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Sound Effects: Age, Gender, and Sound Symbolism in American English

Timothy Allen Krause
Portland State University

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Sound Effects: Age, Gender, and Sound Symbolism in American English

by

Timothy Allen Krause

A thesis submitted in partial fulfillment of the
requirements for the degree of

Master of Arts
in
Teaching English to Speakers of Other Languages

Thesis Committee:
Tucker Childs, Chair
Jenny Mittelstaedt
Jeff Conn

Portland State University
2015

SOUND EFFECTS: AGE, GENDER, AND SOUND SYMBOLISM

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Abstract

This mixed-method study investigated the correlation of sound symbolic associations with age and gender by analyzing data from a national survey of 292 American English speakers. Subjects used 10 semantic differential scales to rate six artificial brand names that targeted five phonemes. Subjects also described the potential products they imagined these artificial brand names to represent. Quantitative analysis alone provided insufficient evidence to conclude that age or gender affect sound symbolism in American English. While 26 out of 60 scales showed a monotonic shift among the means of the three age groups, only three were statistically significant. The evidence of differences between genders was similarly weak; only five scales out of 60 showed a statistically significant difference when comparing genders. Analysis of the qualitative data, however, suggested both monotonic generational shifts as well as generational blips in sound-symbolic associations. Of particular interest is the possible influence of pop culture, fashions, and fads, and society's shifting focus from broadcast to narrowcast media. The implications of this research are relevant for both theory (empirical evidence for iconicity in language) and application (e.g., devising brand names that communicate particular attributes to specific demographics).

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Chapter 1. Introduction

Does a *mil* sound smaller than a *mal*? Does the brand name *Vahnah* sound more effective than the same product called *Nahnah*? Are the answers to these questions the same for twenty-somethings as they are for their grandparents? What about for males and females? Is sound symbolism a socially conditioned phenomenon?

The non-arbitrary connection of meaning to sound commonly known as sound symbolism is a sometimes controversial topic among linguists. Over time, however, the field has accumulated evidence that sound symbolism, also known as phonosemantics, is more than mere coincidence. While sound symbolism is commonly observed in languages around the world, not all associations have been found to be universal, varying from language to language and even region to region.

Some of the driving force behind the more recent studies exploring how sound symbolism functions has come from the fields of marketing and brand name creation. Marketers have utilized the skills of linguists to determine which combinations of sounds convey the appropriate attributes for the products they are selling. Imagine, for example, the differences in perception of Viagra, Levitra, Uprima, and Cialis—brand names for different products that do essentially the same thing but seem to imply to the consumer different experiences simply by the way they sound (see discussion of Jespersen below).

One might think that marketers by now would have applied generalizations about sound symbolic associations in a more specific and systematic way, adding this strategy to their targeting of niche demographics such as age and gender in the same way that they

choose particular linguistic features or cultural icons when attempting to attract a particular type of consumer. Because these demographic measures are found to be common factors in language variation, it would be logical to presume that age and gender would be variables that influence sound symbolism as well. Gender would be expected to cause synchronic variation while age would provide diachronic variation in aspects such as pronunciation, vocabulary, and the like. This assumption, however, has yet to be confirmed because little work has been done in this area, on behalf of the marketing industry or otherwise. In studies related to sound symbolism, age and gender demographics generally have been either unreported or incidental to other research questions. The purpose of this study, then, was to add to the existing body of research by investigating what effect age and gender have on sound symbolism in American English. A study of how demographic factors such as these affect sound symbolism can contribute to the understanding of how closely tied sound symbolism is to social structure, with implications that are relevant to both theory (empirical evidence for iconicity in language) and application (e.g., devising brand names that communicate particular attributes to specific demographics).

Chapter 2. Literature Review

This study primarily draws on two areas of linguistics, namely sound symbolism and language variation. In this chapter, I begin with a brief overview of sound symbolism, sometimes referred to in the literature as phonosemantics or iconicity. Then I address the relevant areas of sociolinguistics pertaining to language varying by age and gender. I conclude this chapter by discussing what the existing literature says about the link between these two areas of concern and what this study may contribute to this body of research.

2.1 Sound Symbolism

As far back as ancient Greece, philosophers postulated that an individual phoneme carries with it an inherent meaning that shapes and informs the word. In *Cratylus*, Plato foreshadowed the study of sound symbolism by discussing what is thought of as a "correctness" to names, with Socrates suggesting the sound associated with the letter *r* expresses motion (e.g., Klink, 2009). Contemporary linguists have been more precise in defining sound symbolism as the non-arbitrary correlation between sound and meaning (Magnus, 2013). The manifestations of these associations are referred to as phonesthemes, the case in which "a sound unit such as a phoneme, syllable, feature, or tone is said to go beyond its linguistic function as a contrastive non-meaning-bearing unit, to directly express some kind of meaning," more typically attributed to morphological or syntactic units (Nuckolls, 1999, p. 228). In English, for example, /fl-/ initial words often denote linear motion, such as in *flow* and *fly*; /kr-/ initial words often denote sudden impact, such as in *crash* and *crush*; and /gl-/ initial words often denote

diffusion of light, such as in *glow* and *glimmer* (e.g., Bolinger 1940; Reilly, Biun, Cowles & Peele, 2008). Like compound words, new lexical items can be created by accretion when phonesthemes combine, and semantic shift can occur when the meaning of one sound becomes associated with other sounds as the word evolves. Thus, over time, a phoneme may acquire a sound symbolic association it did not previously have.

The idea of sound symbolism, however, is not without controversy. Some scholars are critical of the notion and reject the premise. "The number of pictorial, imitative, or onomatopoeic non-derived words in any language is vanishingly small," asserted Newmeyer (1993, p. 758). Locke further reasoned that if word meaning were dependent on sound symbolism, then speakers should be able to immediately define words simply by their sounds, and there would exist only one language (1690/2013). To critics of sound symbolism, sound and meaning are primarily seen as arbitrarily associated and, therefore, any meaning can be represented by any set of sounds (Saussure, 1916/1959). Any apparent connection between sound and meaning, they argued, is a statistical aberration. "The linguistic sign is arbitrary," Saussure (1916/1959, p. 67) famously wrote, leading linguists for decades to rebuff any implicit accord between sound and meaning in language (Magnus, 2013).

Jespersen (1922), however, considered Saussure's assertions too extreme, campaigning instead for a middle ground, seeing the association more as a continuum:

Sounds may in some cases be symbolic of their sense, even if they are not so in all words. ... There is no denying, however, that there are words which we feel instinctively to be adequate to express the ideas they stand for, and others the

sounds of which are felt to be more or less incongruous with their signification.
(pp. 397-398)

Subsequently, researchers have amassed a growing amount of empirical evidence in support of some degree of sound symbolism (Magnus, 2013), particularly in studies requiring subjects to match sounds represented by artificial words with definitions (Parise & Pavani, 2011). Sound-to-meaning correspondences have been documented relating to size, speed, color, sound, and—more recently in the field of marketing and branding—human qualities and emotional attributes such as being daring and courageous. Sapir (1929), for example, wrote:

vocalic and consonantal contrasts tended with many, indeed with most, individuals to have a definite symbolic feeling—significance that seemed to have little relation to the associative values of actual words; that it made surprisingly little difference whether the phonetic contrast was contained in a phonetically "possible" or a phonetically "impossible" context; and that the certainty of the symbolic distinction tended to vary with the nature of the phonetic contrast. (p. 228)

In his experiments, Sapir found an overwhelming correlation (81%) between size and sound using minimal pairs of artificial words contrasting /i/ and /a/, the former conveying a sense of smaller objects and the latter a sense of larger objects. This experiment has been replicated and extended many times in many languages with similar results, consistently showing that high front vowels (where the highest point of the tongue is in the front of the mouth) are associated with the properties of being clear, thin, bright, or

flat, while low back vowels (where the highest point of the tongue is in the back of the mouth) have been associated with properties of being dark, large, thick, heavy, or obscure (e.g., Fischer-Jorgensen, 1978; Jakobson & Waugh, 1987; Newman, 1933; Klink, 2000, 2003). Further support for Sapir's finding is provided by Ultan (1978), who reported that among the languages he surveyed that utilized diminutive endings, nearly 90% formed the diminutive using high front vowels.

Although vowels have been the focus of many of the studies, there are also cases where consonants have been shown to add consistent information to the meaning of the words, not only as an individual phoneme, such as /s/, but also in clusters, such as /st/, and sometimes whole groups, such as fricatives that include /s z ʃ ʒ/ (e.g., Bloomfield, 1933, Hinton, Nichols, & Ohala, 1994). Fricatives as a group (consonants in which there is partial closure of articulators but the airstream is not fully blocked), for example, were judged to be harsh, rough, active, sharp, difficult, or angular, while stops or plosives as a group (consonants in which there is complete closure of articulators so that all airflow from the mouth ceases, such as /p/ and /k/) were associated with qualities of abrupt, tight, rugged, or inhibited (Greenberg & Jenkins, 1966/1990). In a 2003 study, Kelley, Leben, & Cohen found that "fricatives sound symbolically faster than stops and that voiceless consonants are smaller and more luxurious than voiced consonants" (p. 4) (the latter typically representing sounds in which the vocal cords vibrate whereas in the former they do not, as in the difference between /v/ and /f/). Furthermore, Kelley, Leben, & Cohen were able to assign attributes of sad, alive, insecure, and daring to particular clusters of features with surprising consistency. For example,

/v/ was found to be substantially more alive and daring than /b/. However, in non-continuant sounds the opposite effect was found whereby voiced stops /b d g/ were less alive and daring than voiceless stops /p t k/. (p. 6)

Thus, both consonants and vowels can have predictable and varied meanings.

Sound symbolism is sometimes concentrated in a single word class (Childs, 1994). For example, ideophones, especially common among African languages, are characterized by unusual properties such as raised pitch, reduplication, obscure origins, and such. As a whole, they rely on non-arbitrary relations between sound and meaning more than the rest of the lexicon. For example, in Igbo, a medial /k/ or /g/ adds the context of back-and-forth, as in *regerege* ('swinging side to side') and *kwakakwaka* ('shaking side to side') (Maduka, as cited in Childs, 1994). Another example is the category of mimetics in Japanese that includes onomatopoeia for animal sounds as well as words related to events and states that are not dependent on sound (Imai, Kita, Nagumo, & Okada, 2008). Here, combinations of the phonemes /g/ or /k/ with /r/ are often associated with rotation, voiced initial consonants are associated with larger masses while voiceless initial consonants are associated with smaller masses, and reduplication indicates repetition of an event. For example, *koro* ('a light object rolling'), *guru* ('a heavy object rotating around an axis'), and *potapota* ('thin/little liquid hitting a solid surface repeatedly') (p. 55).

Although sound symbolism is found in all languages to varying degrees with shared patterns among some languages (particularly in the subtypes of onomatopoeia and synesthesia), most specific (conventional) sound symbolic associations have not been

found to be universal (Childs, 1994, 2014). This means that the /gl-/ cluster in English that is often associated with meanings involving something visual, especially in association with diffused light (Bloomfield, 1933), is not consistent through all languages. In fact, in another language, the /gl-/ cluster may convey a meaning that is completely unconnected to its English counterpart, if it exists at all. Even within a language, sound symbolism has been found to be subject to regional variation (Wright, 2012). Therefore, instead of searching for universals in sound symbolism, what may be more interesting and possibly more useful to examine is how it functions from a perspective of language variation.

2.2 Language Variation and Change

Language change involves differences in features over time, be it morphology, phonology, or syntax. In other words, contrasts are found in the speech, either that of a group or an individual, from different points in time (Chambers, Trudgill, & Schilling-Estes, 2004). There may be a phonological change, such as the Great Vowel Shift in English in which certain vowels underwent an upward chain shift, for example, changing *goat* from [gɔ:t] to [go:t] (from GAUT to GOAT). The change may be morphological, such as when *pease* once meant 'one pea' or 'multiple peas' instead of the distinction made today between *pea* and *peas*. The change may also be a semantic shift, such as in how *gay* today rarely means 'happy' but rather 'homosexual'. Furthermore, there are now more speakers of English as a second language than native English speakers, creating new varieties of World Englishes with different, but still intelligible accents, vocabulary, and even syntax (McKay, 2012).

While there are challenges to studying phonetic variation in particular, when the variables of individual styles are controlled, the remaining differences are no longer linguistic, but social (Gordon & Heath, 1998). Socially significant variation may originate in language contact; influences of culture, communications, and technology; economic and political pressures; and movement, including invasion, migration, and colonization. Demographic factors such as age and gender also play important roles in shaping language change and variation (Chambers, Trudgill, & Schilling-Estes, 2004).

2.2.1 Variation by Age. When looking at variation by age, three distinct phenomena are considered. First, there are instances of *age-grading*, which are ephemeral "changes in the use of a variant that occur at a particular age in successive generations" (Chambers, 2009, p. 200). These include, for example, common nursery words, such as *horsie*, that are later unconsciously eliminated from adult speech. These variants do not represent an evolution of language, but rather cyclic periods of what is, essentially, generational slang that speakers adopt and later leave behind. In this manner, language change for the individual is abrupt even as the larger community remains unchanged (Meyerhoff, 2011).

Second, there is *lifespan change*, or change over time within an individual that takes place after the critical period (the time in which language learning generally is considered the easiest, typically childhood up to adolescence) and is consistent with a gradual change over time in the speaker's larger community (Meyerhoff, 2011). Lifespan change has been observed in longitudinal studies such as Harrington (2007), who measured speech data from annual broadcasts by Queen Elizabeth II from 1952 to 2002

and noted a gradual vowel shift unexplained by physiological maturation of the vocal system or age-graded changes. Other examples include the change from apical to dorsal /r/ in Montreal French (Sankoff & Blondeau, 2007), as well as changes in word choice and linguistic style over an individual's lifetime (Pennebaker & Stone, 2003). Because the individual's speech change is generally consistent with the community's speech change, this type of age-related phenomena may not be detectable in this study.

Finally, there is *generational change*, or change over time so that the speech of one's parents or ancestors is different from one's own speech, which, in turn, is not the same as later generations' speech. In this scenario, a variable continues to evolve with each subsequent generation, and change is more extensive than within the speech of one individual (Meyerhoff, 2011). As an example, vocabulary not only changes across generations, but may also undergo semantic shifts in reaction to changes in phonological structure, leading to new meanings and forms (Magnus, 2013). For instance, the shift from /r/ to /R/ in Montreal, which began as a lifespan change, became so pervasive as to illustrate a generational change (Meyerhoff, 2011). This, in particular, is the type of age-related language variation that this study was interested in exploring because if there are changes in phonology over time, there may also be accompanying shifts in sound symbolism as the sound associated with a meaning is replaced by another.

2.2.2 Variation by Gender. Differences in speech between males and females have been some of the most consistent findings in sociolinguistic research (e.g., Gordon & Heath, 1998; Newman, Groom, Handelman, & Pennebaker, 2008). In a summary of the research through the 1980s, Labov (1990) supplied two principles reflecting a

traditional view of gender-preferential phenomena in language: men use nonstandard forms of speech more frequently than women, and women more frequently use the incoming variant. In one example, Gordon & Heath (1998) suggested an asymmetry in which not only do men and women favor different vowel spaces, but women lead linguistic changes. They presented examples such as the case in Belfast where females more frequently led the shift from low to high front vowels while males led the shift toward backing and rounding of /a/. More recently, however, linguists have further clarified these cases as being less the effect of a speaker's gender and more a result of their cultural and social roles and networks as men and women (Meyerhoff, 2011).

