



NOVA

University of Newcastle Research Online

nova.newcastle.edu.au

Baxter, Stacey; Ilicic, Jasmina & Kulczynski, Alicia. "You see froot, you think fruit: examining the effectiveness of pseudohomophone priming" Published in the *European Journal of Marketing*, Vol. 51, Issue 5-6, p. 885-902, (2017).

Available from: <http://dx.doi.org/10.1108/EJM-01-2016-0038>

This is an author accepted manuscript published in in the *European Journal of Marketing*. The final authenticated version is available online at: <http://dx.doi.org/10.1108/EJM-01-2016-0038>.

Accessed from: <http://hdl.handle.net/1959.13/1355687>

You See Froot, You Think Fruit: Examining the Effectiveness of Pseudohomophone

Priming

Abstract

Purpose - We introduce pseudohomophone phonological priming effects (non-words that sound like real words with a single semantic representation, such as Whyte primes white) on consumers' product attribute and benefit-based judgments.

Design/methodology/approach- Four studies were conducted. Study 1 examines whether pseudohomophone brand names (e.g., Whyte) prime associative meaning (i.e., the perception of light bread; target: white). Study 2 investigates the pseudohomophone priming process. In Study 3, we examine the influence of brand knowledge of pseudohomophone priming effects.

Findings- Findings indicate that pseudohomophone brand names prime associative meaning, due to retrieval of phonology (sound) of the word during processing. Pseudohomophone priming effects for a semantically (meaningful) incongruent brand name manifest only when consumers do not have knowledge of the brand; with cognitive capacity constraints rendering consumers with strong brand knowledge unable to mitigate the pseudohomophone priming effect.

Research limitations/implications- This research has implications for brand managers considering the creation of a name for a new brand that connotes product attributes and benefits. However, this research is limited as it only examines pseudohomophone brand names with a single semantic representation.

Originality/value- This research shows that sounds activated by pseudohomophones in brand names can influence product judgments. This research also identifies limitations of the applicability of pseudohomophone brand names by identifying a condition under which priming effects are attenuated.

Keywords: phonology, priming, pseudohomophones, brand names, product attributes

Introduction

Research in psycholinguistics demonstrates that sounds in words can communicate meaning (e.g., Nuckolls, 1999). When reading words consumers automatically activate the word's phonology (or sounds regarding the word's pronunciation; Lukatela and Turvey, 1994). Studies examining phonetic symbolism, or the symbolic value of vowel sounds (i.e., a, e, i, o, u), find consistent sound-stimuli relationships between vowel sounds and attributes. For example, phonetic symbolism suggests that as vowel sound creation shifts from the front of the mouth (e.g., Inik) to the back (e.g., Onok), perception of size increases (Sapir, 1929). Research in psycholinguistics has also provided evidence that phonological priming can influence subsequent judgments and behaviors (Humphreys, Evett, and Taylor, 1982; Lukatela and Turvey, 1990). For example, research examining homophone priming finds that individuals are able to quickly name the target word *frog*, irrespective of whether they are primed by the word *toad* or the homophone *towed* (the words *towed* and *toad* are homophones, that is, they have the same sound yet differ in spelling and meaning; Lukatela and Turvey, 1994).

Numerous studies in marketing have demonstrated that phonological devices have an ability to prime, influencing consumer purchase intentions and brand evaluations (e.g., Baxter, Kulczynski, and Ilicic, 2014; Davis and Herr, 2014; Ilicic, Baxter, and Kulczynski, 2015; Baxter, Ilicic, Kulczynski and Lowrey, 2015; Guèvremont and Grohmann, 2015; Lowrey and Shrum 2007). For example, Klink (2000) found that brand names containing front vowel sounds (e.g., [ē] as in Gerps, [i] as in Tidip, [ā] as in Valp) were perceived as smaller, lighter, softer, and thinner than those with back vowel sounds (e.g., [ä] as in Gumil, [u] as in Lupush, and [ü] as in Golud). More recently, Davis and Herr (2014) provided evidence to suggest that exposure to the homophone 'bye' primed meaning associated with purchase, that is, 'buy', in adults. We extend the work of Davis and Herr (2014), who

indicated that future research should examine pseudohomophone priming effects in brand names. Unlike homophones that are real words that sound like other words yet differ in spelling and meaning (e.g., *eight* and *ate*), pseudohomophones are non-words that sound like real words (Lukatela and Turvey, 1994). For example, the pseudohomophone *ayght* is a non-word that sounds like the real words *eight* and *ate* (Lukatela and Turvey, 1994).

Marketers will often seek to create an inventive name for trade marking purposes and also as a means to promote consumer attention and memory (Robertson, 1989; Lowrey, Shrum, and Dubitsky, 2003). To enhance the novelty, uniqueness, and distinctiveness of brand names, marketers may choose to deviate from spelling conventions in the formulation of a brand name through the use of: 1) a non-word with no sound similarity to other words or any semantic meaning (such as, *Lego* or *Google*); 2) a non-word that sounds like a real word but the real word only has one meaning (i.e., the non-word's phonology is *not* homophonous; such as the pseudohomophone brand names, *Froot* (Fruit) *Loops* cereal or *K'Nex* (connects) toys); or 3) a non-word that sounds like a real word that has multiple spellings and meanings (i.e., the non-word's phonology *is* homophonous, in other words, the appropriate meaning of the word is ambiguous to the reader, as they are not sure which activated word the sound represents; such as the semantically ambiguous pseudohomophone brand names, *Playdoh* and *Dunkin' Donuts* (with both dough or doe activated)). This research introduces pseudohomophones as a phonological priming device. We examine the effect of pseudohomophone priming on consumer product attribute and benefit-based judgments. Specifically, we investigate pseudohomophones where the non-word's sound activates a real word that is associated with only one meaning (e.g., *whyte* activates *white*, relating to the colour meaning). We suggest that this research has implications for brand managers in their creation of new a brand name in order to clearly communicate meaning and also as a means to differentiation the brand from competitors.

Phonological-based priming occurs as an individual initially draws meaning from word phonology (sound) rather than word orthography (spelling; Harm and Seidenberg, 2004). Specifically, Van Orden (1987) proposes that phonology is automatically activated in reading and then a process is undertaken that sorts the multiple meaning representations created by phonology in an individual's internal lexicon (dictionary). This process would occur for semantically ambiguous pseudohomophones (e.g., porz), where multiple meaning representations are activated (e.g., pause, pores, and pours) and context determines the word's intended meaning (e.g., feet). However, we argue that when exposed to a pseudohomophone brand name, such as Whyte bread (target: light bread, i.e., white), consumers will automatically activate the word's phonology (white (/waɪt/)), yet no other meaning activation will ensue. As such, we propose priming effects will manifest when consumers are primed with pseudohomophones (single semantic representation) as brand names.

