Intel Inside: The Linguistic Properties of Effective Slogans

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Abstract

How can marketers create slogans that consumers like and remember? We answer this question by analyzing how the lexical, semantic, and emotional properties of a slogan's individual words combine to influence slogan liking and slogan memory. Through a large correlational study with over 800 brand slogans, laboratory experiments, a biometric eye tracking experiment, and a field study, we unearth the word properties that make slogans effective. We predict and find that linguistic properties that make a slogan easier to process (i.e., more fluent) result in slogans that are more likable but less memorable, whereas linguistic properties that reduce processing fluency result in slogans that are less likable but more memorable. Across our multi-method investigation, participants indicated a more favorable attitude towards slogans that are shorter, omit the brand name, and use words that are linguistically frequent, perceptually distinct, and abstract. In contrast, participants were more likely to remember slogans that are longer, include the brand name, and use words that are linguistically infrequent, concrete, and less perceptually distinct. We conclude by offering marketers practical advice into optimal word-choice strategies, and delivering actionable guidance for creating slogans that are either likable or memorable.

Keywords: slogans; brands; language; memory; attitudes; eye-tracking; multi-method

Intel Inside: The Linguistic Properties of Effective Slogans

Firms spend millions creating and communicating slogans, such as "The ultimate driving machine," "Intel inside," and "Just do it" (Edwards 2011). Slogans, together with a brand's name and logo, constitute one of the three key elements of brand identity (Kohli, Leuthesser, and Suri 2007). Brand names tend to be restricted to one or two words, and both brand names and logos rarely change. Slogans, conversely, typically include multiple words and can be updated as firms adapt and reestablish themselves. This makes slogans the most dynamic of the three elements of a brand's identity, and an invaluable tool for building a brand. Slogans contribute to a brand's architecture either by helping consumers remember the brand (i.e., increasing brand awareness) or improving the brand's image (i.e., increasing brand attitude; Keller 1993, 2014). Marketing communications, including slogans, are more likely to boost brand attitudes when consumers have a more favorable attitude towards the communication (Mitchell and Olson 1981), and they are more likely to increase brand awareness when consumers remember the communication (Keller 1987). Slogans, however, are distinct from other marketing communications (e.g., ad copy, social media posts, website text, etc.) because slogans often stand alone, tend to be more concise, are more closely and consistently tied to the brand, and are repeated more frequently than other communications. Given this valuable slogan-brand link (Briggs and Janikaraman 2017; Dahlén and Rosengren 2005; Keller 1993), understanding how to craft likable and memorable slogans warrants the attention of academic researchers and practitioners alike.

How can firms write effective slogans? The literature largely offers holistic advice, recommending that slogans be concise (Kohli et al. 2013), be creative (Dass et al. 2014), and clearly communicate a benefit (Dass et al. 2014). Trade journals suggest that slogans should "capture the soul of the brand" (Kiley 2004), "be skillfully and creatively worded" (Lamons 1997), and "keep the long-term view in mind" (Kohli, Leuthesser, and Suri 2007). While this advice is sound, it also tends to be subjective and difficult to implement. The literature offers little or no actionable insight into the word choice of slogans. For example, it would not help BMW decide whether its slogan should be "The ultimate driving machine" or a synonymous alternative, such as "The peak driving machine" or "The preeminent driving machine."

Which words should brands use in their slogans? Do the specific words even matter or do a slogan's effects depend only on its holistic meaning? Depending on how you interpret the literature, it either has not attempted to answer this question or it has argued that the component words do not matter because consumers process the meaning of slogans holistically (e.g., Budiu and Anderson 2004). We take a closer look at the properties of the words in brand slogans. Holding the meaning of a slogan constant, we examine how the word properties of slogans shape their memorability and likability. Building on research in linguistics, which demonstrates that the lexical, semantic, and emotional properties of words influence both perception and memory (Adelman and Estes 2013; Cortese, Khanna, and Hacker 2010; Kensinger and Corkin 2003; Kuperman, Estes, Brysbaert, and Warriner 2014), we examine how the component words in a slogan influence its effectiveness.

Across a multi-method investigation that includes a content analysis of 820 real brand slogans, a biometric eye-tracking study, lab experiments, and a field study, we identify five distinct linguistic variables that shape how consumers respond to a slogan: its length, whether it includes the brand name, and the extent to which the words are frequently used, perceptually distinct from other words, and concrete. Specifically, we find that consumers are more likely to have a favorable attitude towards, but are less likely to remember, slogans with words that are

easier to read and encode (i.e., fluently processed). Thus, slogans that use fewer words, omit the brand name, and contain words that are frequently used, perceptually distinct, and less concrete are more likable but less memorable.

Our research contributes to the literature by offering novel, practical advice and conceptual insight. First, we provide actionable guidance to help marketers bolster brand architecture by identifying five linguistic factors that influence whether consumers remember and like a slogan. We thereby supplement holistic recommendations (e.g., "be creative") with specific advice about word choice strategies.

Second, we contribute to the slogan literature by revealing a trade-off between creating a likable and a memorable slogan. Specifically, we show that the linguistic factors that improve slogan attitudes tend to make slogans less memorable and vice versa. Brands thus need to word slogans differently depending on whether their primary objective is to increase attitudes or memory, and our research offers practical advice on how to do so. Prior research has explored factors that influence slogan memory (Kohli et al. 2007; Kohli et al. 2013; Mantonakis 2012) and factors that influence slogan liking (Dass et al. 2014; Dimofte and Yalch 2007), but it has not identified the trade-off between creating a memorable and likable slogan.

Third, we contribute to the slogan literature by integrating the scattered effects of individual word properties and consumers' reactions to slogans under a shared conceptual umbrella with fluency as its shaft. While recent investigations have explored the effects of single word properties in marketing communications (Packard and Berger 2021), we account for the simultaneous effects of multiple word properties and their combined effect in shaping consumers' attitudes towards and memory of slogans. By showing how fluency helps explain what had previously been treated as disparate effects, we create a parsimonious theory of how the words in slogans influence consumers' attitudes and memory, the two pillars of brand equity (Keller 1993, 2014).

Conceptual Background, Variables, and Hypotheses

Given the ubiquity and importance of slogans, we were surprised to find only a handful of research articles on the topic. Most of these articles investigate holistic characteristics of slogans, such as whether the slogan is assertive (Kronrod et al. 2012), creative (Dass et al. 2014), expresses strength and virtue (Dowling and Kabanoff 1996), has multiple meanings (Dimofte and Yalch 2007), and clearly communicates a benefit (Dass et al. 2014). Focusing on the aggregate properties of a slogan fits with research showing that people process language holistically; that is, the meaning of a sentence is more than the sum of its individual words (Budiu and Anderson, 2004). For example, readers interpret the word "sack" differently when they read "he put the turnips in a sack" than when they read "he was tired and hit the sack."

We explore the extent to which the properties of a slogan's words matter over and above their meaning. Specifically, we extend the literature by showing that consumers' attitude towards and memory of a slogan depend on the ease with which they can process the slogan's words. Building on processing fluency research (e.g., Lee and Labroo 2004; Schwarz 2004), we further hypothesize that the extent to which consumers can fluently process a slogan should have opposite effects on their attitude towards and memory of the slogan.

Processing fluency refers to the ease with which information is perceived and understood (Schwarz 2004). For example, consumers experience more fluency when they hear a familiar song or read black font on a white background than when they hear a new song or read pink font on a peach background (Schwarz 2004).

When consumers process information fluently, they are more likely to believe it is true (Kelley and Lindsay 1993; Reber and Schwartz 1999) and feel more confident in the judgments and decisions that they make (Alter and Oppenheimer 2009; Novemsky et al. 2007). Importantly, they also tend to form a more positive attitude towards it (Alter and Oppenheimer 2009). For example, participants thought that circles were prettier when the color of the circle contrasted more with its background (Reber, Winkielman, and Schwarz 1998), evaluated a ketchup brand more favorably if they had seen a similar product beforehand (Lee and Labroo 2004), and were more likely to choose wine with a frog on the label if they had previously read the word "frog" (Labroo, Dhar, and Schwartz 2008). We thus predict that linguistic properties that make it easier for consumers to fluently process the words in a slogan should also improve their attitudes towards the slogan.

Information that is difficult to process (i.e., disfluent), in contrast, makes consumers attend more carefully to it (Alter et al. 2007; Diemand-Yauman, Oppenheimer, and Vaughan 2011). People are more likely to remember information when they process it more carefully (Bettman 1979; Craik and Tulving 1975), which suggests that consumers should be more likely to remember slogans with words that are more difficult to process (Cortese et al. 2010; Kohli et al. 2007). We are not aware of research testing the effect of fluency on memory for slogans; however, people tend to remember words better when they are printed in blurred, disfluent font than in clear, fluent font (Rosner, Davis, and Milliken 2015).