This is not to completely rule out sex-based biological factors. Ohala, for example, in work where he employed the term *frequency code*, suggested patterns for meaning based on contrasts with fundamental frequency, or pitch. He wrote, for example, that high frequencies associated with high front vowels and palatal consonants (and even high tones in tonal languages) conveyed the idea of smallness in size, politeness, deference, or submission. Ohala stated, "The phonetic generalization that can be made is that the expression of size utilizes speech sounds whose characteristic acoustic frequencies vary inversely with size of the thing designated" (1997, p. 2). How this biological connection between sound and symbolism is socialized, and its variation by gender, is a debate for another paper. Suffice it to say that between males and females, there exist what are largely subconscious preferences in language use extending across various functions. Whether social or biological, variation by gender is not uncommon.

2.3 Variation in Sound Symbolism

Because age and gender are two variables that commonly influence language variation, it is logical to speculate that similar influences would extend to sound symbolism. In other words, phonosemantic variation would be expected between older and younger speakers and between male and female speakers. Yet little empirical evidence has been presented to support this conclusion since few studies of sound symbolism have collected or reported the effects of age or gender. Those studies that have looked at variable sound symbolism have used convenience samples that did not represent a cross section of the population.

In the cases where the effects of age and gender were addressed, the findings have been mixed. Newman (1933) reported no effect for age, but his subjects were young students within a narrow range of ages, not representing multiple generations. In examining whether there are sound-meaning correspondences related to human qualities such as sad, alive, insecure, and daring, Kelly, Leben, & Cohen (2003) also reported no effect for age, sex, or even geographic location in the U.S. Yet in a study of the effects of culture, environment, age, and musical training on choices of visual metaphors for sound—an experiment not unrelated to sound symbolism—Walker (1987) observed that age was a factor, albeit a minor one in relation to the other variables studied, in which results for the group of elementary age students were statistically different than for the group of adults. Furthermore, a significant amount of contemporary sound symbolism research has focused on promoting commercial products, specifically in the niche of brand name creation (e.g., Klink, 2000; Lowrey & Shrum, 2007). In a study of gender

responses to new product brand names, Klink (2009) found evidence similar to earlier work (e.g., Sapir, 1929) indicating a general female preference for front versus back vowels (although not a male preference for back vowels). He concluded, however, that "the gender effect dissipates as the importance of the product's masculinity-femininity attribute decreases" (p. 323). In other words, Klink implies a correlation between a product's perceived masculine-feminine attributes and the sound symbolic associations assigned by each gender, and that this correlation is all the more evident when the product's attribute is more strongly masculine or feminine.

But the waters here are muddy. In an attempt to make their subjects more comfortable with assessing artificial words, researchers such as Klink asked them to imagine that the artificial words presented were new brand names under consideration for a product such as a sport utility vehicle or a knife. These studies focused on implications for marketing and, as such, their intent was to learn how sound symbolism influenced brand preferences concerning a specific product rather than to analyze responses on a purely phonosemantic basis. It is unclear if this degree of specificity influenced the subjects' responses by conflating participants' associations of the product (e.g., the inherent qualities of the sport utility vehicle or the knife) that they were asked to imagine with their interpretation of the sound symbolism of the artificial words presented to them. Klink argued that these products have "seemingly little masculinity-femininity attribute importance" (2009, p. 333), but no test was reported to determine first whether, for example, a sport utility vehicle would be perceived as feminine and a knife as masculine, or if study participants would generally consider these objects to be gender neutral. It is

uncertain if those underlying assignments influenced the subjects' choices for preferred brand names, passing along any perceived masculine or feminine attributes to the artificial names and the phonemes they represented.

The lack of convincing evidence for an effect of age and gender on sound symbolism, therefore, may be due more to a lack of explicit investigation than an absence of correlation. The purpose of this study, then, was to examine the correlation of sound symbolic associations with age and gender. Specifically, this study asked the following research question: Is age or gender a significant factor in how sound symbolism is perceived by speakers of American English?

This study tested two hypotheses:

1. There will be a statistically significant difference in sound symbolic associations between younger and older individuals.
2. There will be a statistically significant difference in sound symbolic associations between males and females.

Chapter 3. Methodology

To explore language variation in sound symbolism, I conducted a mixed-method analysis of data collected via an online survey of speakers whose L1 was American English. Participants were asked to rate artificial words on semantic differential scales of polar-opposite adjectives (e.g., whether a word with a initial sound /k/ seems *harder* or *softer* than the same word beginning with a different sound, such as /v/) as well as to suggest the product they had imagined the artificial word to represent. I examined the resulting data for statistically significant differences in responses between males and females and among three generational age groups, as well as the interaction among these variables. In this chapter, I first discuss the preparatory pilot study. Then I describe the solicitation of the participants and their demographics. I conclude with a review of the strategies for gathering and analyzing the data.

3.1 Pilot Study

Before beginning the experiment, I conducted a pilot study in order to identify potential problems with the instrument's design, specifically in terms of its size and structure, question context and format, the choice of artificial words, and the general logistics and security of the online survey technology. Appendix A discusses the results in detail. The amount and quality of data, along with general feedback from the pilot study participants about their experiences, shaped the final survey instrument, which appears in Appendix B.

3.2 Participants

To conduct this study, I recruited participants primarily via notices placed on a variety of Craig's List websites across the U.S., research study recruitment websites, and social media. Appendix C provides a comprehensive list of these resources. Although geographic region was not specific to the research questions of this study, I asked participants to report their respective state of residence in order to ensure a diverse sample of American English speakers and to be able to consider this factor in future analyses. A total of 532 individuals attempted the survey, and data from 292 participants were ultimately used in this study. These 292 participants were those who completed all 60 scales of the survey and self-identified as speaking American English as their L1; were currently residing in the U.S.; self-identified as exclusively male or female; and indicated they were 18-23 years old, 26-48 years old, or 51 years or older.¹

Table 3-1 shows the distribution of survey participants by demographic variable. The columns represent the three generational age groups while the rows represent the two genders grouped by geographic region. The Eastern U.S. includes states situated primarily in the Eastern Time Zone; the Western U.S. includes states situated primarily in the Pacific Time Zone. The Central U.S. includes states situated primarily in either Central or Mountain Time Zones. While my goal was to have at least five participants in each combination of age, gender, and geographic region, this was not achieved in the

¹ Allowing for two-year gaps between segments to better isolate each division, the three age groups roughly correspond to three contemporary generations, namely Millennials, Generation Xers, and Baby Boomers (McCrindle & Wolfinger, 2011; CNN, 2011).

case of Millennial-aged males from the Central U.S., of which there were only three survey participants. Furthermore, because participants were recruited largely via social media originating from my personal, Oregon-based connections, the representation of participants from the Western U.S. was significantly higher than other geographic locations. Because this was not a variable that I was measuring, I did not control for geographic distribution in this sample.

Table 3-1

Demographic Distribution of Subjects

		<u>Millennials 18-23 years old</u>	<u>Generation Xers 26-48 years old</u>	<u>Baby Boomers 51 years or older</u>	<u>Total</u>
Eastern U.S.	Males	5	9	6	20
	Females	<u>11</u>	<u>29</u>	<u>21</u>	<u>61</u>
		16	38	27	81
Central U.S.	Males	3	8	5	16
	Females	<u>8</u>	<u>19</u>	<u>18</u>	<u>45</u>
		11	27	23	61
Western U.S.	Males	10	19	11	40
	Females	<u>17</u>	<u>59</u>	<u>34</u>	<u>110</u>
		27	78	45	150
Total	Males	18	36	22	76
	Females	<u>36</u>	<u>107</u>	<u>73</u>	<u>216</u>
		54	143	95	292

3.3. Data Gathering

Data were gathered via an online survey written in English using Portland State University's secure Qualtrics survey platform. No identifying information was collected. Instead, each survey participant automatically received a computer-generated identification number along with the date and time the survey was submitted. Prior to

completing the questionnaire, participants were provided with proper disclosures for human subject participation, which can be found in the survey instrument in Appendix B, as approved by Portland State University's Human Subjects Research Review Committee (HSRRC) Institutional Review Board (IRB). A copy of its approval letter appears in Appendix D.

The survey contained 75 questions. Participants began by answering nine demographic questions regarding age, gender, L1 and additional languages spoken, where they grew up and how many years they spent there; where they live now and how many years there; and level of education. Participants then were asked to rate six artificial words on 10 semantic differential scales, which can be described as bipolar seven-step scales defined by verbal opposites (Osgood, May, & Miron, 1975). A multi-point scale was chosen in order to provide for an indication of both direction and intensity of judgment (Osgood, Suci, & Tannenbaum, 1959/1969). For each artificial word, participants were also asked to specify what product they imagined the artificial word represented. According to information provided by the Qualtrics software, the survey took most participants between five and 15 minutes to complete.

Questions regarding sound symbolism addressed the phonemes /i a k n v/. The vowels represented general characteristics of high front and low back phonemes commonly utilized in previous studies of sound symbolism, a choice made to facilitate comparison of my results with those of existing research (e.g., Sapir, 1929, Jakobson & Waugh, 1987; Klink, 2000, 2003). In addition, these vowels offered significant contrast in sounds even when allowing for allophones and individual interpretations of spelling

that could arise when a participant is reading an artificial word rather than hearing it pronounced aloud. Accommodating for these potential variations permitted an unambiguous written survey rather than a more complicated version requiring audio recordings or a live interview.

Table 3-2 shows the distribution of the contrasting qualities of the phonemes selected as the focus of this study. Here, each phoneme of the study is classified as either voiced or voiceless (or, in the case of vowels, open or close) as well as defined by its point of articulation and manner of articulation.

Table 3-2

Phonemes Targeted in this Study

Phoneme	Voiced or Voiceless	Close or Open	Point of Articulation	Manner of Articulation
/k/	voiceless	—	velar	stop
/n/	voiced	—	alveolar	nasal
/v/	voiced	—	labio-dental	fricative
/i/	—	close	high front	unrounded
/a/	—	open	low back	unrounded

The consonant sounds were chosen to represent a variety of distinct manners of articulation, namely a stop, a nasal, and a fricative. They also represented both voiced and unvoiced options as well as variations in place of articulation. These particular vowel and consonant combinations, including the consistent medial consonant /t/, were also chosen

because, while their pairings did represent possible sound combinations allowed in English phonology, they did not represent actual known words in the English lexicon. Furthermore, the medial /t/ is one of the most frequent consonants used in English and has little effect on the sounds of adjacent vowels. While /t/ in this environment is often pronounced /d/, this was not deemed to be a problem. Either sound would provide a consistent consonant, and neither was a phoneme that was being studied. All together, these highly contrastive sounds provided the articulatory and perceptual distance that permitted a simple written survey rather than a more complicated version requiring audio recordings.

In the survey, these phonemes were presented to participants in the form of six contrasting artificial words, with the target consonants in the initial position followed by reduplicated target vowels separated by the medial consonant /t/, and with initial capitalization to represent brand names, as below:

<i>Keetee</i>	<i>Neetee</i>	<i>Veetee</i>
<i>Kahtah</i>	<i>Nahtah</i>	<i>Vahtah</i>

Participants were asked to rank each of these six artificial words independently according to 10 different scales. Four of these scales were drawn from existing sound symbolism research (e.g., Sapir, 1929) and could therefore serve as a point of comparison with existing data. These included:

<u>/i/</u>	<u>/a/</u>
<i>fast</i>	<i>slow</i>
<i>light</i>	<i>heavy</i>

<i>soft</i>	<i>hard</i>
<i>thin</i>	<i>thick</i>

Three additional scales were based on research by Magnus (1999) that suggested the following associations of meaning for the consonants represented in this study. While Magnus's research presented a number of possible associations for each phoneme, I chose the more frequent association and paired it with an antonym to create the following bipolar adjective scales, as below:

/k/	<i>closed</i>	<i>open</i>
/n/	<i>narrow</i>	<i>wide</i>
/v/	<i>energetic</i>	<i>lazy</i>

I chose the remaining three scales because they represented spectrums of judgment that have commonly polarized society, areas that I believed would also illustrate common divides among age groups and between genders, and would therefore show a change in sound symbolism among those variables. These included:

<i>liberal</i>	<i>conservative</i>
<i>religious</i>	<i>secular</i>
<i>rural</i>	<i>urban</i>

In previous studies designed for marketing purposes, researchers often offered contextual information, asking participants to imagine the word as a brand name for a specific product, such as a sport utility vehicle, a knife, or a computer. To isolate the participant's opinion solely on a word's particular sound without any possible influence of pre-determined subject matter, I asked participants simply to imagine the artificial

words were potential brand names for a new product without actually identifying the product. The survey instrument in Appendix B includes the preamble presented to the participants describing this fictitious marketing scenario. For each of the six stimuli, I concluded by asking participants to identify what product or products they were imagining to be associated with the artificial word.

3.4 Data Analysis

3.4.1 Quantitative Data. I analyzed the resulting quantitative data for variation in responses by the independent variables of age and gender, and interaction of the two together. I began by compiling descriptive statistics, such as mean, median, and mode, for each of the demographic groups. These data appear in Appendices E and F. I used SPSS Statistics software to review histograms and conduct Kolmogorov-Smirnov and Shapiro-Wilk assumption tests. Because many of the histograms depicted data that were not normally distributed, and none of the results of the assumption tests exceeded 0.05, I analyzed the ordinal data using nonparametric tests²—namely, the Kruskal-Wallis one-way analysis of variance (for age) and the Mann-Whitney U test (for gender)—in order to ascertain if the differences, if any, were statistically significant ($p < 0.05$). The results of

² Because data of several histograms appeared to be normally distributed, I was curious to know what might be learned if parametric tests were used. Therefore, I also used SPSS to perform an independent T test (for gender) and an ANOVA test (for age). The results were nearly identical as those of the nonparametric tests, and so I proceeded to focus on the more conservative, non-parametric tests of the data.

the Kruskal-Wallis test appear in Appendix G, while the results of the Mann-Whitney U test appear in Appendix H.

As another way to better distinguish among the three age groups, I also extracted a subset consisting of 67 records composed of 21 of the youngest Millennials (18-20 years old), 24 of the oldest Baby Boomers (66-84 years old), and 22 of Generation Xers clustered at the middle-age point (36-38 years old). Again, I conducted a Kruskal-Wallis test followed by post-hoc Mann-Whitney U tests to determine differences that were statistically significant ($p < 0.05$).

3.4.2 Qualitative Data. I analyzed the qualitative data in two ways. First, I performed a simple word count using online software at textfixer.com to determine the most frequently appearing words for each of the stimuli, ignoring generic terms (e.g., *something, product, use*) and common words (e.g., *the, is, to*). Second, another rater (a Millennial female) and I (a Generation X male) assigned each qualitative response to one or more categories using a standard product taxonomy (Google, 2014), as well as noting frequently occurring themes or attributes (e.g., *fast, soft, clean, foreign*). The coding data appear in Appendix I. Empty responses, or indeterminate responses such as "Nothing" or "I couldn't think of anything," were disregarded, resulting in variable numbers of responses for each artificial brand name. Discrepancies between raters were negotiated and resolved without issue. The frequency of each category then was determined as a percentage of responses to that question.

Chapter 4. Results

In this chapter, I present the results of the analysis, first by age, then by gender. Within each section, I discuss both quantitative and qualitative data.

