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The Sound of branding: An analysis of the initial phonemes of popular brand names

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Abstract

In the marketing literature, the 'K-effect' refers to the claim that the letter K is overrepresented as the initial letter of brand names. To date, however, most findings have only considered the frequency of the *written* letters incorporated into brand names. Here we argue that since letters sometimes sound different when pronounced in different words (e.g., 'C' in **C**artier vs. **C**isco), a phonemic analysis of the initial phonemes is likely to be more insightful than merely a comparison of the written form (as reported by previous researchers). With this in mind, the initial phonemes of top brand names were analyzed and compared with: 1) words in the dictionary; 2) a corpus of contemporary American English; and 3) the most popular current children's names in the USA. We also analyzed a different list of top brands, including both corporate brand names (e.g., Procter & Gamble) as well as the product-related brand names (e.g., Pantene). We conclude by reporting the most underrepresented [vowels (/aʊ/, /ɜː/, /ɔɪ/, /ɔː/) and consonants (/r/, /ʒ/, /l/, /θ/)] and overrepresented [vowels (/iː/, /əʊ/) and consonants (/j/, /z/, /f/, /dʒ/, /p/, /j/, /t/)] initial phonemes in the brand names vis-a-vis the current linguistic naming conventions.

Keywords: *K effect; Phonemes; Brand names; Naming conventions; Phonetic symbolism; Sound branding.*

Introduction

Brand names often constitute the first point of contact between consumers and brands. In that sense, it is not surprising that brand names and branding have generated so much interest in the past from marketing researchers (Bastos and Levy, 2012). One of the foci of such interest relates to the specific letters that compose brand names. For example, in a seminal study, Schloss (1981) analyzed the linguistic attributes of the top brand names of the time (from 1975-1979), reporting an apparent overrepresentation of the letters A, B, C, K, M, P, and S, when compared to the occurrence of these letters in the English dictionary. Similarly, Van Doorn, Paton, and Spence (2016) analyzed the initial letters of the brand names and reported three findings, 1), an over-representation of the letters A and J, 2), an under-representation of the letter S, and 3), neither an over-, nor an under-representation of the letter K.

In the present study, we take a different perspective on the same topic. We argue that in the English language, often the same letter is pronounced differently (e.g., the letter ‘C’ makes different sounds in **C**isco vs. **C**artier; Pogacar et al., 2015). Therefore, it is important to analyze the first phonemes of the brand names, rather than just examining the name-initial letters. To illustrate, Van Doorn et al. (2016) did not comment on the frequency of the letters Y and Z, as these letters do not appear even once as first letters of the top 200 brand names. However, phonemically, the sounds /j/ and /z/ (as in **Y**amaha and **Z**ara; see the International Phonetic Association, IPA, chart for IPA notations, Appendix A; Decker, 1999) do appear in the data set of the top 200 brand names (e.g., /z/ in **X**erox and /j/ in **U**nited Health, **U**nited Parcel Service, and **U**S Foods). In view of this, it is also important to analyze the sounds of the first letters of brand names, rather than only the frequency. As we mentioned earlier, the pronunciation of the same letter is often not uniform in the English language for example, the initial letters A, S, and C, may be pronounced differently depending on the words in which they appear. To illustrate the point, consider the sounds made by the same first letter in the words **A**merica vs. **A**rt vs. **A**my vs. **A**lley. Similarly, the letter C can have four different pronunciations, /k/, /ch/, /s/ and /sh/ as in the brands **C**oke, **Ch**ampion, **C**isco and **Ch**anel respectively (Celce-Murcia, Brinton, and Goodwin, 1996). It is likely that analyzing only the initial letters of words will lead to an overrepresentation of certain letters in the data set. For instance, in the English language, a greater number of words start with the letter S than any other letter (Oxford English Dictionary Online, 2017) and while calculating the frequency of initial letters of the dictionary words, there will be an overrepresentation of the letter S (as these outnumber all other words). For these reasons, this paper will look at the first phonetic sound of the brand name rather than the first letter.

Theoretical framework

It is generally believed that oral communication involves more self-expression than the written form (Anderson, 2018; Schroeder and Epley, 2015; Shen and Sengupta, 2018). Though there are some extreme views on this topic (e.g., "written language has no existence in its own right, but is a shadow cast by speech"; Cook, 2004, p. 31), there is a vast body of literature, both favoring and disputing this notion (Anderson, 2018; Cook, 2004; Ferguson, 1996; Halliday, 1989). In the context of brand names, this appears to be particularly true. Recent research from Shen and Sengupta (2018) highlights that consumers exhibit heightened involvement with the spoken brand names rather than with the written form. Similar results have been shown with job pitches (e.g., spoken vs written achievements and career goals; Schroeder and Epley, 2015), mental capacities (e.g., spoken vs. written emotions; Schroeder, Kardas, and Epley, 2017) and persuasive skills (e.g., spoken vs. written passges to persuade; Van Zant and Berger, 2019). Often, hidden linguistic cues within the spoken language are believed to be the reason behind these differences (McAleer, Todorov and Belin, 2014; Schroeder et al., 2017). The power of the spoken word can be gauged from the fact that out of hundreds of spoken languages across the globe, just 78 are known to have literature associated with them (Palmer, 2014).

The first letter of a word has been shown to be important in many aspects of psycholinguistics, e.g., word reading and recognition, sentence reading (Johnson and Eisler, 2012; Pathak, Velasco, and Calvert, 2019). Relevant to the current discussion, the initial letter has also been shown to be equally important in a person's name (also called the name-letter effect), where the initials associated with a person's name are thought to affect their career choice, place of living, product preferences, and even social interactions with other individuals, who have the same letter initials (Hodson and Olson, 2005). In the brand naming research, often the written form of names is used to form conclusions. However, many proper nouns in the English language are often not regularly pronounced (this is also known as the regularity effect; e.g., Cat and Coke are pronounced regularly, but not Yacht, Nike and Nutella). Consequently, in order to uncover the initial letter effect in the naming of brands, it is more appropriate to look at the first sound and not the first letter of a name.

The importance of the first sound of a name has been shown in the medical science and linguistics. . For instance, in aphasia (a clinical condition in which patients have an inability to comprehend language), patients cannot recall a name in totality but can still remember the first sound of the names (Goodglass et al., 1976). Similarly, in anomia (a condition in which patients show a severe language production deficiency, specifically in terms of recalling names), patients can successfully retrieve the names with just a hint of the first sound (Papagno and Capitani, 1998; Semenza and Sgaramella, 1993). The first phoneme has also been shown to be important in the tip-of-the tongue phenomenon, where a person is temporarily unable to retrieve a word from the memory, but word-retrieval is facilitated when the word-initial phoneme is presented (Abrams and Davis, 2016; Brown and McNeill, 1966). More recently, Adelman, Estes, and Cossu (2018) have shown that even just the first phoneme of a word can effectively convey valence and emotion across languages, especially in challenging situations (e.g., danger, attack).

In branding research, the importance of the first letter is said to be more pronounced as brand names are believed to be an important proxy for a person’s self-expression (e.g., values, identity, and beliefs; Hodson and Olson, 2005; Park et al., 2010). Due to the aforementioned reasons, in this paper, we explore the name-initial phonemic patterns of the top brand names. Our research differs from that of Pogacar et al. (2015) in that we focus only on the name-initial phonemes, whereas the latter authors commented on the general sound patterns within a brand name, and they also reported special linguistic elements (e.g., vowels, approximants, fricatives, plosives, nasals, and affricates), which we do not.

In Study 1, we analyze the occurrence of initial phonemes in the brand names and compare our results with those of Van Doorn et al. (2016). We also report the similarities and differences of our approach vis-à-vis Van Doorn et al.’s study/findings.

Study 1

In this study, we critically evaluate Van Doorn et al.’s (2016) study. The latter authors examined the occurrence of initial letters present in popular brand names. They reported that 35 years after the publication of Schloss's (1981) original findings, the overrepresentation of the letter K (since referred to as the "K effect") no longer existed. Van Doorn et al. also reported a number of other interesting observations. In particular, they commented that among the initial letters of different brand names, there exists: 1) no overrepresentation of the letter K; 2) an overrepresentation of the letter A; 3) no overrepresentation of the letters B, C, M, or T; 4) an underrepresentation of the letter S; 5) neither an overrepresentation nor an underrepresentation of the letter P (the literature is ambiguous concerning the occurrence of the letter P as the initial letter of brand names); and 6) an overrepresentation of the letter J. We used a similar data set and examined the first phoneme of the brand names instead.