Although previous research has identified homophone priming effects (David and Herr, 2014), Study 1 demonstrates that pseudohomophones too can prime associative meaning. We then show, in Study 2, that the activation of phonology is the process by which consumers acquire brand meaning. We confirm the phonological, sound-based, theoretical basis of pseudohomophone priming effects through eliminating orthography (spelling) as an alternate mechanism for the manifestation of pseudohomophone priming effects for fictitious brands. We also empirically reveal the bounds of our pseudohomophone priming effect in Study 3. We add to the current knowledge of phonological priming effects by examining how consumer associative networks can influence the activation of meaning. Specifically, the results provide evidence to suggest that the pseudohomophone priming effect is attenuated when consumers have knowledge of a brand whose name is semantically incongruent with its phonological code (i.e., Froot (/ˈfru:t/) Loops do not contain real fruit, Experiment 3A).

However, we further demonstrate (Experiment 3B) that cognitive capacity constraints results in associative priming effects for consumers who possess higher levels of brand knowledge.

Theoretical development and hypotheses

Phonological Priming

Phonological priming ensues when detection of a target word is aided by a previously presented phonologically similar word. For example, individuals are more likely to recognize a target word (*e.g.*, *made*) when a phonologically equivalent word is used as a prime (*e.g.*, the homophone: *maid*), as opposed to an unrelated word (*e.g.*, *ship*) (*e.g.*, Humphreys et al., 1982). Research in psycholinguistics provides evidence that phonological information is generated automatically and rapidly during the processing of words (Ferrand and Grainger, 1992; Humphreys et al, 1982; Lukatela and Turvey, 1990; Perfetti and Bell, 1991; Van Orden, 1987).

Phonological Priming and Suppression

The lexical quality hypothesis suggests that when reading, an individual extracts meaning from word phonology (sound), with context identifying the intended semantic meaning of the word (Perfetti and Hart, 2002). For example, Lukatela and Turvey (1994) demonstrate that participants rapidly name the target word *frog*, irrespective of whether they are primed by the word *toad* or its homophone *towed*. However, at longer durations, individuals are able to identify the correct meaning of the word, *towed* (*i.e.*, pull along). The process of extracting meaning from a homophone such as ‘toad/towed’ is linked to a secondary process termed homophone suppression. In order for a homophone to elicit its spelling appropriate meaning, individuals must first recognize that the word sound is a homophone, and then suppress the inapplicable meaning that has been activated by the homophone sound (*i.e.*, identify that the

intended meaning of the word *towed* is not associated with *frog*, but the intended meaning of the word *toad* is related to *frog*). Research has shown that homophone priming occurs only before 57 milliseconds (Lukatela and Turvey, 1994) or 35 milliseconds (Lee et al. 1999), with longer exposure to the homophone prime enabling readers to extract the words intended meaning.

Akin to homophones, semantically ambiguous pseudohomophones can activate multiple representations in the internal lexicon through the phonology of the word. For example, the pseudohomophone word *peir*, will active multiple representations in the lexicon through phonology of the word (*i.e.*, pear, pair, or pare). The context, such as fruit, will identify the appropriate meaning (*i.e.*, pear), resulting in suppression of the alternative meanings (*i.e.*, pair and pare). Priming studies in English and Dutch, however, have found a ‘pseudohomophone advantage’, whereby pseudohomophone primes continue to have a priming effect over and above homophones at long prime-presentation durations (Lukatela and Turvey, 1994; Drieghe and Brysbaert, 2002). The authors argue that when processing a semantically ambiguous pseudohomophone (*i.e.*, a non-word that sounds like a real word that has multiple spellings and semantic meanings), individuals use the phonology of the word, and there is additional ambiguity when accessing stored word information in the internal lexicon (as the sound of the word activates multiple words with different spellings and meanings; Lukatela and Turvey, 1994; Drieghe and Brysbaert, 2002). In other words, semantically ambiguous pseudohomophones generate more semantic (meaning) categorization errors (Van Orden, Johnston, and Hale, 1988) as they activate the phonological representation of the word (that is, the word’s sound), which retrieves a number of semantic representations of the word (Zhan, Yu, and Zhou, 2013). The findings of studies examining both homophones and semantically ambiguous pseudohomophones suggest that when an ambiguous phonological code is activated (*i.e.*, a sound code that is shared by more than one

word, such as is the case with homophones and semantically ambiguous pseudohomophones), it can be rapidly disambiguated based on spelling and context (which activates the intended semantic representation), resulting in suppression of the prime.

We introduce pseudohomophones as alternate phonological priming devices in brand names. Pseudohomophones possess only a single lexical representation, characterised by a sole base word holding only one possible meaning (*e.g.*, Whyte/White). Pseudohomophones are non-words that sound like real words that have only one meaning and spelling. We argue that unknown pseudohomophone brand names will prime associative meaning, as they do not result in an ambiguous phonological code (*i.e.*, they activate only one spelling and meaning). When a pseudohomophone is read, its phonology is activated with only one semantic representation retrieved. With no other alternate meanings available, individuals will not require suppression of competing representations in their internal lexicon. As a result, we expect priming effects to manifest as phonology of the word is activated and is associated with the relevant meaning. We expect that a pseudohomophone, such as *Whyte*, will prime associative meaning of *lightness*, equal to the target (real) word, *White*. Formally, our hypothesis is:

H1: A pseudohomophone will have a similar priming ability as a target (real) word. That is, the pseudohomophone's Whyte, Wheet, and Frute will prime associate meanings of product and benefit attributes darkness, graininess, and healthiness, similar to the real words White, Wheat, and Fruit, respectively.

Phonological Process in Priming

The process of word identification in reading is suggested to transform spelling (orthography) to sound (phonology), and then map sound to meaning (semantic) (*e.g.*, see Gough, 1972).

We suggest that this phonological mapping, or phonological route, is the process underlying pseudohomophone priming effects. Researchers, however, have proposed an alternate direct access route to word identification, suggesting that individuals do not make use of phonology in visual word recognition. According to this perspective, individuals use the orthographic representation of a word to activate its entry in the lexicon directly (*e.g.*, see Baron, 1973). A word is orthographically similar when it is the same length as a target word but differs on a single letter, while maintaining letter position (*e.g.*, Face, Fast, Pact, and Tact are orthographically similar to Fact; Coltheart, Davelaar, Jonasson, and Besner, 1997)

We aim to demonstrate that consumers use phonology, not orthography, when obtaining meaning from pseudohomophone brand names by empirically eliminating the alternate orthographic process by which pseudohomophone priming effects may manifest. Specifically, we provide evidence to suggest that orthographic similarity does not confound our proposed phonological process in pseudohomophone priming. As such, we expect that an orthographically similar word (*i.e.*, *Wheut*) to a pseudohomophone (*i.e.*, *Wheet*) will not result in associative priming effects (*i.e.*, *Wheet* (pseudohomophone) will prime *Wheat* (target), that is, the product is grainy, however, *Wheut* (orthographic control) will not prime *Wheat* (target) as strongly as *Wheet* (pseudohomophone)). As a result, the following hypothesis is proposed:

H2: The priming effect of an orthographically similar word to a pseudohomophone will be weaker when compared to the target (real) word. That is, the word Wheut, a word with similar orthography to the pseudohomophone Wheet, will not prime associate meanings of the product attribute, graininess, as strongly as the real word, Wheat.