4.1 Age

4.1.1 Quantitative Data. Six artificial words rated on 10 scales yielded data from a total of 60 scales. Among the means by age, an arbitrary difference of 0.25 or greater was found on 37 of the 60 scales, or 61.7% of the time. Twenty-six of the 60 scales (43.3%) were monotonic, meaning that the means increased or decreased from youngest to oldest. Among the modes, variation of at least one point on the seven-point scale appeared in 27 of the 60 scales, or 45.0%. According to the results of the Kruskal-Wallis test, however, only three of the 60 scales (5.0%) indicated statistically significant differences ($p < 0.05$) as to age among the responses from Millennials, Generation Xers, and Baby Boomers. These were for the words *Kahtah* on the scale of *soft-hard*, *Vahtah* on the scale of *soft-hard*, and *Keetee* on the scale of *liberal-conservative*. Post-hoc Mann-Whitney U tests indicated that Baby Boomers stood apart from the other two age groups for the word *Vahtah* on the *soft-hard* scale, while Millennials were the dissimilar group for the other two instances.

Table 4-1 shows the test results for the three semantic differential scales where statistically significant variation by age was found. Each row represents a different artificial word, while the columns indicate which scale and to what level of significance variation occurred.

Table 4-1

Significant Results of Statistical Tests for Variation of Means, by Age

Stimulus	Scale	Post-Hoc Mann-Whitney U Test					
		Kruskal-Wallis Test			Significance for Groups		
		Chi-Square	df	Asymp. Sig.	1 & 2	2 & 3	1 & 3
<i>Kahtah</i>	<i>soft-hard</i>	16.396	2	.000	.004	.091	.000
<i>Vahtah</i>	<i>soft-hard</i>	10.366	2	.006	.132	.035	.001
<i>Keetee</i>	<i>liberal-conservative</i>	7.095	2	.029	.012	.963	.002

p < 0.05

Group 1 Millennials

Group 2 Generation Xers

Group 3 Baby Boomers

Figure 4-1 plots the means of each age group along the semantic differential scales in which statistically significant variation was found. Here, we can see that the artificial brand name *Kahtah* is perceived by Baby Boomers to be much more associated with the quality of *soft* in contrast to Millennials, who consider the word to be more semantically tied to the quality of *hard*. Similar results are found for the artificial brand name *Vahtah*. Statistically significant variation was also found for the word *Keetee* along the scale of *liberal-conservative*.

Figure 4-1

Statistically Significant Variation of Means, by Age

BB Baby Boomers

GX Generation Xers

ML Millennials

A similar analysis of the quantitative data clustered by age (representing the youngest subjects, the oldest subjects, and the subjects nearest the midpoint of the age range) presented five scales indicating statistically significant differences among the three groups. However, as illustrated in Table 4-2 and Figure 4-2, the significant scales for the age clusters were not the same as the significant scales for the whole population. They were *Keetee* on the scales of *narrow-wide* and *religious-secular*, *Nahtah* on the scale of *slow-fast*, *Neetee* on the scale of *narrow-wide*, and *Veetee* on the scale of *slow-fast*. In this case, the subsequent post-hoc Mann-Whitney U tests did not as clearly define a graduated shift, instead pointing toward the middle age group of Generation X as the

segment that was statistically different than the other two. Table 4-2 shows the test results for the five semantic differential scales where statistically significant variation by age was found, while Figure 4-2 plots the means of each age group along those semantic differential scales.

Table 4-2

Significant Results of Statistical Tests for Variation of Means, by Age Clusters

Stimulus	Scale	Post-Hoc Mann-Whitney U Test					
		<u>Kruskal-Wallis Test</u>			<u>Significance for Groups</u>		
		Chi-Square	df	Asymp. Sig.	1 & 2	2 & 3	1 & 3
<i>Keetee</i>	<i>narrow-wide</i>	9.416	2	.009	.005	.013	.940
<i>Nahtah</i>	<i>slow-fast</i>	8.682	2	.013	.303	.005	.038
<i>Neetee</i>	<i>narrow-wide</i>	8.507	2	.014	.008	.881	.016
<i>Veetee</i>	<i>slow-fast</i>	7.592	2	.022	.674	.006	.060
<i>Keetee</i>	<i>religious-secular</i>	6.100	2	.047	.291	.202	.011

p < 0.05

Group 1 Millennials

Group 2 Generation Xers

Group 3 Baby Boomers

Figure 4-2

Statistically Significant Variation of Means, by Age Clusters

BB Baby Boomers

GX Generation Xers

ML Millennials

4.1.2 Qualitative Data. Figure 4-3 and the tables in Appendix I illustrate the distribution of qualitative responses among a standard taxonomy of product categories (Google, 2014). The graphs represent the three most frequently referenced product categories as a percent of responses grouped by age (e.g., 22.7% of Baby Boomers said

the word *Keetee* represented a product in the category of Animals & Pet Supplies). A single figure with side-by-side results for all six words appears in color in Appendix J.

Figure 4-3

Three Most Frequently Referenced Product Categories, by Age, Percent of Those Responding

Most frequent references: cat, toy

n=238

Most frequent references: cleaning, tea, shirt

$n=236$

Most frequent references: shirt, drink, car, food, tea, energy

$n=235$

Most frequent references: knife, food

$n=230$

Most frequent reference: food

$n=216$

Most frequent references: water, car

$n=270$

4.2 Gender

4.2.1 Quantitative Data. Among the means by gender, an arbitrary difference of 0.25 or greater was found on 13 of the 60 scales, or 21.7%. The modes differed in 19 of 60 scales, or 31.7% of the time. According to the results of the Mann-Whitney U test, however, five of the 60 scales (8.3%) presented statistically significant differences ($p < 0.05$) between the responses from males and females. These were for the word *Kahtah* on the scales of *liberal-conservative* and *soft-hard*, and for the word *Vahtah* on the scales of *liberal-conservative*, *religious-secular*, and *closed-open*.

Table 4-3 shows the test results for the five semantic differential scales where statistically significant variation by gender was found. Each row represents a different

artificial word, while the columns indicate where (which scale) and to what level of significance variation occurred.

Table 4-3

Significant Results of Statistical Tests for Variation of Means, by Gender

Stimulus	Scale	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
<i>Kahtah</i>	<i>liberal- conservative</i>	6649.500	30085.500	-2.670	.008
<i>Vahtah</i>	<i>liberal- conservative</i>	6808.000	30244.000	-2.319	.020
<i>Vahtah</i>	<i>religious- secular</i>	6820.000	30256.000	-2.280	.023
<i>Vahtah</i>	<i>closed-open</i>	6901.500	9827.500	-2.108	.035
<i>Kahtah</i>	<i>soft-hard</i>	6948.000	30384.000	-2.019	.044

Figure 4-4 plots the means of each gender along those semantic differential scales. Here we can see that while the difference may be statistically significant, the effect is small and the means generally surround the midpoints of the scales.

Figure 4-4

Statistically Significant Variation of Means, by Gender

F Females

M Males

All five of the gender-related instances occurred only among the stimuli with low, back vowels (*Kahtah*, *Vahtah*). The age-related instances occurred among the stimuli with either high front vowels or low back vowels (*Keetee*, *Kahtah*, *Vahtah*). None of the instances occurred among the words related to /n/ (*Neetee*, *Nahtah*). Table 4-4 plots this distribution of statistically significant results according to semantic differential scale and stimulus.

Table 4-4

Distribution of Instances of Statistically Significant Variables, by Scale and Stimulus

Scale	<i>Keetee</i>	<i>Neetee</i>	<i>Veetee</i>	<i>Kahtah</i>	<i>Nahtah</i>	<i>Vahtah</i>
<i>slow-fast</i>						
<i>heavy-light</i>						
<i>soft-hard</i>				G, A		A
<i>thin-thick</i>						
<i>closed-open</i>						G
<i>narrow-wide</i>						
<i>energetic-lazy</i>						
<i>liberal-conservative</i>	A			G		G
<i>religious-secular</i>						G
<i>rural-urban</i>						

A Age

G Gender

4.2.2 Qualitative Data. Figure 4-5 and the tables in Appendix I illustrate the distribution of qualitative responses among a standard taxonomy of product categories (Google, 2014). The figures represent the percent of responses (e.g., 20.7% of females said the word *Keetee* represented a product in the category of Animals & Pet Supplies).

Figure 4-5

Three Most Frequently Referenced Product Categories, by Gender, Percent of Those Responding

Most frequent references: cat, toy

n=238

Most frequent references: cleaning, tea, shirt

$n=236$

Most frequent references: shirt, drink, cat, food, tea, energy

$n=235$

Most frequent references: knife, food

$n=230$

Most frequent reference: food

$n=216$

Most frequent references: water, car

n=270

Chapter 5. Discussion

In this chapter, I present a discussion of the study's findings, looking specifically at the quantitative, then qualitative results of this survey. I then highlight two trends I found noteworthy and speculate as to their origin. I conclude this chapter with a discussion of potential limitations that may have affected the outcome of this study.

My original research question asked if age and gender were significant factors that co-varied with sound symbolism in American English. My hypotheses were that they would be and that this would be observable as statistically significant variation among age groups and between males and females. A preliminary scan of the means and modes of the quantitative data continued to support this notion. Using a 0.25-point difference between means as an arbitrary measure of significance implied that while variation according to gender may not have been particularly common, there almost certainly was variation by age—and much of that variation was monotonic. Figures increased or decreased in a graduated fashion from generation to generation, hinting at a potential phonosemantic shift over time.

It was surprising, then, when very little of that variation was found to be statistically significant. In fact, only 8.3% of the results by gender and 5.0% of results by age were determined to be statistically significant. While these findings did not support the broad-based hypotheses of this study with regard to expected significant variation by age or gender, the high degree of consensus regarding phonosemantic associations can be taken as evidence for the presence of sound symbolism even if its social conditioning may not operate as predicted.

In an attempt to tease out a clearer distinction among the generational data, I also examined the significant results of the statistical tests for variation of means by age clusters representing the youngest respondents, the oldest respondents, and the respondents centered between the two in terms of age. Again, only five scales (8.3%) were statistically significant, but these five scales differed from those of the full data set. Because this was a sample of only 67 respondents, I considered the pool to be too small to generalize and therefore did not proceed with further calculations. Had the smaller sample corroborated the full set, it would have strengthened the latter's significance. Because they differed, however, it weakened the argument that the overall results were more than mere noise.

5.1 Quantitative Results

Among the statistically significant results, it is worth reviewing apparent clusters of responses. On the scale of *soft-hard*, for example, there was significant monotonic variation by age for the artificial words *Vahtah* and *Kahtah* from the oldest group of Baby Boomers to Generation Xers to the youngest group of Millennials. Here, the means for Millennials leaned toward the *hard* end of the scale while Baby Boomers reported more of a connotation of *soft*. *Vahtah* and *Kahtah* share the same vowel, /ɑ/, one that is associated in other studies with the meaning of *hard*. Assuming no interference by the word's consonants, this pattern suggests that the phoneme /ɑ/ actually may be exhibiting the low back vowel's traditional ties to masculinity especially among males or those who identify with a male role in society. This is consistent with existing research that suggests

males or those in male roles are more conservative than females or those in female roles in terms of adopting a linguistic variant.

Another cluster of statistically significant results occurred on the *liberal-conservative* scale, an original measure that was not suggested by existing research but included because it represented a strong social divide. Here, in contrast to males, females ranked the phoneme /a/ as being more liberal for the same words *Vahtah* and *Kahtah*. For the phoneme /i/, however, the generational change for the word *Keetee*, the other statistically significant result on the same *liberal-conservative* scale, was not a monotonic shift across generations as was seen with the words on the *hard-soft* scale. Instead, the mean for Millennials was the lowest, or closest to the *liberal* end of the scale, followed by Baby Boomers, with Generation Xers closer to the *conservative* end of the scale. The means for all age groups, however, were less than the scale's midpoint of 4.0. This score indicates that all three means referenced a *liberal* quality that differed only in degree.

The final curiosity among the quantitative results was the reoccurrence of the artificial words *Vahtah* and *Kahtah*, which made up all but one of the eight instances of statistically significant measures found in this study for age and gender combined. Again, because they share the phoneme /a/, it may be possible that change is occurring—perhaps in some interaction between age and gender—whereby /a/ is consistently associated with things that exemplify *hard* and *conservative*. The fact that all but one of the artificial words in question shared the phoneme /a/ and the majority were clustered on the same two scales implies that there is some unifying factor causing this variation.

While the tests of this particular study revealed only these instances of variation,

different combinations of scales and stimuli could illuminate additional correlations among other phonemes and semantic scales. In other words, we may be seeing evidence that variation by age and gender can and does occur in the sound symbolic system of American English, but the conditions under which it applies are not yet understood. In this case, the phoneme /a/ varies only by age and gender in relation to its semantic associations with *soft-hard* and *liberal-conservative*. Other phonemes, however, may react to different associations than those presented here. The question, then, is what are the factors triggering change? Why might the semantic association with /a/ be undergoing change in terms of *hard-soft* and *liberal-conservative*, but not in other places where it would seem relevant, such as on other scales on which it often appears opposite /i/ (e.g., *slow-fast* and *heavy-light*)?

I considered a number of theories when examining the results of the data analysis. For example, there may be a case for relative strength of association between phoneme and meaning such that a stronger tie may resist variation. Another idea is that the sound symbolic associations of these particular consonants and vowels may have affected each other, either in conflict, concord, or even as a sound cluster producing a third, unique sound-meaning association. Still another reason may be related to regional variation and how this study recruited subjects nationally in an attempt to represent the diversity of the population of speakers of American English. Sound symbolism may be an extensive, complicated, and even hierarchical or dynamic system, and this survey instrument alone simply may not have been able to measure the necessary variables.

5.2 Qualitative Results

An analysis of the qualitative data presented additional clues that may help to answer the question of why sound symbolism does not appear more definitively and universally in these results. After ranking each artificial word, survey participants were asked what they were picturing when answering the question. Unlike the semantic scales that were concerned with only polar-opposite adjectives, the open-ended qualitative responses included a mix of specific nouns (e.g., "a knife") and more generic descriptors (e.g., "something that cuts").

Though not analyzed statistically, the qualitative data depicted many instances of generational differences, but a general lack of notable differences between genders. For example, I observed a clear decline among age groups in how frequently *Keetee* was thought of as a product within the category of Animal & Pet Supplies. Sometimes this monotonicity appeared only at the intersection of these variables, such as the number of males who considered the word *Keetee* to represent some product within the category of Food, Beverages, & Tobacco. This association showed a distinct decline from 22.2% of male Baby Boomers to 13.3% of male Generation Xers to 12.5% of male Millennials.

When the shift is not monotonic, there often appeared distinct *generational blips*, the spike or dip where one of the three age groups associates an artificial word with a product category that differs markedly from what the other two age groups report. An example of this could be seen among Generation Xers (males and females). Here, 18.5% considered the word *Veetee* to be a product from the category of Electronics in contrast to 2.7% of Baby Boomers (and, notably, 0% of male Baby Boomers) and 7.3% of

Millennials. Generational blips like these might be explained by a form of socially-influenced variation that caused these phonemes to be interpreted differently by different ages and genders. It is possible that this type of variation is attributable to the passing popularity of certain products, fashions, or fads; the introduction of new technology that subsequently becomes either commonplace or obsolete; or even shifting consumer priorities or preferences. Unlike age grading, these instances reflect a sound-meaning association that sticks with a particular generation.

