage of nonce-words influenced by rhyme and alliteration.

Looking more closely at alliteration, we can see that there is influence on noncewords, such as the examples of Juggling Jott and Vale of Va-Vode. However, it should
be noted that many nonce－words are in alliteration only with other nonce－words，as in the examples of YOTT and YOTTLE．In fact，of the 107 words found in alliteration with other words， 37 are alliterations with other nonce－words．Next，consider the case of alliteration within a word．Altogether，about 13 percent of nonce－words in the survey contain intra－word alliterations（e．g．Zizzer－zazzer－zuzz）．However，strictly speaking， one－syllable words cannot have alliterations within themselves（although an argument can be made for words like $\mathrm{Zummz}^{\text {）}}$ ．If we eliminate the one－syllable words，we find alliteration in 22 percent of multi－syllable words．If we also include reduplications（e．g． Yuzz－a－ma－Tuzz，Zike－Bike），we can account for 30 percent of the multi－syllable nonce－ words．This data suggests that alliteration plays a role，not only in determining the initial letter of a nonce－word，but also the internal form of the word．

## 3．5 Orthography

## 3．5．1 Phonetic Spelling

As we saw earlier，rhyme had an influence on the coinages of Dr．Seuss． However，the nonce－words almost invariably follow phonetic spelling，even when Seuss was rhyming them with words that do not．As examples，／i：／is almost always rendered $e e$ ，and／u：／as $o o$ ．This is illustrated in the examples below．
．．．And the GEELING on the CEILING．．．（Wocket，28）

And the very next second，I groaned，＂Oh good grief！＂
When the Nupper called out to a pair of WILD WHEEF（Bippolo，45）

And JOGG is my letter for spelling Jogg－oons
Who doodle around in the far desert dunes（Zebra，43）

And，under the trees，I saw Brown Bar－ba－loots
frisking about in their Bar－ba－loot suits
as they played in the shade and ate Truffula Fruits．（Lorax，14）
Due to the phonetic spelling，the pronunciation of the nonce－word is unambiguous．This is clearly helpful to children reading the nonce－word for the first time，and I would argue that this is the primary reason that phonetic spelling was employed．

### 3.5.2 Double Consonants

Seuss employs double consonants following a short vowel to end a word. In English, double letters are usually used word-medially to distinguish short vowels and long vowels. Words ending in double letters are not uncommon in English, especially words ending in $f f(s t a f f), l l$ (ball), ss (less), and $z z(j a z z)$ or in proper names (Webb, Todd, Gregg, Finn, Grimm, Depp, Burr, Matt), but they are less common among common nouns or other parts of speech. Table 2 lists the English words ending in double consonants (excluding $f f, l l, s s$, and $z z$ ).

## Table 2

English Words Ending with a Double Consonant (Excluding ff, II, ss, and zz)

| Consonant | English Words |
| :--- | :--- |
| bb | ebb |
| dd | add, odd |
| gg | egg |
| nn | inn |
| pp | app (shortened from application) |
| rr | err, purr |
| tt | mitt (shortened from mitten), mutt (shortened from muttonhead), putt |

Notably, of the eleven words listed above, seven are three-letter words. The doubleletters in these cases are due to a well-known rule in English that lexical words must have at least three letters (Crystal, 263). In three other cases, the word maintained its double letter after a shortening occurred. Clearly, word final double-letters are very limited in English. As we shall see now, Dr. Seuss did not place that same limitation on his own creations.

Table 3 below expands on the previous table with a third column including the nonce-words of Dr. Seuss.

Table 3
English words and Dr．Seuss Nonce－Words Ending with a Double Consonant（Excluding ff， II，ss，and zz）

| Consonant | English Words | Dr．Seuss Nonce－Words |
| :--- | :--- | :--- |
| bb | ebb | Nubb |
| dd | add，odd | Jedd，Mercedd，Nadd，tudd |
| gg | egg | Blogg，Chuggs，Jogg |
| kk | - | Glikk，Yekk |
| mm | - | Bimm，Bumm，Frumm，Snumm，Zumms，Zummz |
| nn | inn | Dinn，Flunn |
| pp | app | gluppity－glupp，Ham－ikka－Schnim－ikka－Schnam－ikka |
|  |  | Schnopp，Krupp，Mupp，Na－Nupp，schlopp，Schloppity－ |
| rr | err，purr | Schlopp，slupp，Snipps，Vipp，yopp |
| tt | mitt，mutt，putt | Jott，Slottz |
| vv | - | snuvv |