Phonological Process and Brand Knowledge

According to Associative Network Theory (Martindale 1991; Anderson 1983; Collins and Loftus 1975), memory is structured as an associative network containing nodes connected via related links. These nodes in memory are portions of brand information, including brand attributes and benefits (Keller, 1993). The connections between the nodes contain the link between the associations to form consumers overall knowledge structure of a brand.

Understanding brand knowledge is crucial as it influences what comes to mind when a consumer thinks about a brand (Keller, 1993). Consumer knowledge linked to the pseudohomophone brand name *Froot Loops*, should activate perceptions of its taste, sugar content, images from advertising campaigns and packaging (such as the brand character Toucan Sam), and also past product experiences. The semantic meaning of a phonologically suggestive brand name, such as *Froot Loops*, enables consumers to infer certain attributes of the product; its fruit flavor. However, those consumers knowledgeable of the brand would associate it with being an unhealthy cereal that does not contain real fruit. As such, *Froot Loops* provides a case where the attributes of the brand are semantically incongruent with the phonological code of the brand's name (*i.e.*, /'fru:t/)

We propose that the phonological process of pseudohomophone meaning activation is attenuated for a semantically incongruent brand, only when consumers are knowledgeable about the brand. Unlike fictitious, or new-to-market, pseudohomophone brand names, semantically incongruent branded pseudohomophones will not prime associative meaning, due to the strong semantic associations tied to the brand being retrieved from an individual's associative network of memory. For example, consumers that are knowledgeable about the brand *Froot Loops* will not associate it with being a healthy breakfast cereal. On the other hand, consumers that are not knowledgeable about the brand will use the information contained within the brand name, that is, the phonology and the semantic association (*i.e.*, fruit), and

will be more likely to associate the brand with being healthy. As such, the following hypothesis is proposed:

H3: Semantically incongruent branded pseudohomophone priming effects will manifest only for consumers low in brand knowledge. That is, the word Froot, will only prime associations of healthy for consumers who are not aware of the branded cereal, Froot Loops.

In their study of homophone priming effects, Davis and Herr (2014) argued and provided evidence that cognitive capacity constraints impeded cognitive resources and reduced the efficiency of homophone suppression, enhancing homophone priming effects. Results of their studies suggested that homophones can prime judgments and behaviors related to an unread homophone, yet only in conditions where individuals experienced cognitive load. For example, in one of their experiments, individuals were asked to memorize a seven-digit number and then read a short story describing a close call collision with *phew* as the prime and *close call* as the control. Finally, individuals were asked how much they believed they would save money (among other dependent variables). When primed with *phew*, individuals under load provided lower behavioral intention (money saving) ratings than in any other condition. Therefore, the homophone prime resulted in actions that were ‘less’ after reading ‘phew’ (homophone pair ‘few’).

We propose semantically incongruent branded pseudohomophones do not prime consumers high in brand knowledge, due to the cognitive resources available to retrieve the semantic representation of the brand. We do, however, suggest that semantically incongruent branded pseudohomophones will prime consumers with strong brand knowledge when they do not have the cognitive resources available to undertake the controlled strategic process of

retrieving semantic knowledge about the brand. We, therefore, argue that cognitive capacity constraints will result in the initial automatic activation of phonology (Bargh and Pietromonaco, 1982; Bargh and Thein, 1985) and reduce the effectiveness of the semantic representation for consumers that are knowledgeable about the brand. We do not expect, however, that cognitive capacity constraints will enhance the priming effects for consumers low in brand knowledge, as activation of phonology will result in the intended meaning being retrieved, irrespective of cognitive capacity. As such, the following hypothesis is proposed:

H4: Semantically incongruent branded pseudohomophone priming effects will occur for consumers high in brand knowledge, only under conditions of cognitive capacity constraints. That is, the word Froot, will prime associations of healthy for consumers who are aware of the branded cereal, Froot Loops, only when they are under time pressure and, therefore, unable to activate their associations with the brand.

Study 1

Study 1 initiated our investigation into pseudohomophone phonological priming effects focusing on a concrete product attribute (that is, colour). Study 1 was undertaken in the context of a fictitious pseudohomophone in order to demonstrate the base-line effect of the phenomenon.

Participants and Procedures

Four hundred and twenty nine Australian's aged six to 88 years participated in an online experiment (210 male, 219 female; $M_{\text{age}} = 27.02$, $SD = 20.99$). Employing G*Power, it was

determined that this sample exceeded that required to achieve statistical power (one-way ANOVA, three groups) of .90, with an a priori alpha level of .05 and estimated medium effect size ($F = .25$) (that is, $n > 207$). A between subjects design was employed with participants randomly allocated to one of the three experimental conditions (refer to Appendix A for Study 1 stimuli). Consent was sought by a parent/guardian and assent gained from child participants (those under 18 years of age) prior to participation.

Participants were shown a brand name (manipulated across conditions) for a fictitious brand of bread: White (target), Whyte (pseudohomophone), or Strel (pronounceable non-word control, Lukatela and Turvey, 1994). After viewing the stimuli, participants were asked to respond to the following item: “How dark is this bread?” using a visual sliding scale (7-point response array) anchored on: *not at all – very much*. ‘Dark’ was used as an alternative to ‘White’, as to not confound the priming effect by avoiding biases introduced by stimuli and dependent variable correspondence (as per Davis and Herr, 2014). Participants were then asked to report simple demographic information.

Results

We expected a pseudohomophone to act as phonological priming device, influencing consumer’s product judgments. To test our hypothesis an ANOVA model was estimated with perceived darkness as the dependent variable. As hypothesized, results revealed a significant difference in product attribute judgments across conditions ($M_{\text{Target (White)}} = 2.04$, $M_{\text{Pseudohomophone (Whyte)}} = 2.31$, $M_{\text{Non-word control (Strel)}} = 3.59$, $F = 57.50$, $p < .001$, $\eta^2 = .213$, see Figure 1) whereby both the target (White) and pseudohomophone (Whyte) were perceived as less dark when compared to the non-word (Strel). Results of post-hoc analysis revealed no significant difference in product attribute judgments following exposure to the pseudohomophone (Whyte) when compared to the target word (White, $p = .143$), supporting

Hypothesis 1. However, a significant difference was observed when comparing both the target word (White) and pseudohomophone (Whyte) to non-word control (Strel; $p < .001$).

