Hard to Right and Easy to Bye: Priming Consequences of Homophone Confusion

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ABSTRACT

We investigate how a homophone (e.g. "bye")—a word that sounds the same as another but has different spelling and meaning—primes judgments and behaviors related to the complementary homophone (e.g. "buy"). Initial reading processes use word sound, not word spelling, to activate word meaning stored in memory. We theorize homophone priming occurs when consumers encounter and process homophones and a secondary, relatively controlled process fails to suppress meanings associated with the incorrect homophone. Additionally, this effect is more likely to occur when consumers experience cognitive load, which reduces ability to suppress the alternate homophone meanings. This research represents the first demonstration of homophone behavioral and perceptual priming, investigates the process underlying the effects, and contributes to the priming literature in general. More specifically, this manuscript contributes to understanding of the role of phonology (word sound) in behavioral and perceptual priming.

INTRODUCTION

Persons under time pressure or otherwise distracted, meaning to write "their" instead write "there," or promising to respond once they "hear" back, write "here." Most people easily distinguish "here" from "hear" but may still inadvertently substitute these homophones (multiple words with identical pronunciation, or phonological code). What causes this homophone confusion? Processing written word meaning has a phonological (sound) basis (Van Orden 1987). Moreover, homophone substitutions are a common misspelling form (Bosman and Van Orden 1997) evading both readers and proofreaders (Coltheart et al. 1988; Daneman and Stainton 1991; Van Orden 1991). Homophone confusion is common, stemming from erroneous thought mapping to the correct orthographic (spelling) version of a homophone. We investigate a related issue; what are the consequences of simply reading homophones? Since reading has a phonological basis and homophones share pronunciation, consumer activities requiring reading (e.g. understanding written marketing communications) may also be susceptible to incorrect homophone meaning substitution (mapping) and its consequences. We suggest reading a homophone may influence thoughts, judgments, and behaviors in ways any activated concept exerts influence (Higgins 1996). We provide evidence homophones may influence consumer judgments and behaviors via their linked phonology.

Homophone exposure (via reading) primes meanings associated with the complementary homophone, which may influence downstream cognition (Lesch and Pollatsek 1993; Lukatela and Turvey 1994a,b; Van Orden 1987). Specifically, homophones are linked in memory (via phonology) and activation can influence subsequent tasks (e.g. lexical decision, Pexman et al. 2001; stem completion, Rueckl and Mathew 1999; and induce memory errors, Azuma et al. 2004). In general, homophone exposure increases complementary homophone response frequencies; i.e. the phonological link activates the complementary word. It is unclear from the literature whether homophones can prime more complex downstream processes. We suggest homophones can indeed prime judgment and behavior and note boundary conditions. For instance, we suggest reading "bye" can influence what consumers will do to "buy" something (e.g., willing to pay more). Identifying conditions wherein homophones influence judgment and behavior is important for understanding consumer behaviors in a variety of marketing contexts.

Reading as a Cognitive Process. Reading is a complex process containing both automatic and controlled processes (Shiffrin and Dumais 1981). Definitions and characteristics of automatic processes vary with respect to stimuli's ability to induce processing, and the control individuals have over the process, including whether the initiation of automatic processing is conscious (Schneider and Shiffrin 1977; Shiffrin and Dumais 1981) or unconscious (Bargh 1984, 1994). Logan's (1979, 1980) notion of automaticity is especially relevant in the present context, as some strategic control is allowed. Logan (1980) distinguishes between tasks completed only with automatic processes, and tasks involving a mixture of both automatic and controlled processes, citing reading as one such task (LaBerge and Samuels 1974; Shiffrin and Schneider 1977; Guttentag and Haith 1978; Van Orden 1987). Prior work has sought to specify the processes underlying skilled reading. Automatic activation of a words' phonological code has been identified as a central process for reading and comprehension (Berent and Perfetti 1995; Frost 1998; Lesch and Pollatsek 1993; Lukatela and Turvey 1994a,b; Perfetti and Bell 1991; Perfetti, Bell, and Delaney 1988; Rayner et al. 1995). A word's phonology is linked to meaning in memory, and through this linkage, text is automatically converted into meaning.

Homophones are multiple words with identical pronunciation (phonological code). Hence, multiple meanings share a common phonological link in memory. Researchers exploit this relationship and use homophones as stimuli to investigate reading processes. Words sharing a phonological code, yet differing lexically, allow disentanglement of phonological and lexical processing. Historically, two competing reading processes have been proposed. One has a lexical basis (Baron 1973; Paap et al. 1982; Smith 1973), the other, and current consensus favorite, posits an initial phonological basis for reading. Specifically, the sub-vocalized word sound activates meanings from memory (Frost 1998; Meyer, Schvaneveldt, and Ruddy 1974; Perfetti, Bell, and Delaney 1988; Van Orden 1987; see also Harm and Seidenberg 2004 for a review). For instance, reading "maid" activates meanings of both "maid" and "made," via a shared phonological code. Thus reading "maid" facilitates recognition (and other associated features) of "made" (Berent and Perfetti 1995; Frost 1998; Lesch and Pollatsek 1993).

Consensus also suggests a second, more controlled and effortful process that follows the initial process, in which the correct homophone meaning is determined (Gernsbacher, Varner, and Faust 1990; Gernsbacher and Faust 1991; Kintsch 1988; Lukatela and Turvey 1994a,b; Paap and Noel 1991). This second process has been conceptualized as a bottom-up propositional process (Kintsch 1988), a controlled corrective process, subject to resource demands (Lukatela and Turvey 1994a,b; Paap and Turvey 1994a,b; Paap and Noel 1991), or suppression (also requiring cognitive resources), wherein incorrect meanings are suppressed (Gernsbacher et al. 1990; Gernsbacher and Faust 1991). These proposed processes all suggest the same relationship. Reading a homophone first automatically activates multiple meanings and a secondary controlled process then ascribes (inhibits) the correct (incorrect) meaning. If this secondary process fails or is compromised, errors occur. We suggest that cognitive load may reduce available resources and inhibit the

effortful secondary process. If so, by introducing load we may systematically manipulate the efficacy of this secondary process. If alternate meanings remain activated, they may indeed influence downstream judgments and behaviors.

Priming Effects. The ability of words to facilitate categorization and recognition is well documented (Meyer and Schvaneveldt 1971; Neely 1977). Priming not only influences speed of categorization, but also ascription of personality traits or goals (Sela and Shiv 2009), choices (Wheeler and Berger 2007), evaluations (Labroo, Dhar, and Schwarz 2008) and other behaviors (Herr 1986). Homophone primes may similarly influence individuals' judgments and behavior.

Consider the homophone pair "bye" and "buy." Since "buy" is associated with consumption, its activation may increase the accessibility of the consumption construct (Bargh 1994; Bargh, Chen, and Burrows 1996; Dijksterhuis and Bargh 2001; Dijksterhuis and van Knippenberg 1998; Herr 1986, 1989; Higgins 1996). For instance, an Apple logo prime may result in more creative behavior (Fitzsimons, Chartrand, and Fitzsimons 2008). If "bye" and "buy" are linked phonetically, reading "bye" may activate associations of "buy", influencing buyingrelated judgments and behaviors. Moreover, as with semantic priming, homophone priming likely occurs outside of awareness (Higgins, Bargh, Lombardi 1985; Bargh and Pietromonaco 1982; Dijksterhuis and Bargh 2001; Wheeler and Petty 2001) and may underlie difficulties in detecting homophone substitutions (Van Orden 1991). Priming effects may be more likely with a cognitive load (Lukatela and Turvey 1994a,b; Paap and Noel 1991), as load increases reliance on automatic processes by reducing the efficacy of controlled processes (Bargh and Pietromonaco 1982; Bargh and Thein 1985; Gilbert and Osborne 1989; Logan 1979). In our case, the secondary corrective process may be especially less efficacious under cognitive load.

As noted, suppression research identifies a likely corrective process, which we suggest cognitive load is likely to compromise (see also Wegner et al. 1987). More specifically, Gernsbacher et al. (1990; experiment 4), find low versus high skill readers less able to suppress alternate homonym meanings. Gernsbacher and Faust (1991; experiment 1), also find low skill readers have difficulty suppressing alternate homophone meanings in much the same way. We extend this research by investigating whether suppression may be affected by cognitive resource constraints, and suggest a similar process may underlie homophone priming. If multiple meanings are activated when homophones are read, the context-inappropriate meaning informs subsequent processing, and priming effects may occur. Individuals under cognitive load should have fewer resources to direct toward suppression mechanisms, thus we may manipulate suppression efficacy. Hence, any priming effects reflecting inappropriate meanings should be more pronounced for individuals under cognitive load. We provide evidence supporting this notion, demonstrate the basic *inability to suppress* effect with four different homophone pairs (exp. 2), examine homophone priming with marketing stimuli (exp. 3) and observe differential responses to advertisements and differential behaviors in an auction (exp. 4).