Dr．Seuss seemed particularly fond of $p p$ ，using it on eleven occasions．Among his onomatopoeia coinages（not included this study＇s data）we see words like Klopp（cf． clop）for the sound of horse，and Dibble Dopp（cf．dribble and drop）for the sound of rain（Moo，5，9）．In only one occasion in the data does Seuss use a single $p$ after a short vowel．Seuss also employs double consonants that are nonexistent word－finally in English：the double $k$ and the double $v$ ．In addition，Seuss uses the unusual single $v$ in snuv（different in meaning from snuvv given above）．For the remaining consonants， Seuss＇s use of double consonants is somewhat more conservative，as we can see in table 4 below．The highlighted boxes represent uncommon patterns in English．

Table 4
Ratio of Single to Double Consonants Following a Short Vowel Word－Finally

| $\mathbf{b}$ | $\mathbf{b b}$ |
| :---: | :---: |
| 4 | 1 |


| $\mathbf{d}$ | dd |
| :---: | :---: |
| 2 | 4 |


| $\mathbf{f}$ | $\mathbf{f f}$ |
| :---: | :---: |
| 0 | 7 |


| $\mathbf{g}$ | $\mathbf{g g}$ |
| :---: | :---: |
| 2 | 3 |


| ck | $\mathbf{k}$ | $\mathbf{k k}$ |
| :---: | :---: | :---: |
| 8 | 0 | 2 |


| $\mathbf{l}$ | ll |
| :---: | :---: |
| 5 | 6 |


| $\mathbf{m}$ | $\mathbf{m m}$ |
| :---: | :---: |
| 8 | 6 |


| $\mathbf{n}$ | $\mathbf{n n}$ |
| :---: | :---: |
| 2 | 2 |


| $\mathbf{p}$ | $\mathbf{p p}$ |
| :---: | :---: |
| 1 | 11 |


| $\mathbf{r}$ | $\mathbf{r r}$ |
| :---: | :---: |
| 34 | 0 |


| $\mathbf{S}$ | $\mathbf{s s}$ |
| :---: | :---: |
| 9 | 1 |


| $\mathbf{t}$ | $\mathbf{t t}$ |
| :---: | :---: |
| 9 | 2 |


| $\mathbf{v}$ | $\mathbf{v v}$ |
| :---: | :---: |
| 1 | 1 |


| $\mathbf{z}$ | $\mathbf{z z}$ |
| :---: | :---: |
| 0 | 5 |

Again, Seuss's use of $p p$ is noticeable when compared to the other letters, but generally Seuss is content to use both single or double consonants.

There are at least three plausible explanations for these spelling choices by Seuss. First, Dr. Seuss was a third-generation German American (Cohen, 12-15), and many of his nonce-words have a noticeable German influence. For example, several of his noncewords contain consonant clusters present in German but rare in English. These include the word-ending -tsch, found in his nonce-word Squitsch, -mpf found in Humpf-Humpf-a-Dumpfer, and-tz in Glotz and Schnutz. In addition, Seuss uses the consonant clusters schn- and schl- in such nonce-words as Schnacks, Schnutz, Schloppity-Schlopp and schlopp. Besides these consonant clusters, we can find other German "borrowings" including the nonce-words Biffer Baum Birds, Herk-Heimer Falls, and Zweiback Motel from Dr. Seuss's Sleen Book $(6,8,30)$. A fuller list of words seemingly influenced by German is provided in table 5 below.