In colloquial English, for example, there is a fairly recent convention of prefixing words with *e-* and *i-* (/i/ and /aɪ/) to represent or evoke a connection to electronics, computers, and the Internet, as well as the fashionable prestige of Apple brand technology and, in the case of *i-*, a self-centered focus. In these examples, the prefixes may be continuing to carry their sound symbolic associations for Generation Xers and Millennials, the two generations for which it is meaningful. However, its salience may fade over time and no longer be relevant to subsequent generations.

In the same way, it is not difficult to imagine a Baby Boomer connecting the word *Veetee* to the product category of Food, Beverages, & Tobacco (with its similarity to "vitamin" and "tea") and a Millennial connecting the word to the product category of Apparel by way of V-neck T-shirt (often referred to simply as a "T") whereas Generation Xers—experiencing both the golden age of television and the dawn of the computer age during their formative years—imagine *Veetee* to be more associated with VT, an abbreviation for video terminal, or an inversion of the abbreviation for television, both having associations with the product category of Electronics. While the generation in

question continues to retain the new sound symbolic association, the community at large does not adopt the variation but instead maintains its more general association or even moves on to another semantic association based on new social input.

In this sense, language variation in sound symbolism may operate both by generational shifts, when a community as a whole gradually changes its sound symbolic associations, as well as by generational blips represented by the spikes or dips in sound symbolic associations that continue to track with a particular generation over time. The difference between the two would depend on the durability of the source of the semantic association. A fad that fades or becomes so commonplace that it seems generic would cause only a spike or a dip, while something more enduring would cause a monotonic semantic shift in which the new association replaces the old.

More often than not, it was the Millennials who exhibited this tendency. In both quantitative and qualitative data, Baby Boomers and Generation Xers were often more closely aligned with each other than with Millennials. This, I believe, reflects the individualistic nature of the Millennial generation. As contemporary media continues to evolve toward *narrowcasting*, or segmentation of communication that provides information or advertising to a particular demographic based on their interests, past behaviors, or even geographic location (Chae & Flores, 1998), it is not surprising that there is less consensus among Millennials than their predecessors who bonded over less diverse, but a wider, more consistent and ubiquitous broadcast media stream. Although one might argue that sharing is a hallmark of Millennials' relationship to modern media, it is often the case that there are many broadcasters and few listeners, which is a situation

opposite of the mass media more familiar to Generation Xers and Baby Boomers in which there were many listeners for few broadcasters. This type of isolation among Millennials is reflected here in how Millennials are generally the group that is distinct from the other two generations among the statistically significant quantitative results and the generally low percentages of respondents that agree on product categorization among the qualitative results.

In practical terms, the qualitative results provide evidence that sound symbolic associations affect an individual's perception of even artificial words to the extent that ignoring this association could be detrimental in terms of international or multicultural brand identity or marketing efficacy just as ignoring a word's translation or homophone in another language can have negative consequences. Among many examples are a brand name for a cheese that in French is innocuous but in Farsi describes something rotten and is a common word for penis (Habibinia, 2010) and the apocryphal story of U.S. automaker Chevrolet introducing its Nova model of car into Mexico where the name in Spanish means 'it doesn't go.' A comparable, albeit fictitious, example can be found within the context of this study. Considering the artificial word *Neetee* to be the brand name of a product, one can see that there is a notably higher association of the word *Neetee* with a cleaning product within the Home & Garden category, especially among Millennials, than with the second most-referenced product, namely a type of tea within the Food, Beverages, & Tobacco category. In this case, 39.5% of Millennials thought *Neetee* was a Home & Garden product while only 4.7% associated the word with a product in the Food, Beverages, & Tobacco category. If a company were considering a

name for a tea to be marketed toward Millennials, it may want to rethink a brand name such as *Neetee*, a term that its target audience is more likely to consider a cleaner than a beverage. In fact, the company may want to carefully consider any potential brand name that uses the phonemes /n/ or /i/.

It is important to note, however, that none of these qualitative data points exceeded 44.4% (a particularly extreme instance reflecting the proportion of male Baby Boomers who considered *Neetee* to be a product in the Home & Garden category). As such, this figure was still less than the majority of the population who provided an answer to that question and, accordingly, an even lower percent of the total population surveyed. This suggests that even where patterns are spotted and even when they are statistically significant, the strength of their effect remains in question. Therefore, when interpreting this data for practical applications, marketers must weigh their options carefully to determine if the effect is strong enough to provide significant return on their investment in segmented marketing based on sound symbolism.

5.3 Limitations

Despite the potential to add to research on language variation and sound symbolism in English, this study had potential limitations. First, time and financial considerations restricted the number and diversity of participants. Efforts were made, for example, to ensure a healthy and equal representation of each demographic category combination (e.g., posting a link to the survey on the Facebook page of a magazine geared toward a specific demographic), but I was unable to recruit additional participants

in certain categories; those categories (e.g., Millennial males) may be under-represented in this study.

Second, I chose to utilize Internet-based testing and to focus on recruiting subjects via web sites situated in the country's largest metropolitan areas as matter of convenience. This may have skewed the results demographically, especially in terms of under-representation of rural areas. The use of an online survey instrument also favored participants with access to technology. A self-directed online survey introduced the risk of an uncontrolled and variable testing environment, including, for example, duplicate surveys from the same participant, multiple participants contributing to a single survey, or a large number of incomplete survey attempts. With no financial incentive to participate and the survey software's ability to restrict access to the survey, the risk of duplicate or tainted surveys was low. Participants recruited from Craig's List sites generally tend to skew young and female (Antoun, Zhang, Conrad, & Schober, 2013), a statistic that also was evidenced in my data, along with a higher response from the Western U.S. compared with Eastern and Central areas, a result of using social media originating primarily among my personal network based in Portland, Oregon.

Presenting the survey in a written format also introduced a risk for the influence of typography (e.g., the letter *n* is more rounded than the letter *v* and therefore its visual form may influence participants' responses). Because this has not been a reported issue in either the existing literature or among participants of my pilot study, and because the survey prompts asked participants to consider the sounds of the stimuli, I considered this to have been a very small risk.

Because the survey repeated the same 10 scales six times, participants may have found the activity to be tedious and failed to provide consistently thoughtful and honest responses. However, similar tests by Osgood and others have used much larger sets of stimuli and scales (Osgood, May & Miron, 1975) without incident. This questionnaire was much smaller and therefore should not have presented a significant problem. Still, it is interesting to note that of 422 subjects who met all the demographic criteria for this study and attempted to participate in the survey, only 292 (69.2%) completed all 60 scales. It is unclear if participants simply missed a scale, did not want to answer a scale, or omitted scales out of fatigue or insufficient time.

Finally, there was the potential for conflicting interpretations of the sounds. For example, there was a chance that the sound symbolism of the medial consonant of the artificial words may have interfered with or distracted participants from an interpretation of the targeted phonemes. I tried to account for this by consistently using /t/ throughout the survey, one of the most common consonants in English as well as one with little influence on adjacent vowels. More importantly, however, may have been the foreign connotations of the artificial words. In an attempt to provide stimuli that were not already existing words in American English, I created artificial words that, while permitted by English phonology, may not have sounded like natural English. Their spelling, chosen to elicit the targeted phonemes, may also have appeared foreign. When asked about this, the pilot study participants agreed that some of the stimuli made them think of foreign or exotic products or attributes. This, therefore, may have been a distraction and/or led the subjects to attribute foreign or exotic qualities to whatever product they had been

imagining when answering the questions. To address this, I included a short preamble to the survey that incorporated this as motivation for the marketing-oriented survey.

Because the words sounded so unusual, I wrote, the marketers wanted to know what associations people already had with these sounds. Then, to better gauge the degree of influence of this foreign quality, I recorded for each artificial word the frequency of such references. This included the words *foreign*, *exotic*, references to other countries and cultures, etc. Because the frequency of these mentions never exceeded 14.4% (see details in Appendix I), I consider this to have had an insignificant effect on the results.

Chapter 6. Conclusions

Quantitative analysis of the ranking of artificial brand names on semantic differential scales within the boundaries of this study does not alone provide sufficient evidence to support the broad hypotheses that age or gender correlate with sound symbolism in American English. When combined with qualitative responses, however, the results do provide motivation for further refinement of the survey instrument and its use in order to more clearly identify potential correlations and conditions of those correlations. In particular, what I call generational blips may represent a unique phenomenon socially influenced by both pop culture, fashions, and fads as well as American society's evolution from broadcasting to narrowcasting, a phenomenon in which a generation continues to utilize a sound symbolic association beyond its original environment. The variation between males and females and among generations may be relevant to those studying sound symbolism as well as to marketers wishing to more carefully target their brand messaging. The strength of effect, however, is not large, and therefore its practicality in the marketplace remains in question.

6.1 Recommendations for Future Research

Future research should continue to refine the survey instrument and methodology in order to more clearly classify potential variation and its implications. These changes might include:

- compiling a more consistent demographic set, either controlled specifically for equal distribution of demographic variables, including geography, or restricted to a more narrowly defined community;

- using forced-choice scales, such as a six-point Likert scale, which would not allow for neutral answers;
- incorporating comparative stimuli such as those used in similar sound symbolism research (e.g., Which sounds faster? Veetee or Neetee?);
- creating a two-part question that uses the comparative example above followed by a measure of intensity (e.g., On a scale of 1-5, how fast?);
- addressing a combination of product category and product attribute (e.g., What type of product is Keetee? If Keetee is a _____, is it a fast _____ or a slow _____? How fast/slow is it?);
- measuring strength of effect and providing some sense of what degree is necessary for branding and marketing professionals to consider implementing changes based on these data;
- applying other statistical modeling, including ranges, factor analysis, etc.;
- investigating the effect of pop culture, fashions, and fads on sound symbolism;
- focusing specifically on the phoneme /a/ and the semantic scales of hard-soft and conservative-liberal in order to explore why only /a/ figured in significant correlations;
- performing tests to document the theory of a hierarchy of phonemes relative to their sound symbolic associations and social demographics.

Perhaps most importantly, however, would be the replication of this study that acquires real-time measurement of the same variables. This could serve to confirm the results of qualitative analysis and conclude whether the variation is a form of

generational shift, age grading, or what I have termed generational blips. This would be especially applicable in instances where Millennials are presented as a generation that is further isolated than the two preceding generations.

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Appendix A. Pilot Study

In order to determine how best to obtain the most useful data in the most efficient manner, I conducted a pilot study with seven volunteers on May 14, 2014 at a computer lab on the campus of Portland State University. In this section, I describe the pilot study session, its participants, and the specific feedback I received from the focus group discussion. I conclude this section with a list of modifications I made to the survey methodology as a result.

After brief introductions, the volunteers completed the online survey using the computers in the computer lab. The group then re-convened at a nearby restaurant for a focus group discussion over complimentary food and drink. Although the discussion was recorded for reference, participation in the pilot study remained confidential; no results were published and the participants' survey responses as well as the audio recording will be deleted upon completion of this thesis.

Participants

For the pilot study, I initially sought six volunteers (one male and one female from each of the three age groups). Although I recruited via the local Portland, Oregon Craig's List web site for convenience sake, I used an advertisement that was similar to what I would use later on a national scale. I placed the ad in the "Volunteer" section of the web site, but received only one response who, notably, never communicated further nor attended the focus group. When it became clear that I would not obtain enough volunteers by the date of the focus group if I pursued only this strategy, I placed additional invitations on both my personal Facebook page, in a Facebook group for

students of Applied Linguistics at Portland State University (specifically seeking their contacts outside of the Applied Linguistics department), as well as on a local theater community listserv in Portland of which I am a member. To my surprise, it was easier to recruit older participants using online methods while the youngest group of Millennial-aged subjects was the most difficult. Although I had eight volunteers registered, only seven volunteers attended the pilot study. Table A1 illustrates the distribution of demographics of pilot study participants. All were current residents of Portland, and all but one had responded to the theater listserv invitation (the other was recruited via the post on my personal Facebook page).

Table A-1

Distribution of Demographics among Pilot Study Participants

Gender	-----Ages-----		
	Millennials	Generation X-ers	Baby Boomers
3 females	23	47	62
4 males	—	28, 37	52, 60

I believe that part of the recruitment challenge was that participants were asked to attend an event at a specific time and place. Because the actual survey would be remotely accessed from participants' homes, offices, public computer terminals, and even smartphones, I believed this would be less of a problem for the actual survey. Still, when discussing motivation to participate, many of the participants expressed skepticism about using Craig's List, suggesting that a trusted referral from a friend or familiar web site would more easily convince them to participate, regardless of reward (see also the

question below about incentives). One participant also suggested that by using Craig's List sites of the most populous metropolitan areas of the country, the results will reflect an urban and economic bias. This was a valid concern that I subsequently included among the study's limitations. Even if true, however, I expected to still be able to measure variation, if any, among age or gender despite such bias.

Pilot Study Questions

I outlined a number of questions that I expected my pilot study to answer, the results of which follow.

Are the instructions and questions clearly written? Did participants understand what they were being asked to do and how to do it? Participants did not express any confusion about how to execute the survey. All participants began with the introductory screen describing the survey scenario and disclosures of safety and privacy, and continued to navigate to the end of the survey without problem. All participants successfully completed the survey. During the focus group, one participant mentioned that she was unsure how some of the scales could apply (i.e., how they are relevant to the given artificial brand name), but that did not prohibit her from completing the survey.

Are all of the participants perceiving the sound of the artificial words in a similar way? After completing the survey, I asked participants to say aloud the artificial words. Participants reported no confusion as to what sounds were intended to be represented by the artificial words. All were in agreement as to both vowels and consonants. There was some brief discussion about differences in syllable stress, but

stress was not relevant to this study because it did not alter the pronunciation of the phonemes.

Are there any significant interferences with the artificial words? Were participants distracted by existing references? None of the participants reported thinking the artificial words were real words in English. Several reported having the impression that some of the artificial words may be of Arabic or Native American origin. One participant said that the artificial word *Kahtah* was similar to a word used in martial arts training. Because that word is pronounced /'kätə/ instead of /'kata/, I believed the similarity to be negligible. However, there was significant discussion around the artificial word *Veetee* and what ideas of products it brought to mind. They also pointed out that *Veetee* might be thought of as the initials V.T. While this is a valid point, I thought at the time that it was a small concern given the limited number of combinations of artificial words that can be constructed using any particular set of vowels and consonants. Following a closer analysis of the final data, this association of *Veetee* with the initials V.T. may contribute to the generational blip I describe in the Discussion chapter of this thesis.

What is the best format of the survey questions? Did participants make considered choices? Participants did not indicate any prohibitive problems with the question format. However, they offered a number of suggestions, including moving the scale descriptors from underneath to beside the circles on either end of the scales. They also expressed some confusion with the demographic questions regarding where they spent the most time during childhood (i.e., Were these only continuous years or

cumulative years? Was childhood measured up to age 18 or age 21?). In the same way, there was confusion about how to report number of years at current residence had the participant's time there not been continuous. I considered omitting these questions but opted to retain them because they were only exploratory questions that provided background information and not central to my research questions.

Another participant said the opening page of disclosures was too long and revealed too much about the study prior to completing the survey. I reviewed the text to make edits where possible. However, much of this language was dependent upon the requirements for full disclosure to human subjects and remained unchanged.

A participant suggested that the open-ended questions (in which participants were asked what they were imagining as the products for each artificial word) be grouped at the end; another participant said this would not work as well because he would not be able to recall all six items at the end of the survey. After some discussion, it seemed the majority of participants agreed with the latter position or were indifferent. I also had some concern that if the demographic questions were simply grouped at the end, then some participants might not bother to answer them. Therefore, I maintained their position following each set of 10 scales.