Importantly, we observe priming effects with long exposure durations and in persuasive contexts, yet consumers do not see the connection between the prime and dependent variable. These findings suggest cognitively busy consumers may not be able to defend against persuasion attempts that use homophones, raising a concern for public policy.

EXPERIMENT 1

In experiment 1 we examine the role of cognitive load in inhibiting suppression of alternate homophone meanings. If cognitive load interferes with suppression of alternate homophone meanings, we can manipulate cognitive load in subsequent studies (rather than relying on differences in reading skill), thus creating experimental conditions where homophone priming is likely. Moreover, since many consumer activities occur under some degree of cognitive load, this demonstration extends the possible realm of homophone priming.

We adapt Gernsbacher and Faust's method (1991) for detecting individuals' ability to suppress alternate homophone meanings. Individuals performed a rejection task after reading sentences ending in homophones (vs. control words; e.g., parallel sentences ending either with "stake" an homophone of "steak" or "pillar"; participants reject "beef"). When no homophone is present, individuals should perform rejection tasks better (as measured by response latency). Gernsbacher and Faust (1991) found differences in the amount of interference (measured by homophone minus control word rejection latency) between high and low skill readers. Low skill readers experienced greater homophone interference. Similarly, we expect differences in interferences in the interferences in the amount of interferences in the interferences in the amount of skill readers.

Method. Participants were randomly assigned to conditions, and all completed a subset of the Multi-Media Comprehension Battery related to reading (story 1: Mike Hooter and the Smart Bears in Mississippi) serving as a covariate in subsequent analyses. Participants read a short story and then answered twelve questions related to facts or occurrences in the story. The number of correctly answered questions serves as a measure of reading skill.

We modify Gernsbacher and Faust's (1991) method in several ways. In the original study, the word (e.g. "beef") either appeared immediately after the sentence (immediate interval) or

after a one second delay (delayed interval). High levels of interference occurred for all readers in immediate interval conditions, as immediate suppression of alternate meanings was universally difficult. Interference differences between low and high skill readers only appear in delayed interval conditions. Hence, we only examine delayed intervals, as we could not reasonably expect differences using the immediate interval. Due to concerns for participant fatigue, we also use a subset of Gernsbacher and Faust's (1991) stimuli materials (40 [out of 80] homophone/control sentence-word pairs and 20 filler sentences, see Appendix A) and include a 60-second break after the first 20 focal sentence-word pairs.

Participants and Procedure. Responses from 54 undergraduates were used in the analysis (see Appendix B for excluded participant *N* and exclusion criteria for all experiments). While seated at a computer, participants were informed they would read a sentence, after which a word would appear. Their task was to press the "Q" key (labeled "match") if the word was related to the preceding sentence, or press the "P" key (labeled "no match") if the word was unrelated. Instructions were to perform the task quickly and accurately. Forty stimulus sentences were divided into two sets. All participants completed one set while experiencing cognitive load (retaining a 7-digit number) and completed the other set without cognitive load. The order of the stimulus sets and which set completed under load were counterbalanced, resulting in four between-subject order/load combinations. All other factors are within-subject. Participants performed 10 practice trials, re-read the procedural instructions and continued to the main task. Sixty sentence-word pairs (20 homophone, 20 control, and 20 filler split between sets) were presented in random order. Following each sentence the screen went blank for 1000 milliseconds, and the test word was displayed in capitalized font flanked by two asterisks (e.g., "**BEEF**").

Latencies were recorded (in milliseconds) from word appearance until a key was pressed. Participants answered demographic questions and completed the reading comprehension task.

Results and Discussion. Response latencies below 300 milliseconds and above 3000 milliseconds (above or below three standard deviations) were replaced with the mean latency for the stimulus object and condition (Fazio 1990). Response latencies were subject to reciprocal transformation for analysis to reduce skewness. Importantly, an analysis of error rates controlling for reading skill indicated the cognitive load manipulation did not affect response accuracy. The only significant effect was a main effect of sentence type (F(1, 52) = 6.88, p < .02), revealing more errors for homophones ($M_{homophone} = 17.3\%$ vs. $M_{control} = 6.1\%$). Cognitive load did not significantly affect error rate as either a main effect or interactively with sentence type (all ps > .50). However, as predicted, cognitive load influenced the level of interference participants experienced for homophone versus control sentences. Interference scores were calculated by subtracting the control sentence from the corresponding homophone sentence response latency for each sentence pair. These interference scores were subjected to a 2 (Cognitive load: High vs. Low) x 20 (replicate) within-subject repeated measures analysis with reading skill as a covariate. This analysis yielded the predicted main effect of cognitive load (F(1, 52) = 5.49, p < .025), such that greater interference existed under conditions of high versus low load ($M_{Highload} = 57.27$ ms vs. $M_{lowload} = 33.1$ ms). No other effects in the model were significant (all ps > .1). Thus, participants with high load were less able to suppress alternate meanings.

This study extends Gernsbacher and Faust's (1991) experiment 1. More importantly, our hypothesis that cognitive load reduces individuals' ability to suppress alternate homophone meanings is supported. Controlling for reading skill, cognitive load led to longer response

latencies for homophone rejection. Poor suppression of alternate meanings is theorized to lead to homophone priming effects. If alternate meanings remain active, these meanings may prime subsequent thoughts, judgments, and behaviors. This result fits our proposed conceptualization of homophone priming and provides a potential process explanation. In the following experiments we demonstrate the basic homophone priming effect.

EXPERIMENT 2

Experiment 2 consists of four conceptual replications (experiments 2a, b, c, & d) demonstrating the basic *inability to suppress* homophone priming effect. For generality, four homophone pairs are used, bye/buy (exp. 2a), right/write (exp. 2b), lightning/lightening (exp. 2c), and phew/few (exp. 2d). The unread (second) homophones are related to a judgment or behavior, and dependent variables are designed to capture differences in those judgments and behaviors. Experimental designs are similar (see Appendix A); each experiment employs a cognitive load factor (load [memorize a seven-digit number] vs. no load) crossed with a prime condition (homophone vs. control). We expect homophone priming effects only under cognitive load, as load should inhibit participants' ability to suppress alternate homophone meanings (as demonstrated in experiment 1). Prime exposure was manipulated through ostensibly unrelated written passages ending either with a homophone or control word. Where noted, experiments have additional control conditions for the purposes of planned comparison. All four experiments are between-subjects and utilize adult native English speaking participants from an online panel (mTurk.com; Buhrmester, Kwang, and Gosling 2011). Additionally, participants answered reading skill, manipulation check, and demographic questions.

Experiment 2A

Participants and Procedure. One hundred ten adults (69% female, Age Range: 18-79, $M_{age} = 35$ years) participated. Homophone priming is examined in a 2 (Prime: "bye bye" [prime] vs. "so long" [control]) x 2 (Cognitive Load: load vs. no load) design. Participants rated the informativeness of a travel blog post, ending with the writer proclaiming "bye bye" (prime) or "so long" (control) to their vacation. In the second, ostensibly unrelated, task participants were informed a restaurant (serving their preferred food type) was opening locally. The restaurant offered a promotion wherein patrons could purchase a "name your own price" dinner for two package. Packages could be purchased anonymously online. Participants indicated how much they were willing to pay (WTP) for the package in dollars, typical amount spent on dinner for two, and indicated if they saw any connection between tasks.

Results and Discussion. WTP amounts were log-transformed to reduce skewness. Untransformed means are reported for clarity. An ANOVA revealed a marginal main effect of load (F(1, 107) = 2.80, p < .10). Participants under load gave higher WTP amounts ($M_{load} =$ \$37.36 vs. $M_{no load} =$ \$29.37). This effect was qualified by the predicted prime x load interaction (F(1, 107) = 6.95, p < .02). Participants who read "bye" under load gave the highest WTP amounts. A complex contrast revealed that WTP in the prime/load condition ($M_{bye load} =$ \$45.48) was significantly greater than in the prime/no load condition ($M_{bye no load} =$ \$29.96) and both control conditions ($M_{load} =$ \$29.24 and $M_{no load} =$ \$31.77; F(1, 107) = 7.96, p < .01; see figure 1). The prime/no load condition and the two control conditions did not differ from each other (all ps) >.5). Adding participants' self-reported typical expenditure amounts did not improve the model. An additional analysis was conducted with reading skill questions as covariates. This variable significantly predicted WTP (F(1, 106) = 7.32, p < .01), and its inclusion improved the model (Proportional Reduction in Error [PRE] = .065). Importantly, however, the prime by load interaction remained significant (F(1, 106) = 7.95, p < .01), indicating the manipulations were effective while controlling for reading skill.

<Insert figure 1 about here >

Experiment 2a provides an initial demonstration of homophone priming on downstream judgment. Individuals who read "bye" while under cognitive load gave higher WTP amounts to "buy" a restaurant package. Priming did not occur in the absence of load, suggesting cognitive resources were successfully employed to suppress alternate meanings. Reading "bye" appears to have primed "buy." Failure to suppress "buy" associations resulted in higher WTP amounts. Participants in control conditions did not provide similarly high WTP amounts, and all scenarios were identical except for the prime "bye." The control condition used the word "long," which could prime largeness, making this a strong test.