## Table 5

Dr. Seuss' s German-Influenced Nonce-Words

| Cluster | Examples |
| :--- | :--- |
| Schl-: | Schloppity-Schlopp, schlopp, Schlottz |
| Schn-: | Ham-ikka-Schnim-ikka-Schnam-ikka Schnopp, Schnacks, Schnutz |
| -pf: | Humpf, Humpf-Humpf-a-Dumpfer |
| -tsch: | Squitsch |
| -tz: | Glotz, Klotz, Schnutz, Zatz-it, Zatz, Spritz, Skritz, Schlottz |
| Others: | Biffer-Baum Birds, Herk-Heimer Falls, Hippo-Heimer, Zweiback <br>  |

Given the above information, it does not seem unreasonable to conclude that the wordending double consonants may also be a German influence, as German employs some double consonants word-finally following a short vowel. However, this explanation does not account for Seuss's use of $b b, d d, g g, k k$ and $v v$, which are not found word-finally in German (see table 6 below).

Table 6
German words and Dr．Seuss Nonce－Words Ending with a Double Consonant（Excluding ff， II，ss，and zz）

| cons． | German | Dr．Seuss |
| :--- | :--- | :--- |
| $b b$ | - | Nubb |
| $d d$ | - | Jedd，Mercedd，Nadd，tudd |
| $g g$ | - | Blogg，Chuggs，Jogg |
| $k k$ | - | Glikk，Yekk |
| $m m$ | Kamm，krumm，Lamm，etc． | Bimm，Bumm，Frumm，Snumm |
| $n n$ | Mann，dann，denn，etc． | Dinn，Flunn |
| $p p$ | knapp，Tipp，Mopp，etc． | gluppity－glupp，Ham－ikka－Schnim－ikka－Schnam－ |
|  |  | ikka Schnopp，Krupp，Mupp，Na－Nupp，schlopp， |
| $r r$ | Herr，starr，wirr，etc． | Schloppity－Schlopp，slupp，Vipp，yopp |
| $t t$ | platt，Rabatt，Tablett，etc． | Jott，Slottz |
| $v v$ | - | snuvv |

A second explanation is that Seuss used double consonants word－finally to make the intended pronunciation of the nonce－word clear．As stated earlier，English uses double letters word－medially preceding a short vowel．By employing this convention word－finally，Seuss may have been indicating the pronunciation of the preceding vowel． This would make sense，as young readers encountering a strange word for the first time might struggle with the pronunciation．As noted in section 3．5．1，we know that Seuss rendered the vowels of his nonce－words phonetically，presumably to make the pronunciation clear．It would follow that Seuss used double consonants for the same reason．Further evidence for this is in the fact that Seuss did not use double consonants following a long vowel．

The final explanation is that the double consonants are used for a special effect：to make the words funnier，more unusual，more interesting．The interesting features of the spelling match the interesting features of the creature being described．David Crystal， in his book Spell It Out，argues that irregular spelling makes words stand out，and for that reason they become more attractive and memorable（224）．He also cites Dr．Seuss＇s nonce－words saying，＂I delight in every one of the names，＂（while making the case that the non－standard spellings are an unneeded hurdle for young learners）（228）．This explanation accounts for the unusual $v$ and $v v$ endings，as well as the $k k$ ending．Further support comes from the nonce－work snarggle，where the extra $g$ does not provide any
extra clarity about the preceding vowel, which is already determined by the $r$. It may also explain Seuss's liberal use of $z$, of which we will go into detail in the next section.

### 3.5.3 Letter Frequency

An astute reader of Dr. Seuss may notice the prevalence of the letter $z$ in his works, or at least in certain books. For example, three of the nine creatures in One Fish Two Fish Red Fish Blue Fish, and eight of the 34 creatures in There's a Wocket in My Pocket begin with the letter $z$. One third (9 out of 27) of the nonce-words in Scrambled Eggs Super! contain the letter z. A passage from Scrambled Eggs Super! illustrates how widely the letter $z$ was used by Dr. Seuss:

Then I went for some Ziffs. They're exactly like Zuffs,
But the Ziffs live on cliffs and the Zuffs live on bluffs.
And, seeing how bluffs are exactly like cliffs,
It's mighty hard telling the Zuffs from the Ziffs.
But I know that the egg that I got from the bluffs,
If it wasn't a Ziff's from cliffs, was a Zuff's. (38)
The letter $z$ is the least used letter in the English alphabet (Sacks, 360). To give the reader an idea about the prevalence of the letter $z$, I calculated the letter frequencies from four works of children's literature: Alice's Adventures in Wonderland, The Secret Garden, Little Women, and The Adventures of Tom Sawyer. Ignoring punctuation marks, there were roughly 1.5 million tokens in total. The letter $z$ was the least common letter, accounting for $0.04 \%$ of the total. The entire alphabet is shown in figure 5 below.