Method

The data set of brand names was compiled from the Fortune 500 list (only US and not Global Fortune 500 list, to control for differences in the phonemic patterns of non-American brand names) for the years 2010-2016. This list included 250 unique brand names chosen from 1200 brand names. The brand names were then transcribed to the spoken form using the IPA notations with the software PhoTransEdit (downloaded from www.PhoTransEdit.com). The first phonemes of all of the brand names were then extracted. In order to compare the brand names with a phonetic dictionary, we used the Carnegie Mellon University Pronouncing Dictionary (CMUPD, version 0.7b, 2014) which has a database of over 134,000 North American English words and their pronunciations, and is actively maintained and expanded by the Carnegie Mellon Speech Group. The first phonemes of all the existing words in CMUPD were extracted for comparison as well.

Two sample z tests of proportions were conducted for each phoneme and the Bonferroni adjustment for 30 comparisons was made (effective alpha level was 0.0017 (0.05/30); phonemes where either of the proportions of the brand names or CMUPD was zero (e.g., /ʒ/ as in plea**s**ure) were not compared).

Insert Table 1 here

Results and discussion

The phonemic analysis presented in Table 1a shows that only the following phonemes of brand names were significantly different from the initial phonemes of words in CMUPD: a) /æ/, /iː/, /dʒ/ and /j/ (as in PayP**a**l, V**i**sa, Neutro**g**ena, and **Y**amaha) were found to be higher in brand names, b) /r/ (as in Sp**r**ite) was found to be higher in CMUPD. Of these differences, /æ/,/r/ and /dʒ/ (as in PayP**a**l, Sp**r**ite, and Neutro**g**ena) were reported by Van Doorn et al. (2016) (i.e., the letters A, R, and J, respectively) to be overrepresented amongst brand names. However, other phonemes (/iː/and /j/ as in V**i**sa and **Y**amaha) do not find any mention in the Van Doorn et al.'s analysis (as both /iː/ and /j/ sounds can also be made by the letter E for e.g., as in **Ea**t and **Eu**ro). Similarly, Van Doorn et al. reported an undererepresentation of the letter S but we find no support for this particular finding. That is, we find no evidence for differences for the phonemes /s/ and /sh/ as in **S**ephora and **Sh**aw). Van Doorn et al. did not compare the letters Y and Z, as they could not find any brand names starting with these letters. By contrast, we find an overrepresentation of the phoneme /j/ (as in **Y**amaha) among top brand names but no difference in the occurrence of the phoneme /z/ (as in **Z**ara). Among the differences that we do observe, as compared to Van Doorn et al., note that the /i:/ (as in V**i**sa) sound can be made by a single letter or sometimes by a combination of letters. For example, i (as in f**ie**ld), ee (as in f**ee**d), ea (as in t**ea**cher), y (as in lad**y**), ey (as in troll**ey**), e (as in m**e**), ie (as in p**ie**ce), ei (as in c**ei**ling), eo (as in p**eo**ple), and oe (as in ph**oe**nix). Similarly, the /j/ sound can be made by various letters, for example, y (as in **y**es), e (as in **E**uro), i (as in on**i**on) and u (as in c**u**e), and /z/ sound can be made by a letter or by combination of letters. For example, z (as in **z**oo), zz (as in pu**zz**le), ze (as in snee**z**e), se (as in chee**s**e), s (as in mo**s**aic), ss (as in de**ss**ert), xh (as in e**xh**austed), x (as in **x**ylophone) and es (as in leav**es**). Although all of these letter combinations make the same sound, note that they would have been counted differently by researchers focusing only on the word initial-letter and not the sound.

While describing ‘the K effect’, Schloss included brand names, which began with the letter K as well those with the phoneme /k/[1]. We believe that Van Doorn et al. (2016) would have reported the K effect, if they had compared the frequency of word-initial letter K in the dictionary with the frequency of word-initial phoneme /k/ of top brand names (similar to Schloss’s approach), i.e., z proportions of 1.32% of 470,000 words vs. 11.2% of initial phonemes of 250 brand names; $z = 13.65$, $p < 0.0001$.

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1 “adding these to the 49 brands that did begin with a K (33) or P (16) sound means that early half (93 of 200) of the top brands begin with or contain the K or P sounds”; Schloss, 1981: p.48

In view of these findings, we feel that comparing initial phonemes appears to be a relevant approach, which complements and perhaps even furthers an approach based on the letter frequency alone. However, we were unable to find evidence of the higher frequency of the initial phoneme /k/ among brand names, when compared to the words in CMUPD. It suggests that /k/ sounds are frequent in everyday conversation. . Apart from these differences, we also found that there are many phonemes which are frequent as the initial sounds of words in the dictionary but none of the top brand names start with those particular phonemes (e.g., /ɔː /as in L**aw**yer; Table 1). This potential underrepresentation in the phoneme usage, can presumably be used by brand consultants when it comes to naming future brands or products. Study 1 compared the initial phonemes of brand names with those of the words appearing in the English dictionary. Since brand names represent a complex a sub-category of nouns (Gontijo et al., 2002), in Study 2 we compare them with the common nouns appearing in everyday conversation.

Study 2

Many researchers working in the field of brand naming have compared brand names with words appearing in the English dictionary. We see two potential problems with such an approach, first, a dictionary is a compilation of all the words that currently exist in a given language, whereas brand names represent a special and complex sub-category of only nouns (Gontijo et al., 2002). We argue that a more appropriate approach would be to compare the brand names only with the existing *nouns* in the dictionary, rather than with all categories of words. Second, if we only analyze the frequency of the word-initial letters of a dictionary, many colloquially infrequent words will still be included in the dataset. In fact, it turns out that no more than 300 words comprise over 65% of all the written text (Fry, 2000). In addition, the top

1000 lexemes (i.e., a particular category of word, e.g., the words /run/, /ran/, /running/, /runs/ etc. are all part of same lexeme 'run') account for almost 80% of the written text (Nation, 2001). If all words appearing in a dictionary are included in the data , a majority of them will lay outside of the common everyday usage, (which, in turn, may bias the analysis towards certain letters as many words are used rarely, or sparingly, at best).

An alternative way of analysis is to use contemporary texts such as those used in media, magazines, or everyday conversations, instead of the words that one finds in the dictionary. Such an approach serves as a "useful proxy for the English language" (Pogacar et al., 2015: p. 555) because only 1000 frequently used words account for 78% of the written text and over 85% of the spoken language (Nation, 2006). This approach could provide an insight into the phonemes or sounds that speakers *regularly* use. Such an analysis will also be more current and up-to-date, as languages evolve over time and adapt to the changing needs of their speakers (Birner, 1999). These changes in a language are best reflected in the corpus of commonly used words (rather than the words found in a dictionary).

Method

In Study 2, we compare the initial phonemes of brand names with the most frequently used nouns found in COCA (Davies, 2010). COCA is a well-cited linguistic database that includes a collection of over 520 million words taken from over 220,225 texts that were published between 1990 and 2015. Such words are commonly used in spoken language, fiction, popular magazines, newspapers, and academic texts. This list is regularly updated and provides a current overview of the usage of the English language (Schmitt and Schmitt, 2014). Since the

COCA also contains some very frequent words (e.g., /the/ & /of/), we selected only the existing 2543 nouns from the list (similar to Pogacar et al., 2015). Note that this approach, where commonly used nouns are compared with the brand names, constitutes an accepted methodology in the area (Klink, 2000). We also took account of the dispersion in the frequency of words (from 0 to 1; 1=Regularly distributed and 0=Irregularly distributed) as reported in the COCA. The first phonemes from the selected nouns were extracted, and their frequency was compared with the frequency of initial phonemes of the top brand names used in Study 1. Two sample z tests of proportions were conducted for each phoneme and the Bonferroni adjustment for 30 comparisons was made (effective alpha level was 0.0017 (0.05/30) and phonemes where either of the proportions of the brand names or CMUPD was zero were not compared).