To confirm that the age of the participant did not moderate the observed priming effect, the PROCESS macro bootstrapping procedure ($n = 10000$, Model 3; Preacher *et al.*, 2007) was employed for i) target word priming (versus control), ii) pseudohomophone priming (versus control), and iii) target versus pseudohomophone priming. In all instances, a significant moderating effect was not observed (i. $\beta = -.001$, $p = .626$, $R^2\Delta < .001$; ii. $\beta = .01$, $p = .362$, $R^2\Delta = .003$; iii. $\beta = -.01$, $p = .164$, $R^2\Delta = .006$), demonstrating that pseudohomophone priming effects are not conditional on age.

These results provide initial evidence of pseudohomophone phonological priming. Specifically, Study 1 demonstrated that a fictitious pseudohomophone's effect on product judgements emulates that of the target word.

Study 2

Study 2 sought to replicate and extend Study 1 through the inclusion of an orthographic control, in order to eliminate word visual similarity as an alternate explanation for pseudohomophone phonological priming effects. The study focused on a concrete product attribute (that is, grain). The study aimed to demonstrate that the phonological route, not the direct orthographic route, is used when activating word meaning.

Participants and Procedures

Five hundred and sixty five Australian's aged six to 85 years participated in an online experiment (264 male, 301 female; $M_{\text{age}} = 22.68$, $SD = 20.52$). Consistent with Study 1, the sample exceeded that required to achieve statistical power of .90 (one-way ANOVA, four

groups), with an a priori alpha level of .05 and estimated medium effect size ($F = .25$) (that is, $n > 232$; G*Power). A between subjects design was employed with participants randomly allocated to one of the four experimental conditions (refer to Appendix B for Study 2 stimuli). Consent was sought by a parent/guardian and assent gained from the child participants prior to participation.

Participants were shown a brand name (manipulated across conditions) for a fictitious brand of bread: Wheat (target), Wheet (pseudohomophone), Wheut (orthographic control), or Korch (pronounceable non-word control; Lukatela and Turvey, 1994). After viewing the stimuli, participants were asked to respond to the following item: “How much grain is in this bread?” using a visual sliding scale (7-point response array) anchored on: *none at all – a lot*. Participants were then asked to report simple demographic information.

Results

Consistent with Study 1, we expected a pseudohomophone to act as a phonological priming device, influencing consumer’s product judgments. Further, we expected a pseudohomophone to act as a more effective priming tool than an orthographically similar word. To test our hypothesis an ANOVA model was estimated with perceived graininess as the dependent variable. As hypothesized, results revealed a significant difference in product attribute judgments across conditions ($M_{\text{Target (Wheat)}} = 5.37$, $M_{\text{Pseudohomophone (Wheet)}} = 5.02$, $M_{\text{Orthographic control (Wheut)}} = 3.68$, $M_{\text{Non-word control (Korch)}} = 3.22$, $F = 67.78$, $p < .001$, $\eta^2 = .266$, see Figure 2). Consistent with Study 1, results of post-hoc analysis revealed no significant difference in product attribute judgments following exposure to the pseudohomophone (Wheet) when compared to the target word (Wheat, $p = .193$), providing additional support for Hypothesis 1. However, a significant difference was observed when comparing the target word (Wheat) to both the orthographic control (Wheut; $p < .001$) and non-word control

(Korch; $p < .001$), as well as the pseudohomophone (Wheet) to the orthographic control (Wheat; $p < .001$), and non-word control (Korch; $p < .001$), supporting Hypothesis 2. A significant difference was not found when comparing the priming effect of the orthographic control (Wheat) and non-word control (Korch; $p = .119$).

These results provided further evidence of pseudohomophone phonological priming effects. In particular, Study 2 demonstrated that pseudohomophone priming effects occurred as a result of phonological activation as opposed to orthographic similarity.

Study 3

Extending Study 1 and Study 2, Study 3 moved beyond fictitious pseudohomophones to investigate the phonological priming effect for a *branded* pseudohomophone. Further, as brand names are known to connote both concrete product attributes and abstract product benefits (Keller, 1993), we extended Study 1 and Study 2's focus on concrete product attributes to examine an abstract product benefit, healthiness. Study 3 comprised two experiments; Experiment 3A examined the moderating effect of brand knowledge on pseudohomophone priming, whilst Experiment 3B sought to promote branded pseudohomophone priming effects through the inclusion of cognitive capacity constraints to impede semantic association retrieval.

Branded Pseudohomophone Selection

Froot Loops, a brand of cereal, was selected as the branded pseudohomophone for Study 3. *Froot Loops* was chosen as it represents a unique, phonetically misleading, situation in which the brand name is semantically incongruent with the brand name's phonological code.

Specifically, despite the brand's phonological code including /'fru:t/, which may elicit the perception that the product contains real fruit (*i.e.*, the product is healthy), those with knowledge of this product would have associations linked to high sugar content (over 30% at 38g per 100g; The Age, 2015). Hence, for *Froot Loops*, the priming effect (healthy) is expected to be contrary to the actual benefit of the product (unhealthy), as the benefit of the brand is semantically incongruent with the phonological code of the brand's name.

Experiment 3A

Participants and Procedures

Five hundred and sixty Australian's aged six to 86 years participated in Experiment 3A (258 male, 302 female; $M_{\text{age}} = 29.08$, $SD = 21.73$). A between subjects design was employed with participants randomly allocated to one of the four experimental conditions (refer to Appendix C for Study 3 stimuli). Consent was sought by a parent/guardian and assent gained from the child participants prior to participation. The sample for Experiment 3A exceeded that required to achieve statistical power of .90 (one-way ANOVA, four groups), with an a priori alpha level of .05 and estimated medium effect size ($F = .25$) (that is, $n > 232$; G*Power).

Participants were shown a brand name (manipulated across conditions) for a brand of cereal: Fruit Loops (target), Froot Loops (branded pseudohomophone), Frute Loops (pseudohomophone), or Thent Loops (pronounceable non-word control; Lukatela and Turvey, 1994). After viewing the stimuli, participants were asked to respond to the following item: "How healthy is this cereal" using a visual sliding scale (7-point response array) anchored on: *not at all – very much*. Participants were then asked to report their knowledge of the brand, Froot Loops, using six items drawn from Yoo, Donthu, and Lee (2000; "*I know*

what Froot Loops looks like”, “*I can recognise Froot Loops among other competing brands*”, “*I am aware of Froot Loops*”, “*Some characteristics of Froot Loops come to mind quickly*”, “*I can quickly recall the symbol or logo of Froot Loops*” and “*I don’t have difficulty in imagining Froot Loops in my mind*”, Cronbach $\alpha = .894$). Participants were then asked to report simple demographic information.

