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Examination of Manner of Motion Sound Symbolism for English Nonce Verbs

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Abstract: This paper offers cross-experimental verification of a previous study that found that English speakers considered velars, palatals, glides, and high vowels to be sound-symbolic of light and jerky movements. Heavy and smooth movements, by contrast, were associated with affricates, glottals, laterals, and non-high vowels. The present study sought to evaluate these findings through a novel experiment with English speaking subjects, who were asked to choose appropriate sound-symbolically constructed nonce verbs for sentences describing light, heavy, smooth, or jerky manners of motion. Our results support many of Saji et al.'s findings and also offer original insights. We find complex interactions between a sound's potential for sound-symbolic effects, and its position in initial or second syllables of disyllabic nonce words.

Keywords: magnitude sound symbolism; motion sound symbolism; English language; cognitive linguistics; experimental linguistics

1. Introduction

Since the publication of Hinton et al. (1996), studies of sound symbolism have been thriving. Though stigmatized by 19th century scholars, because of its association with simple ideas about language origin, sound symbolism is now a legitimate subject for empirical investigation by linguists and cognitive scientists willing to take on the Saussurian ideal of an all-encompassing arbitrariness underlying human language. Research on sound symbolism now commonly acknowledges that language is characterized both by arbitrary, as well as motivated, iconic characteristics (Cuskley 2013; Dingemanse et al. 2016; Nuckolls 1999). Although the term 'arbitrariness' was first used by Saussure, to characterize the bond between a word and its concept, or, more specifically, between a signifier and a signified (Saussure 2016, pp. 22–23), much research on sound symbolism has attempted to identify possible correspondences between varieties of sounds and meanings.

Hinton, Nichols, and Ohala classify sound symbolism into four main categories (Hinton et al. 1996, pp. 2–6). 'Corporeal' sound symbolism, the first type considered, consists of intonational indications of bodily and emotional states, involuntary reflexes, such as coughs, interjections (what have been called 'unorthodox oral expressions' (Ting 2013)), and a variety of unsegmentable but communicative sounds. The second category of sound symbolism, 'imitative' sound symbolism, includes words that make use of linguistic sounds to imitate environmental sounds. Such onomatopoeic words—often labelled ideophones (Dingemanse 2011), mimetics (Akita and Tsujimura 2016), or expressives (Diffloth 1972)—are often structured in ways that deviate from the normal lexicon (Newman 2001; Nuckolls et al. 2016). A third type of sound symbolism, 'synesthetic' sound symbolism, occurs when linguistic sound imitates non-linguistic phenomena, as when, for example, certain vowels, intonational profiles, or repetitive patterns are found to be imitative of size, shape, colors, or rhythm. The fourth main type of sound symbolism, termed 'conventional' sound symbolism, is attributed to such phenomena as phonesthemes, which are sounds, or clusters of sounds, such as the *gl*- cluster in *glitter*, *glimmer*, and *glow*. Because there is no obvious connection between the *gl*- cluster and the visual meaning of the words it is part of, this type of sound symbolism is considered conventional or arbitrary, rather than iconic and motivated.

Having outlined the major types of sound symbolism, and explained their significance for language, we turn now to our research. Our investigation focused on the third type of sound symbolism described above, namely 'synesthetic' sound symbolism, which occurs when linguistic sound imitates non-linguistic phenomena. Specifically, we investigated a well-established type of synesthetic sound symbolism, magnitude sound symbolism. Magnitude sound symbolism occurs when high front vowels, such as [i] and [I], which have high frequency second formants, are associated with smallness of size and related concepts. Back vowels, such as [o] and [a], by contrast, exhibit magnitude sound symbolism when they are linked with ideas of large size, because their second formants have lower frequencies than front vowels. Such communicative tendencies have been synthesized by Ohala (1996) into an ambitious theory, which argues that this type of sound symbolism is not only relevant for human language, but also for non-human agonistic displays.