Results and discussion

The results of this study (see Table 1b) show that initial phonemes of the brand names and those of COCA's nouns differ significantly in the following cases: a) /æ/,/ iː/, /dʒ/, /j/, and /z/ (as in PayP**a**l, V**i**sa, Neutro**g**ena, **Y**amaha and **Z**ara) were found to be higher in the brand names; b) /r/ (as in Sp**r**ite) was found to be higher in COCA (one-tailed only). There was no evidence for any differences for the letter S (both the /s/ and /sh/ sounds, as in **S**ephora and **Sh**aw). A significantly higher frequency of the phoneme /j/ (as in **Y**amaha; similar to Study 1) and /z/ (as in **Z**ara; unlike in Study 1) was found amongst the brand names as compared to COCA. Additionally, the frequency of the phoneme /k/, as in **C**oke, was not found to be significantly different between brand names and COCA nouns.

Apart from these differences, we also found that many phonemes are frequent as the initial sounds of common nouns, but none of the top 200 brand names begin with these phonemes. These phonemes are - /ɔː/, /aʊ/, /ɜː/, /ɔɪ/ and /ʒ/ (as in CBS C**o**rporation, S**ou**thwest Airlines, J**er**gens, T**oy**s "R" Us, and mea**s**ure). Interestingly, some phonemes are not found as the initial sounds in neither the brand names nor the COCA - /ð/, /ŋ/, /ʊ/ and /uː/ (as in brea**th**e, Samsu**ng**, Faceb**oo**k, and G**oo**gle). This we feel is interesting because the use of such infrequent name-initial phonemes may bring out a uniqueness in a brand name, which an entrepreneur or marketer may look to exploit.

In fact, the use of rare phonemes to create unique, memorable, and distinctive names is common in the pharmaceutical industry. It has been suggested that drug manufacturers can spend up to $2.5 million in order to create just one name for branded medicines (Dutchen, 2009). Their focus is to create names that: (1) do not impinge on the trademarked names; and (2) are not confused with the other known brands. Because of these restrictions, there has been a significant increase in the use of the letters q, x and z, when compared to their use in conversation in the English language (Beasley, 2013; Stepney, 2010). The use of these rare letters in a brand name can make them appear more scientific (Collier, 2014), unique, memorable and distinct (Stepney, 2010).

Studies 1 and 2 compared the initial phonemes of brand names with words in the English dictionary and with the frequent nouns appearing in COCA, respectively. The potential problem in these approaches is that brand names are essentially decades old (as brands typically take a long time to get established), whereas the naming practices are quick to change instead. To explore the changing trends in the phonemic patterns of the brand names, we feel it is prudent to compare brand names with the most popular people names, an approach that we follow and report in Study 3.

Study 3

One of the major drawbacks in the previous studies, and also of the analyses reported so far, is that researchers analyze the top brand names existing at the time in order to arrive at their conclusions. Most brands appearing in the top 100 list are decades old. By contrast, popular names in a culture change frequently, with people being less likely to choose a common name for their children (Twenge et al., 2010). Moreover, the current trends in naming also suggest that parents choose a name that is high on uniqueness and individuality and which can make a child ‘stand out’, rather than ‘fit in’ (Twenge et al., 2010).

It is not entirely wrong to say that naming conventions of brands and popular names follow similar trends. In fact, recently, a similarity in the phonemic patterns of brand names and children’s names has been reported (Pathak, Calvert, and Velasco, 2017) and if there is potentially higher usage of certain letters in children’s names, then one may expect a surge in the usage of those letters in brand names too (Van Doorn et al, 2016). Importantly, since parents often want to choose unique names for their children, the naming conventions also provide a glimpse into the prevalent social and cultural influences that may be apparent at the time (Twenge et al., 2010),and analyzing these naming decisions can potentially help marketers to gain new insights into brand naming.

Method

The most popular children's names in the USA in the years between 2010-2016 were taken from the official website of the U.S. Social Security Administration (https://www.ssa.gov/oact/babynames/decades/names/ 2010s.html). The list contains the top 200 names in terms of popularity for both boys and girls chosen within the said period, along with the frequency of chosen children's names. The names were compiled and ranked from a sample of 14,206,558 male births and 13,563,091 female births (https://www.ssa.gov).

The first phonemes of all the children's names were extracted and compared with the first phonemes of the brand names provided in Study 1. We first compared the brand names with all of the children's names and later separately with both male and female names individually. Two sample z tests of proportions were conducted for each phoneme and the corresponding Bonferroni adjustment was made. The effective alpha level for comparison with all names was 0.0018 (0.05/28) and phonemes where either of the proportions of the brand names or children names was zero, were not compared. The alpha level for comparison with only male and female names was 0.0019 (0.05/27) and 0.0019 (0.05/26), respectively.

Results and discussion

The results presented in Table 1c indicate the following differences in the phonemic structures of brand names and children's names, a) /f/, /dʒ/, /p/, and /t/ (as in **F**ord, **J**eep, **P**ayPal, and **T**ide) were found to be significantly higher in brand names, b) /l/ (as in **L**'Oréal) was found to be significantly higher in children's names (one-tailed). We also found phonemes /ɔː/, /ʒ/ and /l/ (as in CBS C**o**rporation, mea**s**ure, and **L**'Oréal) to be more frequent among children's names.

This potentially means that these sounds are being used by consumers in naming, but not by the brand managers. Similarly, phonemes (/j/ & /əʊ/ as in **Y**amaha and Costc**o**) are frequent as initial letters of the brand names but are not present even in a single popular child's name (which may highlight their decreasing usage and may be a cue to brand managers to reduce their use). Another important point worth mentioning here is the use of the phoneme /θ/ (as in /**th**eatre/). /θ/ is increasingly rare in languages (Dubois and Horvath, 2004) and its occurrence is low even amongst top brand names (see Table 1). In Studies 1 and 2, we could not find any difference in the usage of /θ/ among the brand names and COCA or CMUPD. However, the results of this study revealed that the /θ/ sound is a very popular first phoneme amongst current children names (approaching significance levels but not significantly different from those in brand names). The use of the phoneme /θ/ is worth noting. Due to its rarity (Dubois and Horvath, 2004), its usage in a name can potentially enhance a name's uniqueness.

The results of Study 3 are particularly insightful, as analyzing the patterns of children's names can provide a glimpse into the changing norms in relation to phoneme usage and its meaning (Brown, Carvallo, and Imura, 2014; Twenge et al., 2010; Varnum and Kitayama, 2011). Since many of the brand names analyzed here are old, it may not be prudent to expect new brands to copy and follow similar phonemic patterns. An analysis of the most popular current children's names, on the other hand, may reveal the changing patterns in naming conventions. Such an analysis can potentially help bring out the prominent dissimilarities in phoneme usage between the current names and those of the Fortune 200 brands.

Names chosen by a parent for their children are strongly guided by the prevalent social and cultural influences and studying these can often throw light on the evolving cultural values over time (Lieberson and Bell, 1992). For example, with the rise in individualistic traits in the USA, there was a corresponding rise in the number of people choosing unique and uncommon names for their children (Twenge et al., 2010). The research also suggests that changes observed in the adoption of new names for girls are much more frequent than those seen for boys (Lieberson and Bell, 1992; Twenge et al., 2010) and girls are 1.4 times more likely to receive a novel name than boys (Hahn and Bentley, 2003). This may be the reason why we observed more pronounced differences in the girls' names vs. brands names vis-à-vis the boys' names (see the footnote 2 and Appendix B). These differences can provide novel brand-naming ideas to selectively target male and female consumers.

To summarize, in the three studies we have analyzed the same list of brand names with CMPUD, COCA, and popular children's names. We have observed a number of similarities between our results and previous research and some dissimilarities. In agreement with the previous research (Van Doorn et al., 2016), we found: 1) no overrepresentation of the letters B, M, and T (for T, not when compared to children names); 2) an overrepresentation of the letter A (note here that the letter A can make different sounds at different times, but we qualify this difference to be only for the phoneme /æ/ (as in PayP**a**l) and not for the other sounds made by letter A); and 3) an overrepresentation of the letter J (equivalent to the phoneme /dʒ/ (as in **J**eep)).

To some extent, these results disagree with the previous research (Van Doorn et al., 2016).. In particular, we found: 1) no overrepresentation of the letter C and, 2) no underrepresentation of the letter S. Note, though, that in our analysis, the letter C can make sounds, /k/ (as in **C**oke), /ch/ (as in **Ch**allenger), /s/ (as in **C**isco) and /sh/ (as in **Ch**anel). The letter S can make sounds, /s/ (as in **S**amsung), /sh/ (as in **Sh**aw), /z/ (as in Lay**s**) and /ʒ/ (as in mea**s**ure). As such, our results may not be directly comparable to the previous research.