Although careful thought increases memory, it does not necessarily improve attitudes (Petty and Cacioppo 1979). In fact, when consumers are motivated and able to think carefully about a persuasive communication, they are more likely to counter-argue it and less likely to be persuaded by peripheral cues (Campbell and Kirmani 2000; Insko, Turnbull, and Yandell 1974; Petty and Cacioppo 1979). In sum, research suggests that fluency can have opposite effects on attitude and memory. Thus, we predict that the linguistic properties that make slogans more difficult to process should make consumers like a slogan less but remember it better.

What types of words influence the ease with which consumers can process the slogan? Our next section discusses five factors that we hypothesize will make it easier for consumers to process the slogan: whether the slogan (a) is relatively short vs. long, (b) uses words that consumers encounter more frequently vs. less frequently, (c) uses words that have more vs. less distinct spelling, (d) uses words that are less vs. more concrete, and (e) omits vs. includes the brand name. The literature has looked at the effects of a couple of these factors (e.g., Dass et al. 2014; Kohli et al. 2013); however, the effects of most of these factors on both attitude and memory have not been tested, and there have not been any studies that have tested their collective effect.

Linguistic Properties Related to Fluency

Slogan length. Some slogans are short: "Invent" (Hewlett Packard). Others are long: "15 minutes can save you 15% or more on car insurance" (Geico). Should brands craft slogans with fewer words or with more words? Both practitioners (Ries 2010) and scholars (Dass et al. 2014) recommend keeping slogans brief. Processing a lot of information is cognitively taxing (Bettman, Luce, and Payne 1998). Relative to longer slogans, slogans with fewer words are easier to process and encode. Because consumers tend to like communications that are easier to process (Lee and Labroo 2004), we therefore predict that consumers will have a more favorable attitude towards slogans that use fewer words.

The literature similarly argues that shorter slogans are easier to recall (Kohli et al. 2013), but given the limited data, the relationship between slogan length and memorability remains an open empirical question. In contrast to Kohli et al.'s prediction, theory on processing fluency suggests that longer slogans may be easier to remember. Because they are more difficult to process, longer slogans should nudge consumers away from relatively effortless thinking towards more careful thought (Alter et al. 2007). This effortful processing should make consumers more likely to remember longer slogans than shorter slogans. We therefore predict the following.

> **H1:** Slogans with more words will be (a) liked less but (b) remembered more than slogans with fewer words.

Word frequency. Some slogans rely on frequently used words, such as "true" (Budweiser) and "it's the real thing" (Coca-Cola). Others rely on more obscure words, such as "halitosis" (Listerine) and "fahrvergnügen" (Volkswagen). Consumers more easily process words and other stimuli that they encounter frequently (Alter and Oppenheimer 2009; Balota et al. 2004), and consequently, tend to like them more (i.e., the mere exposure effect; Zajonc 1968). Conversely, consumers are more likely to attend to and remember stimuli that they encounter less frequently (Cortese et al. 2010; Lynch and Srull 1982). Thus, we predict that slogans that use words that consumers frequently encounter will be better liked but less remembered.

> **H2:** Slogans with high-frequency words will be (a) liked more but (b) remembered less than slogans with low-frequency words.

Perceptual distinctiveness. Some words look or sound like a lot of other words because they use a similar combination of letters or phonemes. "Can," for example, is only one letter different from "cat," "car," "cab," "con," "man," "ran," "scan," and many other words. Other words, such as "equinox," use a more distinct combination of letters and sounds. Linguists measure the extent to which a word is perceptually distinct from other words by calculating the average number of single letter or phoneme changes needed to transform that word into other words (Yarkoni, Balota, and Yap 2008). For example, it takes fewer changes to transform "do" and "it" into new words than it does to transform "think" and "different." Will slogans be easier to process when they include words that look or sound more similar to (e.g., Nike's "just do it") or distinct from (e.g., Apple's "think different") other words?

The answer to this question is not clear. On the one hand, words with more distinct letter combinations (e.g., "equinox") tend to be less common and learned later than words that visually resemble other words (e.g., "can;" Kuperman, Stadthagen-Gonzalez, and Brysbaert 2012). On the other hand, when consumers read a word that closely resembles other words (e.g., "can"), similar words (e.g., "car," "cat," etc.) automatically come to mind, which would interfere with consumers' ability to understand the focal word (Cortese et al. 2010) and therefore induce more effortful processing. The latter research suggests that distinguishing a perceptually similar word from its close orthographic neighbors requires attention, effort, and care. For example, in one study participants were more likely to confuse perceptually similar, compared to distinct, brand names (Burt et al. 2017). Thus, after accounting for word frequency, consumers should process slogans with distinctive words more fluently than slogans with perceptually similar words (cf. Balota et al. 2004). We therefore predict that slogans with distinct words will be more liked but less remembered than slogans with perceptually similar words.

H3: Slogans with perceptually distinct words will be (a) liked more but (b) remembered less than slogans with perceptually similar words.

Concreteness. Some slogans use words that are concrete: "Like a Rock" (Chevy). Others use words that are abstract: "Innovation that Excites" (Nissan). Concrete words refer to things that we can see, hear, taste, smell, and feel, such as a wool blanket, a five-star customer rating on Amazon.com, and a kiss on the cheek. Abstract words refer to general categories and intangible concepts, such as nondurable goods, satisfaction, and love (Warren et al. 2021). Should advertisers construct slogans that are concrete or abstract?

As with the other linguistic properties, the answer depends on whether advertisers hope to create a slogan that is likable or memorable. There is some evidence that consumers process abstract words more fluently than concrete words. For instance, people read abstract words faster than concrete words (Kousta et al. 2011). Moreover, positive emotion and abstract language are correlated: An analysis of more than 13,000 English words revealed that positive words tend to be more abstract than neutral words (Ponari, Norbury, and Vigliocco 2018). These studies suggest that consumers may process slogans that use abstract language more fluently and may thus have a more favorable attitude towards slogans with abstract words.

Consistent with the idea that concrete language is less fluent, concrete information is more likely to be remembered (Cortese et al. 2010; Fliessbach et al. 2006; Paivio 1991, 2013; Taylor and Thompson 1982). For example, after reading a passage, people were more likely to recall concrete (e.g., "rusty engine") compared to abstract (e.g., "subtle fault") phrases (Begg 1972). We thus predict that concrete words are more difficult to process and thus make slogans less likable but more memorable.

H4: Slogans with more concrete words will be (a) liked less but (b) remembered more than slogans with less concrete words.

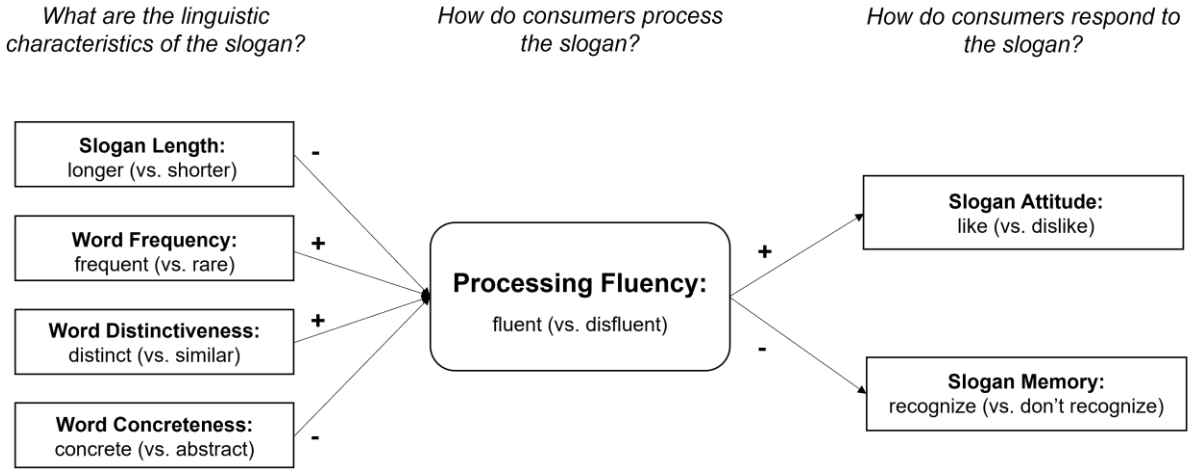
Brand name. One of the easier linguistic properties of a slogan for marketers to change is whether the slogan includes a brand name (e.g., "Every kiss begins with Kay;" Kay) or not (e.g., "A diamond is forever;" De Beers). It is unclear whether consumers will process slogans more fluently with or without brand names. Brand names often consist of unfamiliar words, surnames, acronyms, or even non-words (e.g., Intuit, Lululemon, IKEA, Spotify),[1] which might make them more difficult for consumers to process. At the same time, some brand names are comprised of relatively common words (e.g., Apple, Shell, Target, Tide), and repeated exposure to all brand names (even non-words) can increase their cognitive accessibility over time (e.g., Walmart, Google, Kleenex).