At least one participant suggested re-ordering the six artificial words in order to alternate the sequence of vowel sounds. The existing pattern was based on an early conversational model of presentation (e.g., I imagined an oral interview to include natural discourse, such as "If that was *Nahtah*, then what about *Vahtah*?"). Because much of that conversational tone to the questions had been stripped from the current survey

instrument, I believed this to be a good suggestion and subsequently alternated vowel and consonant sounds for the sake of variety.

None of the participants had any specific feedback about the scales other than to say that if they were unable to choose one or the other descriptor, they intentionally chose the neutral middle circle as their response. It was unanimous that the existing seven-point scale was the right size; it was also unanimous that a two-point—or any forced choice—scale was not preferred. They wanted flexibility in how they responded. This led me to retain the existing format of the scales.

How long does the survey take to complete? Everyone completed the survey within 10 to 15 minutes. When asked later about the duration of the survey, no respondents indicated any concerns about the length, especially with the presence of a progress bar indicating how far along they were in the survey. Furthermore, no one indicated any fatigue from answering questions, and no one reported having provided random responses simply to complete the survey. However, there was a suggestion that the progress bar be labeled as such, in order to be as clear as possible, a change that was easy implemented.

Does the technology perform as required? Did participants encounter any problems taking the survey online? There were no reported technological problems in completing the survey or accessing the data. The software performed as expected.

Am I receiving usable data? When analyzing the data, I saw that some of the exported material was not clearly labeled. This was resolved by simply adjusting the

settings within the Qualtrics survey software. This was only a matter of convenience on my part and did not affect the survey experience or the integrity of the data.

What are the reactions of the participants? All participants were clearly interested in the study, asking numerous questions and providing their own speculations (e.g., they believed that there would be a difference in responses between genders and among age groups). One participant remarked that she thought perhaps she was given too much information about the study upfront. While she mentioned the disclosure screen specifically, I believed part of this came from the wording of the invitation and confirmation e-mails associated with the pilot study specifically. This was background information that future survey participants did not receive.

What are participants' feelings about incentive versus no incentive?

Participants did not indicate a need for an incentive; instead, they expressed more concern about the invitation coming from a trusted source. Most agreed that while the hook was the topic of the study and the ability to access the results of the study when published, the actual motivation to participate was due to the referral source (e.g., a friend or trusted contact). Conversation also included suggestions for other recruitment sites, including Amazon Mechanical Turk, Metafilter.com, Brainpickings newsletter, Facebook (and Facebook groups), LinkedIn and LinkedIn groups. Ultimately, the Facebook and LinkedIn suggestions were incorporated into my recruitment strategy.

Recommendations for Modifications

1. Label the progress bar
2. Edit the disclosure page, advertisement/invitation to be as succinct as possible while still fulfilling the requirements of the Human Subjects Research Review Committee
3. Determine a way to share the results of the study without participants having to contact me, thereby ensuring their continued privacy
4. Explore alternative recruitment possibilities mentioned by pilot study participants, especially those that offer a friendly referral or some endorsement of legitimacy to bolster response rate
5. Review Limitations section of thesis proposal to reflect the aforementioned urban/economic/tech biases
6. Revisit the survey layout to see if scale descriptors could appear on either end instead of below the first and last circles
7. Consider removing the two demographic questions regarding participants current and childhood residency
8. Add missing labels to the underlying data collection fields in the survey software
9. Re-order the sequence of the six words for variety of sounds
10. Before releasing the final survey, purge all pilot study data from the survey collection software and delete audio recording of focus group conversation as well as e-mail communication with participants

Appendix B. Survey Instruments

Recruitment Advertisement

Figure B-1

Image to Accompany Craig's List Advertisement

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Language Research Study - Online Survey

I am a graduate student in the Applied Linguistics department of Portland State University in Oregon conducting research into whether age or gender affects how we perceive the meanings of certain sounds in English. I am recruiting volunteers 18 years and older whose first language is American English to participate in an anonymous, 10-15 minute online survey asking your opinions about potential brand names for a new product.

The survey is easy to complete and (I like to think) thought-provoking and fun. There is no compensation for your participation, but your input will contribute to a better

understanding of language variation in English. To take part in this study, click on the following link: https://portlandstate.qualtrics.com//SE/?SID=SV_29bK40V6uygaUL3

Timothy Krause, Graduate Student

Department of Applied Linguistics/TESOL

Portland State University, Portland, Oregon

krauset@pdx.edu, 503-516-8351

Screen 1: Waiver of Signed Consent

You are being asked to participate in a research study by Prof. G. Tucker Childs, who is the Principal Investigator, and Timothy Krause, a graduate student, from the Department of Applied Linguistics/TESOL at Portland State University in Portland, Oregon. The study is examining differences in meanings associated with certain sounds in the English language. This research is being conducted in order to fulfill a requirement for Timothy's M.A. degree in Applied Linguistics/TESOL.

What will I have to do? If you decide to take part in this study, you will complete an anonymous online questionnaire requiring approximately 10 to 15 minutes of your time. After some preliminary demographic questions, you will be asked to rank six words along 10 scales and then describe the product you think each word represents. Your participation is voluntary.

Are there any risks and what are you doing to protect me? There are very few risks for taking part in this study. There is a small risk that you will feel uncomfortable answering the questions of the questionnaire. However, you are free to skip any questions you feel uncomfortable answering or to exit the survey at any time. Furthermore, your answers are anonymous, and there is no information that links you to the questionnaire.

What will I gain by taking part in this study? By taking part in this study, you will be contributing to the study of language variation and sound symbolism that has the potential to improve our understanding of how individuals perceive the sounds of language. You will also be given a link to a website where you will be able to freely and

anonymously access the results of the survey in the form of Timothy's thesis when it is released in 2015.

Will I be paid for this study? No, there is no compensation for your participation.

What happens if I decide not to take part in this study? You do not have to take part in this study. Your participation is voluntary, and there is no penalty for choosing not to participate.

What can I do if I have questions? If you have any questions, concerns or complaints at any time about the research study, Prof. Tucker Childs, or his associates will be glad to answer them at (503) 725-4099. If you need to contact someone after business hours or on weekends, please call 503-516-8351 and ask for Timothy Krause. If you have questions regarding your rights as a research participant, you may call the PSU Office for Research Integrity at (503) 725-2227 or 1(877) 480-4400. The ORI is the office that supports the PSU Institutional Review Board (IRB). The IRB is a group of people from PSU and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the IRB website at <https://sites.google.com/a/pdx.edu/research/integrity>.

If you agree to participate, please click NEXT to proceed to the survey. If you do not wish to participate, simply exit your browser.

Approved by the Portland State University Human Subjects Research Review Committee, Proposal #143080

Screen 2: Demographic Questions

(The first three items were computer-generated for each survey response.)

- Participant number (computer-generated)
- Data collection region (computer-generated)
- Date survey completed (computer-generated)

Before we begin, please answer the following demographic questions:

With what gender do you identify?	(multiple choice)
	Male, Female, Other
How old are you?	(open numeric field)
Is American English your first language?	(forced choice)
	Yes, No
What other languages do you speak?	(open text field)
Where do you consider your primary childhood residence?	(computer-generated dropdown menu of U.S. states)
How many years did you live there?	(open numeric field)
In what state do you currently reside?	(dropdown of U.S. states)
How many years have you lived there?	(open numeric field)
What is the highest level of education that you have completed?	(forced choice)
	Less than High School
	High School/GED
	Some College
	2-year College Degree

4-year College Degree

Masters Degree

Doctoral Degree

Professional Degree (JD, MD)

Screen 3: Preamble

Imagine a marketing company is trying to create a unique brand name for a new product. They have developed six unusual options, some of which are spelled oddly or may not even sound like English words when you pronounce them. Because of this, they are concerned about what you might think when you hear them. The product is still under development, so they can't tell you what it is yet, but they want to know your opinion about the characteristics and types of products that come to mind when you hear these words.

In this survey, you will be asked to rank six different potential brand names according to 10 different scales of opposing characteristics. For example:

If you heard the brand name Leetee, would you imagine the product to be slow or fast or somewhere in between?

slow ☐ ☐ ☐ ☐ ☐ ☐ ☐ fast

For each scale, click on one circle that you feel best reflects the brand name. Work as fast as you can; don't take too long to make any rating. Instead, rate your first impression of how the brand name sounds to you.

This task is, of course, subjective. Some of the ratings will not be very literal. In some cases, you may wonder how a certain scale can apply to the sound you are rating, but we have found that you will be able to make decisions quite easily if you rate quickly on first impressions. Remember, there are no right or wrong answers. We simply want to know your impressions of what these words sound like to you.

When you're ready to begin, please click NEXT.

Screens 4-9

(The same 10 scales are repeated for each of the six artificial words, in this format.)

1. Let's suppose that you heard the brand name **Keetee**. Would you imagine this product to be

slow	☐	☐	☐	☐	☐	☐	☐	fast
heavy	☐	☐	☐	☐	☐	☐	☐	light
soft	☐	☐	☐	☐	☐	☐	☐	hard
thin	☐	☐	☐	☐	☐	☐	☐	thick
closed	☐	☐	☐	☐	☐	☐	☐	open
narrow	☐	☐	☐	☐	☐	☐	☐	wide
energetic	☐	☐	☐	☐	☐	☐	☐	lazy
liberal	☐	☐	☐	☐	☐	☐	☐	conservative
religious	☐	☐	☐	☐	☐	☐	☐	secular
rural	☐	☐	☐	☐	☐	☐	☐	urban

When you were imagining a product named **Keetee**, what were you picturing? (open-ended answer)

Screen 10: Exit

Thank you for participating in this study.

If you are interested in learning more about the outcome of this study, you will be able to view the results of this study sometime in June 2015 via this link:

<http://tinyurl.com/SoundSymbolismThesis>.

If you have any questions, concerns or complaints at any time about the research study, Prof. Tucker Childs, or his associates will be glad to answer them at (503) 725-4099. If you need to contact someone after business hours or on weekends, please call 503-516-8351 and ask for Timothy Krause. If you have questions regarding your rights as a research participant, you may call the PSU Office for Research Integrity at (503) 725-2227 or 1(877) 480-4400. The ORI is the office that supports the PSU Institutional Review Board (IRB). The IRB is a group of people from PSU and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the IRB website at <https://sites.google.com/a/pdx.edu/research/integrity>.

Appendix C. Survey Distribution

I posted a call for participants on the Internet sites described below. The post included a link to the survey as well as a request for readers to share the post on their own networks. Whenever I observed that someone shared the link, I also "liked" their post and often commented on it in order to raise its popularity and, therefore, its visibility. I also personally asked a variety of contacts on Facebook, representing a variety of demographics, to share the link, which many did.

Facebook

- My personal page
- PSU Linguistics Survivors Support Group page
- One-week ad specifically targeting 18- to 23-year-old males in the U.S. who speak American English
- Various interest groups related to language
- Various pages representing products or media targeted toward demographics that had low representation among survey participants (e.g., Millennial males)

LinkedIn

- My personal account
- Language-related research groups
- Marketing-related research groups

Craig's List (in the Volunteers section; repeated once in each city)

- New York City
- Los Angeles

- Chicago
- Houston
- Minneapolis
- Seattle
- Phoenix
- Boston

Other Sites

- Social Psychology Network website - Wesleyan University
- Psychological Research on the Net - Hanover College
- Reddit - Participant Recruitment Page

Direct E-mail

- Professors Kimberley Brown and Nike Arnold, Portland State University, who said they would share it with their students
- Members of the pilot study focus group

Appendix D. Letter of Exemption from Portland State University**Human Subjects Research Review Committee**

Post Office Box 751
Portland, Oregon 97207-0751
Human Subjects Research Review Committee
hsrrc@lists.pdx.edu

503-725-2227 tel
503-725-8170 fax
hsrrc@lists.pdx.edu

Date: June 23, 2014

To: G. Tucker Childs; Timothy Krause

From: Karen Cellarius, HSRRC Chair

A handwritten signature in black ink that reads 'Karen Cellarius'.

Re: HSRRC approval for your project titled, "Sounds Effects: Age, Gender, and Sound Symbolism in English"
HSRRC Proposal # 143080

Review Type: Exempt, Category 2

In accordance with your request, the Human Subjects Research Review Committee has reviewed your proposal referenced above for compliance with PSU and DHHS policies and regulations covering the protection of human subjects. The Committee is satisfied that your provisions for protecting the rights and welfare of all subjects participating in the research are adequate, and your project is approved. Please note the following requirements:

Approval: You are approved to conduct this research study after receipt of this approval letter; and the research must be conducted according to the plans and protocol submitted (approved copy enclosed).

Consent: A signed consent is not required from participants in this study, as the study qualifies for a waiver of documentation of consent.

Changes to Protocol: Any changes in the proposed study, whether to procedures, survey instruments, consent forms or cover letters, must be outlined and submitted to the Committee immediately. The proposed changes cannot be implemented before they have been reviewed and approved by the Committee.

Adverse Reactions and/or Unanticipated Problems: If any adverse reactions or unanticipated problems occur as a result of this study, you are required to notify the Committee immediately. If the issue is serious, approval may be withdrawn pending an investigation by the Committee.

Completion of Study: Please notify the Committee as soon as your research has been completed. Study records, including protocols and signed consent forms for each participant, must be kept by the investigator in a secure location for three years following completion of the study (or per any requirements specified by the project's funding agency).

If you have questions or concerns, please contact the Office of Research Integrity in the PSU RSP at 503-725-2227, 1600 SW 4th Ave., Market Center Building, Suite 620.