More importantly, we report some additional findings, which are new. Among the brand names, we observed an overrepresentation of , 1a) the vowel (/iː/ as in V**i**sa) and the consonants (/j/ & /z/ as in **Y**amaha and **Z**ara) (when compared with COCA and CMUPD) and, 1b) the vowel (/əʊ/ as in Cisc**o**) and consonants (/f/, /dʒ/, /p/, /j/, & /t/ as in **F**ord, **J**eep, **P**ayPal, **Y**amaha, and **T**ide) (when compared with current children's names).

We also observed an underrepresentation of 1a) the vowels (/aʊ/, /ɜː/& /ɔɪ/ as in S**ou**thwest Airlines, J**er**gens, and T**oy**s "R" Us) and the consonant (/r/ as in **R**evlon) (when compared with COCA & CMUPD) and, 1b) the vowel (/ɔː/ as in CBS C**o**rporation) and the consonants (/ʒ/, /l/, & /θ/ as in mea**s**ure, **L**'Oréal, and ma**th**) (when compared with all three categories, COCA, CMUPD, and current children's names).

We report four phonemes which are not observed as initial sounds amongst any of the three categories [i.e. two vowels (/ʊ/ and /uː/ as in Faceb**oo**k and G**oo**gle) and two consonants (/ŋ/ & /ð/ as in Samsu**ng** and **th**y)].. Apart from the differences reported above, we also observed a few differences in the brand names vs. male and female names (see the footnote 2 and Appendix B for these findings).

In Studies 1-3, we used the top brands appearing in Fortune 500 list, which essentially comprises both the global umbrella brands (e.g., P & G) and the individual product brands (e.g., Coca-Cola). If the same parent company has more than one brand in the top brands list (e.g., Pantene and Pampers are both owned by P & G and are both in top brands list), those brands are not taken into consideration. This, we feel, is problematic because when consumers think of brands, they more often mean the individual product brands (e.g., Head & Shoulders or Tide) rather than their parent brands/company. To overcome this issue, in Study 4, we analyze the initial phonemes of the Brand Finance's 500 most valuable brands instead (which contains individual product brands).

Study 4

One potential limitation with the previous research relates to the source of the brand names used. In particular, the brand names were chosen from the Fortune 500 list (only US firms) for the years 2010-2016. This list essentially consists of a mix of many global umbrella brand names and a few individual product brands and does not comprise all the top individual product brands within each global umbrella brand. To illustrate, consider the following examples. The current list contains only P&G and not many of P&G's top brands. For example, Gillette, Pantene, Pampers, Tide, Olay, and Heads & Shoulders have not been included in the list, whereas only P&G has been included once. These brands are often listed as amongst the top global brands. Likewise, the current list mentions the company, Kimberly-Clark, but Kimberly-Clark's iconic brand Huggies is not mentioned. Coca-Cola figures only once in the list and their other top brand, Sprite is missing. PepsiCo has at least two brands among the top global brands, Pepsi and Lays, of which Lays is not mentioned in the list. Budweiser is mentioned only once in the list whereas their other brand, BudLight too, is among the top global brands. Another example is Johnson & Johnson, which is included in the list but not their other top global brand Neutrogena. Among the automotive companies, General Motors appears in the list but their brand Chevrolet does not.

It can be argued that when consumers talk about brands, they usually refer to the brands *they use* and not necessarily to the parent company though in some cases the brand name and parent company are very similar (e.g., Pepsi, Coca-Cola). Hence, another approach is to look at the phonemic patterns of top brands sourced from a different list and to overcome this seemingly -important shortcoming, in Study 4, the list containing the most valuable brands of 2017 was used.

Method, results and discussion

One hundred ninety-seven top American brands featuring in the Brand Finance's 500 most valuable brands of 2017 were used. (Brandfinance.com, 2017). As earlier, we extracted the initial phonemes of the selected brand names and compared them with the CMUPD, COCA, and children's names.

The results reveal that, /ð/, /eɪ/ and /j/ (as in **th**y, F**a**cebook, and **Y**amaha) were significantly frequent among the brand names than CMUPD. We also observed a significantly higher usage of /eɪ/, /dʒ/, /ð/ and /z/ (as in F**a**cebook, **J**eep, **th**y and **Z**ara) among the brand names than in COCA. On comparison of children names with brand names, we observed a frequent use of /dʒ/ (as in **J**eep) among the children's names (14% vs. 4%, highlighting a wide gap). We also observed a higher use of /f/, /θ/, /ð/, /əʊ/, and /j/ (as in **F**ord**,** ma**th, th**y, Cisc**o**, and **Y**amaha) among the brand names as compared to children's names.

Study 4 reveals that 44.16% of the top brand names begin with the phonemes, /k/, /s/, /m/, /b/, /e/, /h/ and /p/ (as in **C**oke, **S**ephora, **M**ini, **B**udweiser, Acc**e**nture, **H**ilton, and **P**ayPal). If we add the phonemes /d/, /j/, /t/ and /dʒ/ (as in **D**ell, **Y**amaha, **T**id**e,** and **J**eep) to the list, 61.9% of the brand names begin with just 11 phonemes (see Figure 1), whereas the rest of the 28 phonemes of the English language, form the initial sounds of only 38.1% of the brand names. The results also reveal that the /k/ sound still features prominently as the initial phoneme among the brands because a maximum number (8.63%) of the current popular brands begin with /k/, which is surprising given the fact that letter K is one of the least common initial letters (1.10%) in the English dictionary (other rare letters being X, Z, V, J, Y and Q; Concise Oxford Dictionary, 1995). The higher frequency of the /k/ initial sound may result from the fact that a great variation of letter(s) can make the /k/ sound, for example, c (as in **C**ake), cc (as in O**cc**ur), k (as in **K**eep), ck (as in Ba**ck** or Bu**ck**et) and q (as in **Q**ueen) (though not cc and ck as the initial letters of a word).

Insert Table 2 and Figure 1 here

General Discussion

In four studies reported here, we explored the phonemic patterns associated with the first sound of the top brand names. We explored the frequency of the /k/ sound, as reported by Schloss (1981), and further compared our findings to those reported by Van Doorn et al. (2016). Both of these research groups compared the frequency of the *written* initial letters of the brand names whereas we re-analyzed these findings in the context of the initial sounds rather than the written letter. We observed that the /k/ initial phoneme is still the most frequent among the current top brand names (Study 4).

Note, though, that the higher usage of the phoneme /k/ is surprising given the fact that the letter K is one of the least commonly appearing initial letters in the English dictionary (this may, potentially, provide a way in which to differentiate brand names, though). We also found that if we compare the first sounds of the brand names with the first letter of the words that appear in the English dictionary, the K (phoneme) effect still persists.

Note that we cannot directly compare our results with those of many previous authors as they commented on the frequency of *written* initial letters and those we argue, may take different sounds in different words. For example, the letter A has been reported to be overrepresented as the initial letter of brand names whereas we report that out of the various pronunciations of the written letter A, only /æ/ (as in PayP**a**l) (Study 1 & 2) and /eɪ/ (as in F**a**cebook) (Study 4) are overrepresented among the brand names and not the others. Similarly, we find that out of 197 top brands of 2017 (Study 4), 61.9% still begin with just 11 phonemes (/k/, /s/, /m/, /b/, /e/, /h/, /p/, /d/, /j/, /t/ & /dʒ/as in **C**oke, **S**ephora, **M**ini, **B**udweiser, Acc**e**nture, **H**ilton, **P**ayPal, **D**ell, **Y**amaha, **T**ide, and **J**eep) (see Figure 1). We also observed an overrepresentation of the phoneme /dʒ/ (as in Jeep) amongst the brand names, but no evidence for the overrepresentation of /p/ and /s/ (as in **P**ayPal and **S**amsung).

Apart from comparing the brand names with words in dictionary and COCA, we also compared the brand names with current children's names (between 2010-16). Studying phonemic differences between the current children's names and the top brand names may uncover important patterns, which can be suitably used by brand managers. It leads us to an important and relevant question – why do the differences exist in the names that we report? Why would certain phonemes be overrepresented in specific word groups (e.g., successful brand names)?