Brand names may also influence slogan attitudes through other mechanisms. For instance, brand names may activate consumers' persuasion knowledge (Laran, Dalton, and Andrade 2011; Tellis, MacInnis, Tirunillai, and Zhang 2019), which can induce resisting, and even counter-arguing, the slogan (Friestad and Wright 1994; Teixeira, Wedel, and Pieters 2010). Indeed, Tellis et. al (2019) find that placing brand names prominently in social media ads interferes with the effect of other persuasive ad characteristics and limits consumers' ability to fully process the ad, resulting in reduced sharing. Dass et al. (2014) similarly find that slogans that include the brand name are less likable. On the other hand, a conceptual article suggests that

[1] Among Interbrand's 2022 Best Global Brands list, the majority of the 100 listed brand names are not standard English dictionary words.

including the brand name may improve the slogan's memorability (Kohli et al. 2007). Given the ambivalent nature of the prior evidence, we do not predict how the presence of the brand name will influence slogan attitude or memory. Rather, we measure (Study 1) and manipulate (Studies 2, 4a, 4b) it to explore the relationship between this property and slogan liking and memory.

Figure 1. Conceptual model



Overview of Studies

We use a mix of methods to investigate the effect of linguistic properties on consumers' attitude towards and memory of slogans. We begin with a large correlational study using over 800 brand slogans (Study 1). We then show how firms can create either more likable or more memorable slogans by strategically using words that make the slogan more or less fluent (Study 2). We use eye tracking to offer evidence that slogans with linguistically frequent, perceptually distinct, and abstract words are processed more fluently (Study 3). We next conduct two laboratory experiments (Studies 4a and 4b) that mimic the way that consumers view slogans outside the lab (i.e., bumper ads before YouTube videos). We conclude with a field study (Study 5). Notably, we use real brand slogans in each study to demonstrate that simply tuning these linguistic variables can improve attitudes or memory of professionally designed slogans.

Study 1

We conducted a large-scale analysis of the linguistic properties that predict consumers' attitude towards and memory of real slogans. We aggregated a set of more than 800 slogans used by brands from a variety of industries. We first calculated the length of each slogan and the frequency of usage, distinctiveness, and concreteness of its words. We also coded whether the slogan included the brand name. We then measured the extent to which a sample of participants liked and remembered the slogans. Finally, we used the linguistic properties of the words to predict liking for and memory of the slogans.

Method

Participants. Participants were 594 undergraduates at a large U.S. university.

Stimuli. The stimulus set initially consisted of 830 unique slogans[2] obtained from the online repositories and databases of various slogan consultancy firms and websites (see Web

[2] We included 845 slogans in the data collection phase of this study, but afterward we discovered that 15 of the slogans were duplicated in the composite list. We did not initially detect the duplications because they included

Appendix A for details). All were real slogans used previously or currently by a wide array of organizations. However, linguistic variables were not available for all of the slogans. For instance, because the slogan "Beanz meanz Heinz" does not contain any dictionary-approved words, we could not measure the linguistic properties of the words in the slogan. We thus excluded 10 such slogans, leaving us with a final sample of 820 slogans. The stimuli constitute a reasonably representative sample of actual, English-language brand slogans.

Procedure. Each participant evaluated a randomly selected subset of 50 slogans, similar to Cortese, Khanna, and Hacker (2010). Participants viewed the slogans one at a time in random order, and the brand was shown below each slogan. For each slogan, participants rated *slogan liking* ("Overall, how much do you like this slogan?") and *brand attitude* ("Based on this slogan, what is your attitude toward the brand?"). As control variables, they also rated *slogan familiarity* ("Prior to this survey, how familiar were you with this slogan?"), and *brand familiarity* ("Prior to this survey, how familiar were you with this brand?"). The measures used scales from 1 to 7 (dislike—like; not familiar—very familiar).

After evaluating 50 slogans, participants took a brief filler survey before completing a surprise recognition test, similar to that used by Cortese et al. (2010). Participants viewed 100 brand slogans—the 50 that they had previously evaluated (i.e., "old"), and 50 slogans that they had not evaluated but were evaluated by other participants (i.e., "new"). The slogans appeared onscreen one at a time, and participants indicated whether or not they had evaluated the slogan earlier during the survey. The study lasted approximately 10-15 minutes, which is comparable to other similar studies (e.g., Cortese et al. 2010).

Measured variables. Slogans were the unit of analysis in this study. Each of the 820 slogans was evaluated by approximately 35 participants. We calculated a score for each slogan by averaging the responses (i.e., liking ratings or familiarity judgments) across all participants who evaluated the slogan. Thus, for each slogan, we obtained mean ratings of slogan familiarity, slogan liking, brand familiarity, and brand attitude.

We also calculated a memory accuracy score for each slogan by subtracting the "false alarm rate" from the "hit rate" (Cortese et al. 2010). The "hit rate" refers to the percentage of participants who correctly reported that they had seen the slogan. The "false alarm rate" refers to the percentage of participants who incorrectly reported that they had seen the slogan despite not having seen it. The measure of *memory accuracy* equals the hit rate minus the false alarm rate. A score of zero indicates random guessing, whereas a score of 100% indicates perfect memory.

Linguistic variables. To calculate the linguistic properties of the slogans, we first decomposed each slogan into its constituent words (e.g., "Just do it" became "just", "do", and "it"). This yielded 4527 word-units across the 820 slogans. Next, we used validated databases (described below) to retrieve linguistic measures for each of these 4527 word-units. As is standard in linguistics research (e.g., Balota et al. 2004; Kuperman et al. 2014), we retrieved a host of lexical, semantic, and affective variables known to influence word processing, including some not described here. We report full details of all variables, as well as the procedures for selecting our key variables, in Web Appendix B. For simplicity and clarity, however, we describe only our key linguistic variables here.

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minor variations in brand names (e.g., both Alka Seltzer and Alka-Seltzer were included) or slogans (e.g., appearing once with and once without a period). In these 15 cases, we averaged the liking, memory, and familiarity data across the two versions of the slogan, leaving 830 unique slogans, and resulting in a final sample of 820 slogans after excluding the 10 slogans that contained no dictionary-approved words.

We measured *slogan length* by counting the number of words in the slogan, and we created a *brand name* variable by dummy coding whether the brand name was present in the slogan (1) or not (0). We assessed *word frequency* with contextual diversity, which is the number of different semantic contexts in which the word occurs in a large corpus (Adelman, Brown, and Quesada 2006). As is standard, we log-transformed the frequency measure to correct for skew. We determined the *perceptual distinctiveness* of the words using orthographic Levenshtein distance (Balota et al. 2007).[3] We obtained values for *concreteness* from Brysbaert, Warriner, and Kuperman (2014). Finally, for word frequency, distinctiveness, and concreteness, we computed slogan-level scores by averaging the scores across all word-units in each slogan for each variable. For instance, the concreteness of "Think different" was the average concreteness of "think" and "different". There were two exceptions to this procedure. First, we had to omit non-words (e.g., "Betcha" in "Betcha can't eat just one") because they were not available in the lexical databases. Second, as is common practice in text analysis (e.g., Packard and Berger 2021), we excluded "stop words" such as articles (e.g., "the") and prepositions (e.g., "of") because they tend to skew measures without adding substantial semantic content.

Results

We performed multivariate regression analyses using the linguistic variables to predict liking and memory for the 820 unique slogans. Liking ratings varied substantially across slogans (M = 4.39, SD = .96, *Range* = 1.47 to 6.58) and were normally distributed (*skew* = -.24, *kurtosis* = -.51). Memory accuracy (i.e., hits minus false alarms) also varied substantially across slogans (M = 86.98%, SD = 13.15%, *Range* = 2.32% to 100%), but was not normally distributed (*skew* = -1.97, *kurtosis* = 5.77). We therefore square-transformed memory accuracy, which yielded a more normal distribution (*skew* = -1.17, *kurtosis* = 1.00). The raw and transformed measures of memory accuracy yielded similar results, so for simplicity, we report the raw measure here. Table 1A presents the summary statistics of the dependent and predictor variables and their intercorrelations. Note that liking and memory were not correlated, r = -.02, p = .51, which reveals that likable slogans may not be memorable slogans, and vice versa.

Liking. To estimate the collective effect size of the five linguistic factors, we entered slogan familiarity (a control variable) in the first block of a stepwise linear regression (see Table 1B, model 1). Familiarity explained a large and significant percentage of the variance in ratings of slogan liking, $F(1, 818) = 692.77$, $p < .001$, $R^2 = .46$; more familiar slogans were liked more (b = 0.48, SE = 0.02, t = 26.32, $p < .001$). Importantly, however, adding the five linguistic factors to the model (i.e., model 2) collectively explained a significant amount of additional variance in slogan liking, $F(5, 813) = 14.80$, $p < .001$, $\Delta R^2 = .05$. As predicted, slogans were liked more when they included more frequent words (b = 0.24, SE = 0.08, t = 3.15, p = .002) and more distinctive words (b = 0.21, SE = 0.08, t = 2.75, p = .006), and when they omitted the brand name (b = -0.37, SE = 0.05, t = 6.81, $p < .001$). Including less concrete words also improved slogan liking, though only marginally (b = -0.09, SE = 0.05, t = 1.88, p = .060).