Appendix E. Means, Modes, and Medians, by Age

Table E-1

Means, Modes, and Medians for the Artificial Word Keetee, by Age

		Keetee									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	4.65	4.70	3.56	3.22	4.04	3.20	2.93	2.96	4.85	4.70
	Generation Xers	4.33	4.99	3.97	3.31	4.23	3.11	2.86	3.55	5.05	4.69
	Baby Boomers	4.36	5.07	3.94	3.32	4.58	3.52	2.98	3.51	4.78	4.77
	Variation between ML and GX	0.32	-0.28	-0.41	-0.09	-0.19	0.09	0.07	-0.58	-0.20	0.02
	Variation between GX and BB	-0.03	-0.09	0.03	-0.01	-0.35	-0.40	-0.12	0.04	0.27	-0.08
	Variation between ML and BB	0.29	-0.37	-0.38	-0.09	-0.54	-0.31	-0.05	-0.54	0.07	-0.06
Medians											
	Millennials	5	5	3	3	4	3	3	3	5	5
	Generation Xers	4	5	4	3	4	3	2	4	5	5
	Baby Boomers	4	5	4	3	4	3	3	4	4	5
	Variation between ML and GX	1	0	-1	0	0	0	1	-1	0	0
	Variation between GX and BB	0	0	0	0	0	0	-1	0	1	0
	Variation between ML and BB	1	0	-1	0	0	0	0	-1	1	0
Modes											
	Millennials	5	6	2	2	4	2	2	4	4	6
	Generation Xers	4	5	5	2	4	3	2	4	4	6
	Baby Boomers	4	6	5	2	4	2	2	4	4	4
	Variation between ML and GX	1	1	-3	0	0	-1	0	0	0	0
	Variation between GX and BB	0	-1	0	0	0	1	0	0	0	2
	Variation between ML and BB	1	0	-3	0	0	0	0	0	0	2

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
GX Generation Xers
ML Millennials

Table E-2

Means, Modes, and Medians for the Artificial Word Vahtah, by Age

		Vahtah									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	3.815	3.185	4.241	5.093	4.037	5.093	4.130	3.796	4.056	4.000
	Generation Xers	3.531	3.434	3.867	4.490	4.385	4.895	4.273	3.720	3.930	4.161
	Baby Boomers	3.463	3.421	3.421	4.726	4.074	4.821	4.358	3.789	3.905	4.242
	Variation between ML and GX	0.283	-0.248	0.374	0.603	-0.348	0.197	-0.143	0.076	0.125	-0.161
	Variation between GX and BB	0.068	0.013	0.446	-0.237	0.311	0.074	-0.085	-0.069	0.025	-0.081
	Variation between ML and BB	0.352	-0.236	0.820	0.366	-0.037	0.272	-0.228	0.007	0.150	-0.242
Medians											
	Millennials	4	3	5	5	4	5	4	4	4	4
	Generation Xers	3	3	4	5	4	5	4	4	4	4
	Baby Boomers	3	3	3	5	4	5	5	4	4	4
	Variation between ML and GX	1	0	1	0	0	0	0	0	0	0
	Variation between GX and BB	0	0	1	0	0	0	-1	0	0	0
	Variation between ML and BB	1	0	2	0	0	0	-1	0	0	0
Modes											
	Millennials	4	2	5	5	4	4	5	4	4	4
	Generation Xers	2	2	4	4	4	4	5	4	4	4
	Baby Boomers	2	3	4	5	4	4	5	4	4	4
	Variation between ML and GX	2	0	1	1	0	0	0	0	0	0
	Variation between GX and BB	0	-1	0	-1	0	0	0	0	0	0
	Variation between ML and BB	2	-1	1	0	0	0	0	0	0	0

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
GX Generation Xers
ML Millennials

Table E-3

Means, Modes, and Medians for the Artificial Word Neetee, by Age

Measure	Age Groups	Neetee									
		slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	4.852	5.222	3.593	3.037	4.093	3.204	3.130	3.630	4.593	4.870
	Generation Xers	4.811	5.273	3.650	3.014	4.035	3.308	3.210	3.888	4.392	4.392
	Baby Boomers	4.632	5.211	3.642	3.042	4.284	3.463	3.021	3.758	4.600	4.621
	Variation between ML and GX	0.041	-0.051	-0.058	0.023	0.058	-0.104	-0.080	-0.258	0.201	0.479
	Variation between GX and BB	0.180	0.062	0.008	-0.028	-0.249	-0.155	0.189	0.130	-0.208	-0.229
	Variation between ML and BB	0.220	0.012	-0.050	-0.005	-0.192	-0.259	0.109	-0.128	-0.007	0.249
Medians											
	Millennials	5	5	4	3	4	3	3	4	4	4.5
	Generation Xers	5	5	4	3	4	3	3	4	4	4
	Baby Boomers	4	5	4	3	4	4	3	4	4	4
	Variation between ML and GX	0	0	0	0	0	0	0	0	0	0.5
	Variation between GX and BB	1	0	0	0	0	-1	0	0	0	0
	Variation between ML and BB	1	0	0	0	0	-1	0	0	0	0.5
Modes											
	Millennials	5	5	5	3	4	4	2	4	4	4
	Generation Xers	5	6	4	2	4	4	4	4	4	4
	Baby Boomers	4	6	4	3	4	4	4	4	4	4
	Variation between ML and GX	0	-1	1	1	0	0	-2	0	0	0
	Variation between GX and BB	1	0	0	-1	0	0	0	0	0	0
	Variation between ML and BB	1	-1	1	0	0	0	-2	0	0	0

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
 GX Generation Xers
 ML Millennials

Table E-4

Means, Modes, and Medians for the Artificial Word Kahtah, by Age

		Kahtah									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	4.093	3.556	5.074	4.185	3.741	4.037	3.833	3.870	4.296	3.611
	Generation Xers	3.993	3.790	4.294	4.238	4.014	4.406	3.734	3.979	4.098	4.105
	Baby Boomers	3.853	3.863	3.947	4.674	4.042	4.726	4.200	3.884	3.937	3.958
	Variation between ML and GX	0.100	-0.235	0.780	-0.053	-0.273	-0.369	0.099	-0.109	0.198	-0.494
	Variation between GX and BB	0.140	-0.073	0.346	-0.436	-0.028	-0.321	-0.466	0.095	0.161	0.147
	Variation between ML and BB	0.240	-0.308	1.127	-0.488	-0.301	-0.689	-0.367	-0.014	0.359	-0.347
Medians											
	Millennials	4	3	5.5	4	4	4	4	4	4	4
	Generation Xers	4	4	5	4	4	4	4	4	4	4
	Baby Boomers	4	4	4	5	4	5	4	4	4	4
	Variation between ML and GX	0	-1	0.5	0	0	0	0	0	0	0
	Variation between GX and BB	0	0	1	-1	0	-1	0	0	0	0
	Variation between ML and BB	0	-1	1.5	-1	0	-1	0	0	0	0
Modes											
	Millennials	3	3	6	4	4	5	4	4	4	4
	Generation Xers	3	3	5	4	4	4	4	4	4	4
	Baby Boomers	3	3	3	4	4	4	4	4	4	4
	Variation between ML and GX	0	0	1	0	0	1	0	0	0	0
	Variation between GX and BB	0	0	2	0	0	0	0	0	0	0
	Variation between ML and BB	0	0	3	0	0	1	0	0	0	0

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
 GX Generation Xers
 ML Millennials

Table E-5

Means, Modes, and Medians for the Artificial Word Veetee, by Age

		Veetee									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	5.222	5.444	4.296	3.074	3.963	3.481	3.130	3.722	4.667	4.870
	Generation Xers	5.154	5.084	4.259	3.105	4.147	3.266	2.846	3.524	4.622	4.944
	Baby Boomers	5.179	5.337	3.979	2.979	4.305	3.021	2.758	3.442	4.842	4.821
	Variation between ML and GX	0.068	0.361	0.038	-0.031	-0.184	0.216	0.283	0.198	0.044	-0.074
	Variation between GX and BB	-0.025	-0.253	0.280	0.126	-0.158	0.245	0.088	0.082	-0.220	0.123
	Variation between ML and BB	0.043	0.108	0.317	0.095	-0.342	0.460	0.372	0.280	-0.175	0.049
Medians											
	Millennials	5	6	4	3	4	4	3	4	4	4
	Generation Xers	5	5	4	3	4	3	3	4	4	5
	Baby Boomers	5	5	4	3	4	3	3	4	4	5
	Variation between ML and GX	0	1	0	0	0	1	0	0	0	-1
	Variation between GX and BB	0	0	0	0	0	0	0	0	0	0
	Variation between ML and BB	0	1	0	0	0	1	0	0	0	-1
Modes											
	Millennials	7	5	6	2	4	4	4	4	4	4
	Generation Xers	7	6	4	3	4	4	2	4	4	4
	Baby Boomers	4	6	4	2	4	4	2	4	4	4
	Variation between ML and GX	0	-1	2	-1	0	0	2	0	0	0
	Variation between GX and BB	3	0	0	1	0	0	0	0	0	0
	Variation between ML and BB	3	-1	2	0	0	0	2	0	0	0

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
 GX Generation Xers
 ML Millennials

Table E-6

Means, Modes, and Medians for the Artificial Word Nahtah, by Age

		Nahtah									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Millennials	54	54	54	54	54	54	54	54	54	54
	Generation Xers	143	143	143	143	143	143	143	143	143	143
	Baby Boomers	95	95	95	95	95	95	95	95	95	95
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Millennials	3.167	3.444	3.593	4.944	4.111	4.944	4.796	4.130	4.222	3.463
	Generation Xers	3.007	3.748	3.329	4.573	4.140	4.510	4.685	4.161	4.168	3.720
	Baby Boomers	3.358	3.537	3.695	4.726	3.726	4.474	4.526	3.989	4.147	3.968
	Variation between ML and GX	0.160	-0.304	0.264	0.371	-0.029	0.434	0.111	-0.031	0.054	-0.257
	Variation between GX and BB	-0.351	0.211	-0.366	-0.153	0.414	0.037	0.159	0.171	0.020	-0.248
	Variation between ML and BB	-0.191	-0.092	-0.102	0.218	0.385	0.471	0.270	0.140	0.075	-0.505
Medians											
	Millennials	3	3	4	5	4	5	5	4	4	4
	Generation Xers	3	4	3	5	4	5	5	4	4	4
	Baby Boomers	3	4	4	5	4	4	5	4	4	4
	Variation between ML and GX	0	-1	1	0	0	0	0	0	0	0
	Variation between GX and BB	0	0	-1	0	0	1	0	0	0	0
	Variation between ML and BB	0	-1	0	0	0	1	0	0	0	0
Modes											
	Millennials	3	3	2	5	4	5	5	4	4	4
	Generation Xers	3	4	3	4	4	4	4	4	4	4
	Baby Boomers	4	4	4	4	4	4	4	4	4	4
	Variation between ML and GX	0	-1	-1	1	0	1	1	0	0	0
	Variation between GX and BB	-1	0	-1	0	0	0	0	0	0	0
	Variation between ML and BB	-1	-1	-2	1	0	1	1	0	0	0

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

BB Baby Boomers
GX Generation Xers
ML Millennials

Appendix F. Means, Modes, and Medians, by Gender

Table F-1

Means, Modes, and Medians for the Artificial Word Keetee, by Gender

Measure	Age Groups	Keetee									
		slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means	Males	4.41	4.71	3.72	3.12	4.32	3.13	2.93	3.36	5.04	4.57
	Females	4.39	5.05	3.94	3.36	4.31	3.31	2.90	3.45	4.88	4.77
	Differences	0.01	-0.34	-0.21	-0.24	0.01	-0.17	0.03	-0.09	0.16	-0.20
Medians	Males	5.00	5.00	4.00	3.00	4.00	3.00	3.00	3.50	5.00	5.00
	Females	4.00	5.00	4.00	3.00	4.00	3.00	3.00	4.00	5.00	5.00
	Differences	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.50	0.00	0.00
Modes	Males	5.00	6.00	5.00	3.00	4.00	3.00	2.00	4.00	4.00	4.00
	Females	4.00	6.00	5.00	2.00	4.00	2.00	2.00	4.00	4.00	4.00
	Differences	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Table F-2

Means, Modes, and Medians for the Artificial Word Vahtah, by Gender

Measure	Age Groups	Vahtah									
		slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means	Males	3.58	3.29	3.92	4.72	3.92	4.83	4.11	4.05	4.25	4.14
	Females	3.56	3.42	3.75	4.66	4.32	4.94	4.33	3.65	3.84	4.16
	Differences	0.02	-0.13	0.18	0.06	-0.40	-0.11	-0.23	0.40	0.41	-0.02
Medians	Males	3.50	3.00	4.00	5.00	4.00	5.00	4.00	4.00	4.00	4.00
	Females	3.00	3.00	4.00	5.00	4.00	5.00	5.00	4.00	4.00	4.00
	Differences	0.50	0.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00
Modes	Males	2.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Females	2.00	2.00	4.00	6.00	4.00	5.00	5.00	4.00	4.00	4.00
	Differences	0.00	0.00	0.00	-2.00	0.00	-1.00	-1.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Table F-3

Means, Modes, and Medians for the Artificial Word Neetee, by Gender

		Neetee									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Males	4.80	5.38	3.41	2.93	4.14	3.43	3.26	3.87	4.55	4.58
	Females	4.75	5.19	3.72	3.06	4.12	3.31	3.09	3.77	4.48	4.55
	Differences	0.06	0.19	-0.31	-0.13	0.02	0.13	0.18	0.10	0.08	0.03
Medians											
	Males	5.00	5.50	4.00	3.00	4.00	3.00	3.00	4.00	4.00	4.00
	Females	5.00	5.00	4.00	3.00	4.00	3.00	3.00	4.00	4.00	4.00
	Differences	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Modes											
	Males	5.00	5.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00
	Females	4.00	6.00	4.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00
	Differences	1.00	-1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Table F-4

Means, Modes, and Medians for the Artificial Word Kahtah, by Gender

		Kahtah									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Males	4.12	3.64	4.66	4.16	3.76	4.38	3.79	4.20	3.97	3.79
	Females	3.91	3.81	4.21	4.44	4.05	4.46	3.94	3.83	4.12	4.03
	Differences	0.21	-0.17	0.45	-0.29	-0.28	-0.08	-0.15	0.36	-0.15	-0.24
Medians											
	Males	4.00	3.00	5.00	4.00	4.00	5.00	4.00	4.00	4.00	4.00
	Females	4.00	4.00	4.00	4.00	4.00	4.50	4.00	4.00	4.00	4.00
	Differences	0.00	-1.00	1.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
Modes											
	Males	3.00	3.00	5.00	4.00	4.00	5.00	4.00	4.00	4.00	4.00
	Females	4.00	3.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Differences	-1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Table F-5

Means, Modes, and Medians for the Artificial Word Veetee, by Gender

		Veetee									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Males	4.97	5.16	4.17	2.89	4.12	3.32	2.95	3.66	4.70	5.14
	Females	5.25	5.26	4.18	3.12	4.18	3.19	2.84	3.49	4.70	4.80
	Differences	-0.27	-0.10	0.00	-0.22	-0.06	0.12	0.10	0.17	-0.01	0.34
Medians											
	Males	5.00	5.00	4.00	3.00	4.00	3.50	3.00	4.00	4.00	5.00
	Females	5.00	5.50	4.00	3.00	4.00	3.00	3.00	4.00	4.00	5.00
	Differences	0.00	-0.50	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
Modes											
	Males	4.00	5.00	4.00	3.00	4.00	4.00	2.00	4.00	4.00	4.00
	Females	6.00	6.00	4.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00
	Differences	-2.00	-1.00	0.00	1.00	0.00	0.00	-2.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Table F-6

Means, Modes, and Medians for the Artificial Word Nahtah, by Gender

		Nahtah									
Measure	Age Groups	slow-fast	heavy-light	soft-hard	thin-thick	closed-open	narrow-wide	energetic-lazy	liberal-conserv	religious-secular	rural-urban
Counts											
	Males	76	76	76	76	76	76	76	76	76	76
	Females	216	216	216	216	216	216	216	216	216	216
	Totals	292	292	292	292	292	292	292	292	292	292
Means											
	Males	2.99	3.78	3.25	4.68	3.78	4.67	4.57	4.28	4.29	3.93
	Females	3.21	3.57	3.58	4.69	4.08	4.55	4.69	4.04	4.13	3.69
	Differences	-0.22	0.21	-0.33	-0.01	-0.30	0.12	-0.12	0.24	0.16	0.24
Medians											
	Males	3.00	3.00	3.00	5.00	4.00	4.50	5.00	4.00	4.00	4.00
	Females	3.00	4.00	4.00	5.00	4.00	5.00	5.00	4.00	4.00	4.00
	Differences	0.00	-1.00	-1.00	0.00	0.00	-0.50	0.00	0.00	0.00	0.00
Modes											
	Males	2.00	3.00	2.00	4.00	4.00	4.00	5.00	4.00	4.00	4.00
	Females	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Differences	-1.00	-1.00	-2.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00

Note: On the slow-fast scale, 1 = slowest and 7 = fastest.