Evidence in support of magnitude sound symbolism has also been found in one meticulous, conservative, and comprehensive study. Eliminating many possible confounding factors, including areal contact, genealogical relations, articulatory production costs, or systemic constraints, Blasi et al. (2016) found that the high front vowel [i] was 1.58 times more likely to occur in a word for the concept 'small' in 78 lineages, representing three out of five macro-areas of world languages.

The modest nature of this claim, however, does not diminish the significance of magnitude sound symbolism, since the lexical inventory of the study was limited to 100 basic vocabulary items, that do not represent the range of concepts which may potentially be linked with magnitude. In fact, magnitude sound symbolism has a notable tendency to be 'stretched' into a variety of cross-modal relationships. Jurafsky (2014), for example, compared vowels in the names of ice cream flavors and crackers. He discovered a preponderance of front vowels in the names of crackers (Wheat Thins, Triscuit, Ritz) suggestive of smallness, and by implication, desirable qualities of lightness and crispness. By contrast, there was a higher than expected number of back vowels in the names of ice cream flavors (Rocky Road, Jamoca Almond Fudge, Cookie Dough), all of which are suggestive of largeness and, by extension, desirable qualities of heaviness and richness. Coulter and Coulter (2010) found that when people mentally rehearsed prices that have numbers containing front (small) vowels, they tended to overestimate the size of the discount that was to be applied. In contrast, they underestimated the discount when the numbers contained back vowels, which are associated with largeness.

That front vowels symbolizing 'smallness' may also be expressive of 'desirable lightness' or 'cheapness' and back vowels, symbolizing 'largeness', may also be extended to apply to 'heaviness', 'richness', and 'expensiveness', are just a few examples of the cross-modal correspondences that have been attested for vowels and consonants. Others are discussed in Dingemanse and Lockwood (2015) extensive review. What is noteworthy about much of the experimental work on sound symbolism discussed in this review, whether focused on vowels, consonants, or both, is that, in addition to size, the attested correspondences are generally related to static concepts. These include brightness and darkness (Asano and Yokosawa 2011); colors, such as reds, yellows and greens (Moos et al. 2014); shapes, such as spikiness and roundness (Ramachandran and Hubbard 2001; Nielsen and Rendall 2013); and tastes, such as sweet and sour (Simner et al. 2010).

Given the focus of the aforementioned research on links between magnitude sound symbolism and static concepts, the relatively recent line of experimental inquiry into possible links between magnitude sound symbolism and manner of motion is especially welcome. Cuskley (2013) designed an experiment that tested research subjects' ability to make a connection between speed and sound. Participants heard invented words that varied in terms of reduplication, voicing, and vowel quality. They were then asked to adjust the speed of an animated bouncing ball to match these invented words. Results were that nonce words containing back vowels were rated as significantly slower than those containing front vowels or those featuring front and back vowels.

Yet another line of inquiry into magnitude sound symbolism and motion has been followed by Saji et al. (2013, 2018), whose research catalyzed this work. They conducted an open-ended study, allowing participants to devise their own sound-symbolic utterances, which they were asked to match with actions featured in short video clips. For each clip, participants were first asked to rate the action, according to whether it was jerky vs. smooth, large vs. small, heavy vs. light, and energetic vs. non-energetic. They were then asked to invent a word that they felt described the action portrayed. These invented nonce words were constructed to fit the template $C_1V_1C_2V_2$. However, only the first consonant and vowel of the resulting nonce words were coded according to features such as place and manner of articulation, backness, and voicing, because they felt the first syllable would be the most influential part of the nonce word. Those features were then mined using a canonical correlation analysis. In this way, features that were correlated with particular actions could be identified, along with the strength of the association between each feature and action type.

Their results demonstrate that some sound symbolism correlations were made by both Japanese and English speakers. For example, voiced sounds, especially voiced sonorant sounds, such as nasals, were associated with slowness. Other correlations were language-specific. For instance, English speakers associated affricate consonants with heavy actions, in contrast to the Japanese participants, who produced nonce words containing affricates to denote light actions. This example of language-specific sound symbolism is attributed to the different phonological status of affricates in each of the languages. An additional, language-specific difference in sound symbolism was discovered with the high back vowel [u], which symbolized energetic motion for English speakers. The closest equivalent sound in Japanese, however, is an unrounded [ɯ] sound, which symbolized slowness for Japanese participants.