[3] Perceptual distinctiveness is typically measured via *Levenshtein distance* (LD), which is the number of substitutions, insertions, and deletions necessary to transform one word into another. For instance, transforming "boy" into "toys" requires one substitution (b → t) and one insertion (s), yielding a LD of 2. Orthographic LD is the mean number of operations necessary to transform a given word into its twenty most orthographically similar words in the lexicon. This is essentially a measure of how visually distinct a given word is; higher scores indicate higher distinctiveness from other words in the lexicon.

Table 1. (**A**) Descriptive statistics and intercorrelations (Pearson *r*), and (**B**) regression results, Study 1.

A.

Variable	*M*	*SD*	*Min*	*Max*	1.	2.	3.	4.	5.	6.	7.	8.
1. Slogan Familiarity	2.47	1.35	1.03	6.86	—							
2. Slogan Length	5.65	2.93	1.00	27.00	-.15 ***	—						
3. Word Frequency	3.47	0.40	1.42	3.92	.08 *	.27 ***	—					
4. Distinctiveness	1.70	0.39	1.00	4.80	-.01	-.27 ***	-.56 ***	—				
5. Concreteness	2.70	0.50	1.33	4.95	.04	-.04	-.21 ***	-.07	—			
6. Brand Name	0.28	0.45	0.00	1.00	-.07 *	.15 ***	.01	-.10 **	.03	—		
7. Slogan Liking	4.39	0.96	1.47	6.58	.68 ***	-.12 ***	.11 **	.04	-.05	-.23 ***	—	
8. Slogan Memory (%)	86.98	13.15	2.32	100.00	.06	.26 ***	-.15 ***	-.03	.21 ***	.29 ***	-.02	—

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

B.

	Dependent Variable			
	Slogan Liking		Slogan Memory	
Predictor	(1) Base	(2) Linguistic	(3) Base	(4) Linguistic
Control: Slogan Familiarity	0.48*** (0.02)	0.47*** (0.02)	0.63 (0.34)	1.34*** (0.31)
Linguistic Variable				
Slogan Length		0.00 (0.01)		1.35*** (0.15)
Word Frequency		0.24** (0.08)		-7.74*** (1.31)
Distinctiveness		0.21** (0.08)		-1.44 (1.31)
Concreteness		-0.09† (0.05)		4.16*** (0.85)
Brand Name		-0.37*** (0.05)		7.31*** (0.92)
Intercept	3.20*** (0.05)	2.40*** (0.42)	85.44*** (0.96)	92.14*** (7.11)
R^2	0.46***		0.00	
Marginal R^2		0.05***		0.23***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). † $p < .10$, ** $p < .01$, *** $p < .001$.

Memory. On its own (i.e., Table 1B, model 3), slogan familiarity did not significantly predict memory accuracy (b = 0.63, SE = 0.34, t = 1.84, p = .066, R^2 = 0.00). However, adding the five linguistic factors to the model (i.e., model 4) significantly and substantially improved the fit, $F(5, 813) = 47.56$, $p < .001$, $\Delta R^2 = .23$. These additional factors explained nearly a quarter of the variance in memory accuracy. As predicted, slogans were more memorable when they were longer (b = 1.35, SE = 0.15, t = 9.12, $p < .001$) and when they included infrequently used words (b = -7.74, SE = 1.31, t = 5.92, $p < .001$), more concrete words (b = 4.16, SE = 0.85, t = 4.90, $p < .001$), and the brand name (b = 7.31, SE = 0.92, t = 7.94, $p < .001$).

Results of the hit and false alarm rates, analyzed separately, are reported in Web Appendix B. This supplemental analysis revealed that the same linguistic factors that predicted overall memory accuracy (Table 1B) also tended to predict hit rates, but not false alarm rates (Table A6 of Web Appendix B). Thus, the effects on overall memory accuracy are largely attributable to correct recognition of seen slogans (i.e., hits) rather than to false recognition of unseen slogans (i.e., false alarms). This result is consistent with findings from memory of single words (Cortese et al. 2010).

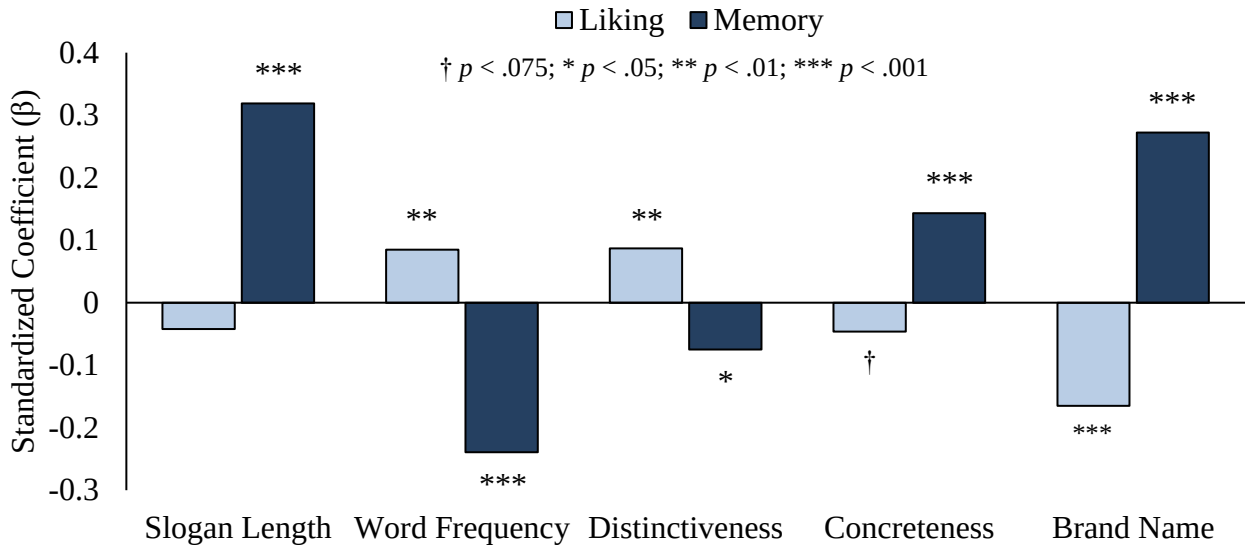
Comparison to alternative measures. The analyses presented above are based on measures that are averaged across individual words in the slogan. We replicated our analyses using alternative, non-average measures such as the max, min, and range of values within the slogan. For instance, rather than averaging the word frequencies of "just", "do", and "it", we instead used the max, min, and range of those frequencies (also distinctiveness and concreteness scores) in separate models. These alternative models provided a test of whether the "average" model (i.e., the model in which the linguistic properties are averaged across words within the slogan) is the best model for predicting slogan liking and/or memory. Indeed, although the differences among models were small, the "average" model was the best performer for both slogan liking and slogan memory. Please see Table A7 in Web Appendix B for detail.

Robustness test with brand attitude. Marketers care not only about whether consumers like a slogan, but also whether they like the brand. To test whether the linguistic properties of slogans may have a similar effect on brand attitude, we performed the same analyses, but with brand attitude and brand familiarity replacing slogan liking and slogan familiarity, respectively. The results were similar (see Table A8 in Web Appendix B), providing initial evidence for the linguistic effects at the brand level.

Replication study. We tested the reliability of the observed results by conducting an exact replication with an online sample of 404 participants recruited from Amazon's Mechanical Turk. The procedure was identical to the main study described above. The results were also consistent with those of the main study; all five of the key linguistic variables also significantly predicted liking and/or memory in this replication study (see Web Appendix B, Table A9).

Combined analysis. To maximize reliability, we also analyzed results from the original lab sample and the online replication sample together. As illustrated in Figure 2, the five linguistic variables again predicted slogan liking and memory. Results of this combined analysis are reported in Table A9 of Web Appendix B. Finally, we also tested whether any of these five linguistic factors interacted with brand familiarity in predicting slogan liking and/or memory. Of the ten possible interactions (i.e., 5 linguistic factors × 2 dependent variables), only one was significant: Including the brand name in the slogan improved memory of the slogan more for highly familiar brands than for less familiar brands. Please see Web Appendix B, "Interaction Model with Brand Familiarity".

Figure 2. Effect sizes (β) of the linguistic variables, combined analysis, Study 1.