Figure 5. Frequency of letters in four children's books.

This frequency distribution is，however，skewed by non－lexical items such as $a$ ，the，and to which appear more often than lexical items．Since we will be comparing our nonce－ word data（essentially a word list），frequency distributions were also created from two other online word lists：the 3000 most common English words（figure 6）and the top 1000 American surnames（figure 7），containing roughly 19,000 tokens and 6000 tokens， respectively．In the 3000 most common words，the letter $z$ represents $0.1 \%$ of all letters． In the surnames list，$z$ is more common，representing $1.02 \%$ of all tokens，likely owing to the prevalence of Spanish names in America（Rodriguez，Martinez，Hernandez，Lopez， and Gonzalez are found in the top 25）．


Figure 6．Frequency of letters in the most common 3000 words of English（data from Education First＂3000 Most Common Words in English I Learn English．＂EF，www． ef．edu／english－resources／english－vocabulary／top－3000－words／．）


Figure 7．Frequency of letters in the top 1000 American Surnames（data from U．S． 2000 Census provided at Mongabay．＂Most Common Surnames［Last Names］in the United States（Top 1000）．＂Mongabay．com，names．mongabay．com／most＿ common＿surnames．htm．）

There are some differences between the frequencies，but generally the same letters are
found on the top end and bottom end of each distribution. Now let us compare these to the Dr. Seuss nonce-word data. The 377 words in the data are made up of 2556 letters. The distribution is shown in figure 8 below, with the letter $z$ highlighted.


Figure 8. Frequency of letters in Dr. Seuss nonce-words.

In the Dr. Seuss nonce-words, the letter $z$ is the tenth most common letter, and accounts for $4.42 \%$ of the total, a striking difference from the other distributions. Other letters whose frequencies differed widely from the other frequency lists are $k$ (4.3\% of Seuss words, compared to $1.1 \%$ on average in the other lists) and $u(5.6 \%$ in Seuss, $2.7 \%$ average in others), both which are used more often in the Seuss nonce-words, and $e$ ( $8.1 \%$ in Seuss, $11.9 \%$ average in others) and $t$ ( $4.3 \%$ in Seuss, $7 \%$ average in others), both which are used less often in the Seuss nonce-words. In addition, the shapes of the distributions show that the variance in letter frequency in the Seuss nonce-words is lower than that in the other lists.

### 3.5.4 Word-Initial Letter Frequency

Next, let us look at the word-initial letters in the nonce-word data. Figure 9 below shows the frequency of each letter appearing as the first letter of a word. Consonants are counted here whether they appear alone in the onset of the word (e.g. Sala-magoox), or as the first letter of a consonant cluster (e.g. Skritz, Snoo). Again, the letter $z$ is high on the list. The top four letters $(s, g, z \& b)$ account for over 40 percent of all words.


Figure 9．Frequency of word－initial letters in the nonce－word data．

Each of these four letters also cluster with other consonants，which，especially in the case of $s$ ，may explain why the numbers are high．The letter $z$ ，however，occurs only once in a cluster，in the irregular formation zlock．If we look at each possible onset， whether a single consonant or a consonant cluster，and include words that begin with a vowel，we end up with 61 different word beginnings．Figure 10 below shows the top twenty－four beginnings，which account for 80 percent of all the words．


Figure 10．Top word beginnings，treating single consonant and consonant clusters as separate entities．

Looking beyond the letter $z$ ，we see that the letters $b$ and $g$ are also used frequently in nonce－words（see fig．9，10），besides both being relatively low in frequency in English（see fig．5－7）．This suggests that perhaps in their relative rareness，they are appropriate for nonce－words．First，less common letters are less likely to already exist as a word．For example，if you want a nonce－word that rhymes with school，your options are limited：cool，fool，pool，rule，stool，spool，tool，and yule already exist，but bool，snool，

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and zool do not.
Secondly, especially for the letter $z$, I feel that their rarity adds a sense of oddity to the nonce-word, which could possibly be what Dr. Seuss intended. This idea is supported by Sacks, who states that due to historical avarice to the letter, " $Z$ retained an aura of foreignness or mystery... If creative media minds chose a Z-word, it usually was for that effect... on 1950s TV, the hero Zorro's name seemed almost as exotic as his Z-slash calling card" (362).