We theorized homophones may prime subsequent thoughts, judgments, and behaviors. Willingness to pay is a behavioral intention, not an actual behavior. Although we observe the expected pattern of differences in WTP, participants' responses had no real consequence. In experiment 2b, we examine another homophone pair "right/write." Writing is a behavior, and writing more versus less has consequences for cognitive effort and time. Does reading "right" under load influences how much people "write?"

Experiment 2B

Participants and Procedure. Two hundred ninety-two participants (63% female, Age Range: 18-81, $M_{age} = 34$ years) were included in this experiment. Participants were informed the experiment related body position or focusing on the body and cognition. In two conditions participants moved their laptop or keyboard as far left (move left), or right (move right) as possible while still being able to type. In a control condition, participants centered their keyboard or laptop (center). In two additional conditions, participants focused on the right side of their body (focus right), or were given no instructions at all (no instruction). The two conditions in which participants read "right" served as homophone priming conditions for "write." This 5 (Prime: move right and focus right [prime] vs. move left, center, and no instruction [control]) x 2 (Cognitive Load: load vs. no load) experiment was designed with the intent of collapsing across prime and control conditions, resulting in a 2 (prime vs. control) x 2 (Cognitive Load: load vs. no load) design. Following the manipulation, participants described their thoughts and actions during a typical grocery-shopping trip in an essay. Word count served as the dependent variable.

Results and Discussion. Essay word counts were log-transformed for analysis to reduce skewness. Untransformed means are reported for clarity. An ANOVA revealed effects of prime (F(4, 282) = 5.06, p < .01) and cognitive load (F(1, 282) = 12.32, p < .01) and the predicted two-way interaction (F(4, 282) = 2.58, p < .04). Planned comparisons confirmed the two experimental and the eight control conditions could be collapsed and analyzed as planned (all comparisons NS). The subsequent ANOVA revealed effects of prime (F(1, 288) = 15.34, p

<.001) and load (F(1, 288) = 17.33, p < .001) and the predicted two-way interaction (F(1, 288) = 9.78, p < .002). We compared individuals who read "right" while under cognitive load in a complex contrast with the remaining conditions. They wrote significantly more ($M_{\text{right load}}$ =57.62 words) than those who read "right" without load ($M_{\text{right no load}}$ =36.54 words) and those who did not read "right" while experiencing cognitive load ($M_{\text{control load}} = 37.23$ words) or not experiencing cognitive load ($M_{\text{control no load}} = 34.81$ words; F(1, 288) = 26.86, p < .001; see figure 2). The prime/no load condition and the control conditions did not significantly differ from each other (p > .1). In an additional ANCOVA controlling for reading skill, the prime by load interaction remained significant (F(1, 287) = 10.48, p < .001). The predicted results were obtained despite two opposing forces that may lead us to expect contrary results. First, participants wrote more while experiencing a cognitive load; their cognitive resources were reduced, yet they still wrote more words. Second, participants were paid a flat rate for participation, and thus were monetarily incentivized to minimize time on the experimental task. However, individuals receiving the "right" prime while under load wrote more than those in control conditions, although writing more was counter to cognitive and financial self-interests.

<Insert figure 2 about here>

Experiment 2b demonstrates homophone priming with a second homophone pair, right/write. Under cognitive load, those who read "right" wrote more in a subsequent task. Writing, requiring physical effort is an actual behavior. As with experiment 2a, individuals not experiencing cognitive load who read "right" did not write more relative to control conditions. Reading "right" appears to have activated semantic meanings associated with "write" and individuals under cognitive load failed to effectively inhibit these alternate meanings, which appear to have influenced the amount written.

Experiments 2a and b seem to indicate that homophone priming effects result in participants perceiving or engaging in "more" of something related to the primed homophone. This pattern may not always hold. The nature of the English language may influence this effect, as many words denote the presence of some physical object (nouns) or some action (verbs). Words describing an absence occur less frequently (e.g. modifiers "none" "no" and "nothing" fairly well describe the absence of any object or action) or are simply modified versions of nouns and verbs (e.g. utilizing the prefixes of "non", "dis", or "un"). Homophone priming effects may be fundamentally assimilative in nature. Assimilating toward the presence of a construct should result in a judgment of, or engaging in "more" behavior directed toward, the primed construct (Herr, Sherman, and Fazio 1983). In fact, the majority of homophones seem most likely associated with the presence of an object or action. Lists of homophones reveal few examples of a word's meaning (or strong semantic associates' meaning) being related to less of something or of a relatively small quantity. A notable exception, "Phew" is a homophone for "few", the latter denoting a small quantity. Similarly, "lightning" is a homophone for "lightening" indicating a decrease in weight or shade. Another potential candidate is "cell" as in cellphone and "sell" as in divestiture of assets. In experiment 2c & 2d, we prime judgments and behavior of "less" via homophones, examining the possibility that homophone priming is assimilative in nature and that semantic meaning drives effects. Experiment 2c employs a judgment-related dependent variable (weight), and experiment 2d, a behavioral intention measure.

Experiment 2C

Participants and Procedure. Responses from 227 participants (51% female, Age Range: 18-70, $M_{age} = 34$ years) were included in this experiment. This experiment examines the lightning/lightening homophone pair. We include two control conditions and an additional conceptual priming condition. The conceptual prime condition was included to compare the direction of homophone and conceptual primes, and to further investigate process. A picture should activate semantic meaning (Bajo 1988), but viewing it does not require reading, so subvocalization of "lightning" may not occur. Consequently, homophone priming effects may be attenuated or not occur. In all word priming conditions, participants read facts related to an unknown object. The last sentences read, "So what is this talking about? None other than-(see next page)." In prime conditions participants read "lightning" and in control conditions participants read "clouds" or "eastern white pine" on the next page. "Clouds" was used as a conservative control condition, as they are associated with lightness and thus could prime related constructs. In the conceptual priming condition participants saw a lightning photograph. Following the manipulation, participants estimated the weight (open-ended) of paper grocery bag filled with various items (pictorially represented). Estimates were analyzed via a 4 (Prime condition: Lightning word [homophone prime], vs. Lightning picture [conceptual prime], vs. Clouds, and Eastern White Pine [controls]) x 2 (Cognitive Load: High vs. Low) betweensubjects full factorial design.

Results and Discussion. Weight estimates were log-transformed prior to analysis to reduce skewness. Untransformed means are reported for clarity. An initial analysis of the full design revealed a significant interaction of condition and load (F(3, 219) = 2.64, p = .05). No

other effects obtained significance. A complex contrast revealed participants in the lightning word/load condition (focal condition) gave significantly lower weight estimates (M = 11.89lbs) than participants in all other conditions (F(1, 222) = 7.25, p < .01).

However, close inspection revealed weight estimates in the lightning picture/load condition (conceptual prime condition; M = 14.03 lbs) did not differ from the focal condition (F(1, 1)) (222) < 1) or any of the control conditions (see figure 3 for individual condition means). Participants viewing a lightning photograph under load gave weight estimates falling between estimates given in the focal and control conditions. While statistically inconclusive, the direction of the means suggest that some conceptual priming may have occurred in the photograph condition, and the homophone prime was in the same direction. Priming concepts linked via homophones with pictures may not be as effective as using the words themselves. Reading is not integral to viewing the picture and subvocalization of the prime word may be less likely (only 52% of participants in conceptual prime conditions reported thinking "lightning" when viewing the picture), so this result may be unsurprising, yet speaks to our proposed process and represents an important boundary condition of how homophones can prime. Relatedly, while pictures and words have common semantic representations, their priming efficacy is dependent on the task, participant strategies, and whether the prime is within- or cross-modality (Bajo 1988; Carr et al. 1982). The initial analysis revealed collapsing across control conditions was permissible. The analysis presented below does not include the conceptual priming condition. Therefore it is a 2 (Prime: Lightning vs. Control) x 2 (Cognitive load: Load vs. No Load) analysis.

<Insert figure 3 about here>

This ANOVA revealed the predicted prime x cognitive load two-way interaction (F(1, 163) = 8.13, p < .01). A complex contrast revealed participants who read "lightning" while experiencing cognitive load (M = 11.89lbs), gave lower weight estimates than participants in other conditions (F(1, 164) = 9.99, p < .01). Additionally, an ANCOVA controlling for reading skill revealed it predicted weight estimates (F(1, 162) = 5.87, p < .02), but the prime by load interaction remained significant (F(1, 162) = 10.14, p < .01).

This experiment provides an additional demonstration of homophone priming. Participants who read "lightning" under load gave lower weight estimates than in any other condition; the "lightning" prime resulted in "less" being primed. Individuals seemingly assimilate judgments toward the homophone prime, as expected if the prime activates semantic meaning. Thus, this experiment provides preliminary evidence that when the homophone indicates less of something individuals' propensity to assimilate towards the prime may result in judgments of "less." In experiment 2d we provide a conceptual replication of this effect using a different homophone pair (phew/few) and behavioral intention dependent measures.