Results

First, an ANOVA model was estimated with perceived healthiness as the dependent variable. Results revealed a significant difference in product benefit judgments across conditions ($M_{\text{Target (Fruit Loops)}} = 3.76$, $M_{\text{Pseudohomophone (Frute Loops)}} = 3.67$, $M_{\text{Branded Pseudohomophone (Froot Loops)}} = 2.84$, $M_{\text{Non-word control (Thent Loops)}} = 3.07$, $F = 11.31$, $p < .001$, $\eta^2 = .057$, refer to Figure 3). Results of post-hoc analysis revealed no significant difference in product benefit judgments following exposure to the fictitious pseudohomophone (Frute Loops) when compared to the target word (Fruit Loops, $p = .979$), replicating Study 1 and Study 2, and supporting Hypothesis 1. However, a significant difference was observed when comparing the target word (Fruit Loops) to both the branded pseudohomophone (Froot Loops; $p < .001$) and non-word control (Thent Loops; $p = .001$).

Further analysis was then undertaken to examine the moderating role of brand knowledge. To test Hypothesis 3, the Preacher, Rucker, and Hayes (2007) PROCESS macro bootstrapping procedure ($n = 10\,000$, Model 1, branded pseudohomophone compared to the target) was employed. As hypothesized, brand knowledge was a significant moderator of the priming effect ($\beta = .43$ $p = .002$, $R^2\Delta = .024$). Results of the simple effects analysis revealed that the branded pseudohomophone only primed perceptions of healthiness when a lower level of brand knowledge (BK) was possessed (Point 1, $BK_{(\bar{x} - 1\sigma)} = 3.47$), with significant

effects not observed for those with higher levels of brand knowledge (Point 2, $BK_{(\bar{x})} = 4.74$, Point 3, $BK_{(\bar{x} + 1\sigma)} = 6.01$, refer to Table 1).

Whilst these results provided further evidence of pseudohomophone phonological priming effects (Frute Loops → Fruit Loops), the results of Experiment 3A demonstrated a bound of the phenomenon, that is, pseudohomophone phonological priming effects do not manifest when the semantically incongruent pseudohomophone is not fictitious and when individuals possess knowledge about the brand primed.

Experiment 3B

Participants and Procedures

Four hundred and eighty six Australian's aged six to 79 years participated in Experiment 3B (214 male, 272 female; $M_{age} = 26.49$, $SD = 20.73$). A 4 (prime: target, branded pseudohomophone, pseudohomophone, vs. pronounceable non-word) x 2 (cognitive capacity: no load vs. load) between subjects factorial design was employed, with participants randomly allocated to one of the eight experimental conditions. Consent was sought by a parent/guardian and assent gained from the child participants prior to participation. Those who participated in Experiment 3A did not participate in Experiment 3B. The sample for Experiment 3B exceeded that required to achieve statistical power of .90 (ANOVA [main effects and interactions], eight groups), with an a priori alpha level of .05 and estimated medium effect size ($F = .25$) (that is, $n > 231$; G*Power).

As the priming ability of homophones has been shown to be dependent on time, where longer exposure to the homophone prime enables extraction of the homophones intended meaning (Lukatela and Turvey, 1994; Lee et al. 1999); time pressure was employed

as a cognitive capacity constraint (Meyer et al. 2011) as opposed to number memorization. Participants in the cognitive load conditions were first informed that they would be given three seconds to respond to each question (timer displayed on screen). Those in the no load conditions were not given an instruction regarding response time (replicating Experiment 3A).

Participants were then shown a brand name (manipulated across conditions and asked to indicate the perceived healthiness of the cereal (consistent with Study 3A). Participants were then asked to report their brand knowledge using six items employed in Study 3A (Cronbach $\alpha = .910$). Finally, participants were asked to report simple demographic information.

Manipulation Check

As intended, participants with cognitive load took significantly less time to examine the advertisement ($M_{\text{time}} = 1.98$, $SD_{\text{time}} = .69$) when compared to those in the no cognitive load conditions ($M_{\text{time}} = 13.15$, $SD_{\text{time}} = 47.11$; $t = 3.48$, $p = .001$), indicating that the manipulation of cognitive impairment was successful.

Results

A 4 (prime: target, branded pseudohomophone, pseudohomophone, vs. pronounceable non-word) x 2 (cognitive capacity: no load vs. load) ANOVA was first performed with perceived healthiness as the dependent variable. Results revealed a significant main effect for prime ($M_{\text{Target (Fruit Loops)}} = 3.80$, $M_{\text{Pseudohomophone (Frute Loops)}} = 3.60$, $M_{\text{Branded Pseudohomophone (Froot Loops)}} = 2.72$, $M_{\text{Non-word control (Thent Loops)}} = 2.91$, $F = 11.31$, $p < .001$, $\eta^2 = .073$). Again, results of post-

hoc analysis revealed no significant difference in product benefit judgments following exposure to the fictitious pseudohomophone (Frute Loops) when compared to the target word (Fruit Loops, $p = .901$), replicating Study 1, Study 2 and Study 3A, and supporting Hypothesis 1. However, a significant difference was observed when comparing the target word (Fruit Loops) to both the branded pseudohomophone (Froot Loops; $p < .001$) and non-word control (Thent Loops; $p < .001$). No other significant effects were observed ($p > .05$).

To examine the moderating role of brand knowledge on the effect of the interaction (prime x cognitive capacity) on product judgments, we employed the Preacher et al. (2007) PROCESS macro bootstrapping procedure ($n = 10000$, Model 3, branded pseudohomophone compared to the target). We expected a three-way interaction to occur, whereby the interaction (prime x cognitive capacity) would not be significant when brand knowledge was low, yet significant when participants possessed greater knowledge of the brand. Specifically, it was expected that a branded pseudohomophone would prime those with a limited brand-related associative network, irrespective of the cognitive capacity constraints imposed. However, for those with knowledge of the brand (thus a developed or extensive associative network) priming would only occur when a cognitive capacity constraint was imposed (inhibiting suppression).

As hypothesized, a significant three-way interaction was observed ($\beta = .81$, $p = .027$, $R^2\Delta = .017$), whereby the interaction (prime x cognitive capacity) did not have a significant effect on product benefit judgments when brand knowledge (BK) was low (Point 1, $BK_{(\bar{x} - 1\sigma)} = 3.53$). Significant effects were only observed when a higher level of brand knowledge was possessed (Point 2, $BK_{(\bar{x})} = 4.74$ and Point 3, $BK_{(\bar{x} + 1\sigma)} = 5.95$), refer to Table 2 and Figure 4). As expected, those with higher levels of brand knowledge reported that Froot Loops and Fruit Loops were of similar ‘healthiness’ when a cognitive capacity constraint was imposed, supporting Hypothesis 4. However, when cognitive capacity constraints were not imposed,

individuals with higher levels of brand knowledge reported that Froot Loops were significantly less healthy than Fruit Loops, replicating the effects observed in Study 3A and providing further support for Hypothesis 4.