### 3.6 Syllable and stress patterns

As noted earlier, rhyme was a large influence on the nonce-words, as the majority of books written by Dr. Seuss were written in verse. There is a similar influence from stress patterns. Figure 11 shows that the one-syllable and two-syllable words are the most common in the data, accounting for 77 percent of the words. However, it is in the multi-syllabic words where we see the influence of stress patterns on the nonce-words.


Figure 11. The number of words by the number of syllables in the word.

As was the case in phonetic spelling, Dr. Seuss seems to have written his noncewords in ways that makes the stress pattern clearer, in particular, with his use of hyphenation. Of the 222 multi-syllable words, 81 ( $36 \%$ ) include hyphenation, usually preceding a stressed syllable (e.g. Da-Dake, Zinniga-Zanniga). Over 64 percent of noncewords of three or more syllables are hyphenated words, and of the 37 nonce-words which contain four or more syllables, 33 ( $89 \%$ ) contain a hyphen, three contain a space before the stressed syllable, and only one contains neither space nor hyphen. In addition, many of the unstressed syllables share a common feature: an optional single consonant followed by the letter $a$, as in table 7 below.

## Table 7

List of Words Containing Unstressed，Hyphenated Syllables Ending in the Letter A

| 2－syllable words | 3－or more syllable words |  |  |
| :--- | :--- | :--- | :--- |
|  | －a－syllable | －ma－syllable | －ba－／－fa－syllable |
| Ba－zoo | chuck－a－luck | Fizza－ma－Wizza－ | Bar－ba－loot |
| Da－Dake | Humpf－Humpf－a－ | ma－Dill | Brigger－ba－root |
| Fa－Zoal | Dumpfer | Katta－ma－Side | Motta－fa－Potta－fa－ |
| Ga－Zair | Itch－a－pods | Sala－ma－goox | Pell |
| Ga－Zayt | Lass－a－lack | Sala－ma－Sond |  |
| Ga－Zoom | Zinn－a－zu | Yuzz－a－ma－Tuzz |  |
| Ka－Troo | Zoom－a－Zoop | Zomba－ma－Tant |  |
| Na－Nupp |  |  |  |
| Va－Vode |  |  |  |

These words alone account for over thirty percent of all hyphenated words in the data，and eleven percent of all multi－syllabic words in the data．Similar syllables are found in the data，including multiple cases of no（e．g．Bippo－no－Bungus）and ikka（e．g． Jill－ikka－Jast），and hyphens occurring immediately after er（e．g．Fiffer－feffer－feff）and le （e．g．Zumble－Zay）are seen several times as well．In addition，there are cases where the letter $a$ precedes a stressed syllable，though not isolated with hyphens（e．g．Boola Boo， Neeka－tave）．

Seuss＇s use of the letter $a$ to represent the unstressed vowel／ə／follows convention，as we see this in English renderings such as gonna and gotcha．Interestingly， the $-a$－syllables in table 7 above mostly follow a stress pattern of stressed－unstressed－ stressed，whereas the－ma－syllables have a stressed－unstressed－unstressed－stressed pattern． The－ma－syllables，in fact，seem to be influenced by the（unusual sounding）American city Kalamazoo，in particular Sala－ma－goox，although only Sala－ma－Sond and Zomba－ma－ Tant actually refer to（imaginary）place names．Lastly，the two－syllable words all follow an unstressed－stressed pattern，which suggests again that Seuss，through hyphenation， was making clear to the reader the intended stress pattern．

## 4．Conclusion

Examining Dr．Seuss＇s＂pure＂nonce－words（those not made up of existing morphemes），we find that more often than not，a rhyme with another word influences its form．Alliteration is influential to a lesser degree，but besides influencing the onsets of words，is also important word－internally in multisyllabic nonce－words．Dr．Seuss＇s
nonce-words are often written phonetically, but may contain unusual orthography, most prominently of which are word-final double consonants. Dr. Seuss seemed particularly fond of using the letter $z$ word-initially in his nonce formations, and may have chosen such lesser used letters partly out of necessity, and partly for their oddity. Finally, multisyllabic words, particularly those of four syllables or more, seem to be influenced by the stress pattern of the verse.