Experiment 2D

Participants and Procedure. Responses from 88 participants (51% female, Age Range: 18-70, $M_{age} = 34$ years) were analyzed. This experiment used the phew/few homophone pair to prime the concept of less. We reasoned reading "phew" would activate "few," leading to lowered behavioral intentions relative to control. All participants read a story about two people driving at night. A deer jumped onto the road, nearly causing a collision. In the last sentence the driver turned to the passenger to say something. It was revealed what the driver said on the following

screen: "Phew!" (prime) or "Close Call!" (control). This experiment employed a 2 (Prime: Phew [prime] vs. Close Call [control]) x 2 (Cognitive Load: High vs. Low) between-subjects design. Following the experimental manipulation, participants indicated how much they would engage in ten behaviors (e.g., dollars saved, miles walked, miles driven, fast food meals consumed) over the next one-year period versus the last one-year period, (rated on a nine-point scale anchored by 1 =much less than last year, and 9 = much more than last year).

Results and Discussion. An initial MANOVA of all ten behavioral intentions revealed the predicted two-way interaction only for the first dependent variable (dollars saved). This result appears to indicate that prime only influenced the first dependent variable and isn't entirely surprising; many priming effects only influence initial dependent variables, after which situational forces may take over (Herr 1986). Given this result, we focus subsequent analyses on dollars saved. Note saving money is generally a positive behavior. Demonstrating a downward priming effect for positive behavioral intentions represents a strong test.

An ANOVA with dollars saved as the dependent variable yielded a significant effect of load (F(1, 84) = 6.88, p < .02), with individuals under cognitive load giving lower estimates than others (Ms = 5.96 vs. 7.00; respectively). This effect was qualified by the expected prime x load interaction (F(1, 84) = 4.06, p < .05). A complex contrast confirmed individuals who read the "phew" prime under load gave lower behavioral intention ratings (M = 5.23) than in any other condition (F(1, 43) = 14.57, p < .01; see figure 4 for condition means).

<Insert figure 4 about here>

Participants in the phew/load condition gave lower behavioral intention estimates, thus conceptually replicating experiment 2c. In experiment 2a and 2b the homophone prime influenced individuals in such a way that they judged or engaged in "more" of something. In experiment 2c and 2d, homophone primes influenced individuals in such a way that they judged or intended to participate in "less" of something. This relationship seems to indicate that homophone priming is a result of priming the semantic meanings (and whether the word indicates a presence or absence) of homophones, not some alternate process of simply priming "more" irrespective of word meaning. This finding speaks directly to our proposed process underlying homophone priming effects; shared phonological codes are linked to different meanings in memory. In the following two experiments we tie homophone priming to judgments and behaviors individuals are likely to encounter in a consumption context. In experiments 3 and 4, we embed homophones in advertising and auction contexts, respectively. We also investigate potential boundary conditions of homophone priming effects.

EXPERIMENT 3

This experiment tests theoretically relevant boundary conditions of homophone priming (compound words, prime and judgment order, and use of a marketing context). The goal is to further theoretical understanding of how and why homophone priming effects occur and investigate the effects in a persuasion context, more directly demonstrating applicability to consumer behavior. One way to test the proposed phonological underpinning of homophone priming effects is to use a compound word (e.g. "goodbye") as a prime. With a compound word, the phonological component remains, yet the lexical complexity of the word increases. If

compound words' homophone components can prime, it may be possible to deviate from spelling convention and still induce homophone priming effects, if the phonological component remains. In this case, marketers may create pseudohomophone brand names (e.g., a hypothetical analgesic brand "Phealnopane") that influence brand evaluations. Indeed, related research on phonemes in brand names and pseudohomophones in cognitive psychology indicates that such a relationship may be possible (Argo, Popa, and Smith 2010; Lowrey and Shrum 2007; Lukatela and Turvey 1994b; Yorkston and Menon 2004). This may prove fruitful for future research.

We consider whether observed effects are due to priming or some other experimental commonality. If these effects are unrelated to the more general experimental context, then like most priming effects, homophone primes should influence subsequent but not previously formed evaluations. Hence, we manipulate the temporal sequence of prime and evaluation. Participants either a) read the prime and then view the evaluation object, b) simultaneously read the prime and view the evaluation object or, c) first view the evaluation object and then read the prime. In the last case, no priming effect should occur as evaluations are formed prior to prime exposure.

Additionally, we investigate homophone priming in a marketing context. In previous experiments, the prime and dependent variable were ostensibly unrelated. In this experiment the prime is embedded in a restaurant advertisement and dependent variables are related to the restaurant. In a persuasive context, consumers may be more apt to connect prime and context. From the results of experiments 1 and 2, we expect to observe priming effects only when participants are under cognitive load, therefore all participants receive a load manipulation.

Participants and Procedure. Responses from 175 native English speakers recruited from an online panel (47% female, Age Range: 18-77, $M_{age} = 29$ years) were included in this

experiment. Participants received the load manipulation (memorize a seven-digit number) and were informed restaurant (of their preferred type) was opening. Their task was to evaluate the restaurant based on an advertisement. The advertisement read, "Enjoy Tonight, Say 'Goodbye [So Long]' to Everything Else" and participants read this statement before, after, or while simultaneously viewing a restaurant scene, resulting in a 2 (Prime: Goodbye [prime] vs. So Long [control]) x 3 (Time Sequence: Prime-evaluation vs. Simultaneous presentation vs. Evaluation-prime [reverse]) full factorial design. Participants then answered the questions, "How good of a value do you think you would get at this restaurant?" (1 = Not good at all, 7 = Very Good), and "How much would you be willing to pay for dinner for two (including dessert and drinks) at this restaurant?" Participants answered manipulation check, demographic, and covariate questions.

Value Judgments. An ANOVA with judged value as the dependent variable revealed a main effect of time sequence (F(2, 171) = 4.27, p < .02). Participants in prime-evaluation conditions gave higher evaluations than in simultaneous conditions, whose evaluations were higher than those given in evaluation-prime conditions (Ms = 4.90, 4.77, and 4.33, respectively). This effect was qualified by the expected prime × time sequence interaction (F(2, 171) = 4.91, p < .01). Primed participants gave the highest value judgments, whereas the lowest judgments were in the evaluation-prime condition. Means in all control conditions did not differ (all ps > .8). Planned comparisons revealed that the "Goodbye" prime-evaluation condition (M = 5.26) did not differ from the "Goodbye" simultaneous condition (M = 4.93; F(1, 174) = 1.51, p > .2) but significantly differed from all other conditions, as expected (F(1, 174) = 12.55, p < .01). However, the "Goodbye" simultaneous condition only differed from the "Goodbye" evaluation-prime condition (M = 4.07; F(1, 174) = 8.50, p < .01), but not from any control conditions (F < 1.25, p < .01).

 See figure 5 for individual condition means. These results indicate the priming effect occurred when individuals read the homophone prime and then evaluated the target.
 Simultaneous presentation directionally influenced judgments. The prime-reverse condition resulted in directionally lower value judgments than control conditions.

<Insert figure 5 about here>

Willingness To Pay. WTP amounts were log-transformed to reduce skewness. Untransformed means are reported for clarity. An ANCOVA controlling for average dinner expenditure and romantic relationship status revealed a significant effect of prime (F(1, 169) =16.4, p < .001) such that individuals in prime conditions were willing to pay more (M = \$58.43) than those in control conditions (M = \$47.18). This effect was qualified by a marginally significant two-way interaction (F(2, 169) = 2.51, p < .09). Planned comparisons revealed why the interaction did not obtain (Kerlinger 1986). As expected, a complex planned comparison revealed participants in the "Goodbye" prime-evaluation condition gave significantly higher WTP amounts (M = \$65.87) than in any other condition (F(1, 174) = 16.93, p < .001), except for the "Goodbye" simultaneous condition, which was marginally less (M = \$56.28; F(1, 174) =3.36, p < .07). The "Goodbye" evaluation-prime condition and all "So Long" control conditions did not significantly differ (p > .10). See figure 6 for individual condition means.

<Insert figure 6 about here>

Discussion. Homophones embedded in a larger word—"Goodbye"—exhibited priming effects similar to those in prior studies. Reading "Goodbye" influenced judgments of restaurant value (good buy) and influenced behavioral intentions related to "buy" (WTP). These effects occurred in a marketing context where prime and judgment were related and motivation to defend against influence should be relatively high. Finally, the temporal sequence manipulation provided further insights. The strongest priming effects were observed when prime exposure occurred first, followed by evaluation. Priming effects were weaker when the prime (and evaluation co-occurred and when the prime occurred after viewing the ad). The nature of the stimuli may also have influenced the effect, as the restaurant picture was located above the homophone prime text. If participants scanned the page from top to bottom, they would always see the restaurant scene before the prime. When the evaluation target and the prime were presented in reverse order, no priming effects occurred, as expected. The greatest influence occurs when the evaluation temporally follows the prime, a requisite feature of priming.