Discussion

Study 1 reveals five linguistic properties that predict slogan liking and memorability: the length of the slogan, the frequency, distinctiveness, and concreteness of its words, and the inclusion of the brand name. As predicted, the linguistic properties that make slogans easier to process tend to increase slogan attitudes but decrease slogan memory, whereas properties that make slogans harder to process tend to decrease slogan attitudes but increase slogan memory. Those linguistic effects tended to be larger on memory than on liking. As shown in Figure 2, longer slogans slightly decreased liking, but had a large positive effect on memory. More frequently used words slightly increased liking but had a large negative effect on memory. More perceptually distinctive words also increased liking and decreased memory, although these effects were small. Concrete words marginally decreased liking but moderately improved memory. Finally, including the brand name in the slogan had a similar effect as using disfluent words: Slogans that included a brand name were less liked but better remembered, and both effects were relatively large. We observed these effects across 820 real brand slogans, some of which were familiar to participants and others of which were not. Importantly, the effects held after controlling for participants' familiarity with the slogan, which suggests that the number of times that participants had seen a slogan before completing our study cannot explain the results.

Study 2

In Study 2, we tested whether we could influence the liking and memory of real brand slogans by altering the linguistic properties that significantly predicted slogan liking and memory in Study 1: slogan length, word frequency, distinctiveness, concreteness, and the presence of the brand name. We predicted that reducing the number of words, and including words that are more frequently used, more perceptually distinct, and less concrete would make slogans more likable but less memorable. Building on the results of Study 1, we also tested whether adding a brand name to slogans would make the slogan less liked but better remembered, and whether removing a brand name would have the opposite effects.

Method

Participants. Two hundred forty-three undergraduates at a U.S. university participated.

Stimuli. We edited 25 slogans from Study 1 to create four sets: one intended to improve attitudes (*attitude targets*), one intended to improve memory (*memory targets*), one in which we removed the brand name from the slogan (*brand name removed*), and one in which we added the brand name to the slogan (*brand name added*). See Web Appendix C for a list of the stimuli.

To create the *attitude targets*, we selected eight real slogans from Study 1 that scored relatively low on liking. For each slogan we created a second, edited version by replacing the original words with synonyms that maintained the meaning of the slogan. For some of the revised slogans we maintained the same length as the original slogan, replacing only key words with synonyms that are (a) more frequently used and/or (b) less concrete (see Web Appendix C). For example, we edited Club Med's slogan "the antidote for civilization" to "the cure for mankind." For others, we selected relatively long slogans and edited them to be semantically similar but more concise. For instance, we shortened Chevrolet's slogan "The road isn't built that can make it breathe hard" to "No road can challenge it."

To create the *memory targets*, we identified eight real slogans from Study 1 that scored low on recognition. Building on the results of Study 1, we edited the slogans to include words that (a) are used less frequently and (b) are more concrete but that (c) left the meaning of the slogan unchanged. For example, we changed Toyota's slogan "get the feeling" to "snag the sensation."

To create the *brand-name-removed targets*, we identified five slogans that originally included the brand name and removed it (e.g., "Nothing is more effective than Anadin" became "Nothing is more effective"). Finally, to create the *brand-name-added targets*, we identified four slogans that originally did not include the brand name and added it (e.g., "Try it, you'll like it" became "Try Alka Seltzer, you'll like it").

Linguistic Fluency. Creating alternative slogans that preserved the meaning of the original slogan while increasing some linguistic variables (e.g., word frequency, distinctiveness) and decreasing others (e.g., slogan length, concreteness) was challenging. Each single word-change affected several of these variables. For instance, substituting a more frequent word also tended to decrease distinctiveness and increase concreteness, due to the intercorrelations among the variables. To address this limitation, we focused on changing the factors that had the largest effects in Study 1 (e.g., word frequency, concreteness).

To ensure that our edits successfully manipulated the linguistic variables as intended, we created a weighted measure of each slogan's *linguistic fluency*: that is, the extent to which the slogan contained relatively (a) few words, (b) frequent words, (c) distinctive words, and (d) abstract words. For each slogan, we standardized each of its variable scores (i.e., slogan length, word frequency, distinctiveness, and concreteness), weighted them by the standardized regression coefficient for that variable obtained in Study 1, and then summed them. Thus, each of the four factors was weighted according to the magnitude of its effect on liking and memory (using the data from Study 1), and higher standardized scores corresponded to more fluent linguistic properties (i.e., fewer, more frequent, more distinctive, and less concrete words). Across the sixteen pairs of attitude targets and memory targets, the slogans that we intended to be more fluent were significantly higher in linguistic fluency (M = .08, SD = .14) than the slogans that we intended to be disfluent (M = -.08, SD = .19), $t(30) = 2.72$, $p = .01$. Thus, we successfully manipulated the target slogans. See Web Appendix D for further detail.

As an additional validation of these fluency differences, we conducted a follow-up study with human raters. Participants (N = 636) rated the slogans on the single-item, seven-point semantic differential scale validated by Graf, Mayer, and Landwehr (2017) for processing fluency. The results confirmed that the slogans intended to be more fluent were indeed processed more fluently (M = 5.34, SE = .03) than their disfluent counterparts (M = 4.46, SE = .03), F(1, 635) = 827.42, p < .001, and the effect size was large, η^2 = .566.

Procedure. The experiment included 50 slogans: 8 attitude targets + 8 memory targets + 9 brand name targets (25 total) × 2 versions (original, edited). We created two experimental lists, with each list including only one version of each slogan (either original or edited), and each list including an approximately equal number of original and edited slogans within each of the target-types (attitude, memory, and brand name targets). Thus, each list included 25 experimental slogans. To reduce the likelihood of a ceiling effect in the recognition memory test, we followed the procedure of prior studies (e.g., Cortese et al. 2010) by including 50 stimuli in the evaluation phase for each experimental list. To do so, we randomly sampled 25 additional slogans from Study 1, and we used these *filler slogans* in the evaluation phase for both experimental lists. Finally, to include an equal number of slogans that were not previously shown (i.e., "foils") in the memory test, we randomly selected an additional 50 slogans to use as foils in the memory test. The filler slogans and foil slogans were constant across conditions.

The procedure was similar to that of Study 1. Participants were randomly assigned to evaluate one of the two lists of slogans. The 50 slogans within each list (25 experimental + 25 fillers) were presented one at a time in random order, with the brand name appearing below the slogan. For each slogan, participants rated *slogan liking* ("Overall, how much do you like this slogan?"), *slogan familiarity* ("Prior to this survey, how familiar were you with this slogan?"), and *brand familiarity* ("Prior to this survey, how familiar were you with this brand?"), on scales from 1 to 7. After evaluating the 50 slogans, participants took a brief filler survey and then completed a surprise recognition test. Participants viewed 100 slogans, 50 of which they had previously evaluated (old), and 50 of which they had not seen (new). The slogans appeared onscreen one at a time, and participants indicated whether or not they had previously evaluated the given slogan.

Analyses. For each dependent variable, we analyzed the data using a mixed-effects linear model with random effects for participant and slogan, and a fixed effect for edited/original. To further assess memory, we also performed a mixed effects binary logistic regression (with random effects for participant and slogan, and a fixed effect for edited/original) to identity the odds ratios for slogan recognition.

Results

Attitude targets. As predicted, participants had a more favorable attitude towards the edited (i.e., fluent) slogans (M = 4.48, SE = .11) than the original (i.e., disfluent) slogans (M = 3.22, SE = .11), b = -1.26, t(1935.20) = 15.17, p < .001. The slogan version (original vs. edited) did not affect participants' familiarity with the brand, b = -.115, t(1935.38) = 1.77, p = .08. Counterintuitively, however, participants rated the edited slogans (M = 2.99, SE = .34), which they could not have seen before the experiment, as being more familiar than the original, unedited slogans (M = 1.93, SE = .34), b = -1.06, t(1934.89) = 12.62, p < .001. These findings are consistent with our prediction that processing fluency underlies the effect of psycholinguistic properties on attitudes: More fluent stimuli seem more familiar (Whittlesea 1993), thereby improving attitudes toward the stimulus (Alter and Oppenheimer 2009). Here, the slogans that we edited to be more fluent were (mis)perceived as being more familiar, and they also improved

attitudes. However, participants remembered significantly fewer edited slogans (M = .85, SE = .03) than original slogans (M = .89, SE = .03), b = .037, t(1935.01) = 2.53, p = .012. The results of a mixed-effects logistic regression (β = .356, SE = .14, p = .012) further revealed that the odds of memory for the original slogans were 1.43 times that of the edited slogans (i.e., the original slogans were 43% more likely to be remembered than the edited slogans; 95% CI: 1.08–1.88). Thus, by manipulating the linguistic properties of real brand slogans, we successfully improved attitudes toward those slogans and even increased the slogans' perceived familiarity, but this improvement in attitudes came at the cost of decreased memorability.