There are other influences that I did not consider here, including sound symbolism. In addition, a fuller lexicon of Dr. Seuss nonce-words, which includes onomatopoeia, compounds, and other nonce formations, may reveal more about Seuss's overall use of nonce-words. These are potential directions for further study.

## Appendix

Full list of the nonce－words chosen for this study，listed alphabetically，and including sources（abbreviated）and page numbers．Except when the source word was in all caps， capitalization reflects the usage in the source material．

| balber | 500 Hats | 31 | Bunglebung | Lucky | 4 | Flummox | Circus | 21 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Bar－ba－loot | The Lorax | 14 | Bustard | Zoo | 14 | Flunn | Zebra | 45 |
| Ba－Zoo | Lucky | 34 | chuck－a－luck 30 | 30 Tigers | 48 | Flunnel | Zebra | 45 |
| Bazzim | Zebra | 36 | Chuggs | ZOO | 33 | Flustard | Zoo | 14 |
| Beezlenut | Kwuggerbug | 20 | Crandall | Sleep Book | 25 | Foodle | Sleep Book | 48 |
| beft | Oh，the Thinks | 35 | cruffulous | The Lorax | 40 | Foo－Foo | I Can Read | 21 |
| bellar | Wocket | 26 | （Mt．）Crumpit | The Grinch | 38 | Foon | Circus | 14 |
| Ben－Deezing | Circus | 25 | Crunk－Car | Mooney | 21 | Foona－Lagoona | Sleep Book | 34 |
| berk | The Sneetches | 9 | Da－Dake | Oh，the Thinks | 16 | fotichee | 500 Hats | 31 |
| Biffer－Baum（Birds）Sleep Book |  | 6 | Dake | Yertle the Turtle | 32 | Frink | Sleep Book | 17 |
| Biggel－Ball | Sleep Book | 18 | Dawf | Eggs | 42 | Frumm | Circus | 13 |
| Bimm | The King＇s Stilts | 1 | dellar | Wocket | 26 | Fuddle | Zebra | 24 |
| Bingle | Thidwick | 2 | Dinn | Oobleck | 3 | Fuddle－dee－Dud | dle Zebra | 24 |
| bipping | Horton Hears | 52 | Dippo－no－Dungus | us Zoo | 49 | Gack | One Fish | 58 |
| Bippolo | Bippolo | 11 | Dofft | Sleep Book | 38 | gase | Wocket | 3 |
| Bippo－no－Bungus | Us Zoo | 49 | Dooklas | Lucky | 13 | Gasket | Zoo | 38 |
| Blogg | The Shape of Me | 61 | Drize | Lucky | 1 | Ga－Zair | Lucky | 8 |
| bloog | Oh，the Thinks | 12 | duddled | Fox in Socks | 59 | Ga－Zayt | Lucky | 6 |
| bloop | Circus | 21 | Dutter | Birthday | 43 | Ga－Zoom | Mooney | 28 |
| bloozer | Circus | 21 | faddle | Lucky | 21 | geeling | Wocket | 28 |
| bofa | Wocket | 17 | Fa－Zoal | Eggs | 22 | Gekko | Zebra | 48 |
| Bolster | Circus | 21 | Fibbel | Circus | 21 | gellar | Wocket | 26 |
| Boober | Lucky | 4 | Fiffer－feffer－feff | ABC | 16 | ghair | Wocket | 16 |
| Boola Boo | Solla Sollew | 54 | findow | Wocket | 2 | Gherkin | Zoo | 38 |
| Borfin | Lucky | 16 | fista | Oobleck | 10 | Gick | Lucky | 11 |
| Brickel | The Sneetches | 48 | Fizza－ma－Wizza－m | a－ma－Dill Zoo | 50 | gicky | Bippolo | 48 |
| Brigger－ba－root | Circus | 17 | Floob | Zebra | 38 | Gizz | Lucky | 33 |
| Bumble－Boat | Mooney | 27 | Floob－Boober－Bab | Bab－Boober－Bubs |  | gleap | 500 Hats | 31 |
| bumble－tub | Sleep Book | 42 |  | Zebra | 38 | gleeks | Solla Sollew | 20 |
| Bumm | Lucky | 4 | floop | Circus | 21 | Glik | Zebra | 26 |
| bummbeling | Circus | 20 | flubbulous | Solla Sollew | 30 | Glikker | Zebra | 26 |