Appendix G. Results of Kruskal-Wallis Test, for Age

Table G-1

Results of Kruskal-Wallis Test, for Age

	Test Statistics		
	Chi-Square	df	Asymp. Sig.
Kahtah - Soft-Hard	16.396	2	.000
Vahtah - Soft-Hard	10.366	2	.006
Keetee - Liberal-Conservative	7.095	2	.029
Kahtah - Energetic-Lazy	5.548	2	.062
Kahtah - Thin-Thick	5.430	2	.066
Nahtah - Narrow-Wide	5.345	2	.069
Kahtah - Rural-Urban	5.306	2	.070
Vahtah - Thin-Thick	5.128	2	.077
Kahtah - Narrow-Wide	4.896	2	.086
Neetee - Rural-Urban	4.771	2	.092
Nahtah - Closed-Open	4.660	2	.097
Veetee - Narrow-Wide	4.641	2	.098
Nahtah - Rural-Urban	4.623	2	.099
Keetee - Narrow-Wide	4.438	2	.109
Keetee - Closed-Open	3.848	2	.146
Nahtah - Slow-Fast	3.522	2	.172
Nahtah - Soft-Hard	3.333	2	.189
Vahtah - Closed-Open	2.794	2	.247
Nahtah - Thin-Thick	2.749	2	.253
Veetee - Heavy-Light	2.586	2	.274
Keetee - Slow-Fast	2.550	2	.279
Keetee - Soft-Hard	2.362	2	.307
Neetee - Closed-Open	2.226	2	.329
Kahtah - Religious-Secular	2.068	2	.356
Veetee - Soft-Hard	2.067	2	.356
Nahtah - Heavy-Light	2.042	2	.360
Keetee- Religious-Secular	1.966	2	.374
Neetee - Slow-Fast	1.841	2	.398
Nahtah - Energetic-Lazy	1.818	2	.403
Kahtah - Closed-Open	1.742	2	.418
Vahtah - Slow-Fast	1.728	2	.422

Veetee - Energetic-Lazy	1.719	2	.423
Neetee - Liberal-Conservative	1.647	2	.439
Neetee - Narrow-Wide	1.612	2	.447
Neetee - Religious-Secular	1.601	2	.449
Veetee - Closed-Open	1.597	2	.450
Kahtah - Heavy-Light	1.456	2	.483
Veetee - Religious-Secular	1.393	2	.498
Keetee - Heavy-Light	1.187	2	.552
Veetee - Rural-Urban	1.161	2	.560
Vahtah - Rural-Urban	1.155	2	.561
Vahtah - Narrow-Wide	1.154	2	.562
Vahtah - Heavy-Light	1.123	2	.570
Vahtah - Religious-Secular	1.031	2	.597
Veetee - Liberal-Conservative	1.027	2	.598
Vahtah - Energetic-Lazy	.905	2	.636
Nahtah - Liberal-Conservative	.843	2	.656
Veetee - Thin-Thick	.834	2	.659
Kahtah - Slow-Fast	.633	2	.729
Nahtah - Religious-Secular	.632	2	.729
Vahtah - Liberal-Conservative	.553	2	.759
Keetee - Energetic-Lazy	.538	2	.764
Neetee - Energetic-Lazy	.470	2	.791
Keetee - Thin-Thick	.448	2	.799
Veetee - Slow-Fast	.369	2	.831
Kahtah - Liberal-Conservative	.219	2	.896
Neetee - Heavy-Light	.219	2	.896
Neetee - Thin-Thick	.110	2	.946
Keetee - Rural-Urban	.025	2	.987
Neetee - Soft-Hard	.003	2	.998

Appendix H. Results of Mann-Whitney U Test, for Gender

Table H-1

Results of Kruskal-Wallis Test, for Gender

	Test Statistics			
	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Kahtah - Liberal-Conservative	6649.500	30085.500	-2.670	.008
Vahtah - Liberal-Conservative	6808.000	30244.000	-2.319	.020
Vahtah - Religious-Secular	6820.000	30256.000	-2.280	.023
Vahtah - Closed-Open	6901.500	9827.500	-2.108	.035
Kahtah - Soft-Hard	6948.000	30384.000	-2.019	.044
Veetee - Rural-Urban	7037.500	30473.500	-1.923	.054
Kahtah - Closed-Open	7189.500	10115.500	-1.656	.098
Keetee - Heavy-Light	7187.000	10113.000	-1.650	.099
Nahtah - Soft-Hard	7199.500	10125.500	-1.622	.105
Veetee - Slow-Fast	7237.000	10163.000	-1.573	.116
Nahtah - Liberal-Conservative	7297.500	30733.500	-1.567	.117
Neetee - Soft-Hard	7300.500	10226.500	-1.461	.144
Nahtah - Closed-Open	7431.000	10357.000	-1.263	.207
Vahtah - Energetic-Lazy	7435.000	10361.000	-1.248	.212
Nahtah - Rural-Urban	7503.000	30939.000	-1.187	.235
Kahtah - Religious-Secular	7504.000	10430.000	-1.177	.239
Kahtah - Heavy-Light	7496.000	10422.000	-1.144	.253
Neetee - Heavy-Light	7507.500	30943.500	-1.137	.256
Nahtah - Religious-Secular	7553.000	30989.000	-1.129	.259
Keetee - Rural-Urban	7532.000	10458.000	-1.090	.276
Kahtah - Rural-Urban	7575.000	10501.000	-1.053	.292
Nahtah - Slow-Fast	7570.500	10496.500	-1.029	.303
Vahtah - Heavy-Light	7597.500	10523.500	-.982	.326
Keetee - Soft-Hard	7609.000	10535.000	-.961	.337
Keetee - Thin-Thick	7621.000	10547.000	-.948	.343
Veetee - Thin-Thick	7669.500	10595.500	-.869	.385
Keetee- Narrow-Wide	7703.000	10629.000	-.815	.415
Vahtah- Soft-Hard	7702.500	31138.500	-.812	.417
Veetee - Liberal-Conservative	7753.000	31189.000	-.776	.438
Kahtah - Thin-Thick	7739.000	10665.000	-.760	.447

Keetee - Religious-Secular	7749.000	31185.000	-.759	.448
Kahtah - Slow-Fast	7743.500	31179.500	-.746	.456
Vahtah - Narrow-Wide	7760.000	10686.000	-.728	.467
Keetee - Liberal-Conservative	7801.000	10727.000	-.675	.499
Veetee - Narrow-Wide	7797.500	31233.500	-.667	.504
Veetee - Heavy-Light	7810.000	10736.000	-.644	.519
Neetee - Thin-Thick	7825.000	10751.000	-.620	.535
Nahtah - Energetic-Lazy	7847.000	10773.000	-.584	.559
Kahtah - Energetic-Lazy	7849.000	10775.000	-.579	.563
Veetee - Energetic-Lazy	7851.000	31287.000	-.578	.564
Neetee - Energetic-Lazy	7859.500	31295.500	-.565	.572
Keetee - Energetic-Lazy	7858.500	31294.500	-.565	.572
Neetee - Narrow-Wide	7876.500	31312.500	-.539	.590
Keetee - Slow-Fast	7893.500	31329.500	-.515	.607
Neetee- Slow-Fast	7919.000	31355.000	-.470	.638
Nahtah - Heavy-Light	7921.500	31357.500	-.460	.646
Veetee - Closed-Open	7960.000	10886.000	-.406	.684
Vahtah - Thin-Thick	8020.500	31456.500	-.303	.762
Neetee - Liberal-Conservative	8040.500	31476.500	-.289	.773
Nahtah - Narrow-Wide	8043.000	31479.000	-.268	.789
Vahtah - Rural-Urban	8051.000	10977.000	-.256	.798
Neetee - Closed-Wide	8070.500	10996.500	-.226	.821
Neetee - Rural-Urban	8088.000	31524.000	-.199	.842
Vahtah - Slow-Fast	8084.500	31520.500	-.199	.842
Keetee - Closed-Open	8092.500	11018.500	-.188	.851
Neetee - Religious-Secular	8103.000	31539.000	-.183	.855
Veetee - Soft-Hard	8159.500	11085.500	-.078	.938
Veetee - Religious-Secular	8186.000	31622.000	-.038	.970
Kahtah - Narrow-Wide	8207.000	31643.000	-.002	.999
Nahtah - Thin-Thick	8208.000	11134.000	.000	1.000

Appendix I. Results of Category Coding of Qualitative Data

Table I-1

Results of Category Coding of Qualitative Data for the Artificial Word Keetee

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages, & Tobacco	Furniture	Hardware	Health & Beauty	
KEETEE													
Number of responses	238	45	20	3	2	2	0	18	35	0	2	34	
Percent of responses		18.91%	8.40%	1.26%	0.84%	0.84%	0.00%	7.56%	14.71%	0.00%	0.84%	14.29%	
Females	174	20.69%	9.77%	0.57%	0.57%	1.15%	0.00%	9.20%	14.37%	0.00%	1.15%	13.22%	
Males	64	14.06%	4.69%	3.13%	1.56%	0.00%	0.00%	3.13%	15.63%	0.00%	0.00%	17.19%	
Baby Boomers	75	22.67%	8.00%	0.00%	2.67%	0.00%	0.00%	4.00%	12.00%	0.00%	0.00%	16.00%	
Generation Xers	120	17.50%	7.50%	1.67%	0.00%	0.00%	0.00%	8.33%	18.33%	0.00%	0.83%	14.17%	
Millennials	43	16.28%	11.63%	2.33%	0.00%	4.65%	0.00%	11.63%	9.30%	0.00%	2.33%	11.63%	
Baby Boomer females	57	26.32%	10.53%	0.00%	1.75%	0.00%	0.00%	5.26%	8.77%	0.00%	0.00%	14.04%	
Baby Boomer males	18	11.11%	0.00%	0.00%	5.56%	0.00%	0.00%	0.00%	22.22%	0.00%	0.00%	22.22%	
Generation X females	90	20.00%	6.67%	1.11%	0.00%	0.00%	0.00%	10.00%	20.00%	0.00%	1.11%	13.33%	
Generation X males	30	10.00%	10.00%	3.33%	0.00%	0.00%	0.00%	3.33%	13.33%	0.00%	0.00%	16.67%	
Millennial females	27	11.11%	18.52%	0.00%	0.00%	7.41%	0.00%	14.81%	7.41%	0.00%	3.70%	11.11%	
Millennial males	16	13.33%	0.00%	3.33%	0.00%	0.00%	0.00%	3.33%	6.67%	0.00%	0.00%	6.67%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
KEETEE													
Number of responses	24	0	1	0	0	0	10	18	18	10	12	15	
Percent of responses	10.08%	0.00%	0.42%	0.00%	0.00%	0.00%	4.20%	7.56%	7.56%	4.20%	5.04%	6.30%	
Females	9.77%	0.00%	0.57%	0.00%	0.00%	0.00%	4.02%	8.05%	6.32%	3.45%	1.72%	7.47%	
Males	0.10938	0.00%	0.00%	0.00%	0.00%	0.00%	4.69%	6.25%	10.94%	6.25%	4.69%	3.13%	
Baby Boomers	8.00%	0.00%	1.33%	0.00%	0.00%	0.00%	1.33%	5.33%	5.33%	5.33%	5.33%	9.33%	
Generation Xers	10.83%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	8.33%	10.83%	4.17%	4.17%	5.83%	
Millennials	11.63%	0.00%	0.00%	0.00%	0.00%	0.00%	6.98%	9.30%	2.33%	2.33%	6.98%	2.33%	
Baby Boomer females	7.02%	0.00%	1.75%	0.00%	0.00%	0.00%	1.75%	7.02%	3.51%	5.26%	7.02%	8.77%	
Baby Boomer males	11.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.11%	5.56%	0.00%	11.11%	
Generation X females	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.44%	7.78%	10.00%	3.33%	4.44%	7.78%	
Generation X males	13.33%	0.00%	0.00%	0.00%	0.00%	0.00%	6.67%	10.00%	13.33%	6.67%	3.33%	0.00%	
Millennial females	14.81%	0.00%	0.00%	0.00%	0.00%	0.00%	7.41%	11.11%	0.00%	0.00%	3.70%	3.70%	
Millennial males	3.33%	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	3.33%	3.33%	3.33%	6.67%	0.00%	

**Foreign" was not a category on the standard product taxonomy

but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Table I-2

Results of Category Coding of Qualitative Data for the Artificial Word Vahtah

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages, & Tobacco	Furniture	Hardware	Health & Beauty	
VAHTAH													
Number of responses	270	4	12	7	1	3	0	5	75	5	1	21	
Percent of responses		1.48%	4.44%	2.59%	0.37%	1.11%	0.00%	1.85%	27.78%	1.85%	0.37%	7.78%	
Females	198	1.52%	6.06%	3.03%	0.51%	0.51%	0.00%	2.02%	27.27%	1.01%	0.51%	8.08%	
Males	72	1.39%	0.00%	1.39%	0.00%	2.78%	0.00%	1.39%	29.17%	4.17%	0.00%	6.94%	
Baby Boomers	86	0.0%	7.0%	4.7%	0.0%	0.0%	0.0%	0.0%	30.2%	1.2%	0.0%	9.3%	
Generation Xers	131	3.1%	3.1%	0.8%	0.8%	1.5%	0.0%	3.1%	26.0%	1.5%	0.0%	8.4%	
Millennials	53	0.0%	3.8%	3.8%	0.0%	1.9%	0.0%	1.9%	28.3%	3.8%	1.9%	3.8%	
Baby Boomer females	65	0.0%	9.2%	4.6%	0.0%	0.0%	0.0%	0.0%	27.7%	1.5%	0.0%	12.3%	
Baby Boomer males	21	0.0%	0.0%	4.8%	0.0%	0.0%	0.0%	0.0%	38.1%	0.0%	0.0%	0.0%	
Generation X females	98	3.1%	4.1%	1.0%	1.0%	0.0%	0.0%	3.1%	26.5%	1.0%	0.0%	6.1%	
Generation X males	33	3.0%	0.0%	0.0%	0.0%	6.1%	0.0%	3.0%	24.2%	3.0%	0.0%	15.2%	
Millennial females	35	0.0%	5.7%	5.7%	0.0%	2.9%	0.0%	2.9%	28.6%	0.0%	2.9%	5.7%	
Millennial males	18	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	27.8%	11.1%	0.0%	0.0%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
VAHTAH													
Number of responses	32	0	1	0	1	9	3	16	3	19	23	39	
Percent of responses	11.85%	0.00%	0.37%	0.00%	0.37%	3.33%	1.11%	5.93%	1.11%	7.04%	8.52%	14.44%	
Females	11.11%	0.00%	0.51%	0.00%	0.51%	3.54%	0.00%	6.06%	1.52%	5.05%	8.59%	14.65%	
Males	13.89%	0.00%	0.00%	0.00%	0.00%	2.78%	4.17%	5.56%	0.00%	12.50%	8.33%	13.89%	
Baby Boomers	7.0%	0.0%	0.0%	0.0%	1.2%	4.7%	1.2%	5.8%	0.0%	3.5%	10.5%	15.1%	
Generation Xers	14.5%	0.0%	0.8%	0.0%	0.0%	3.1%	1.5%	4.6%	2.3%	9.2%	6.1%	16.0%	
Millennials	13.2%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	9.4%	0.0%	7.5%	11.3%	9.4%	
Baby Boomer females	6.2%	0.0%	0.0%	0.0%	1.5%	6.2%	0.0%	6.2%	0.0%	1.5%	12.3%	15.4%	
Baby Boomer males	9.5%	0.0%	0.0%	0.0%	0.0%	0.0%	4.8%	4.8%	0.0%	9.5%	4.8%	14.3%	
Generation X females	13.3%	0.0%	1.0%	0.0%	0.0%	3.1%	0.0%	5.1%	3.1%	7.1%	7.1%	17.3%	
Generation X males	18.2%	0.0%	0.0%	0.0%	0.0%	3.0%	6.1%	3.0%	0.0%	15.2%	3.0%	12.1%	
Millennial females	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.6%	0.0%	5.7%	5.7%	5.7%	
Millennial males	11.1%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	11.1%	0.0%	11.1%	22.2%	16.7%	