The results of Experiment 3B demonstrated that the bound of pseudohomophone phonological priming effects identified in Experiment 3A (brand knowledge) may be overcome by the imposition of cognitive load. Specifically, we provided evidence that consumers with strong brand knowledge will not undertake the controlled strategic process of retrieving semantic knowledge about the brand to attenuate priming effects, when under cognitive capacity constraints.

General discussion and conclusions

Previous research has shown that particular words have the ability to prime semantic and conceptually related ideas. In particular, recent research in marketing has identified the practicality of utilizing homophones (a word with the same pronunciation but different meaning or spelling to another word), as a means to influence consumer behavior and judgments for adult consumers, whilst under cognitive load (Davis and Herr, 2014). This study introduces pseudohomophone priming as an alternate phonological priming device that influences consumer's product attribute and benefit judgments.

First, we examined the priming effect of pseudohomophones (a word with unconventional spelling that possesses the same sound as another word with a single lexical meaning) on consumer product attribute judgments. We showed that pseudohomophones have the ability to act as a phonological priming device, influencing judgments, whereby individuals who read the word 'Whyte' had similar perceptions of the bread being 'dark, target: white', to individuals who read the word 'White'.

Second, we examined the process underlying pseudohomophone priming effects. Results revealed that the pseudohomophone priming process is not due to the orthographic similarity of the prime. In our study we showed that the pseudohomophone, ‘Wheet’, primed consumer perceptions of graininess (target: wheat) significantly greater than the orthographic control, ‘Wheat’; suggesting that priming effects manifest due to the activation of phonology and not orthographic similarity.

Third, we examined a bound of the pseudohomophone priming effect through the moderating role of brand knowledge on priming effects for a semantically incongruent branded pseudohomophone. Results revealed that individuals high in brand knowledge have a strong semantic representation of the brand and identify that the branded pseudohomophone, *Froot Loops*, is not healthy (*i.e.*, does not contain real fruit); attenuating the priming effect. The findings provided evidence to suggest that the branded pseudohomophone priming effect manifests when individuals have low brand knowledge. In other words, *Froot Loops* primed the product benefit of being healthy for consumers who had not generated the association that the brand was high in sugar content.

Fourth, we also sought to examine whether the imposition of cognitive load would influence the ability of a consumer to suppress the priming effect of a semantically incongruent branded pseudohomophone; particularly for individuals who were high in brand knowledge and had a strong semantic representation of the brand. Results indicated that when no load was applied, the real (target) word ‘Fruit Loops’ produced greater judgments of ‘being healthy’ in the advertised cereal, than the branded pseudohomophone ‘Froot Loops’, for consumers both high and low in brand knowledge. Under conditions of load, however, the semantically incongruent branded pseudohomophone was just as effective as the real word (target: Fruit) for eliciting judgments of how healthy the cereal was for consumers high in

brand knowledge. Therefore, the imposition of cognitive load rendered consumer high in brand knowledge unable to mitigate the pseudohomophone priming effect. In other words, under cognitive load, consumers high in brand knowledge perceived the *Froot Loops* branded cereal as significantly healthier than consumers that had the cognitive resources available to search for semantic knowledge of the brand within their associative network. Whilst we only examined a semantically incongruent branded pseudohomophone, future research should also examine semantically congruent pseudohomophone priming. These studies would confirm that the priming effects will occur irrespective of brand knowledge; due to the appropriate semantic association tied to the brand.

Brand names are important for creating favourable, strong, and unique brand associations that are imperative for building customer-based brand equity (Keller, 1993). Brand names are central to brand recall and recognition, where effective facilitation of these processes is generated by a brand name that is simple, familiar, and distinctive. Further, a brand name should either aid in the promotion of brand awareness or provide the connection that links a brand and brand associations (Keller, 1993).

Increasing the memorability of a brand name is necessary for the creation of brand awareness (e.g. Lowrey, Shrum, and Dubitsky, 2003). Research suggests that pseudohomophones facilitate differentiation in a cluttered media environment (Collins, 1977) and increase memorability (Lukatela, Frost, and Turvey, 1998). Craik and Lockhart's (1972) level of processing theory has been drawn upon to explain how unusual brand name spellings increase recall and recognition (Lowrey et al., 2003). The level of processing theory suggests that distinctiveness is a theoretical construct that produces more elaborate memory traces than non-distinctive characteristics; supporting discriminative processes at retrieval (Hunt, 1995). Lowrey's et al. (2003) research on brand names supports the level of processing theory, with findings suggesting that brand name memory is enhanced when deeper processing of stimuli

can be induced through distinctiveness. In their studies, Lowrey et al. (2003) show that brand name memory for unusual spellings is significant for both less familiar and familiar brands (although stronger for less familiar brands), where unusual linguistic characteristics in brand names significantly affect brand name memory for familiar brands. Marketers can, therefore, increase the memorability of their brand name by employing *distinctive* linguistic devices, such as pseudohomophones, to encourage deeper processing and memory retrieval.

Pseudohomophone brand names, as demonstrated by this research, are just as effective as real words in producing product attribute and benefit associations. Further, the use of pseudohomophone brand names enables marketers to be distinctive, whilst using simple words that are somewhat familiar to consumers. The balance between familiarity and distinctiveness can be achieved with pseudohomophone brand names, by using words with the same sound as words that are familiar to consumers, but with distinctive spelling that can be used to attract attention and differentiate a brand from competitors. However, as pseudohomophone brand names have the ability to prime attributes and benefits absent of any marketing activity signifies that consumers can still assume attributes and benefits on the basis of the brand name alone (Keller, 1993). It is important to note, however, that these recommendations apply mainly to new and early brands, or brands that consumers have yet to be exposed to, as brand knowledge created through brand exposure and use allows consumers to make judgments superseding judgments related to the brand name alone.

This research has implications for advertisers and brand managers when developing brand names and marketing communications that aim to influence consumer perceptions of product attributes and benefits. A number of successful brands possess brand names comprising pseudohomophones, such as Nintendo Wii (We). Results from this research suggest that the implementation of a pseudohomophone brand name would increase consumer perceptions of the related product attribute, function, or benefit. There are

situations in marketing where a brand name that relies only on concrete attributes may fail to differentiate itself from competitors. In these situations product benefit associations are more meaningful to consumers (Claeys, Swinnen, and Abeele, 1995). The ability of pseudohomophone brand names to prime both product attribute and product benefit associations provides marketers with the opportunity to be more creative when developing brand names. Utilization of brand names containing pseudohomophones may also provide greater opportunity for brand managers to leverage product attribute and benefit associations, similar to other brands that may already be protected under trademark, whilst at the same time providing a means of differentiation.