|  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |


| Oobleck | Oobleck | 1 | smoke－smuggered | d The Lorax | 52 | tinkibus | 500 Hats | 31 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Palooski | Z00 | 44 | snarggle $T$ | The Lorax | 40 | Tizzle | Eggs | 7 |
| Pelf | Eggs | 24 | Snarp C | Circus | 21 | Tizzy | Eggs | 32 |
| piffulous | Lucky | 13 | Snee Z | Zebra | 30 | Tobsk | Zoo | 42 |
| Poo－Boken | Lucky | 31 | Sneedle Z | Zebra | 30 | Truffle | Circus | 21 |
| Poogle－Horn | Lucky | 31 | Sneelock C | Circus | 6 | Truffula（tree） | The Lorax | 12 |
| poozer | Solla Sollew | 35 | Sneetch T | The Sneetches | 1 | tudd | 500 Hats | 31 |
| Prax | The Sneetches | 25 | snergelly $T$ | The Lorax | 10 | tuttle－tuttle（tree） | $A B C$ | 46 |
| Preep | Zoo | 46 | snerl Zoomer | Zoo | 32 | tweetle | Fox in Socks | 49 |
| Proo | Z00 | 46 | Sneth E | Eggs | 40 | Um | Zebra | 20 |
| puffle | Zebra | 52 | Snide $T$ | The Sneetches | 50 | Umbus | Zebra | 20 |
| punkerish | Lucky | 45 | Snipe C | Circus | 32 | Vail | Sleep Book | 26 |
| Quan | Zebra | 32 | Snipps 5 | 500 Hats | 20 | Va－Vode | Sleep Book | 44 |
| Quilligan | Solla Sollew | 6 | Snoo I | 1 Can Read | 21 | Vipp | Oh，the Thinks | 32 |
| quimney | Wocket | 22 | snookers B | Birthday | 43 | vipper | Oh，the Thinks | 32 |
| Redd－Zoff | Sleep Book | 20 | Snoor L | Lucky | 11 | Vlad－i－koff | Horton Hears | 24 |
| rink－rinker－fink | Oh，the Thinks | 22 | Snumm C | Circus | 13 | voom | Cat Comes Back | 57 |
| rippulous | The Lorax | 15 | snuv O | Oh，the Thinks | 8 | Vroo | Zebra | 51 |
| Rolf | Circus | 12 | snuvv $T$ | The Lorax | 9 | Vrooms | Zebra | 51 |
| Ronk | Lucky | 41 | Snux L | Lucky | 11 | vug | Wocket | 20 |
| Roover | The Sneetches | 46 | Solla Sollew S | Solla Sollew | 12 | Vung | Solla Sollew | 1 |
| Sala－ma－goox | Eggs | 4 | Soobrian C | Circus | 32 | Wah－Hoo | Solla Sollew | 12 |
| Sala－ma－Sond | Yertle the Turtle | 1 | Spazz Z | Zebra | 36 | Walloo | Circus | 15 |
| schlopp | Oh，the Thinks | 7 | Spazzim Z | Zebra | 36 | wamel | Lucky | 21 |
| Schloppity－Schlopp The Lorax |  | 44 | Spritz E | Eggs | 10 | wasket | Wocket | 5 |
| Schlottz | Lucky | 18 | spuggle 3 | 30 Tigers | 47 | wellar | Wocket | 26 |
| Schnacks | Oh Say | 16 | Squitsch E | Eggs | 22 | Wheef | Bippolo | 45 |
| Schnutz | 30 Tigers | 51 | Stroodel E | Eggs | 18 | Who | The Grinch | 1 |
| Screebees | 500 Hats | 22 | Strookoo E | Eggs | 28 | Who－bub | Birthday | 17 |
| Seersucker | Zoo | 48 | Swomee－Swans | The Lorax | 12 | winkibus | 500 Hats | 31 |
| shlump | Lucky | 16 | tellar W | Wocket | 26 | Winna－Bango | Thidwick | 1 |
| Skeegle－mobile | Zoo | 12 | Thidwick T | Thidwick | 2 | wista | Oobleck | 10 |
| Skrink | Solla Sollew | 10 | Thnad Z | Zebra | 35 | Wocket | Wocket | 1 |
| Skritz | Solla Sollew | 10 | Thnadner Z | Zebra | 35 | Wogs | Eggs | 16 |
| Skrux | Lucky | 11 | thneed $T$ | The Lorax | 18 | Woo－Wall | Solla Sollew | 54 |
| slippard | Solla Sollew | 53 | Throm－dim－bu－lato | tor Lucky | 11 | woset | Wocket | 7 |
| slupp | The Lorax | 10 | Thwerll Z | Zoo | 32 | wub | Solla Sollew | 14 |
| smogulous | The Lorax | 40 | tidder 5 | 500 Hats | 31 | Wubble | Solla Sollew | 12 |