The initial phoneme of a word plays an important role in a word's recognition (Hawkins and Cutler, 1988) and it has been reported to be an important influencer of the phonetic symbolism (Adelman et al., 2018; Kawahara, Shinohara, and Uchimoto, 2008). Research on phonetic symbolism has shown the association of various sounds present in brand names (or words) with different attributes, for example, slowness, coldness, mildness, thinness, heaviness, fastness, or lightness (Abel and Glinert, 2008; Berlin, 2006; French, 1977; Klink, 2000; Newman, 1933; Parise and Spence, 2012; Sapir, 1929; Shinohara et al., 2016; Yorkston and Menon, 2004), roundedness vs. angularity (Köhler, 1929; Ramachandran and Hubbard, 2001), luxurious appeal (Pathak et al., 2017), masculinity vs. femininity (Klink, 2000), aggressiveness vs. submissiveness (Krishna, 2012), hardness vs. softness (Slepian and Galinsky, 2016), energy (Begley, 2002), efficacy (Erlich, 1995), pleasantness vs unpleasantness (Whissell, 1999), disgust and dislike (Shrum and Lowrey, 2007; Smith, 1998; see also Spence, 2012).

The sound symbolic associations between names and product attributes are understandable if they are congruent (e.g., the name of a fast car containing front vowels or attributes of fastness). But, why should people or brand managers choose unusual (or unpopular) phonemes for naming children or brands? For example, one may argue that /ʊ/, and /uː/ are associated with disgust (Shrum and Lowrey, 2007) and hence are not liked as initial phonemes in names. Nevertheless, that does not explain the absence of /ð/ and /ŋ/ (as in **th**y and Samsu**ng**) as initial phonemes in names, since these phonemes have been shown to be rare (Dubois and Horvath, 2004), luxurious (Pathak et al., 2017), and pleasant (Anderson, 1998; Crystal, 1995; Whissell, 1999).

Similarly, many of the differences that we report pertain to diphthongs. Diphthongs are combination of two adjacent vowels, also known as the gliding vowels (e.g., /ɔɪ/, /əʊ/ as in T**oy**s "R" Us and Cisc**o**). Though there is a vast literature on the sound symbolic association of single vowel sounds (e.g., /i/ or /e/ as in K**i**t Kat and Acc**e**nture), the literature on phonetic associations of the diphthongs and trip-thongs is rare.

Unfortunately, the literature does not provide sufficient insights to explain the reasons for the overrepresentation (or underrepresentation) of certain initial letters (Van Doorn et al., 2016). This we argue may be because we are comparing something old (brands which are decades old) with something which is more current (COCA or children's names). Since people often use unique names to stand-out, changes in the popular names take place at a much faster pace. For example, Jacob was a very popular name up until 2007, but now it is difficult to find even one child with that name in a cluster of six classes (Twenge et al., 2010). Similarly, uniqueness in names can also be brought out by using different phonemic patterns or unusual spellings (e.g., Jackson vs. Jaxon vs. Jaxen and Aayden vs. Aiden vs. Aedon vs. Ayden vs. Aidon vs. Aydan vs. Aiyden).

Naming is an important part of culture across the world and any change in the naming practices reflects a change in people's desires (Twenge and Campbell, 2009). Studying changes in the popular names is a good way to study the cultural changes (e.g., fashion) taking place within a society. And, like change in fashions, peoples' taste in names too change, new names attain a peak in popularity and then fade away, to reappear again after a few years (Acerbi, Ghirlanda, and Enquist, 2012; Barucca et al., 2015; Berger and Le Mens, 2009; Carbon, 2010; Goldstone and Gureckis, 2009; Hahn and Bentley, 2003).

Naming decisions are not always rational (Ghirlanda, 2017) and sometimes even negative events influence the choice of a name, for example, the name Katrina surged in popularity after the extreme destruction caused by Hurricane Katrina (Berger et al., 2012). Brand names too form an important part of the naming landscape, but studying the phonemic patterns of the brand names cannot be a standalone exercise in itself. We argue that brand names *are* affected by the popularity of phonemic usage in the current cultural milieu (e.g. prevalent children's names, or negative events like 'Katrina'). If the name Karen happens to be more popular, it can influence the popularity of other names starting with a similar hard /k/ sound (e.g., **K**itKat, **C**arl or **K**atie). Similarly, if a word-ending phoneme is more popular in names, the same trend can be seen among the brands names (e.g., Amazo**n**, Darre**n** and Kare**n**, if /n/is a more popular phonetic ending) (e.g., Berger et al. 2012; Lieberson, 2000). To illustrate the impact of popular names on brand names, let us take the letter J as an example. Van Doorn et al. (2016) reported the surge in the usage of J as the initial letter among the brand names, but if we look at the popular children names, this pattern of a high usage of the word-initial phoneme /dʒ/ (as in **J**eep) (the sound often made by letter J) can be traced back to the 1880s. /dʒ/ phoneme has been the most popular initial sound among children's names from the 1880s up until the middle of the 2000s, when /k/ sounds became the most popular initial phoneme among the children names (Time Magazine, 2015). The popularity of /k/ as the initial sound in popular names too can be traced back to 1960s, when the /k/ phoneme became the second most popular initial phoneme. Note that this time coincides with the data set of brand names appearing in Schloss (1981) and led to the first reporting of the K effect. In fact, there was a time in the 1980s when just four phonemes, /dʒ/, /k/, /m/ and /æ/ (as in **G**eorge, **K**atie, **M**illie and **A**shley) formed the initial phonemes of more than 80% of the names of all the children born in the USA.

The preponderance of certain phonemes in the popular names, in turn will influence their usage in the prevalent brand names too. For example, we report that among the children names, the use of initial phonemes, /ʒ/, /ɔː/ and /z/ (as in **J**acques, **O**rlando and **Z**oe), is on the rise (Johnson, 2014; Time Magazine, 2015), this we argue, may be reflected in the future brand names.

If the presence of certain sounds in brand names can be attributed to sound symbolism, then why should there be differences in the phoneme usage between popular names and brand names (because we desire for the same characteristics/traits of uniqueness, likability or novelty in all names, be it a brand or a child). We argue that these differences are seen because we are comparing the phonemic patterns of old (brands) vs. contemporary (children) names. If future research compares the COCA and contemporary children names with new and emerging brands, we may find more similarities. Nonetheless, the differences highlighted in the current paper also present potential suggestions which brand consultants can use while creating novel and unique names for their brands. In the current paper, we have just examined the initial phonemes of the brand names; in the future, scientists can compare the overall occurrence of phonemes in the brand names with the most frequent phonemes found in the spoken or written text.

Managerial implications

Many factors influence the making of a successful brand and naming is undoubtedly one of them. However, what essentially makes a good brand name? There is no straight-forward and simple answer to this question. What is clear with the research that is currently available is that a consumer’s connection with a brand can be strengthened both explicitly (e.g., with a soothing jingle), and implicitly (e.g., sound symbolism). And, with a stronger connection with consumers, brands can expect a better consumer loyalty, satisfaction, positive associations and favorability.

Sound symbolism explores the non-arbitrary link between sounds and numerous linguistic cues (e.g., syllables, vowels, consonants, stresses) contained within a word (Nuckolls, 1999). Although we have only focused on the initial sounds of brand names, the findings are similar for other sounds contained within the brand names (e.g., middle and word ending phonemes). For example, it has been shown that many successful brands exhibit an over-representation of certain letters in their names (e.g., /s/, /l/, /m/, /ee/ as in **S**ephora, **L**'Oréal, **M**ini and V**i**sa) (Pogacar et al., 2015). Similarly, the success and international acceptance of many Swedish brands (e.g., Abba, Absolut, IKEA and Volvo) is in part attributed to their sound symbolically well-balanced names (Abelin, 2015). In fact, it is believed that almost 40% of a products' success may be attributed to a well-chosen brand name (Alashban, Hayes, Zinkhan and Balazs, 2002; Zaltman and Wallendorf, 1983) and often while judging a products' quality, consumers rely on signals from the brand name more than the other cues (e.g., price or physical appearance of a product) (Dawar and Parker, 1994). This makes sound symbolism, and the findings reported in this paper important for brand managers.