The importance of the study by Saji et al. (2013, 2018) is that it demonstrated general, as well as language system-specific sound symbolism, at work for the same stimuli. Assuming that any study is validated by additional research employing different methodologies, we decided to seek verification of their results for English speakers, using a different set of procedures. In the present paper, we initiated this cross-experimental verification by testing the degree to which English speakers associate light and jerky actions with velars, palatals, glides, and high vowels, and the degree to which they correlate heavy and smooth movements with affricates, glottals, laterals, and non-high vowels. We were also interested in the possibility that non-initial syllables might be sound-symbolically salient.

2. Method Participants

2.1. Participants

Participants were paid $2 for completing the study. They were recruited on Mechanical Turk, a crowdsourcing platform (Miller et al. 2017). A total of 280 participants completed the survey. Of these, 73 were eliminated. Participants whose answers indicated that they were not native English speakers were excluded, along with those who appeared to click through the study without listening to each recording to the end. This was defined as participants whose total completion time was below two standard deviations from the mean. Also eliminated were participants who answered any of the truth-testing questions incorrectly. Most of those who were overly fast responders also failed one or more truth-testing questions. Once these were deleted, there were data for 207 participants. Of these 207 participants, 83 were female and 124 male. Their mean age was 35.9 (SD 9.6, range: 22–68). The educational levels of the participants were quite high, with 56 having completed high school, 155 being university graduates, and 36 having graduate degrees.

2.2. Design

Given the fact that, in English, manner of motion tends to be encoded within verbs, we constructed 12 pairs of CVCV nonce verbs (see Appendix A). One member of the pair was comprised of/i, u, k, g, j/which were associated with light and jerky motions in Saji et al. (2018). The other member of the pair contained/l, h, n, tʃ, aʊ, aɪ, ɑ, eɪ, oʊ/which were associated with heavy and smooth actions (e.g., *keyku*/kiku/ versus *chayhow*/tʃeɪhaʊ/) in that study. In addition to the test words, 29 test sentences were constructed that illustrated the four actions being studied (see Appendix B).

Smooth: Everyone would like to ____ through life with no bumps or glitches.

Jerky: Hip hop dancers like to _____ in stiff robot-like motions.

Heavy: It took dozens of workers to _____ the massive stone slab into place.

Light: It ___ through the air like a bubble.

This design includes four independent variables derived from the structure of the nonce words (CVCV): the first consonant in the nonce word, the first vowel, the second consonant, and the second vowel. There are two dependent variables: heaviness of motion (heavy vs. light) and jerkiness of motion (jerky vs. smooth).

A number of distractor items were included, as well. These 18 nonce words also had a CVCV structure, but contained different consonants than the test items. They appeared in test sentences that did not exemplify smooth, jerky, heavy, or light actions. Four truth-tester questions were also included. These items appeared to be regular test questions early on in the recording, but, at the end of the recording, the participants were asked to leave the question blank, for example:

My gerbil would ___ around his cage, running circles. Please don't respond to this question, Leave it blank.

Providing an answer to the question means the participant did not listen to the complete sound clip.

2.3. Procedure

For each question, the participants saw the graphemic representations of each member of the pair of test words (e.g., *keyku*, *chayhow*) with the instructions to "Listen to the audio clip below and choose A or B." The questions were presented as audio recordings, in which the nonce words were pronounced three times. Questions followed this format:

A *keyku*
B *chayhow*
A The moment he paid off his heavy debt he felt his burdens *keyku* off of his shoulders.
B The moment he paid off his heavy debt he felt his burdens *chayhow* off of his shoulders.
A *keyku*
B *chayhow*

The order of the response words was randomized. When a participant chose *keyku*, for instance, the phones in each position that comprise that test word were included as independent variables, and the value of the dependent variable of heaviness was "light," since that is the meaning the sentence depicts. Every pair of test words appeared in four different test sentences, corresponding to the four action types. Since there were not 12 different test sentences for each of the four action types, some of the test sentences were used more than once.