*"Foreign" was not a category on the standard product taxonomy but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Table I-3

Results of Category Coding of Qualitative Data for the Artificial Word Neetee

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages, & Tobacco	Furniture	Hardware	Health & Beauty	
Neetee													
Number of responses	236	5	34	3	9	1	0	7	35	0	2	25	
Percent of responses		2.1%	14.4%	1.3%	3.8%	0.4%	0.0%	3.0%	14.8%	0.0%	0.8%	10.6%	
Females	172	2.3%	14.5%	0.6%	4.7%	0.6%	0.0%	3.5%	13.4%	0.0%	0.6%	12.2%	
Males	64	1.6%	14.1%	3.1%	1.6%	0.0%	0.0%	1.6%	18.8%	0.0%	1.6%	6.3%	
Baby Boomers	76	3.9%	17.1%	1.3%	5.3%	0.0%	0.0%	1.3%	15.8%	0.0%	0.0%	13.2%	
Generation Xers	117	1.7%	12.8%	0.9%	4.3%	0.0%	0.0%	3.4%	17.9%	0.0%	0.9%	11.1%	
Millennials	43	0.0%	14.0%	2.3%	0.0%	2.3%	0.0%	4.7%	4.7%	0.0%	2.3%	4.7%	
Baby Boomer females	58	5.2%	19.0%	0.0%	6.9%	0.0%	0.0%	1.7%	12.1%	0.0%	0.0%	15.5%	
Baby Boomer males	18	0.0%	11.1%	5.6%	0.0%	0.0%	0.0%	0.0%	27.8%	0.0%	0.0%	5.6%	
Generation X females	87	1.1%	11.5%	0.0%	4.6%	0.0%	0.0%	4.6%	16.1%	0.0%	1.1%	11.5%	
Generation X males	30	3.3%	16.7%	3.3%	3.3%	0.0%	0.0%	0.0%	23.3%	0.0%	0.0%	10.0%	
Millennial females	27	0.0%	14.8%	3.7%	0.0%	3.7%	0.0%	3.7%	7.4%	0.0%	0.0%	7.4%	
Millennial males	16	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	6.3%	0.0%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
Neetee													
Number of responses	80	0	2	0	4	0	2	5	6	3	17	8	
Percent of responses	33.9%	0.0%	0.8%	0.0%	1.7%	0.0%	0.8%	2.1%	2.5%	1.3%	7.2%	3.4%	
Females	33.1%	0.0%	1.2%	0.0%	2.3%	0.0%	0.6%	1.7%	2.9%	1.2%	7.0%	2.3%	
Males	35.9%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	3.1%	1.6%	1.6%	7.8%	6.3%	
Baby Boomers	34.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	1.3%	1.3%	0.0%	2.6%	2.6%	
Generation Xers	31.6%	0.0%	1.7%	0.0%	2.6%	0.0%	0.9%	2.6%	2.6%	0.9%	8.5%	4.3%	
Millennials	39.5%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	2.3%	4.7%	4.7%	11.6%	2.3%	
Baby Boomer females	31.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	1.7%	0.0%	3.4%	0.0%	
Baby Boomer males	44.4%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	11.1%	
Generation X females	33.3%	0.0%	2.3%	0.0%	3.4%	0.0%	1.1%	2.3%	3.4%	1.1%	6.9%	4.6%	
Generation X males	26.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	13.3%	3.3%	
Millennial females	37.0%	0.0%	0.0%	0.0%	3.7%	0.0%	0.0%	0.0%	3.7%	3.7%	14.8%	0.0%	
Millennial males	43.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	6.3%	6.3%	6.3%	6.3%	

*"Foreign" was not a category on the standard product taxonomy but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Table I-4

Results of Category Coding of Qualitative Data for the Artificial Word Kahtah

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages & Tobacco	Furniture	Hardware	Health & Beauty	
Kahtah													
Number of responses	230	14	20	8	1	2	0	2	43	2	9	11	
Percent of responses		6.1%	8.7%	3.5%	0.4%	0.9%	0.0%	0.9%	18.7%	0.9%	3.9%	4.8%	
Females	172	6.4%	8.7%	3.5%	0.6%	0.6%	0.0%	1.2%	18.6%	1.2%	2.9%	5.2%	
Males	58	5.2%	8.6%	3.4%	0.0%	1.7%	0.0%	0.0%	19.0%	0.0%	6.9%	3.4%	
Baby Boomers	74	10.8%	8.1%	4.1%	0.0%	1.4%	0.0%	1.4%	20.3%	0.0%	2.7%	6.8%	
Generation Xers	115	5.2%	9.6%	2.6%	0.9%	0.0%	0.0%	0.0%	20.0%	0.9%	3.5%	4.3%	
Millennials	41	0.0%	7.3%	4.9%	0.0%	2.4%	0.0%	2.4%	12.2%	2.4%	7.3%	2.4%	
Baby Boomer females	62	11.3%	6.5%	4.8%	0.0%	0.0%	0.0%	1.6%	22.6%	0.0%	1.6%	4.8%	
Baby Boomer males	12	8.3%	16.7%	0.0%	0.0%	8.3%	0.0%	0.0%	8.3%	0.0%	8.3%	16.7%	
Generation X females	84	4.8%	11.9%	1.2%	1.2%	0.0%	0.0%	0.0%	17.9%	1.2%	4.8%	6.0%	
Generation X males	31	6.5%	3.2%	6.5%	0.0%	0.0%	0.0%	0.0%	25.8%	0.0%	0.0%	0.0%	
Millennial females	26	0.0%	3.8%	7.7%	0.0%	3.8%	0.0%	3.8%	11.5%	3.8%	0.0%	3.8%	
Millennial males	15	0.0%	13.3%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	0.0%	20.0%	0.0%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
Kahtah													
Number of responses	36	0	1	0	1	3	1	17	5	13	24	27	
Percent of responses	15.7%	0.0%	0.4%	0.0%	0.4%	1.3%	0.4%	7.4%	2.2%	5.7%	10.4%	11.7%	
Females	17.4%	0.0%	0.6%	0.0%	0.0%	1.2%	0.0%	6.4%	2.3%	4.1%	11.6%	11.0%	
Males	10.3%	0.0%	0.0%	0.0%	1.7%	1.7%	1.7%	10.3%	1.7%	10.3%	6.9%	13.8%	
Baby Boomers	5.4%	0.0%	1.4%	0.0%	0.0%	4.1%	0.0%	2.7%	2.7%	6.8%	12.2%	14.9%	
Generation Xers	21.7%	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%	8.7%	0.9%	6.1%	7.8%	10.4%	
Millennials	17.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.2%	4.9%	2.4%	14.6%	9.8%	
Baby Boomer females	4.8%	0.0%	1.6%	0.0%	0.0%	3.2%	0.0%	3.2%	3.2%	6.5%	14.5%	12.9%	
Baby Boomer males	8.3%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%	0.0%	0.0%	8.3%	0.0%	25.0%	
Generation X females	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	1.2%	3.6%	7.1%	9.5%	
Generation X males	12.9%	0.0%	0.0%	0.0%	3.2%	0.0%	3.2%	12.9%	0.0%	12.9%	9.7%	12.9%	
Millennial females	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.5%	3.8%	0.0%	19.2%	11.5%	
Millennial males	6.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	6.7%	6.7%	6.7%	6.7%	

***Foreign" was not a category on the standard product taxonomy but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Table I-5

Results of Category Coding of Qualitative Data for the Artificial Word Veetee

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages & Tobacco	Furniture	Hardware	Health & Beauty	
Veetee													
Number of responses	235	4	41	2	3	0	0	27	51	1	2	24	
Percent of responses		1.7%	17.4%	0.9%	1.3%	0.0%	0.0%	11.5%	21.7%	0.4%	0.9%	10.2%	
Females	169	2.4%	16.0%	0.6%	0.6%	0.0%	0.0%	11.2%	22.5%	0.6%	0.6%	10.1%	
Males	66	0.0%	21.2%	1.5%	3.0%	0.0%	0.0%	12.1%	19.7%	0.0%	1.5%	10.6%	
Baby Boomers	75	4.0%	24.0%	0.0%	1.3%	0.0%	0.0%	2.7%	32.0%	0.0%	0.0%	9.3%	
Generation Xers	119	0.8%	11.8%	1.7%	0.8%	0.0%	0.0%	18.5%	17.6%	0.0%	1.7%	11.8%	
Millennials	41	0.0%	22.0%	0.0%	2.4%	0.0%	0.0%	7.3%	14.6%	2.4%	0.0%	7.3%	
Baby Boomer females	56	5.4%	25.0%	0.0%	0.0%	0.0%	0.0%	3.6%	35.7%	0.0%	0.0%	7.1%	
Baby Boomer males	19	0.0%	21.1%	0.0%	5.3%	0.0%	0.0%	0.0%	21.1%	0.0%	0.0%	15.8%	
Generation X females	87	1.1%	9.2%	1.1%	0.0%	0.0%	0.0%	17.2%	16.1%	0.0%	1.1%	13.8%	
Generation X males	32	0.0%	18.8%	3.1%	3.1%	0.0%	0.0%	21.9%	21.9%	0.0%	3.1%	6.3%	
Millennial females	26	0.0%	19.2%	0.0%	3.8%	0.0%	0.0%	7.7%	15.4%	3.8%	0.0%	3.8%	
Millennial males	15	0.0%	26.7%	0.0%	0.0%	0.0%	0.0%	6.7%	13.3%	0.0%	0.0%	13.3%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
Veetee													
Number of responses	16	0	0	0	2	0	2	16	8	27	12	10	
Percent of responses	6.8%	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%	6.8%	3.4%	11.5%	5.1%	4.3%	
Females	4.7%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	7.7%	3.6%	11.8%	5.3%	4.1%	
Males	12.1%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	4.5%	3.0%	10.6%	4.5%	4.5%	
Baby Boomers	6.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	2.7%	9.3%	1.3%	2.7%	
Generation Xers	6.7%	0.0%	0.0%	0.0%	1.7%	0.0%	1.7%	6.7%	4.2%	12.6%	6.7%	5.0%	
Millennials	7.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.2%	2.4%	12.2%	7.3%	4.9%	
Baby Boomer females	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	3.6%	8.9%	1.8%	1.8%	
Baby Boomer males	15.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	10.5%	0.0%	5.3%	
Generation X females	3.4%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	9.2%	4.6%	13.8%	6.9%	4.6%	
Generation X males	15.6%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	3.1%	9.4%	6.3%	6.3%	
Millennial females	11.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.5%	0.0%	11.5%	7.7%	7.7%	
Millennial males	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	6.7%	13.3%	6.7%	0.0%	

**"Foreign" was not a category on the standard product taxonomy

but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Table I-6

Results of Category Coding of Qualitative Data for the Artificial Word Nahtah

		Animals & Pet Supplies	Apparel & Accessories	Arts & Entertainment	Baby & Toddler	Business & Industrial	Cameras & Optics	Electronics	Food, Beverages & Tobacco	Furniture	Hardware	Health & Beauty	
Nahtah													
Number of responses	216	6	12	7	7	1	0	3	58	6	2	21	
Percent of responses		2.8%	5.6%	3.2%	3.2%	0.5%	0.0%	1.4%	26.9%	2.8%	0.9%	9.7%	
Females	157	1.9%	7.6%	3.2%	3.8%	0.0%	0.0%	1.9%	23.6%	3.2%	0.6%	10.2%	
Males	59	5.1%	0.0%	3.4%	1.7%	1.7%	0.0%	0.0%	35.6%	1.7%	1.7%	8.5%	
Baby Boomers	71	0.0%	5.6%	1.4%	4.2%	0.0%	0.0%	1.4%	23.9%	4.2%	0.0%	14.1%	
Generation Xers	107	5.6%	4.7%	3.7%	2.8%	0.0%	0.0%	0.9%	32.7%	0.9%	0.9%	9.3%	
Millennials	38	0.0%	7.9%	5.3%	2.6%	2.6%	0.0%	2.6%	15.8%	5.3%	2.6%	2.6%	
Baby Boomer females	55	0.0%	7.3%	1.8%	5.5%	0.0%	0.0%	1.8%	20.0%	3.6%	0.0%	10.9%	
Baby Boomer males	16	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.5%	6.3%	0.0%	25.0%	
Generation X females	77	3.9%	6.5%	3.9%	2.6%	0.0%	0.0%	1.3%	31.2%	1.3%	1.3%	11.7%	
Generation X males	30	10.0%	0.0%	3.3%	3.3%	0.0%	0.0%	0.0%	36.7%	0.0%	0.0%	3.3%	
Millennial females	25	0.0%	12.0%	4.0%	4.0%	0.0%	0.0%	4.0%	8.0%	8.0%	0.0%	4.0%	
Millennial males	13	0.0%	0.0%	7.7%	0.0%	7.7%	0.0%	0.0%	30.8%	0.0%	7.7%	0.0%	
		Home & Garden	Luggage & Bags	Senior	Media	Office Supplies	Religious & Ceremonial	Software	Sporting Goods	Toys & Games	Vehicles & Parts	No Category	Foreign*
Nahtah													
Number of responses	23	0	1	0	3	1	4	8	9	11	11	28	
Percent of responses	10.6%	0.0%	0.5%	0.0%	1.4%	0.5%	1.9%	3.7%	4.2%	5.1%	5.1%	13.0%	
Females	12.1%	0.0%	0.6%	0.0%	1.9%	0.0%	1.3%	3.2%	3.8%	4.5%	5.7%	12.1%	
Males	6.8%	0.0%	0.0%	0.0%	0.0%	1.7%	3.4%	5.1%	5.1%	6.8%	3.4%	15.3%	
Baby Boomers	8.5%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	1.4%	4.2%	4.2%	2.8%	18.3%	
Generation Xers	9.3%	0.0%	0.9%	0.0%	0.9%	0.9%	2.8%	3.7%	4.7%	5.6%	6.5%	13.1%	
Millennials	18.4%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	7.9%	2.6%	5.3%	5.3%	2.6%	
Baby Boomer females	10.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	5.5%	3.6%	3.6%	16.4%	
Baby Boomer males	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	6.3%	0.0%	25.0%	
Generation X females	11.7%	0.0%	1.3%	0.0%	1.3%	0.0%	2.6%	2.6%	2.6%	5.2%	6.5%	11.7%	
Generation X males	3.3%	0.0%	0.0%	0.0%	0.0%	3.3%	3.3%	6.7%	10.0%	6.7%	6.7%	16.7%	
Millennial females	16.0%	0.0%	0.0%	0.0%	8.0%	0.0%	0.0%	8.0%	4.0%	4.0%	8.0%	4.0%	
Millennial males	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	7.7%	0.0%	0.0%	

*"Foreign" was not a category on the standard product taxonomy but includes any mention of the words foreign, exotic, names of other countries or languages, etc.

Appendix J. Comparison of Qualitative Results

Figure J-1

Three Most Frequently Referenced Product Categories, Percent of Those Responding