Often, sounds within a brand name itself can create an expectation for the product in a consumer's mind. For example, brand name sounds for a hiking boot should convey ruggedness (e.g., Mammut Ducan; Klink and Athaide, 2012). Similarly, the name sounds for a moisturizing product such as Dove or Olay should convey softness. It has been shown that if product features and brand name sounds are congruent (e.g., harsh sounds with an apparently rugged product), such products are appreciated more (Klink, 2001; Yorkston and Menon, 2004). Sound symbolic names can also influence the post-product evaluation (Coulter and Coulter, 2010; Lowrey and Shrum, 2007; Yorkston and Menon, 2004). In fact, the link between the sound of a brand name and the related sound symbolic product expectations is particularly strong in case of unfamiliar brand names (Fenko, Lotterman, and Galetzka, 2016). It has been shown that even in hypothetical brand names, the mere presence of specific speech sounds (or linguistic cues) can have implicit meanings for consumers (e.g., longer brand names (> 3 syllabic length) are perceived as more luxurious (Pathak, Velasco, Petit, and Calvert, 2019); an ice cream brand name with rounded or back vowel sound (e.g., /o/ as in fr**o**sh) is perceived as creamier or richer (Yorkston and Menon, 2004).

By applying the aforesaid psycholinguistic insights in the brand name generation, particularly those being launched in foreign markets, brands can more easily convey the nature of their product, as well as some of its distinctive features. With increasing globalization, consumers are being exposed to linguistically unfamiliar or foreign-sounding brands names (e.g., Huawei, TsingTao). Since firms often spend millions of dollars in creating and promoting new brand names, it is desirable to use a linguistically *sound* brand name globally, and we feel our research can help brand managers in achieving that objective.

Here, we build on the work of Schloss (1981) and Van Doorn et al. (2016) and show the relevance of first phonemes in brand names vis-à-vis popular names and initial letters of the brand names. Brand names have social values and a specific image associated with them (e.g., Hodson and Olson, 2005) and an emerging of body of research in psychology suggests that consumers are even guided by the first letters of their own names. For example, if Louis prefers to live in St. Louis (Pelham et al., 2002) and Lizzie likes lizards (Hodson and Olson, 2005), then it is possible that Karen likes Kellogg’s and KFC (i.e., the same initial letters as the first name), as well as, Coke and Cartier (same phoneme initials as the first name). Studying similar patterns between people’s names, common words and brand names can, then, help managers use them in novel product positioning. For example, certain sounds (e.g., ‘ngth’ or ‘rtz’ as in length and Hertz) do not exist in many languages (Usunier and Shaner, 2002). A brand manager should avoid these sounds in new brand names, especially if they plan to expand in linguistically diverse cultures. Similarly, in the English language there is no word starting with the initial sound /ng/ (as in Samsu**ng**), but the /ng/ sound is common as word-ending sound in English (e.g., as in the words somethi**ng** and anythi**ng**).

Brand managers can choose these rare initial phonemes (e.g., /ng/) in brand names to bring out a distinctiveness (e.g., among English speaking consumers), or can avoid these altogether (e.g., in China where /ng/ is a common initial phoneme). Global firms often spend millions of dollars in order to create a new name, yet this process lacks the scientific rigor (Pogacar et al., 2015). The findings of this paper can guide the marketers in a more scientific way in the novel name discovery process.

Conflict of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Footnote

[2] Some interesting insights emerged from separate comparisons of male and female names. Note that for both comparisons, the Bonferroni adjustment was made at an alpha level of 0.00190 (0.05/26). For male names, a) /ʌ/,/ə/, /ɪ/,/p/, /t/ and /s/ were found to be frequent in brand names than in male names, b) /dʒ/ and /l/ were found to be frequent in male names than in brand names, c) /f/ and /j/ were found to be frequent in brand names but not a single instance of their use was found in the male names, which may be reflective of the changes in naming conventions. For female names, a) /d/, /t/ and /w/ were found to be frequent in brand names than in female names, b) /l/ was found to be frequent in female names than in brand names, c) /θ/, /əʊ/ and /j/ were found to be frequent in brand names but not a single instance of their use was found in the female names, d) /ɔː/ and /ʒ/ were found to be frequent in female names but not a single instance of their use was found in the brand names (see Appendix B for details).

Appendices

Appendix A

IPA	Consonant examples	IPA	Full vowel examples
b	**b**uy, ca**b**	ɑː	**pa**lm, f**a**ther, br**a**
d	**d**ye, ca**d**, **d**o	ɒ	l**o**t, p**o**d, J**o**hn
dʒ	**g**iant, ba**dge**, **j**am	æ	tr**a**p, p**a**d, b**a**n
ð	**th**y, brea**the**, fa**th**er	aɪ	pr**i**ce, r**i**de, f**i**le, f**i**ne, p**ie**
f	**f**an, , **ph**i	aʊ	m**ou**th, l**ou**d, f**ou**l, d**ow**n, h**ow**
ɡ	**g**uy, ba**g**	ɛ	dr**e**ss, b**e**t, f**e**ll, m**e**n
h	**h**igh, a**h**ead	eɪ	f**a**ce, m**a**de, f**ai**l, v**ei**n, p**ay**
hw	**wh**y	ɪ	k**i**t, l**i**d, f**i**ll, b**i**n
j	**y**es, hallelu**j**ah	iː	fl**ee**ce, s**ee**d, f**ee**l, m**ea**n, s**ea**
k	s**k**y, cra**ck**	ɔː	th**ou**ght, m**au**d, d**aw**n, f**a**ll, str**aw**
l	**l**ie, s**l**y, ga**l**	ɔɪ	ch**oi**ce, v**oi**d, f**oi**l, c**oi**n, b**oy**
m	**m**y, s**m**ile, ca**m**	oʊ	g**oa**t, c**o**de, f**oa**l, b**o**ne, g**o**
n	**n**igh, s**n**ide, ca**n**	ʊ	f**oo**t, g**oo**d, f**u**ll, w**o**man
ŋ	sa**ng**, si**n**k, si**ng**er	uː	g**oo**se, f**oo**d, f**oo**l, s**oo**n, d**o**
p	**p**ie, s**p**y, ca**p**	juː	c**u**te, m**u**le, p**u**ny, bea**u**ty, h**u**ge, t**u**ne
r	**r**ye, t**r**y, ve**r**y	ʌ	str**u**t, b**u**d, d**u**ll, g**u**n
s	**s**igh, ma**ss**		
ʃ	**sh**y, ca**sh**, emo**ti**on		
t	**t**ie, s**t**y, ca**t**, a**t**om		
tʃ	**ch**ina, ca**tch**		
θ	**th**igh, ma**th**		
v	**v**ie, ha**ve**		
w	**w**ye, s**w**ine		
z	**z**oo, ha**s**		
ʒ	equa**t**ion, plea**s**ure, vi**s**ion, bei**g**e		

Adapted from http://en.wikipedia.org/wiki/Help:IPA_for_English and Decker (1999).

Appendix B

Distribution of initial phonemes in brand names, male and female names.