Method

The first part of the survey presented a consent form, then gathered the participant's gender, educational level, and age. A number of questions were designed to determine if the speakers were native English speakers (i.e., What country are you from originally? Where do you reside now? What language(s) was spoken in your home when you were 4 years old?). The instructions for the study were as follows:

Certain shapes are often related to made up words. For example, which of the two shapes below is "kiki" and which is "bouba"? (Figure 1)

Most people relate the spiky shape with "kiki" and the round one with "bouba". In this study we want you to pair made up words with certain kinds of actions. You'll need to base your answer on the way the words sound and the meaning they have in the sentence. You will hear two made up words like "powfoo" and "likno." They will be presented in sentences like:

"Little kids like to powfoo around in circles until they get dizzy."

"Little kids like to likno around in circles until they get dizzy."

Your job is to choose the made up word that fits the sentence best. Please listen to both sentences before choosing your answer. It will take you about 15–20 min to complete. Make sure that your speakers are on so that you can hear the sentences. Don't answer until you have heard the entire question.

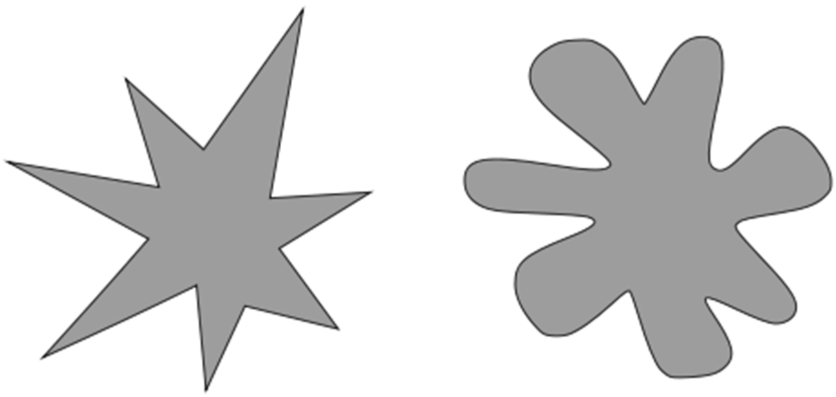

Figure 1. Kiki and bouba.

The questions were randomized differently for each participant. In order to make the survey doable in the allotted 15 to 20 min, each participant only responded to a random selection of 34 questions from the 48 test questions, 48 distractors, and four truth testers.

3. Results

Mixed-effects logistic regression analysis was used to analyze the data. (See Supplementary Materials for a link to the data.) The analyses were done in R, using the RBRUL interface (Johnson 2009). Random intercepts were included for each participant. However, including a random intercept for each test item kept the statistical analysis from completing without error. The independent variables were the four phones that comprise the CVCV test words the participants chose in the each of the test questions. The values of the first consonant and second consonants were/l, h, n, ʧ, k, g, j/. The values of the first and second vowels were/aʊ, aɪ, aʊ, eɪ, oʊ, i, u/. In the first analysis, the dependent variable was whether the test word was placed into a heavy or light action-type sentence. For the second analysis, the dependent variable was whether the test word was placed into a jerky or smooth action-type sentence.

3.1. Heavy and Light Action Sentences

In the light versus heavy analysis, only the first vowel and second consonant were significant (p = 0.014 and 0.008 respectively); however, they exhibited a high degree of collinearity, and, for this reason, they were evaluated individually in separate regressions. In the results of the regressions positive logodds indicate phones that are associated with heavy actions. In contrast, phones with negative logodds are associated with light actions. Phones with logodds close to zero are those that show no particular trend toward heavy or light movements. As Table 1 illustrates, nonce words whose first vowel was /ɑ/ or /aʊ/, or those whose second consonant was /tʃ/, /n/, or /h/ were associated with sentences that demonstrated a heavy movement. Sentences portraying light movements, on the other hand, were more likely to have /i, u, aɪ/ as the first vowel or /j/ and /g/ as the second consonant.