Of course, other factors in marketing contexts may affect homophone priming effects. Experiment 3 employed an advertising context. Experiment 4 employs an incentivized simulated auction. Auctions also present an interesting possibility—the context may overwhelm any effect of the prime. The process of negotiation is associated with behavioral scripts (i.e. buyers trying to get the best deal, sellers trying to maximize selling price; Srivastava and Chakravarti 2011) and these behavioral scripts may overwhelm any immediate influence of a homophone prime.

EXPERIMENT 4

In a simulated auction, participants were monetarily incentivized to engage in behaviors self-interested individuals should normatively perform. In addition to the manipulation, all participants were informed a winner would be jointly determined by accurate valuation of an auctioned product (a used Android smartphone) and securing the best deal. The winner received a \$10 bonus [3000% more than participation payment]. This approach should maintain price ranges within a reasonable range and ensure participants engage in normatively self-interested behavior. Although normative behaviors may not win the 3000% bonus, deviation from normative behaviors rules out receiving the bonus.

The homophone pair cell/sell was chosen for the association of "sell" with auctions, as well as how "cell" could be incorporated into the stimulus (a cellphone, which is never referred to as a "cellphone"). Using buyer and seller roles examines another possibility; the "cell" prime may differentially influence buyers and sellers. We expect when participants employ a seller's mindset, the "cell" prime will increase motivation to "sell," producing lower reservation prices. However, when employing a buyer's mindset, the "cell" prime may cue the complementary role and associated motivations, producing higher reservation prices. We employ a 2 (Role: Seller vs. Buyer) x 2 (Cognitive Load: Load vs. No Load) full factorial design, in which all participants receive the "cell" prime. Two control conditions were run in parallel to the main experiment (using the same subject pool and timeframe) to serve as dependent variable baselines.

Participants and Procedure. Responses from 127 native English speakers recruited from an online panel (83 in the main experiment, 44 in parallel control conditions; overall 45% female, Age Range: 18-66, $M_{age} = 33$ years) were included in the analysis. All participants read the incentivizing introduction about the \$10 bonus and were randomly assigned to buyer or seller roles. Individuals in buyer roles were informed they wished to purchase a phone to replace their lost phone. Individuals assigned to seller roles were informed that they recently upgraded their phone, and wished to sell their old phone. All were informed they would have the opportunity to make counteroffers, but if no agreement were reached they would not get the phone (money).

Participants viewed a smartphone picture. Small print across the top read, "Below is the listing for the phone you want to bid on (get rid of). Please read the listing." Below the cellphone picture was written, "Android Smartphone. 1-year old. Works Perfectly. Includes Charger." Control conditions contained no further information. However, in experimental conditions, above and below the phone was written, "CELL! CELL!" in 40-point bold font. On the next page, all participants were asked, "What is the absolute maximum (minimum) you would be willing to pay (accept) for this phone in dollars?" This reservation price served as the main dependent variable. Subsequently, buyers were told that the seller's asking price was 175% of their reservation amount (calculated by the program and based on each participant's stated reservation amount). Similarly, sellers were informed that the first bid was 30% of their minimum reservation amount. Upon viewing these amounts, participants were allowed to accept the offer, (ending the auction) or to counteroffer. Initial counteroffers also serve as a dependent variable. The program provided up to three more counteroffers, and participants were allowed to enter up to four more counteroffers. Participants were unaware of the number of allowed iterations. To approximate an actual negotiation, participants in buyer's roles saw the seller's price drop 15% in each iteration (175%, 160%, 145%, and 130% of reservation amount) and participants in seller's roles saw the buyer's offer rise 15% in each iteration (30%, 45%, 60%, and 75% of reservation amount). If participants entered all 5 possible bids, they were informed the other party (the program) had accepted their final offer. After finishing the auction, all participants

were asked if they had acted as though they wanted to buy (sell) the phone. Those answering "No" were taken to the end of the survey, and their data excluded from analysis. Given the structure of the subject pool, we reasoned individuals would participate in the experiment without placing themselves in an auction mindset—to simply receive the nominal payment offered. Participants who indicated they did not place themselves in the experimental situation were still paid the nominal fee. Participants answered several demographic and manipulation check questions prior to debriefing. One winner was determined and rewarded as promised.

Reservation amounts. Skewness and kurtosis analyses revealed reservation and initial bid amounts were normally distributed (all test values < 2). An initial ANOVA yielded a main effect of role (F(1, 79) = 9.82, p < .01). Buyers gave higher reservation prices (M = \$104.33) than sellers (M = \$71.05). This effect was qualified by the expected role by load interaction (F(1, 79)= 6.45, p < .02). Buyers and sellers in the no-load condition gave equivalent reservation prices, ($M_{buyer} = \$86.48$ vs. $M_{seller} = \$79.80$; F(1, 80) < 1, NS). Similarly, buyers with no cognitive load did not differ from buyers in the control condition ($M_{buyernoload} = \$86.48$ vs. $M_{buyercontrol} = \$98.53$; F(1, 80) < 1, NS). Sellers without cognitive load did not differ from sellers in the control condition ($M_{sellernoload} = \$79.80$ vs. $M_{sellercontrol} = \$94.77$; F(1, 80) < 1, NS). The load conditions drove the interaction, with buyers giving marginally higher reservation prices (M = \$114.85; F(1, 80) = 3.78, p < .07) and sellers giving directionally lower reservation prices (M = \$62.30; F(1, 80) = 2.71, p = .11) than in complementary no load conditions. More importantly, these two conditions differed significantly from one another (F(1, 80) = 11.08, p < .01; see figure 7 panel a for details). In other words, money was left on the table that was not left in the no load condition.

Initial Counteroffers. A parallel analysis was conducted on participants' initial counteroffers, yielding a significant role by load interaction (F(1, 79) = 4.69, p < .04). The means were in a cross-over pattern. Buyers not experiencing a load gave marginally lower initial offers (M = \$53.01) than sellers not experiencing a load (M = \$76.95; F(1, 80) = 3.45, p < .07). When experiencing a load this relationship reverses, with buyers (M =\$73.17) giving directionally higher initial bids than sellers (M = \$54.76; F(1, 80) < 1, NS). Buyers under load gave directionally higher initial bids than buyers in the control condition (M =\$73.17 vs. M =\$59.17; F(1, 80) < 1, NS) and sellers under load gave directionally lower initial bids than in the control condition (M = \$54.76 vs. M = \$83.82; F(1, 80) = 3.54, p < .07; see figure 7 panel b). As expected, means in the buyer/no load and buyer/control condition were similar and means in the seller/no load and seller/control condition were also similar and did not statistically differ (Fs <1). While the effects of the priming manipulation are not as strong for this dependent variable, we should not necessarily expect the effects to be as strong for two reasons. First, the effect of the prime may be diffused on the first dependent variable (see experiment 3; Herr 1986). Second, buyers and sellers are responding to offers that are much higher (lower) than their previously expressed maximum (minimum) reservation amount. This many temper the effect of the prime. Interestingly, however, buyers and sellers do not completely capitulate their original position.

<Insert figure 7 about here>

Discussion. Reading "cell" primed "sell," whose meaning, apparently, was not suppressed by participants under cognitive load. This failure to suppress differentially influenced buyer and sellers in an auction. Buyers and sellers in control conditions gave reservation and first

bid amounts that conformed to the situation. In control and no load conditions, buyers gave lower reservation prices than sellers, reflecting self-interested behavior. Sellers want to receive as much as possible for their product, buyers want to pay as little as possible. However, buyers and sellers who read "cell" exhibited a different pattern. Buyers were willing to pay more and sellers were willing to accept less, relative to controls. Also, in prime conditions, buyers' reservation prices were higher than sellers'. This pattern is the opposite of that observed in control conditions, and does not reflect self-interested behavior in an auction setting. We suggest individuals were primed with the idea of "sell" when they read "cell", and, depending on their assigned role, the prime influenced them differently. Sellers primed with "sell" seemed more eager to complete the selling transaction, expressing lower reservation prices. Buyers primed with "sell" gave higher reservation prices. "Sell" apparently primed the complementary role of seller and sellers' motivations. Providing higher reservation prices is an appropriate response.

We also observe a similar pattern of results for the second dependent variable—first bid amounts. First bids should be correlated with reservation prices, but their extremity may be attenuated. The influence of the prime may have begun to dissipate after collection of the initial dependent measure. Moreover, the contextual behavioral script may have overwhelmed the prime with the passage of time. Indeed, no differences exist in the number of negotiation rounds. In fact, most participants completed all negotiation rounds. Importantly, individuals' initial behaviors were influenced by the homophone prime, and while negotiations are not single-shot behaviors, many consumption behaviors are, as are initial judgments. Homophones may influence these judgments and behaviors, and as we observed in experiment 4, how the prime influences behavior, may depend on the consumer's role in the consumption event.