Memory targets. As intended, participants remembered significantly more of the edited (i.e., disfluent) slogans (M = .81, SE = .04) than the original (i.e., fluent) slogans (M = .62, SE = .04), b = .190, t(1935.03) = 9.72, p < .001. A mixed-effects logistic regression (β = 1.04, SE = .11, p < .001) further showed that the odds of memory for the edited slogans were 2.82 times (i.e., more than double) that of the original slogans (95% CI: 2.28–3.49). However, this increased memorability impaired attitudes towards the slogans; participants reported less positive attitudes towards the edited slogans (M = 3.74, SE = .15) than the original slogans (M = 4.14, SE = .15), b = -.395, t(1932) = 4.75, p < .001. The slogan version (original vs. edited) did not affect participants' familiarity with the brand, b = -.037, t(1935) = .45, p = .65. Also unsurprisingly, the edited slogans (M = 2.18, SE = .24) were rated significantly less familiar than the original, unedited slogans (M = 2.53, SE = .24), b = -.352, t(1935.19) = 4.16, p < .001. Thus, by manipulating the linguistic properties of real slogans, we successfully improved the slogans' memorability, but this improvement came at the cost of decreased attitudes toward the slogans.

Brand name removed. As predicted, participants reported more favorable attitudes towards the edited slogans without the brand name (M = 3.28, SE = .12) than the original slogans with the brand name (M = 2.85, SE = .12), b = -.425, t(1209.16) = 4.24, p < .001. However, they remembered the original slogans (M = .89, SE = .04) significantly better than the edited slogans (M = .62, SE = .04), b = .270, t(1208.41) = 11.72, p < .001, with the odds of memory for the original slogans being 5.13 times (95% CI: 3.77–6.99) that of the edited slogans (β = 1.64, SE = .16, p < .001). Participants (mis)perceived the edited slogans as more familiar (M = 1.34, SE = .07) than the original slogans (M = 1.19, SE = .07; b = -.152, t(1209.31) = 3.10, p = .002). Thus, removing the brand names from real slogans successfully improved attitudes toward those slogans and even increased the slogans' perceived familiarity, but reduced their memorability.

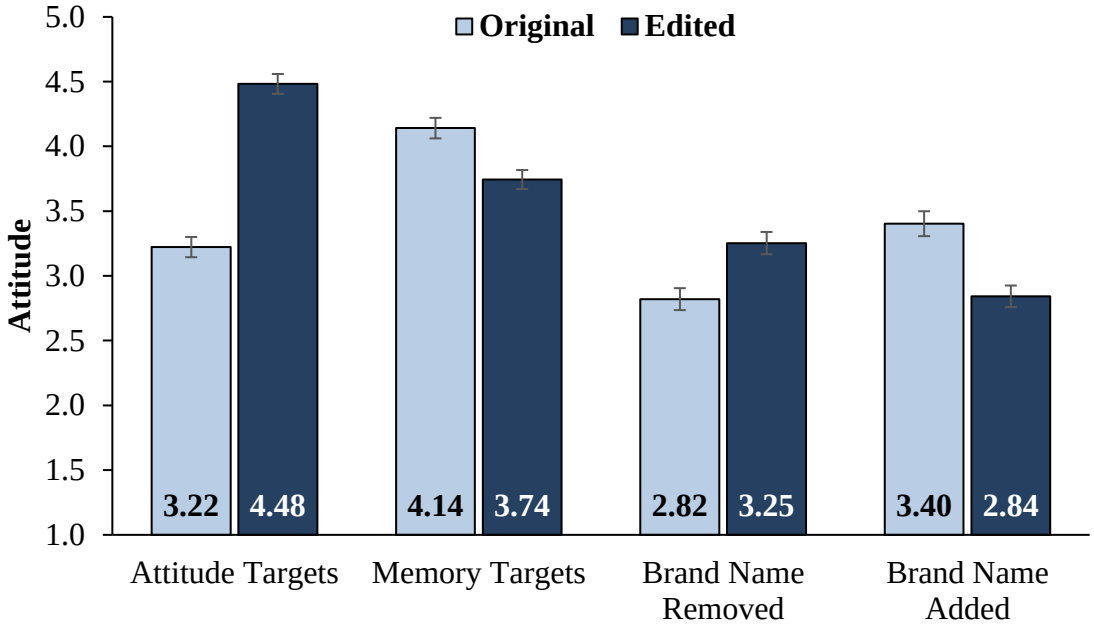
Brand name added. Mirroring the results of when we removed the brand name from slogans, editing slogans to include the brand name (M = .92, SE = .05) made the slogans more memorable than the originals (M = .65, SE = .05), b = .264, t(967.02) = 10.73, p < .001, with the odds of memory for the edited slogans being 6.42 times (95% CI: 4.38–9.40) that of the original slogans (β = 1.86, SE = .19, p < .001). However, participants reported less favorable attitudes towards the edited slogans with the added brand name (M = 2.84, SE = .25) than the original versions (M = 3.40, SE = .25), b = -.557, t(967) = 4.87, p < .001. Thus, adding brand names made the slogans less likable but more memorable. It did not influence participants' ratings of brand familiarity (b = -.015, t(968.07) = .20, p = .84) nor slogan familiarity (b = -.088, t(967.02) = 1.06, p = .29). Furthermore, these results cannot be attributed to seeing the brand name twice (i.e., once in the slogan and once beneath it, see Web Appendix F for details).

Discussion. By altering the linguistic properties (i.e., slogan length, word frequency, distinctiveness, and concreteness) of real slogans, we successfully improved either participants' attitudes toward or memory of the slogans. Notably however, improving participants' attitudes towards the slogan impaired their memory of it; conversely, improving memory impaired

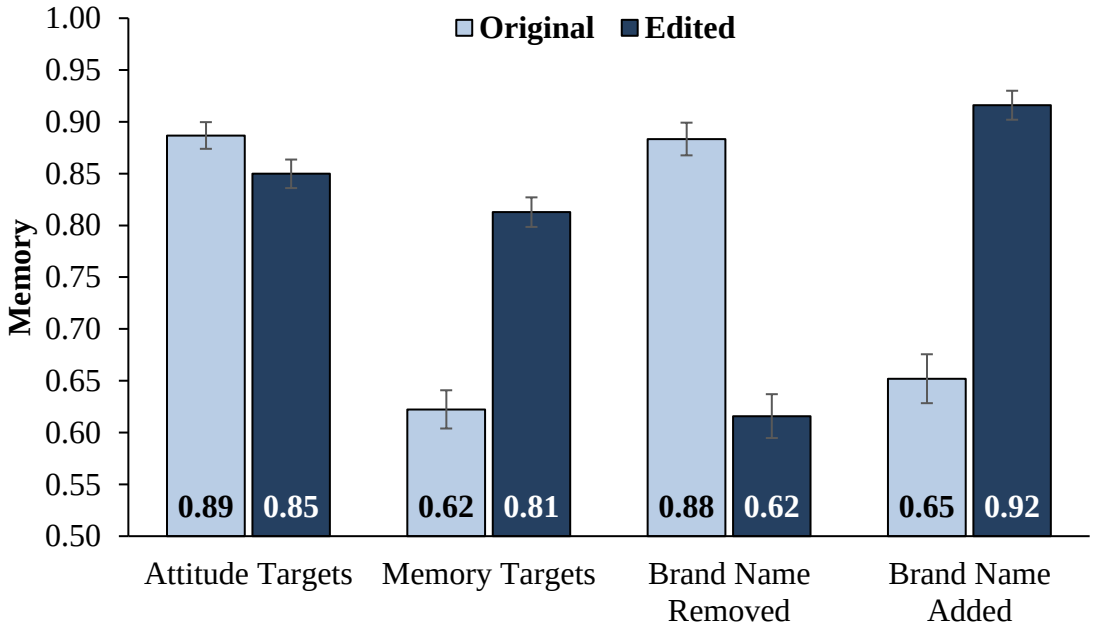
attitudes. Also, removing the brand name from the slogan improved participants' attitudes towards the slogan but impaired their memory of it, whereas adding the brand name improved memory but impaired attitudes. The results, which we display in Figure 3, corroborate our findings from Study 1 and demonstrate how marketers, politicians, and organizations of all stripes can improve consumers' attitudes toward or memory of their slogans.

Figure 3. (**A**) Mean attitude ratings and (**B**) memory accuracy (proportion correct), Study 2. Error bars indicate ±1 *SE*.

A.



B.



Study 3

In Study 2, we improved either attitudes toward or memory of slogans by manipulating their linguistic properties to make them more or less fluent. By varying slogan length, word frequency, distinctiveness, and concreteness, we argue that the slogans became easier or harder to process. Study 3 tested this processing fluency explanation by changing a single word in the slogans (e.g., "Echo around the world" to "Echo around the globe") and tracking participants' eye movements while they read the slogan.