Further, whilst the results of these studies indicate that pseudohomophone brand names are just as equal in their ability to prime product attribute and benefit judgments as real words, pseudohomophone brand name use may add an element of fun and appeal for consumers. Not only may pseudohomophone brand names affect product attribute and benefit judgments, but they could also possess the ability to positively influence consumer attitude towards the product, attitudes towards the brand, and purchase intention. Future research should investigate whether consumer perceptions of a pseudohomophone brand name, such as fun, might also influence other positive judgments related to the product and brand.

Previous research in psycholinguistics, specifically phonetic symbolism, has demonstrated the importance that sounds in words have on brand name preference and perceptions of product attributes (*e.g.*, Yorkston and Menon, 2004; Lowrey and Shrum, 2007; Baxter and Lowrey, 2011; Shrum et al., 2012). Whilst these studies focused primarily on the front and back vowel distinction, where front vowel sounds (*e.g.* [i] as in Gimmel) were preferred for smaller and lighter products, and brand names containing back vowel sounds (*e.g.*, [ä] as in Gommel) were preferred for larger and heavier products (Lowrey and Shrum, 2007), the findings of this research suggested that a brand name with a pseudohomophone

equivalent name to a specific product attribute, may be just as effective in communicating brand and product attributes to consumers. Future research should examine the comparative priming effects across phonological devices such as pseudohomophones, semantically ambiguous pseudohomophones, and phonetic symbolism.

Lastly, this research is not without limitations. While the findings of our study can be generalized across ages (as simple words were examined), we suggest that future research examine the role of literacy or cognitive development in priming effects for more complex pseudohomophones. This research is also limited as it examines only one product category (food). Future research should extend to other product categories and services. Additionally, whilst our research demonstrates the priming ability of a real brand incorporating a pseudohomophone, little is known about the motivation behind the choice of the name Froot Loops. It is unknown whether the name was created to evoke fun, to deceive consumers into thinking the product contained fruit, to indicate fruit flavour, or to perhaps use a play on words to incorporate the shape of the product in the brand name for visual appeal. Future research should not only examine pseudohomophone priming effects in other product categories and contexts; but should also aim to understand the motivation factors for creating pseudohomophone brand names, beyond communicating product attribute and benefit judgments.

Appendix A: Study 1 Stimuli (Target word: Light)

Pseudohomophone Condition



Target word Condition



Pronounceable non-word Condition



Appendix B: Study 2 Stimuli (Target word: Grain)

Pseudohomophone Condition



Orthographic control Condition



Target word Condition



Pronounceable non-word



Appendix C: Study 3 Stimuli (Target word: Healthy)

Branded Pseudohomophone Condition

**FROOT
LOOPS**
BREAKFAST CEREAL



Pseudohomophone Condition

**FRUTE
LOOPS**
BREAKFAST CEREAL



Target word Condition

**FRUIT
LOOPS**
BREAKFAST CEREAL



Pronounceable non-word Condition

**THENT
LOOPS**
BREAKFAST CEREAL



References

- Achenreiner, G.B., and John, D.R. (2003), "The meaning of brand names to children: A developmental investigation," *Journal of Consumer Psychology*, Vol. 13 No. 3, pp. 205-219.
- Anderson, J.R. (1983), *Language, Memory, and Thought*, Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Baxter, S.M., Ilicic, J. and Kulczynski, A. (2014), "What's in a Name? Examining the Effect of Phonetic Fit between Spokesperson Name and Product Attributes on Source Credibility", *Marketing Letters*, Vol. 25 No. 4. pp. 525-534.
- Baxter, S.M., Ilicic, J., Kulczynski, A., and Lowrey, T.M. (2015), "Communicating Product Size using Sound and Shape Symbolism," *Journal of Product & Brand Management*, Vol. 24 No. 5, pp.472 – 480.
- Baxter, S.M., Kulczynski, A., and Ilicic, J. (2014), "Revisiting the Automaticity of Phonetic Symbolism Effects," *International Journal of Research in Marketing*, Vol. 31 No. 4, pp. 122-124.
- Baxter, S.M. and Lowrey, T.M. (2014), "Examining children's preference for phonetically manipulated brand names across two English accent groups", *International Journal of Research in Marketing*, Vol. 31 No. 1, pp. 122-124.
- Bargh, J.A. and Pietromonaco, P. (1982), "Automatic information processing and social perception: The influence of trait information presented outside of conscious awareness on impression formation", *Journal of Personality and Social Psychology*, Vol. 43 No. 3, pp. 437-449.
- Bargh, J.A. and Thein, R.D. (1985), "Individual construct accessibility, person memory, and the recall-judgment link: The case of information overload", *Journal of personality and Social Psychology*, Vol. 49 No. 5, pp. 1129-1146.

- Baron, J. (1973), "Phonemic stage not necessary for reading," *Quarterly Journal of Experimental Psychology*, Vol. 25, pp. 241-246.
- Claeys, C., Swinnen, A., and Abeele, P.V. (1995), "Consumers' means-end chains for "think" and "feel" products," *International Journal of Research in Marketing*, Vol. 12, pp. 193-208.
- Cohen, J. (2013), *Statistical power analysis for the behavioral sciences*. Routledge Academic.
- Coltheart, M., Davelaar, E., Jonasson, J. F., and Besner, D. (1977), "Access to the internal lexicon," In Dornic, S. (Ed.), *Attention & Performance VI*. Hillsdale, NJ: Erlbaum, pp. 535-555.
- Collins, L. (1977), "A name to compare with a discussion of the naming of new brands," *European Journal of Marketing*, Vol. 11, No. 5, pp. 337-363.
- Collins, A.M., and Loftus, E.F. (1975), "Theory of semantic processing," *Psychological Review*, Vol. 82 No. 6, pp. 407-428.
- Craik, F.I.M., and Lockhart, R.S. (1972), "Levels of processing: A framework for memory research," *Journal of Verbal Learning & Verbal Behavior*, Vol. 11, pp. 671-684.
- Davis, D.F. and Herr, P.M. (2014), "From Bye to Buy: Homophones as a Phonological Route to Priming," *Journal of Consumer Research*, Vol. 40 No. 6, pp. 1063-1077.
- Drieghe, D. and Brysbaert, M. (2002), "Strategic effects in associative priming with words, homophones, and pseudohomophones," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, Vol. 28 No. 5, pp. 951-961.
- Falk, L. W., Sobal, J., Bisogni, C. A., Connors, M., & Devine, C. M. (2001). Managing healthy eating: definitions, classifications, and strategies. *Health education & behavior*, 28(4), 425-439.