GENERAL DISCUSSION

Convergent evidence is found for the ability of homophones to prime and influence judgments and behaviors of participants under cognitive load. Individuals who read "bye" gave higher "buy" amounts. Likewise, individuals who read "right" wrote more. Moreover, homophone priming also resulted in actions that were "less;" reading "lightning" lowered weight judgments, and reading "phew" produced estimates of saving less money. These results suggest reading a homophone primed semantic associates of the complementary homophone. These effects were observed in marketing contexts where the linkage between prime and judgment and behavior may be more apparent. Reading "goodbye" influenced restaurant value judgments. Buyers and sellers who read "cell" gave higher (lower) reservation amounts. These effects occurred only when individuals experienced reduced cognitive capacity and follow a pattern conceptually consistent with other (assimilative) priming effects and conceptual priming effects (Higgins, Rholes, and Jones 1977; Srull and Wyer 1979). We provide evidence cognitive load reduces ability to suppress meanings associated with the unread homophone. This is consistent with prior research, which finds cognitive load reduces individuals' ability to suppress thoughts and behaviors (Rosen and Engle 1998) such as thoughts about food by restrained eaters (Ward and Mann 2000). Access to meaning associated with one homophone is increased by reading its compliment, as both meanings are activated via a shared phonological code. These findings contribute to findings in psychology, by extending homophone priming to the behavioral domain (Lesch and Pollatsek 1993; Lukatela and Turvey 1994; Pexman et al. 2001; Van Orden 1987) and building on the work of Gernsbacher and colleagues (e.g. Gernsbacher and Faust 1991).

Priming effects were observed for stand-alone homophones, as well as embedded homophones (goodbye). The ability of pseudohomophones (brand names; e.g., "Alli" consumers' weight-loss "Ally") to prime meaning in a similar manner may prove a fruitful avenue for future research. Relatedly, just as components of brand names may contain phonemes that influence brand evaluations (Argo et al. 2010; Lowrey and Shrum 2007; Yorkston and Menon 2004), so too may the brand name sound like something relevant to brand evaluations. For instance, consider a hypothetical analgesic with the pseudohomophone brand name "Phealnopane", or booking travel with a company named "Beech and Son." These brand names may communicate meaning via similar processes.

An important conceptual distinction is warranted. Homophones are related to, but different from 1) homographs (words with identical spellings, but different pronunciation and meanings; e.g. "lead" the metal or to lead others), 2) stress homographs (stress on different syllables, e.g. "refuse" as in rubbish or to reject), and 3) homonyms, words that are both homophones and homographs (e.g. "bank" as in river or financial institution). We suggest homophones' ability to prime is rooted in shared phonology, not shared orthography. Hence, we focused on homophones in this manuscript. Homographs and homonyms may prime in much the same way. Due to the presence of orthographic confounds, however, we believe clear process support may be more difficult to obtain. If homographs and/or homonyms can indeed prime in ways similar to homophones, the applicability of this research is greatly expanded. If so, reading about what is happening in the "present" may lead to buying more gifts, or reading about trash and "refuse" may make people less likely to compromise.

These findings are important for furthering understanding of priming and automatic processes, especially for consumer behavior. Future work it may address conditions when

homophone priming results in contrast effects, wherein judgments and/or behaviors are biased away from the prime (Herr, Sherman, and Fazio 1983). For instance, contrast effects have been observed when individuals become aware of a prime's influence and overcorrect (Martin 1986; DeCoster and Claypool 2004). The complementary homophone is never mentioned in our experiments, and we always use synonyms. Perhaps using the complementary homophone in the dependent variable or elsewhere would alert consumers and produce contrast effects. If participants read both homophones in a pair, or simply the homophone whose meaning is related to the dependent variable, they may become aware of the relationship and overcorrect, thus contrast effects may be observed.

We examine how homophone confusion can prime judgments and behavior. Yet different cognitive styles may also be primed (Oyserman and Lee 2008). Homophones (and possibly homographs) may similarly induce particular cognitive approaches. Our theorizing suggests the possibility that reading about being "discreet" may influence how individuals categorize objects (discrete) or that reading about carvings and other "elaborate" artwork may lead to more elaborative thinking. Moreover, priming's impact on person perception and individual traits is incontrovertible (Bargh and Peitromonaco 1982; Higgins et al. 1977). Through homophone priming, reading "boulder" may make a target person seem more "bold."

Our results suggest the potential of homophone-based persuasion and the likely difficulty in debiasing the effect. If consumers are unaware reading a homophone may influence their evaluations and/or behaviors, it is unlikely they can correct its influence (Wegener and Petty 1995) and it may "fly under the radar" (e.g. Fitzsimons et al. 2008; Fitzsimons and Shiv 2001; Williams, Fitzsimons, and Block 2004) especially when they are cognitively busy. People likely lack naïve theories of how homophones may exert influence, thus debiasing may prove difficult. Indeed, of 1,186 participants, only one expressed awareness of the connection between the homophone and subsequent task, even when prime and dependent variables were related, as in experiments 3 & 4. Furthermore, if individuals did perceive a link between homophones, it is unclear that they would realize the direction of influence on their evaluations or behavior. The effects we find may have implications for marketing practice as well as public policy and consumer protection efforts. On one hand, these findings may be important for firms who seek to persuade consumers and communicate meaning via advertisements, brand name construction, or other communications. Homophones used in these contexts may facilitate consumers' forming positive perceptions of the brand or product, or engaging in particular consumption behaviors. On the other hand, such efforts may not always be in consumers' best interests. As the results of experiment 2a, 3, and 4 suggest, use of homophone primes in communications may cause consumer harm by impelling consumers to spend more money than they otherwise would. Consumers are chronically cognitively busy, thus this suggests a population at risk of unwanted homophone influence. Public Policy makers and communication regulators may find this research informative. We do not wish to suggest homophone priming can only harm consumers, as pro-social behaviors may also be influenced. For instance, "phew" may decrease propensities to engage in negative behaviors, and "wait" may be used to prime "weight", perhaps useful in fighting the obesity epidemic. With this research, we raise the possibility that phonologicallybased confusion, through priming, may influence a wide range of consumption activities.

APPENDIX A:

Experiment 1 Rejection Task Materials:

Gernsbacher and Faust's (1991) materials are available at http://psych.wisc.edu/lang/materials/homophon.html

Experiment 2A Homophone Manipulation:

I can't believe it is the 15th of May already, my last day in Canada!!! Well what can I say I've been doing a lot of traveling, seeing the sights and all, not much time to get online and update this. I hope it has given you a good idea of all the amazing things I have seen and done over the last few weeks.

As for now, I am sat in a lovely lakeside condo in Saint Sauveur, which is just outside Montreal, courtesy of my friend Hayley's Uncle. He's lent us this place for our last week here in Canada and what a great way to finish the trip with a bit of luxury.

The last few days have consisted of chilling out, visiting a spa and sitting in the sun by the hot tub! It's been great to wind down after a hectic few weeks, I mean I haven't been working but that doesn't mean I haven't been busy! Of course I have been writing my blog and reflecting on the past year. I have a come up with a few lists of things I'll miss about Canada, and a few places I have really loved:

Things I'm going to miss:

- 1. The mountains
- 2.The snow

3.My friends

4. The Canadian Way of Life

5.Hockey (Ice Hockey that is)

There are a few more like the excellent service in restaurants and the fact that they split the bill for a big group as well, but I guess these are the top 5.

Places/things I recommend people to visit/see:

1.Silver Star – best ski resort. I have to say that but I believe it too!

2. Vancouver – best City by far!

3.Rocky Mountains - the best scenery

4. Whale watching in Victoria – guaranteed to see Orcas!

5.Tofino – best place to go Kayaking followed closely by Deep Cove in Vancouver

So I guess it is time to say so long to Canada, it has been an awesome year, so good that I have struggled to write these lists thinking about everything I have seen and done! I'm so lucky to have been able to travel and work in this amazing country, if I'm honest I really don't want to leave, but it is time to go.

Bye Bye! [So Long!]

Experiment 2B Homophone Manipulation:

Focus Right. There is some evidence that focusing on one side of your body can affect thinking. We are interested in how this might affect how people think about typical activities. Please focus on the right side of your body. It is important that you focus your mind on the right side of your body, how it moves etc., failure to do so can make the entire study invalid. So please focus your thoughts to the right.

Move Right/Left/Center. There is some evidence that moving one's laptop or keyboard off center in relation to your body can affect thinking. We are interested in how this might affect how people think about typical activities. [You are in a control group.] Please move your laptop or keyboard as far to the right (left) as is comfortable [so that it is centered in front of you]. It is important that you move your laptop or keyboard as far right (left) as possible [so that it is centered], failure to do so can make the entire study invalid. So please move your laptop or keyboard to the right (left). [So please make sure your laptop is centered.]