Table 1. Relationship between phones of nonce words and heavy and light actions.

First Vowel	Logodds	Second Consonant	Logodds
ɑ	0.49	tʃ	0.25
aʊ	0.14	n	0.19
oʊ	0.03	h	0.17
eɪ	−0.02	k	0.02
aɪ	−0.12	l	−0.09
u	−0.21	g	−0.11
i	−0.31	j	−0.43
p =	0.014	p =	0.008
Pseudo r^2 =	0.22	Pseudo r^2 =	0.23

How do these results match those of Saji et al. (2018)? Fortunately, they used a canonical correlation analysis on their data, which assigns every value of a phonetic variable, such as place and manner of articulation, an r value, according to how much each value is positively or negatively correlated with the heaviness of the action the nonce words were devised to describe. Since positive r values and positive logodds both reflect a trend toward heaviness, and negative r values and logodds correspond to lightness, the two may be correlated, in order to determine how closely related the findings of the present study are to those of Saji et al.

When the logodds of the second consonant (see Table 1) are correlated with the r values for the place of articulation (alveolar 0.35, glottal 0.78, velar −1.52, palatal −1.68) of Saji et al. (2018), the resulting positive correlation trends in a similar direction (r (5) = 0.72, p = 0.069), but does not reach significance at $p < 0.05$. However, it should be noted that using an alpha such as 0.05 to determine what is relevant, has been criticized (e.g., Amrhein et al. 2019), and Kline (2004) argues that there are a number of reasons why an alpha level of 0.1 rather 0.05 makes more sense in the behavioral sciences. In any event, the logodds also correlate well with the r values for the manner of articulation (affricate 0.79, nasal 0.52, fricative 0.22, stop -0.31, lateral 0.49, stop −0.31, glide −0.84; (r (5) = 0.82, p = 0.023). Taken together, this suggests that the second consonants in our nonce words, and those of Saji et al., are very similar in their relationship to the sound symbolism of heavy and light actions. In contrast, the correlation between their vowels and ours is low. There is a reason for this. It is difficult to compare the vowels in the two studies, because it is not clear how the coding system of Saji et al. would apply to the diphthongs [aʊ] and [oʊ], as far as vowel height is concerned. What is more, when the logodds for the first vowel in our study are correlated with the vowel backness r values of their study (back 0.11, front −0.13), no significant relationship is observed (r (5) = 0.533, p = 0.218).

3.2. *Jerky and Smooth Action Sentences*

The only variables that reached significance in the jerky versus smooth action analysis are the first and second consonants in the nonce words ($p < 0.0001$). Since these two variables were highly collinear, their influence was evaluated in separate regressions. In Table 2, large logodds indicate consonants that favor smooth actions, while small logodds favor jerky actions. The most robust finding is that the consonants [g] and [k], and the glide [j], are favored in nonce words describing jerky actions. This is true regardless of whether they appear in the first or second consonant position of the nonce words. In contrast, [h] and [l] are favored in nonce words denoting smooth actions. The affricate [tʃ] is more strongly associated with smooth actions when it occupies the first consonant position, while in the second consonant position its influence is negligible. The nasal consonant [n] is enigmatic, because its influence is position-specific. As an initial consonant, it is favored in words with jerky actions, while it is favored in words with smooth actions when it appears as the second consonant.

Table 2. Relationship between phones and smooth and jerky actions.

First Consonant	Logodds	Second Consonant	Logodds
h	0.87	h	0.72
l	0.78	n	0.64
tʃ	0.40	l	0.50
n	−0.22	tʃ	0.07
j	−0.34	g	−0.60
g	−0.59	k	−0.61
k	−0.91	j	−0.72
$p <$	0.0001	$p <$	0.0001
Pseudo r^2 =	0.30	Pseudo r^2 =	0.29