Phoneme	Example	% MNs	Z value (MNs)	p value (MNs)	% FNs	Z value (FNs)	p value (FNs)
ɒ, ɑː	T**o**t, F**a**ther	2.31	0.52	0.60	2.71	0.08	0.93
æ	C**a**t	5.89	-0.20	0.84	7.41	-1.09	0.27
ʌ, ə	D**u**ck	0.32	**7.00**	**< 0.0001**	**7.29**	-2.73	0.0068
ɔː	L**aw**yer	0.00	NA	NA	1.14	NA	NA
aʊ	C**ou**ch	0.00	NA	NA	0.00	NA	NA
aɪ	H**i**de	1.85	-1.70	0.09	0.46	-0.14	0.88
b	**B**at	5.88	-1.53	0.13	3.14	0.42	0.67
tʃ	**Ch**ess	1.13	-0.49	0.62	0.00	NA	NA
d	**D**og	5.02	0.13	0.90	1.01	**6.61**	**< 0.0001**
ð	**Th**en	0.00	NA	NA	0.00	NA	NA
e	B**e**d	4.18	-0.14	0.89	7.22	-1.97	0.05
ɜː	P**ea**rl	0.00	NA	NA	0.00	NA	NA
eɪ	G**a**te	3.79	-2.81	0.005	3.24	-2.53	0.01
f	**F**orest	0.00	NA	NA	0.43	9.60	<0.0001
g	**G**olf	2.83	-0.41	0.68	2.10	0.33	0.74
h	**H**orse	3.33	0.59	0.55	3.45	0.48	0.63
ɪ	P**i**t	0.48	**6.18**	**< 0.0001**	**4.29**	-0.85	0.39
iː	Sh**ee**t	2.48	-0.49	0.62	1.65	0.44	0.66
dʒ	**G**eneral	17.78	**-5.53**	**< 0.0001**	**4.23**	0.13	0.89
k	**K**een	10.49	0.36	0.71	8.85	1.30	0.19
l	**L**ot	7.41	**-3.26**	**0.0012**	**6.78**	**-3.00**	**0.0029**
m	**M**oon	6.81	-0.01	0.99	9.31	-1.36	0.17
n	**N**o	4.15	-0.12	0.90	3.28	0.64	0.52
ŋ	Samsu**ng**	0.00	NA	NA	0.00	NA	NA
əʊ	N**o**te	0.00	NA	NA	0.00	NA	NA
ɔɪ	B**oi**l	0.00	NA	NA	0.00	NA	NA
p	**P**ost	1.13	**6.08**	**< 0.0001**	**2.49**	2.75	0.006
r	**R**ose	2.95	-2.01	0.04	2.76	-1.89	0.056
s	**S**amsung	2.79	**4.24**	**< 0.0001**	**9.68**	-1.33	0.18
ʃ	**Sh**ell	0.22	0.59	0.55	1.11	-1.07	0.28
t	**T**iger	2.26	**3.13**	**0.0019**	**0.91**	**7.13**	**< 0.0001**
θ	Ear**th**y	0.25	1.75	0.08	0.00	NA	NA
ʊ	H**oo**d	0.00	NA	NA	0.00	NA	NA
uː	T**u**ne	0.00	NA	NA	0.00	NA	NA
v	I**v**y	0.58	1.29	0.20	2.75	-1.4961	0.13
w	A**w**ay	2.72	0.85	0.39	0.26	**10.33**	**< 0.0001**

j	**Y**es	0.00	NA	NA	0.00	NA	NA
z	Ea**s**y	0.97	-0.91	0.36	1.82	-1.68	0.09
ʒ	Mea**s**ure	0.00	NA	NA	0.21	NA	NA

BN- Brand Names; MNs- Male names; FNs- Female names All *p* values are two tailed unless specified Z values which are significantly different are highlighted in bold, along with the corresponding *p* values

Tables

Table 1

Distribution of initial phonemes in brand names, words in CMUPD, COCA and children's names (1a presents CMUPD, 1b presents COCA, and 1c presents children's names).

			1a			1b			1c		
Phoneme	**Example**	**% age BNs**	**% age CMUPD**	**Z value**	**p value**	**% age COCA**	**Z value**	**p value**	**% CNs**	**Z value**	**p value**
ɒ, ɑː	T**o**t, F**a**ther	2.8	1.43	1.81	0.0711	1.45	1.79	0.0754	2.48	0.33	0.7429
æ	C**a**t	5.6	2.17	3.72	**0.0002**	1.27	6.10	**0.0001**	6.53	-0.60	0.5519
ʌ, ə	D**u**ck	2.8	2.50	0.30	0.7621	2.51	0.29	0.7732	3.24	-0.39	0.6933
ɔː	L**aw**yer	0.0	0.68	NA	NA	0.51	NA	NA	0.48	NA	NA
aʊ	C**ou**ch	0.0	0.26	-0.81	NA	0.28	NA	NA	0.00	NA	NA
aɪ	H**i**de	0.4	0.46	NA	NA	0.71	-0.59	0.5577	1.27	-1.23	0.2211
b	**B**at	3.6	7.24	-2.22	0.0274	4.71	-0.83	0.4075	4.73	-0.84	0.4014
tʃ	**Ch**ess	0.8	0.94	-0.24	0.8132	1.62	-1.02	0.3063	0.66	0.28	0.7790
d	**D**og	5.2	5.78	-0.39	0.6954	5.03	0.12	0.9046	3.34	1.64	0.1029
ð	**Th**en	0.0	0.05	NA	NA	0.00	NA	NA	0.00	NA	NA
e	B**e**d	4.0	2.21	1.92	0.0554	2.09	2.11	0.0358	5.45	-1.01	0.3123
ɜː	P**ea**rl	0.0	0.29	NA	NA	0.06	NA	NA	0.00	NA	NA
eɪ	G**a**te	0.4	0.37	0.07	0.9427	0.42	-0.06	0.9540	3.56	-2.70	0.0075
f	**F**orest	4.4	4.17	0.18	0.8590	5.28	-0.62	0.5355	0.18	**15.73**	**< 0.0001**
g	**G**olf	2.4	3.71	-1.09	0.2748	2.65	-0.25	0.8061	2.52	-0.13	0.9000
h	**H**orse	4.0	5.01	-0.73	0.4644	3.10	0.82	0.4119	3.38	0.54	0.5861
ɪ	P**i**t	3.2	2.99	0.19	0.8452	4.13	-0.74	0.4614	2.08	1.24	0.2173
iː	Sh**ee**t	2.0	0.44	3.70	**0.0003**	0.22	5.99	**0.0001**	2.13	-0.15	0.8839
dʒ	**G**eneral	4.4	1.61	3.48	**0.0006**	0.91	5.81	**0.0001**	12.10	**-3.73**	**0.0002**
k	**K**een	11.2	9.66	0.82	0.4111	9.18	1.10	0.2710	9.80	0.74	0.4589
l	**L**ot	2.0	4.10	-1.67	0.0953	3.81	-1.49	0.1367	7.15	**-3.16**	**0.0018***
m	**M**oon	6.8	7.10	-0.18	0.8560	6.10	0.47	0.6417	7.86	-0.62	0.5336
n	**N**o	4.0	2.55	1.45	0.1487	2.13	2.05	0.0417	3.78	0.18	0.8587
ŋ	Samsu**ng**	0.0	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA

Note. BN- Brand Names; CN- Children Names; All p values are two tailed unless specified

			1a			1b			1c		
Phoneme	**Example**	**% age BNs**	**% age CMUPD**	**Z value**	**p value**	**% age COCA**	**Z value**	**p value**	**% CNs**	**Z value**	**p value**
əʊ	N**o**te	0.4	0.98	-0.93	0.3552	0.14	1.14	0.2570	0.00	NA	NA
ɔɪ	B**oi**l	0.0	0.02	NA	NA	0.11	NA	NA	0.00	NA	NA
p	**P**ost	5.2	5.82	-0.42	0.6743	9.92	-2.50	0.0132	1.70	**4.27**	**< 0.0001**
r	**R**ose	0.8	5.58	-3.29	**0.0011**	5.15	-3.11	**0.0021***	2.87	-1.96	0.0511
s	**S**amsung	7.2	9.33	-1.16	0.2480	11.30	-2.05	0.0415	5.68	1.04	0.3002
ʃ	**Sh**ell	0.4	1.86	-1.71	0.0890	0.90	-0.83	0.4055	0.60	-0.40	0.6886
t	**T**iger	5.2	3.66	1.30	0.1951	5.48	-0.19	0.8475	1.69	**4.30**	**< 0.0001**
θ	Ear**th**y	0.8	0.48	0.74	0.4598	1.04	-0.37	0.7124	0.14	2.74	0.0066
ʊ	H**oo**d	0.0	0.01	NA	NA	0.00	NA	NA	0.00	NA	NA
uː	T**u**ne	0.0	0.07	NA	NA	0.00	NA	NA	0.00	NA	NA
v	I**v**y	1.2	1.80	-0.71	0.4755	1.33	-0.18	0.8574	1.49	-0.38	0.7069
w	A**w**ay	3.6	2.86	0.70	0.4868	4.77	-0.86	0.3877	1.69	2.34	0.0198
j	**Y**es	4.8	1.02	5.93	**0.0001**	1.67	3.86	**0.0001**	0.00	NA	NA
z	Ea**s**y	0.4	0.71	-0.58	0.5592	0.03	3.33	**0.0010**	1.32	-1.28	0.2025
ʒ	Mea**s**ure	0.0	0.07	NA	NA	0.01	NA	NA	0.09	NA	NA

Note. BN- Brand Names; CN- Children Names; All p values are two tailed unless specified; * Significantly different by one-tailed test (used for the phonemes /l/ & /r/ because /r/ was found to be significantly preponderant in Study 1). /l/ & /r/ have also been reported to be preponderant sounds among the brand names (Pogacar et al., 2015) and have been reported to be pleasant (Whissell, 1999).