Eye tracking provides two direct but implicit measures of processing fluency: how many times readers look at a word (i.e., fixation count) and how long they look at the word (i.e., fixation duration). When readers easily understand a word, they look at it less often and for less time. Conversely, when readers do not easily understand a word, they look at it more often and for longer, as they attempt to makes sense of it (Rayner 1998). Thus, if our processing fluency explanation is correct, then the words that we edited to be more frequent and distinctive, and less concrete (e.g., "world") should elicit fewer and shorter fixations than words that are less-frequent, less distinctive, and more concrete (e.g., "globe"). For comparison, we also examined how long and how often participants fixated on the other words in the slogan that we did not manipulate. Prior research has shown that a single disfluent word tends to selectively slow reading of that word without affecting reading of other words in the text (Reingold and Rayner 2006; Sanchez and Jaeger 2015). We therefore expected the manipulation to selectively reduce fixation counts and durations for the edited word, but not for the other words in the slogan.

Method

Participants. Eighty-four undergraduates (57% females) at a U.S. university participated.

Stimuli. We selected ten slogans from Study 1 and created a second version of each that differed in its linguistic properties, but not meaning. As a stringent manipulation, we edited only a single word in each slogan and replaced it with a synonym that differed primarily on a single factor (i.e., frequency, distinctiveness, or concreteness). We altered five of the slogans by replacing the focal word with a more fluent word, and we altered the other five slogans by replacing the focal word with a less fluent word. For example, we changed Tyco's slogan "a vital part of your world" to "a crucial part of your world" (more perceptually distinct; fluent); we changed Edison Records' slogan "echo around the world" to "echo around the globe" (less frequent; disfluent). See Web Appendix C for a complete list of the stimuli. We again validated our slogan manipulations using the measure of linguistic fluency described in Study 2 (see Web Appendix D for detail). Across the ten slogan pairs, the slogans that we intended to be more fluent were significantly higher in linguistic fluency (M = .11, SD = .14) than the slogans that we intended to be disfluent (M = -.11, SD = .13), $t(18) = 3.72$, $p < .01$. Thus, we successfully manipulated the slogans' linguistic fluency.

Procedure. As in Study 2, we created two lists so that each participant evaluated (a) an equal number of fluent and disfluent slogans and (b) only one version of each slogan. We conducted the experiment using a Tobii TX300 remote screen-based eye tracker at a sampling rate of 120 Hz (i.e., 120 gaze metrics per second). We first calibrated the eye tracker to each participant, randomly assigned them to one of the two lists, and left them alone to complete the study. Participants evaluated the slogans, one at a time, by pressing the number keys 1 (dislike) through 7 (like). Each slogan appeared automatically after participants evaluated the previous slogan. Participants saw a fixation cross before each slogan and were told to look at the cross until the new slogan appeared. Participants rated two filler slogans, which were the same in both lists, and then the ten experimental slogans.

Results

Data normalization. Because we manipulated one word within each slogan (e.g., "crucial" instead of "vital"), the size of the areas of interest (AOIs) around the target words and slogans varied. Overall, the AOIs were slightly larger for the fluent words (M = 1.64% of the display area) than the disfluent words (M = 1.55%), and for the fluent slogans (M = 7.26%) than the disfluent slogans (M = 7.16%). Consequently, the fluent condition might exhibit more and/or longer fixations simply due to covering a larger space. Following standard procedure in such cases (Holmqvist et al. 2011), we normalized our measures by dividing the raw scores by the total area of the given AOI (see Birmingham, Bischof, and Kingstone 2009). For instance, if a given target word occupied 2.0% of the visual display and elicited a mean of 1.5 fixations, then its normalized fixation count would be 0.75 (i.e., 1.5/2). The analyses reported below use these normalized measures. As in the previous study, we analyzed the data using linear mixed-effects models with random effects for participant and slogan, and fixed effects for AOI (word, slogan) and version (more-fluent, less-fluent).

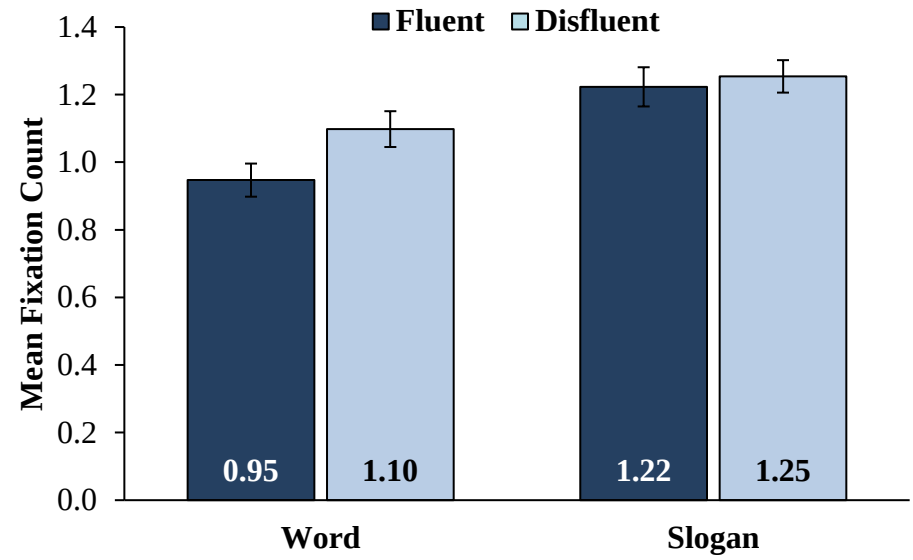
Fixation count. As predicted, the results (Figure 4a) revealed a significant main effect of slogan version, $F(1, 829.05) = 4.21$, $p = .041$. Specifically, participants fixated more frequently when they read the disfluent version of the slogan (M = 1.18, SE = .10) than when they read the fluent version (M = 1.09, SE = .10). The main effect of AOI was also significant $F(1, 838) = 62.54$, $p < .001$, indicating that participants fixated more on the whole slogan (M = 1.24, SE = .10) than on the target word (M = 1.02, SE = .10). As expected, these effects were further qualified by a significant interaction, $F(1, 838) = 4.90$, $p = .027$. Specifically, participants looked more often at the target words of the disfluent slogans (M = 1.10, SE = .16) than the fluent slogans (M = .95, SE = .16), $b = .152$, $t(828.99) = 2.60$, $p = .01$, but the manipulation did not influence how frequently participants looked at the other words in the slogans ($p = .44$).

Fixation duration. The same analysis of fixation durations (Figure 4b) revealed a significant main effect of slogan version, $F(1, 829.16) = 18.99$, $p < .001$. As predicted, participants fixated longer when reading the slogans with disfluent target words (M = .07, SE = .004) than when reading the slogans with fluent target words (M = .06, SE = .004). The main effect of AOI was also significant, $F(1, 838.01) = 479.65$, $p < .001$, such that the target words elicited longer fixations (M = .10, SE = .004) than fixations on any other words in the slogans (M = .03, SE = .004). Once again, these effects were qualified by the predicted interaction, $F(1, 838.01) = 21.15$, $p < .001$. Specifically, participants fixated longer on the target words of the disfluent slogans (M = .12, SE = .008) than the fluent slogans (M = .09, SE = .008), $b = .029$, $t(829.28) = 4.61$, $p < .001$, but the manipulation did not influence how long participants fixated on the other words in the slogan (p =.63).

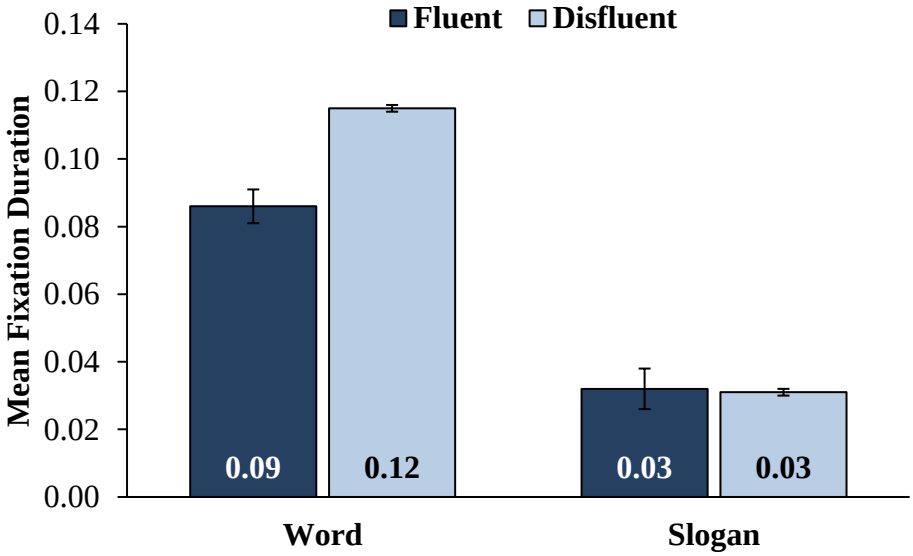
Discussion. Biometric eye tracking technology revealed that participants more easily processed slogans that contained words that are more frequently used, more perceptually distinct, and less concrete. Moreover, this fluency difference emerged only when participants processed the target word, not the other words in the slogan. These results are consistent with our hypothesized process: Readers needed to look at disfluent words more often and for longer to understand them. Study 3 builds on the previous studies to suggest that consumers are more likely to like but less likely to remember slogans that use more frequent, more perceptually distinct, and less concrete words because they process these slogans more fluently.