A comparison of our findings with those of Saji et al. shows a great deal of similarity. The logodds of our experiment are positively correlated with their r values for the place of articulation (glottal 0.78, alveolar (including alveopalatal) 0.35, palatal −1.68, velar, −1.52) of both the initial consonant (r (5) = 0.85, p = 0.016) and the second consonant (r (5) = 0.96, p < 0.005). Similarly, a positive correlation exists for the manner of articulation of the second consonant (fricative 0.22, lateral 0.49, affricate 0.79, nasal 0.52, glide −0.84, stop −0.31; r (5) = 0.80, p = 0.032). However, no significant correlation occurs for the manner of articulation of the first consonant (r (5) = 0.63, p = 0.127), although the trend is in the right direction. Once again, this indicates a good deal of overlap in the phones that our study finds to be related to smooth and jerky actions, and those found by Saji et al.

4. Discussion

Our paper offers cross-experimental verification of the results for English language sound symbolism from Saji et al. (2013, 2018), as well as new findings. We confirmed that magnitude sound symbolism is not just about static qualities of smallness versus largeness. It can be observed, as well, in invented words for actions and processes. This may stem from what Talmy has identified as a human cognitive bias toward dynamism (Talmy 2000, p. 171). The most significant finding of this study, however, is that sounds occurring in non-initial syllables exhibit sound-symbolic effects. This particular discovery challenges claims about the privileged status of initial syllables for sound symbolism judgements. Such claims, which are summarized in Kawahara et al. (2008), are based on a concept of psycholinguistic salience, or prominence for sounds in word-initial syllables.

Our results, by contrast, reveal that, in nonce verbs, some position-specific, sound-symbolic effects can be identified. With respect to the contrast between heavy and light actions, our results verified Saji et al.'s finding that, for English nonce words, the affricate /tʃ/ was sound-symbolic of heavy movements. However, in our study, the heaviness of /tʃ/ was found to be significant mostly in the second syllables of nonce verbs, while in the first syllables its influence was much weaker. Other sounds that symbolized heaviness in second syllables were /n/ and /h/. Heavy movements were also identified when the vowels of initial syllables were /ɑ/ or /aʊ/. Sentences portraying light movements, on the other hand, were more likely to have /i/, /u/, or /aɪ/ as the first vowel, or /j/ and /g/ as the second consonant. Such heavy and light patterning for the vowel sounds generally supports magnitude sound symbolism principles, because front and high vowels are associated with light actions, which can be related to smallness of size, while back vowels are associated with heavy actions, which are related to largeness of size.

For some sounds and meanings, however, position within a word seemed irrelevant. We found, for example, that the consonants /g/ and /k/, and the glide /j/, were associated with jerky actions whether they appeared in the first or second consonant position of the nonce verbs. Moreover, /h/ and /l/ are associated with smooth actions, irrespective of their positions within words. The nasal consonant, /n/, however, is enigmatic, because its sound-symbolic value changes with position. As an initial consonant, it is favored in words with jerky actions, while it is favored in words with smooth actions when it appears as the second consonant.

The findings of Dingemanse et al. (2016) may be cited to contextualize the significance of our study. They tested Dutch research subjects' ability to correctly assign meanings to actual words drawn from five different languages. These words were taken from a class of expressions called ideophones which are, by their nature, sound-symbolically expressive. The ideophones were presented to subjects in resynthesized forms that controlled for the possible iconicity of both segments, as well as prosody. They argue that segmental sounds and prosody each make significant contributions to subjects' ability to correctly assess meaning, and that psycholinguistic research tends to endow segments alone with too much importance. Our discovery that a sound's position within a word is also significant adds another dimension to considerations of sound symbolism, by pointing to the importance of combinatoric principles, as well as principles that have yet to be identified.