- Ferrand, L. and Grainger, J. (1992), "Phonology and orthography in visual word recognition: Evidence from masked non-word priming," *Quarterly Journal of Experimental Psychology: Section A*, Vol. 45 No. 3, pp. 353-372.
- Gough, P.B. (1972), "One second of reading", in *Language by Ear and by Eye*, Kavanagh, J.F. and Mattingly, I.G. (Eds.), Cambridge, MA: MIT Press, pp. 331-358.
- Guèvremont, A., and Grohmann (2015), "Consonants in brand names influence brand gender perceptions", *European Journal of Marketing*, Vol. 49 No. 1/2, pp.101 – 122.
- Harm, M.W. and Seidenberg, M.S. (2004), "Computing the meanings of words in reading: cooperative division of labor between visual and phonological processes", *Psychological Review*, Vol. 111 No. 3, pp. 662-720.
- Hota, M., Chumpitaz, R.C., and Cousin, A. (2010), "Can Public Service Advertising Change Children's Nutrition Habits? The Impact of Relevance and Familiarity", *Journal of Advertising Research*, Vol. 50 No. 4, pp. 460-477.
- Howard, J.K.H., Bindler, R.M., Synoground, G., and VanGemert, F.C. (1996), "A Cardiovascular Risk Reduction Program for the Classroom", *Journal of School Nursing*, Vol. 12 No. 4, pp. 4-11.
- Humphreys, G.W., Evett, L.J. and Taylor, D.E. (1982), "Automatic phonological priming in visual word recognition", *Memory & Cognition*, Vol. 10 No. 6, pp. 576-590.
- Hunt, R.R. (1995), "The subtlety of distinctiveness: What von Restorff really did," *Psychonomic Bulletin & Review*, Vol. 2 No. 1, 105-112.
- Illicic, J., Baxter, S.M. and Kulczynski, A. (2015), "Names versus Faces: Examining Spokesperson-Based Congruency Effects in Advertising", *European Journal of Marketing*, Vol. 49 No. 1/2, pp. 62-81.
- Keller, K.L. (1993), "Conceptualizing, measuring, and managing customer-based brand equity," *Journal of Marketing*, Vol. 57 No. 1, pp. 1-22.

- Klink, R. R. (2000), "Creating brand names with meaning: the use of sound symbolism." *Marketing Letters*, Vol. 11 No. 1, pp. 5-20.
- Lee, H., Rayner, K., and Pollatsek, A. (1999), "The time course of phonological, semantic, and orthographic coding in reading: Evidence from the fast-priming technique", *Psychonomic Bulletin & Review*, Vol. 6 No. 4, pp. 624-634.
- Lowrey, T.M. and Shrum, L.J. (2007), "Phonetic symbolism and brand name preference", *Journal of Consumer Research*, Vol. 34 No. 3, pp. 406-414.
- Lowrey, T. M., Shrum, L. J., & Dubitsky, T. M. (2003), "The relation between brand-name linguistic characteristics and brand-name memory," *Journal of Advertising*, Vol. 32 No. 3, pp. 7-17.
- Lukatela, G. and Turvey, M.T. (1990), "Automatic and pre-lexical computation of phonology in visual word identification," *European Journal of Cognitive Psychology*, Vol. 2 No. 4, pp. 325-343.
- Lukatela, G. and Turvey, M.T. (1994), "Visual lexical access is initially phonological: 2. Evidence from phonological priming by homophones and pseudohomophones", *Journal of Experimental Psychology: General*, Vol. 123 No. 4, pp. 331-353.
- Lukatela, G., Frost, S. J., & Turvey, M. T. (1998), "Phonological priming by masked nonword primes in the lexical decision task," *Journal of memory and Language*, Vol. 39 No. 4, pp. 666-683.
- Martindale, C. (1991), *Cognitive psychology: a neural-network approach*, California: Brooks/Cole Publishing.
- Meyer, M.L., Berkman, E.T., Karremans, J.C., and Lieberman, M.D. (2011), "Incidental regulation of attraction: The neural basis of the derogation of attractive alternatives in romantic relationships," *Cognition and Emotion*, Vol. 25 No. 3, pp. 490-505.

- Nairn, A., Griffin, C., and Wicks, P.G. (2008), "Children's use of brand symbolism," *European Journal of Marketing*, Vol. 42 No. 5/6, pp. 627 – 640.
- Nuckolls, J. B. (1999), "The case for sound symbolism." *Annual Review of Anthropology*, Vol. 28, pp. 225-52.
- Perfetti, C.A. and Bell, L. (1991), "Phonemic activation during the first 40 ms of word identification: Evidence from backward masking and priming", *Journal of Memory and Language*, Vol. 30 No. 4, pp. 473-485.
- Perfetti, C.A. and Hart, L. (2002), "The lexical quality hypothesis," in *Precursors of Functional Literacy*, Verhoeven, L., Elbro, C. and Reitsma, P. (Eds.), Philadelphia: John Benjamins Publishing Company, pp. 189- 213.
- Preacher, K.J., Rucker, D.D. and Hayes, A.F. (2007), "Addressing moderated mediation hypotheses: Theory, methods, and prescriptions", *Multivariate behavioral research*, Vol. 42 No. 1, pp. 185-227.
- Robertson, Kim (1989), "Strategically Desirable Brand Name Characteristics", *Journal of Product and Brand Management*, Vol. 1 No. 3, pp. 62-72.
- Sapir, E. (1929), "A study of phonetic symbolism." *Journal of Experimental Psychology*, Vol. 12 No. 3, pp. 225-39.
- Shrum, L.J., Lowrey, T.M., Luna, D., Lerman, D.B., and Liu, M. (2012), "Sound symbolism effects across languages: implications for global brand names", *International Journal of Research in Marketing*, Vol. 29 No. 3, pp. 275-279.
- Van Orden, G.C. (1987), "A ROWS is a ROSE: Spelling, sound, and reading", *Memory & Cognition*, Vol. 15 No. 3, pp. 181-198.
- Van Orden, G.C, Johnston, J.C., and Hale, B.L. (1988), "Word identification in reading proceeds from spelling to sound to meaning," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, Vol. 14 No. 3, pp. 371-386.

Yorkston, E. and Menon, G. (2004), "A sound idea: phonetic effects of brand names on consumer judgement," *Journal of Consumer Research*, Vol. 31, pp. 43-51.

Zhan, J., Yu, H., and Zhou, X. (2013), "fMRI evidence for the interaction between orthography and phonology in reading Chinese compound words," *Frontiers in human neuroscience*, Vol. 7 No. 753, pp. 1-11.

Ziegler, J.C., Muneaux, M., and Grainger, J. (2003), "Neighborhood effects in auditory word recognition: Phonological competition and orthographic facilitation," *Journal of Memory & Language*, Vol. 48, pp. 779-793.