Experiment 2C Homophone Manipulation:

Clouds (control). It is a visible mass of liquid droplets or frozen crystals make of water and/or various chemicals. Typically forming in the troposphere, they also form in the stratosphere and mesosphere. They have been observed on other planets, but are composed of such chemicals as methane, ammonia, and sulfuric acid. Like animals, they are classified into families (Genus), species, and varieties. So what is this talking about? None other than— (see next page): CLOUDS

Eastern White Pine (Control). Its habitat extends across much of northeastern North America, including Appalachia. It can grow as tall as 200 feet and can live to be almost 500 years old, making it the largest species in the eastern United States. It has slender cones, and cone production peaks every 3 to 5 years. Its needles can be used to make a tea, it's inner bark is edible and was used to make flour by Native Americans. So what is this talking about? None other than the—(see next page): EASTERN WHITE PINE

Lightning (Prime). It can travel at speeds of 140,000 mph and can reach temperatures approaching 54,000 °F. That's hot enough to fuse silica sand into glass channels known as fulgurites. It causes ionization in the air, leading to the formation of nitric oxide and ultimately, nitric acid, which is a great plant fertilizer. Volcanoes and forest fires can cause it to occur. The study of this is called fulminology. So what is this talking about? None other than— (see next page): LIGHTNING

Lightning Picture:



Experiment 2D Homophone Manipulation:

Late one winter evening with the full moon in view, Seth and his wife Cheryl were driving down a country road on their way home. They were both looking up at the moon, which was especially bright on this clear evening. Seth glanced back and the road and his eye caught something on the side of the road ahead. A deer jumped out into the road and Seth instinctively hit the brakes, tires squealed and both passengers braced themselves as the distance between deer and vehicle quickly decreased. The deer turned ran up the road, but the truck was getting closer, at the last second the deer turned back off the road and the truck came to a full stop. Seth turned to Cheryl and said — (see next page): Phew! [Close Call!]

Experiment 3 Manipulation (Simultaneous Condition):



Say "Goodbye" [So Long] to Everything Else.

Experiment 4 Manipulation:

CELL! CELL!



Android Smartphone. 1-year old. Works Perfectly. Includes charger.

CELL! CELL!

APPENDIX B:

Experiment	Initial N	Excluded N	Reason(s)
1	59	5	English was second language (1) Failure to follow instructions (4)
2A	112	2	WTP Responses above 3 std. dev. of the mean (2)
2B	300	8	Failure to complete the experiment (6) Essay word counts below 3 std. dev. of the mean (2)
2C	230	3	Failure to follow instructions (2) Found connection between manipulation and DV (1)
2D	100	12	Failure to complete the experiment (7) Failure to follow instructions (5)
3	180	5	Failure to complete the experiment (5)
4	205	78	Did not respond as though in auction (self-report; 71) Responses above 3 std. dev. of the mean (4) Failure to follow instructions (3)
Total	1,186	113	

Summary of all excluded participants and reasons for exclusion

REFERENCES

- Argo, Jennifer J., Monica Popa, and Malcolm C. Smith (2010), "The Sound of Brands," *Journal* of Consumer Research, 74(July), 97-109.
- Azuma, Tamiko, Erica J. Williams, and Juliet E. Davie (2004), "Paws + Cause = Pause? Memory Load and Memory Blends in Homophone Recognition," *Psychonomic Bulletin and Review*, 11(4), 723-28.
- Bajo, Maria-Teresa (1988), "Semantic Facilitation With Pictures and Words," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14(4), 579-89.
- Bargh, John A. (1984), "Automatic and Conscious Processing of Social Information," in *Handbook of Social Cognition*, Vol. 3, eds. Robert S. Wyer, Jr. and Thomas K. Srull. Hillsdale, NJ: Erlbaum, 1-43.
 - (1994), "The Four Horsemen of Automaticity: Awareness, Intention, Efficiency, and Control in Social Cognition," in *Handbook of Social Cognition*, ed. Robert S. Wyer Jr. and Thomas K. Srull, Hillsdale, NJ: Erlbaum, 1-40.
- Bargh, John A., Mark Chen, and Lara Burrows, (1996), "Automaticity of Social Behavior: Direct Effects of Trait Construct and Stereotype Activation on Action," *Journal of Personality* and Social Psychology, 71(2), 230-44.
- Bargh, John A. and Paula Pietromonaco (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*, 43(3), 437-49.
- Bargh, John A. and Roman D. Thein (1985), "Individual Construct Accessibility, Person Memory, and the Recall-Judgment Link: The Case of Information Overload," *Journal of Personality and Social Psychology*, 49(5), 1129-46.
- Baron, Jonathan (1973), "Phonemic Stage not Necessary for Reading," *Quarterly Journal of Experimental Psychology*, 25(2), 241-46.
- Berent, Iris and Charles A. Perfetti (1995), "A Rose is a REEZ: The Two-Cycles Model of Phonology Assembly in Reading English," *Psychological Review*, 102(1), 146-84.
- Bosman, Anna .M.T., and Guy C. Van Orden (1997), "Why Spelling is More Difficult than Reading," in C.A. Perfetti, L. Rieben, and M. Fayol (eds.), *Learning to Spell* (173-94), Mahwah, NJ: Lawrence Erlbaum Associated, Inc.
- Buhrmester, Michael, Tracy Kwang, and Samuel D. Gosling (2011), "Amazon's Mechanical Turk: A New Source of Inexpensive, Yet High-Quality, Data?" *Psychological Science*, 6(1), 3-5.

- Carr, Thomas H., Charley McCauley, Richard D. Sperber, and C.M. Parmelee (1982), "Words, Pictures, and Priming: On Semantic Activation, Conscious Identification, and the Automaticity of Information Processing," *Journal of Experimental Psychology: Human Perception and Performance*, 8 (6), 757-77.
- Coltheart, Veronika, Veronica Laxon, Mary Rickard, and Caroline Elton (1988), "Phonological Recoding in Reading for Meaning by Adults and Children," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14(3), 387-97.
- Daneman, Meredyth and Murray Stainton (1991), "Phonological Recoding in Silent Reading," Journal of Experimental Psychology: Learning, Memory, and Cognition, 17(4), 618-32.
- DeCoster, Jamie and Heather M. Claypool (2004), "A Meta-Analysis of Priming Effects on Impression Formation Supporting a General Model of Informational Biases," *Personality and Social Psychology Review*, 8(1), 2-27.
- Dijksterhuis, Ap, and John A. Bargh (2001), "The Perception-Behavior Expressway: Automatic Effects of Social Perception on Social Behavior," *Advances in Experimental Social Psychology*, 33, 1-40.
- Dijksterhuis, Ap, and Ad van Knippenberg (1998), "The Relation Between Perception and Behavior, or How to Win a Game of Trivial Pursuit," *Journal of Personality and Social Psychology*, 74(4), 865-77.
- Fazio, Russell H. (1990), "A Practical Guide to the Use of Response Latency in Social Psychological Research," in *Research Methods in Personality and Social Psychology*, ed. Clyde Hendrick and Margaret S. Clark, Newbury, CA: Sage, 74-97.
- Fitzsimons, Grainne M., Tanya L. Chartrand, and Gavan J. Fitzsimons (2008), "Automatic Effects of Brand Exposure on Motivated Behavior: How Apple Makes you 'Think Different'," *Journal of Consumer Research*, 35(June), 21-35.
- Fitzsimons, Gavan J. and Baba Shiv (2001), "Nonconscious and Contaminative Effects of Hypothetical Questions on Subsequent Decision Making," Journal of Consumer Research, 28(2), 224-238.
- Frost, Ram (1998), "Toward a Strong Phonological Theory of Visual Word Recognition: True Issues and False Trials," *Psychological Bulletin*, 123(1), 71-99.
- Gernsbacher, Morton Ann and Mark E. Faust (1991), "The Mechanism of Suppression: A Component of General Comprehension Skill," *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 17(2), 245-62.

- Gernsbacher, Morton Ann, Kathleen R. Varner, and Mark E. Faust (1990), "Investigating Differences in General Comprehension Skill," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16(3), 430-45.
- Gilbert, Daniel T. and Randall E. Osborne (1989), "Thinking Backward: Some Curable and Incurable Consequences of Cognitive Busyness," *Journal of Personality and Social Psychology*, 57(6), 940-49.
- Guttentag, Robert E. and Marshall M. Haith (1978), "Automatic Processing as a Function of Age and Reading Ability," *Child Development*, 49(3), 707-16.
- Harm, Michael W. and Mark S. Seidenberg (2004), "Computing the Meanings of Words in reading: Cooperative Division of Labor Between Visual and Phonological Processes," *Psychological Review*, 111(3), 662-720.
- Herr, Paul M. (1986), "Consequences of Priming: Judgment and Behavior," *Journal of Personality and Social Psychology*, 51(6), 1106-15.
- Herr, Paul M. (1989), "Priming Price: Prior Knowledge and Context Effects," *Journal of Consumer Research*, 16(1), 67-75.
- Herr, Paul M., Steven J. Sherman, and Russell H. Fazio (1983), "On the Consequences of Priming: Assimilation and Contrast Effects," *Journal of Experimental Social Psychology*, 19(4), 323-40.
- Higgins, Edward T. (1996), "Knowledge Activation: Accessibility, Applicability, and Salience," in Social Psychology: Handbook of Basic Principles, ed. E. Tory Higgins and Arie W. Kruglanski, New York, NY: Guilford Press, 133-68.
- Higgins, Edward T., William S. Rholes, and Carl R. Jones (1977), "Category Accessibility and Impression Formation," *Journal of Experimental Social Psychology*, 13(2), 141-54.
- Higgins, Edward T., John A. Bargh, and Wendy J. Lombardi (1985), "Nature of Priming Effects on Categorization," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 11(1), 59-69.
- Kerlinger, Fred N. (1986), *Foundations of Behavioral Research* (3rd ed.), New York: Holt, Rinehart & Winston.
- Kintsch, Walter (1988), "The Role of Knowledge in Discourse Comprehension: A Construction-Integration Model," *Psychological Review*, 95(2), 163-82.
- LaBerge, David and S. Jay Samuels (1973), "Toward a Theory of Automatic Information Processing in Reading," *Cognitive Psychology*, 6(2), 293-323.