Supplementary Materials: The data for this study are available at http://www.mdpi.com/2226-471X/4/4/85/s1.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Pair #	Test Word Graphemic	Test Word Phonemic	Expected Action
1	keyku	/kiku/	light/jerky
1	chayhow	/tʃeɪhaʊ/	heavy/smooth
2	geeku	/giku/	light/jerky
2	chaynay	/tʃeɪneɪ/	heavy/smooth
3	yeekey	/jiki/	light/jerky
3	chawlow	/tʃɑloʊ/	heavy/smooth
4	koogu	/kugu/	light/jerky
4	hyechay	/haɪtʃeɪ/	heavy/smooth
5	geegoo	/gigu/	light/jerky
5	howno	/haʊnoʊ/	heavy/smooth
6	yougee	/jugi/	light/jerky
6	haylaw	/heɪlɑ/	heavy/smooth
7	keeyee	/kiji/	light/jerky
7	nochay	/noʊtʃeɪ/	heavy/smooth
8	gooyou	/guju/	light/jerky
8	nayhaw	/neɪhɑ/	heavy/smooth
9	yeeyu	/jiju/	light/jerky
9	nyelay	/naɪleɪ/	heavy/smooth
10	keeky	/kiki/	light/jerky
10	lowchay	/loʊtʃeɪ/	heavy/smooth
11	geegee	/gigi/	light/jerky
11	lowhaw	/loʊhɑ/	heavy/smooth
12	youyou	/juju/	light/jerky
12	lawnah	/lɑnɑ/	heavy/smooth

Distractor Graphemic	Distractor Phonemic
leely	/lili/
hawhay	/hɑheɪ/
loomu	/lumu/
hayso	/heɪsoʊ/
leeny	/lini/
hashay	/hɑʃeɪ/
mooloo	/mulu/
sewhah	/soʊhɑ/
meemu	/mimu/
saysah	/seɪsɑ/
meenee	/mini/
sewshah	/soʊʃɑ/
neely	/nili/
shayhay	/ʃeɪheɪ/
newmee	/numi/
showso	/ʃoʊsoʊ/
neenu	/ninu/
shashay	/ʃɑʃeɪ/

Appendix B

Action Type	Test Sentence
smooth	Everyone would like to ____ through life with no bumps or glitches.
smooth	The ship sleekly ___ through the glass calm ocean.
smooth	The skater ____ across the ice with no apparent effort.
smooth	The jet ___ through the air painting a straight white line behind it.
smooth	The current silently ____ the raft towards the horizon.
smooth	The steady stream of ideas _____ seamlessly from her mind to the blank pages of her novel.
smooth	Certain students ___ through difficult material as if it were as easy as reading Dr. Seuss.
smooth	In spite of the rough terrain, the hovercraft ___ smoothly across it.
smooth	The hot air balloon ____ up through the air so smoothly you could hardly tell it was moving at all.
smooth	In spite of the rough terrain, the hovercraft ___ smoothly across it.
jerky	He fell on the floor and ___ like he was having a seizure.
jerky	Hip hop dancers like to _____ in stiff robot-like motions.

Action Type	Test Sentence
jerky	Flies are hard to catch because they ________ from place to place in an unpredictable fashion.
jerky	The rowdy crowd ___ each other around like balls in a pinball machine.
jerky	Kids with attention deficit may be able to sit, but they can't help but ___ in their chair.
jerky	The earthquake made the trees and houses ____ back and forth.
jerky	The rocks and potholes in the road made the wagon _____ wildly as it went.
heavy	It took dozens of workers to _____ the massive stone slab into place.
heavy	The obese man _____ his way across the park, sweating and panting as he went.
heavy	The heavy-laden camels ____ through the deep desert sand.
heavy	All of his emotional baggage, the mistakes he'd made, and a lifetime of regrets came to _________ his mind to the point that he could do nothing but stare into his coffee.
heavy	With the enormous backpack he was carrying, he tried to walk normally, but _____ instead.
heavy	The oxen strained to get the overloaded wagon to move. Finally it moved and ___ its way slowly down the trail.
heavy	The massive tree gave an ear splitting crack, then ______ to the ground causing the ground to tremble.
light	The moment he paid off his heavy debt he felt his burdens _____ off of his shoulders.
light	It only took a gentle breeze to ____ the feather through the air.
light	It ___ through the air like a bubble.
light	She stared at the clouds imagining faces and animals in their shapes as they _____ across the sky.
light	Ballerinas are able to _______ as if they weighed nothing at all.

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