Table 2

Distribution of initial phonemes of brand names (as per Brand Finance, 2017), words in CMUPD, COCA and children's names.

Phoneme	Example	% BNs	% CMUPD	Z value	p value	% COCA	Z value (COCA)	p value (COCA)	% CNs	Z value (CNs)	p value (CNs)
ɒ, ɑː	T**o**t, F**a**ther	2.03	1.43	0.70	0.4830	1.45	0.68	0.4963	2.48	-0.40	0.6871
æ	C**a**t	3.05	2.17	0.85	0.3980	1.27	2.22	0.0277	6.53	-1.98	0.0491
ʌ, ə	D**u**ck	3.05	2.50	0.49	0.6249	2.51	0.48	0.6344	3.24	-0.16	0.8763
ɔː	L**aw**yer	0.51	0.68	-0.30	0.7678	0.51	0.002	0.9983	0.48	0.06	0.9513
aʊ	C**ou**ch	0.00	0.26	NA	NA	0.28	NA	NA	0.00	NA	NA
aɪ	H**i**de	0.51	0.46	0.11	0.9158	0.71	-0.34	0.7330	1.27	-0.95	0.3413
b	**B**at	5.58	7.24	-0.89	0.3718	4.71	0.58	0.5642	4.73	0.57	0.5723
tʃ	**Ch**ess	1.02	0.94	0.10	0.9188	1.62	-0.67	0.5033	0.66	0.62	0.5337
d	**D**og	4.57	5.78	-0.73	0.4677	5.03	-0.30	0.7653	3.34	0.96	0.3383
ð	**Th**en	1.02	0.05	**5.83**	**<0.0001**	0.00	NA	NA	0.00	NA	NA
e	B**e**d	5.08	2.21	2.73	0.0068	2.09	2.93	0.0038	5.45	-0.23	0.8155
ɜː	P**ea**rl	0.00	0.29	NA	NA	0.06	NA	NA	0.00	NA	NA
eɪ	G**a**te	2.03	0.37	**3.81**	**0.0002**	0.42	**3.47**	**0.0006**	3.56	-1.16	0.2478
f	**F**orest	3.05	4.17	-0.79	0.4294	5.28	-1.40	0.1628	0.18	**9.48**	**<0.0001**
g	**G**olf	2.03	3.71	-1.25	0.2142	2.65	-0.54	0.5891	2.52	-0.44	0.6588
h	**H**orse	5.08	5.01	0.04	0.9672	3.10	1.60	0.1109	3.38	1.32	0.1883
ɪ	P**i**t	2.54	2.99	-0.37	0.7106	4.13	-1.12	0.2633	2.08	0.45	0.6550
iː	Sh**ee**t	1.02	0.44	1.21	0.2271	0.22	2.37	0.0187	2.13	-1.09	0.2787
dʒ	**G**eneral	4.06	1.61	2.72	0.0071	0.91	**4.66**	**<0.0001**	12.10	**-3.46**	**0.0007**
k	**K**een	8.63	9.66	-0.49	0.6252	9.18	-0.27	0.7875	9.80	-0.55	0.5797
l	**L**ot	2.03	4.10	-1.46	0.1445	3.81	-1.30	0.1942	7.15	-2.79	0.0058
m	**M**oon	6.60	7.10	-0.27	0.7866	6.10	0.30	0.7678	7.86	-0.66	0.5112
n	**N**o	3.05	2.55	0.44	0.6616	2.13	0.89	0.3747	3.78	-0.54	0.5872
ŋ	Samsu**ng**	0.00	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA
əʊ	N**o**te	0.51	0.98	-0.67	0.5045	0.14	1.42	0.1575	0.00	NA	NA
ɔɪ	B**oi**l	0.00	0.02	NA	NA	0.11	NA	NA	0.00	NA	NA
p	**P**ost	5.08	5.82	-0.448	0.6548	9.92	-2.274	0.0241	1.70	3.659	0.0003

Note. BN- Brand Names; CN- Children's Names; All p values are two tailed unless specified

Phoneme	Example	% BNs	% CMUPD	Z value	p value	% COCA	Z value (COCA)	p value (COCA)	% CNs	Z value (CNs)	p value (CNs)
r	**R**ose	1.02	5.58	-2.79	0.0058	5.15	-2.62	0.0094	2.87	-1.56	0.1205
s	**S**amsung	8.12	9.33	-0.58	0.5602	11.30	-1.41	0.1599	5.68	1.48	0.1403
ʃ	**Sh**ell	2.03	1.86	0.18	0.8589	0.90	1.69	0.0931	0.60	2.62	0.0095
t	**T**iger	4.57	3.66	0.68	0.4962	5.48	-0.56	0.5759	1.69	3.13	0.0020
θ	Ear**th**y	1.02	0.48	1.09	0.2749	1.04	-0.03	0.9767	0.14	**3.23**	**0.0015**
ʊ	H**oo**d	0.00	0.01	NA	NA	0.00	NA	NA	0.00	NA	NA
uː	T**u**ne	0.00	0.07	NA	NA	0.00	NA	NA	0.00	NA	NA
v	I**v**y	2.54	1.80	0.78	0.4384	1.33	1.48	0.1406	1.49	1.22	0.2251
w	A**w**ay	3.55	2.86	0.58	0.5632	4.77	-0.80	0.4253	1.69	2.03	0.0437
j	**Y**es	4.57	1.02	**4.94**	**<0.0001**	1.67	3.18	0.0017	0.00	NA	NA
z	Ea**s**y	0.51	0.71	-0.34	0.7347	0.03	**3.82**	**0.0002**	1.32	-1.00	0.3175
ʒ	Mea**s**ure	0.00	0.07	NA	NA	0.01	NA	NA	0.09	NA	NA

Note. BN- Brand Names; CN- Children's Names; All p values are two tailed unless specified

Figures

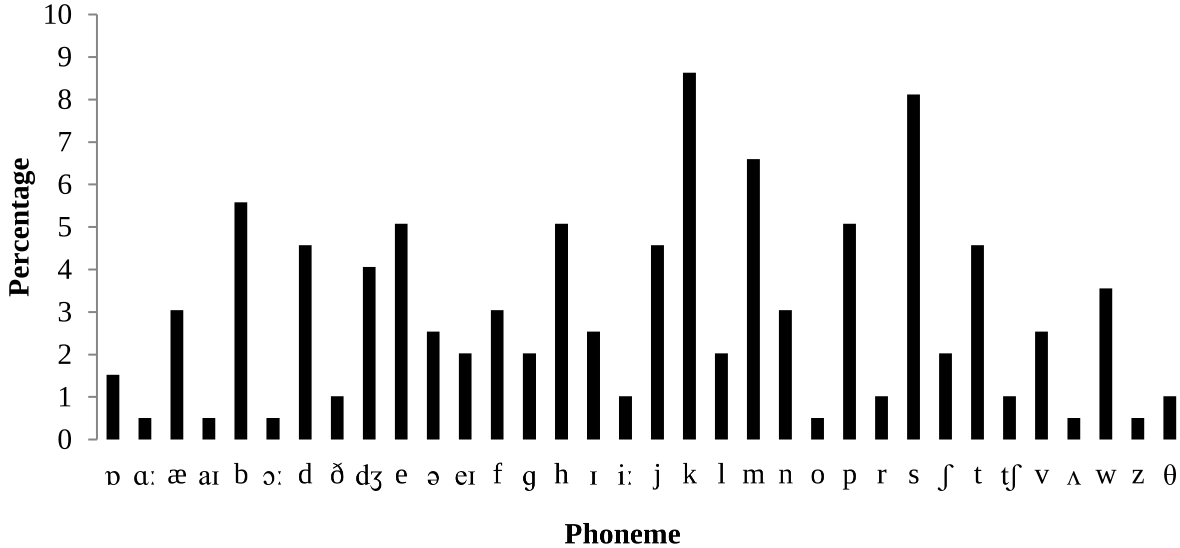

Figure 1. Percentages of initial phonemes among the top ranking brands in 2017.