- Labroo, Aparna A., Ravi Dhar, and Norbert Schwarz (2008), "Of Frog Wines and Frowning Watches: Semantic Priming, Perceptual Fluency, and Brand Evaluation," *Journal of Consumer Research*, 34(6), 819-31.
- Lesch, Mary F., and Alexander Pollatsek (1993), "Automatic Access of Semantic Information by Phonological Codes in Visual Word Recognition," *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 19(2), 285-94.
- Logan, Gordon D. (1979), "On the Use of a Concurrent Memory Load to Measure Attention and Automaticity," *Journal of Experimental Psychology: Human Perception and Performance*, 5(2), 189-207.

(1980), "Attention and Automaticity in Strop and Priming Tasks: Theory and Data," *Cognitive Psychology*, 12(4), 523-53.

- Lowrey, Tina M. and L.J. Shrum (2007), "Phonetic Symbolism and Brand Name Preference," *Journal of Consumer Research*, 34(October), 406-14.
- Lukatela, Georgije, and M. T. Turvey (1994a), "Visual Lexical Access is Initially Phonological:
 1. Evidence from Associative Priming by Words, Homophones, and Pseudohomophones," Journal of Experimental Psychology: General, 123(2), 107-28.
 - (1994b), "Visual Lexical Access is Initially Phonological: 2. Evidence From Phonological Priming by Homophones and Pseudohomophones," *Journal of Experimental Psychology: General*, 123(4), 331-53.
- Martin, Leonard L. (1986), "Set/Reset: Use and Disuse of Concepts in Impression Formation," *Journal of Personality and Social Psychology*, 51(3), 493-504.
- Meyer, David E. and Roger W. Schvaneveldt (1971), "Facilitation in Recognizing Pairs of Words: Evidence of a Dependence Between Retrieval Operations," *Journal of Experimental Psychology*, 90(2), 227-34.
- Meyer, David E., Roger W. Schvaneveldt, and Margaret G. Ruddy (1974), "Functions of Graphemic and Phonemic Codes in Visual Word-Recognition," *Memory & Cognition*, 2(2), 309-21.
- Neely, James H. (1977), "Semantic Priming and Retrieval from Lexical Memory: Roles and Inhibitionless Spreading Activation and Limited-Capacity Attention," *Journal of Experimental Psychology: General*, 106(3), 226-54.
- Oyserman, Daphna and Spike W. S. Lee (2008), "Does Culture Influence What and How We Think? Effects of Priming Individualism and Collectivism," *Psychological Bulletin*, 134(2), 311-42.

- Paap, Kenneth R., Sandra L. Newsome, James E. McDonald, Roger W. Schvaneveldt (1982),
 "An Activation-Verification Model for Letter and Word Recognition: The Word-Superiority Effect," *Psychological Review*, 89(5), 573-94.
- Paap, Kenneth R. and Ronald W. Noel (1991), "Dual-Route Models of Print to Sound: Still a Good Horse Race," *Psychological Research*, 53(1), 13-24.
- Perfetti, Charles A. and Laura C. Bell (1991), "Phonemic Activation During the First 40 ms of Word Identification: Evidence from Backward Masking and Priming," *Journal of Memory and Language*, 30(4), 473-85.
- Perfetti, Charles A., Laura C. Bell, and Suzanne M. Delaney (1988), "Automatic (Prelexical) Phonetic Activation in Silent Word Reading: Evidence from Backward Masking," *Journal of Memory and Language*, 27(1), 59-70.
- Pexman, Penny M., Stephen J. Lupker, and Debra Jared (2001), "Homophone Effects in Lexical Decision," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27(1), 139-56.
- Rayner, Keith, Sara C. Sereno, Mary F. Lesch and Alexander Pollatsek (1995), "Phonological Codes are Automatically Activated During Reading: Evidence from an Eye Movement Priming Paradigm," *Psychological Science*, 6(1), 26-32.
- Rosen, Virginia M. and Randall W. Engle (1998), "Working Memory Capacity and Suppression," *Journal of Memory and Language*, 39, 418-36.
- Rueckl, Jay G. and Shashi Mathew (1999), "Implicit Memory for Phonological Processes in a Visual Stem Completion", *Memory & Cognition*, 27 (1), 1-11.
- Schneider, Walter, and Richard M. Shiffrin (1977), "Controlled and Automatic Human Information Processing: I. Detection, Search, and Attention," *Psychological Review*, 84(1), 1-66.
- Sela, Aner and Baba Shiv (2009), "Unraveling Priming: When Does the Same Prime Activate a Goal versus a Trait?" *Journal of Consumer Research*, 36(3), 418-33.
- Shiffrin, Richard M. and Susan T. Dumais (1981), "The Development of Automatism," in Cognitive Skills and Their Acquisition, ed. John R. Anderson, Hillsdale, NJ: Erlbaum, 111-140.
- Smith, Frank (1973), *Psycholinguistics and Reading*, Oxford, England: Holt, Rinehart & Winston.
- Srivastava, Joyadeep and Dipankar Chakravarti (2011), "Price Presentation Effects in Purchases Involving Trade-Ins," *Journal of Marketing Research*, 48(5), 910-19.

- Srull, Thomas K. and Robert S. Wyer (1979), "The Role of Category Accessibility in the Interpretation of Information about Persons: Some Determinants and Implications," *Journal of Personality and Social Psychology*, 37(10), 1660-72.
- Van Orden, Guy C. (1987), "A ROWS is a ROSE: Spelling, Sound and Reading," *Memory & Cognition*, 15, 181-98.
- Van Orden, Guy C. (1991), "Phonological Mediation is Fundamental to Reading," in D. Besner and G. Humphreys (Eds.), *Basic Processes in Reading: Visual Word Recognition*, (77-103), Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Ward, Andrew and Traci Mann (2000), "Don't Mind If I Do: Disinhibited Eating Under Cognitive Load," *Journal of Personality and Social Psychology*, 78(4), 753-63.
- Williams, Patti, Gavan J. Fitzsimons, and Lauren G. Block (2004), "When Consumers Don't Recognize "Benign" Intentions Questions as Persuasion Attempts," Journal of Consumer Research, 21(3), 540-550.
- Wegener, Duane T. and Richard E. Petty (1995), "Flexible Correction Processes in Social Judgment: The Role of Naïve Theories in Correction for Perceived Bias," *Journal of Personality and Social Psychology*, 68(1), 36-51.
- Wegner, Daniel M., David J. Schneider, Samuel R. Carter III, and Teri L. White (1987), "Paradoxical Effects of Thought Suppression," *Journal of Personality and Social Psychology*, 53(1), 5-13.
- Wheeler, S. Christian and Jonah Berger (2007), "When the Same Prime Leads to Different Effects," *Journal of Consumer Research*, 34(3), 357-68.
- Wheeler, S. Christian and Richard E. Petty (2001), "The Effects of Stereotype Activation on Behavior: A Review of Possible Mechanisms," *Psychological Bulletin*, 127(6), 797-826.
- Yorkston, Eric, and Geeta Menon (2004), "A Sound Idea: Phonetic Effects of Brand Names on Consumer Judgments," *Journal of Consumer Research*, 31(June), 43-51.

FIGURE 1:

Mean WTP Amounts (Experiment 2A)



Note. Means differing by at least \$4.37 differ at p = .05, Bonferroni *t*.

FIGURE 2:



Mean Essay Word Counts (Experiment 2b)

Note. Means differing by at least 7.31 words differ at p = .05, Bonferroni *t*.

FIGURE 3:

Weight Estimates (Experiment 2c)



Note. Means differing by at least 3.16lbs differ at p = .05, Bonferroni t.

FIGURE 4:





FIGURE 5:



Restaurant Value Judgments (Experiment 3)

Note. Means differing by at least .43 differ at p = .05, Bonferroni t.

FIGURE 6:



WTP Amounts (Experiment 3)

Note. Means differing by at least \$10.39 differ at p = .05, Bonferroni t.

FIGURE 7:



Note. Means differing by at least \$26.52 differ at p = .05, Bonferroni t.

Panel B: First Counteroffer Amounts