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| wubble-some <br> wuddled | Solla Sollew <br> Fox in Socks | 1459 | Zinzibar-Zanzibar | Eggs | 4463 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Zizzer-zazzer-zuz | zuzz ABC |  |
| Wum | Zebra | 19 | Zizzer-Zoof | Sleep Book | 44 |
| Wumbus | Zebra | 19 | Zizzy | The Cat's Quizzer | 1 |
| Wump | One Fish | 18 | zlock | Wocket | 9 |
| Yekk | Zebra | 48 | Zomba-ma-Tan | ZOo | 14 |
| Yekko | Zebra | 48 | zong | Oh, the Thinks | 21 |
| yent | What Pet? | 26 | Zoom-a-Zoop | Circus | 25 |
| yeps | Wocket | 24 | Zoop | Circus | 25 |
| Yerka | Zoo | 34 | Zom | Bithday | 1 |
| Yertle | Yertle the Turtle | 1 | zower | Wocket | 29 |
| Ying | One Fish | 40 | Zozzfozzel | The Cat's Quizzer | 1 |
| Yink | One Fish | 42 | Zuff | Eggs | 38 |
| Yop | One Fish | 44 | Zuks | Eggs | 27 |
| yopp | Horton Hears | 57 | zum | Bithday | 38 |
| yot | Wocket | 14 | Zumble-Zay | Mooney | 25 |
| yottle | Wocket | 15 | Zummer | Bithday | 38 |
| Yupster | Zebra | 52 | Zumms | Eggs | 27 |
| Yuzz | Zebra | 16 | Zummz | Eggs | 27 |
| Yuzz-a-ma-Tuzz Zebra |  | 6 |  |  |  |
| zable | Wocket | 16 |  |  |  |
| zall | Wocket | 23 |  |  |  |
| zamp | Wocket | 13 |  |  |  |
| Zans | One Fish | 37 |  |  |  |
| Zatz | Zebra | 41 |  |  |  |
| Zatz-it | Zebra | 41 |  |  |  |
| Zax | The Sneetches | 25 |  |  |  |
| Zayt | Lucky | 6 |  |  |  |
| Zeds | One Fish | 55 |  |  |  |
| Zeep | One Fish | 62 |  |  |  |
| zelf | Wocket | 10 |  |  |  |
| zellar | Wocket | 26 |  |  |  |
| Ziff | Eggs | 38 |  |  |  |
| Zike-Bike | Mooney | 16 |  |  |  |
| zillow | Wocket | 30 |  |  |  |
| Zind | Zoo | 26 |  |  |  |
| Zinn-a-zu | Thidwick | 6 |  |  |  |
| Zinniga-Zanniga Bippolo |  | 20 |  |  |  |

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[^0]:    †大阪産業大学 国際学部 講師
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