Figure 4. (**A**) Mean fixation counts and (**B**) mean fixation durations on the target word or whole slogan in Study 3. Values are normalized to correct for differences in the size of the AOIs. Error bars indicate ±1 *SE*.

A.



B.



Study 4

We extend our investigation to a more realistic context in Study 4. We showed participants "bumper ads" with either the brand's original slogan, or a new version of the slogan that we edited to be more or less fluent (see Web Appendix C). On platforms like YouTube, consumers often need to watch a brief (6 seconds or less), non-skippable bumper ad before watching a video. In Study 4a, participants viewed bumper ads and indicated their liking of the slogans. In Study 4b, participants watched thirty-second YouTube videos with the same set of bumper ads appearing for 6 seconds at the start of each video. After evaluating the YouTube videos (a decoy), participants completed a surprise memory test for the slogans in the bumper ads.

Study 4a: Method

Participants. Four hundred one undergraduates (57% females) at a U.S. university participated in the study.

Stimuli. We edited the words in six of the slogans from Study 1 to vary the linguistic properties of the slogan without changing its meaning. For each slogan, we created a simple ad, consisting of the brand name, logo, and slogan, and in some cases the product. The two versions of each ad were identical except for the edited slogan words. For example, Toyota's slogan changed from "Get the Feeling" to "Snag the Sensation" (see Web Appendix C for details). We again validated our slogan manipulations using the measure of linguistic fluency developed in Study 2 (see Web Appendix D for detail). The slogans that we intended to be more fluent were significantly higher in linguistic fluency (M = .13, SD = .18) than the slogans intended to be disfluent (M = -.13, SD = .08), $t(6) = 2.64$, $p = .039$. Thus, we successfully manipulated the slogans.

Procedure. As in the previous studies, we created two lists, so that each participant evaluated only one version of each ad, and an equal number of fluent and disfluent slogans. The procedure was identical to that of Study 1, except that each participant evaluated six ads, which appeared one at a time in random order, and did not complete the surprise memory test. For each ad, participants rated *slogan liking*, *brand attitude*, *slogan familiarity*, and *brand familiarity* on scales from 1 to 7.

Study 4a: Results

Each participant evaluated three fluent slogans and three disfluent slogans. As in the preceding studies, we analyzed the data using a linear mixed-effects model with random effects for participant and slogan. As predicted, participants liked the fluent versions of the slogans (M = 3.98, SE = .13) more than the disfluent versions (M = 3.22, SE = .13), b = -.761, $t(2399.98) = 10.26$, $p < .001$. They similarly expressed more positive attitudes towards brands with fluent slogans (M = 4.23, SE = .13) than disfluent slogans (M = 3.69, SE = .13), b = -.542, $t(2399.68) = 8.19$, $p < .001$. Moreover, participants claimed to be more familiar with the fluent slogans (M = 2.18, SE = .24) than the disfluent slogans (M = 1.83, SE = .24), b = -.357, $t(2398.99) = 5.12$, $p < .001$, even though half of the fluent slogans were actually the (new) edited versions that we created. Participants similarly rated the brands as more familiar for the fluent slogans (M = 4.77, SE = .87) than for the disfluent slogans (M = 4.68, SE = .87), b = -.099, $t(2396.90) = 1.95$, $p = .05$, although this difference was small.

In sum, Study 4a replicated the results of Study 2 in a more realistic setting. It also revealed that a slogan's linguistic properties not only impact slogan liking, but also shape brand attitudes: Participants had more favorable attitudes towards brands that used fluent compared to disfluent slogans. Thus, firms can improve a slogan's likability and its brand image by varying the linguistic properties to make its words more fluent.

Study 4b: Method

Participants. Four hundred eighty-seven undergraduates (52% females) at a U.S. university participated.

Stimuli. We used the six bumper ads from Study 4a as the target stimuli. We also included four filler ads to use in the memory task. The filler ads were conceptually and visually similar to the target ads, but we did not manipulate the slogans in them. As in the preceding studies, we created two experimental lists, so that each participant saw only one version of each target ad, and each participant saw an equal number of fluent and disfluent slogans. The filler ads were the same across both lists.

Procedure. To disguise the purpose of the study, we told participants that we were studying YouTube videos and instructed them to watch ten videos. Each video began with a 6-second bumper ad, followed immediately by 30-seconds of sports highlights. To create a viewing situation that parallels the way that most consumers view ads online, we did not mention the bumper ads in the instructions. To minimize primacy and recency effects on the subsequent memory task, we had participants view the filler ads in the first, second, ninth, and tenth videos. The six target ads appeared, randomly, before videos 3-8. To maintain the cover story, we asked participants three questions after they finished watching the videos (e.g., "What is your overall attitude toward these YouTube videos?"). Participants then completed an unrelated filler task that lasted approximately eight minutes. Finally, participants completed a surprise recognition memory test, consisting of twenty slogans: Ten were "old" (i.e., the 6 targets + 4 primacy and recency fillers seen during the YouTube video phase) and ten were "new" (i.e., 10 fillers not previously seen). We asked participants to "indicate whether you saw each slogan earlier during the survey" by checking either "yes" or "no." The twenty slogans appeared in random order.

Study 4b: Results

We used the same linear mixed-effects model as in the preceding studies to analyze the data. As predicted, participants better remembered the disfluent versions of the slogans (M = .59, SE = .04) than the fluent versions (M = .44, SE = .04), b = .152, $t(2912.07) = 8.47$, $p < .001$, and the results of a mixed-effects binary logistic regression analysis revealed that the odds of memory for the disfluent slogans were 1.88 times (i.e., nearly double) that of the odds of memory for the fluent slogans (β = .631, SE = .08, $p < .001$; Exp (β) 95% CI:1.62–2.18). Study 4b thus confirms that slogans with less-fluent words are better remembered, even when participants were incidentally exposed to the slogans in a more realistic context.

Replication: Slogan Recall

As an additional robustness test of these results, we conducted a modified version of Study 4b that used an alternative memory measure: free recall. Specifically, we were interested in how often the manipulated target words would be correctly recalled in the disfluent vs. fluent versions of the slogans after incidental exposure during the brief YouTube bumper ads. As predicted, the results replicated those of Study 4b: Participants better recalled the disfluent versions (M = .17, SE = .01) of the slogans than the fluent versions (M = .12, SE = .01), $t(531) = 4.43$, $p < .001$ (see Web Appendix G for details).

Study 5

Do the words in an advertising slogan influence the success of the ad? In line with industry practice and the literature, our previous studies measured slogan attitude and memory. However, attitude and memory measures are limited because they do not directly assess whether the slogan changes consumers' behavior. Our final study attempts to address this limitation by

switching to the context of online advertising, where it is possible to measure whether a slogan directly influences behavior. Specifically, we test whether the words in an actual ad slogan influence if users click on a social media ad. We worked with a small business to create a fluent and a disfluent version of a slogan for its audio recording website and ran a field experiment to examine which version attracted more clicks. Because clicking does not require the consumer to remember the slogan before responding to it, we predicted that clicking behavior would mirror the effects on slogan liking such that the fluent version of the slogan would attract more clicks on the ad than the disfluent version.

Method

We partnered with a sound recording company, audio-issues.com, to conduct a field experiment through the Facebook Ads platform. We created two versions of a slogan for an audio-issues.com ad. The ads were identical except for the edited slogan words. We launched both versions of the ad on the same day with a budget of $10 per day. The ad targeted men and women aged 25 to 55 years old with an interest in "sound recording and reproduction." We told Facebook to optimize the ads for clicks because our focal metric was click-through-rate (CTR). The ads ran for 14 days, and 101,224 Facebook users were exposed to the ad.

Stimuli. We created a fluent and a disfluent slogan for the company's "Quick Mix Checklist," a free product that audio-issues.com uses to attract customers as part of a larger inbound marketing campaign. Both versions used words that meant the same thing, but the fluent version relied on words that are more frequently used and less concrete. The fluent version was: "110 tricks to make awesome mixes from your home studio." The disfluent version was: "110 tips to forge astounding mixes from your residential studio." The measure of linguistic fluency that we developed in Study 2 (see Web Appendix D for detail) confirmed that the fluent version was more fluent than the disfluent version (M = .13 vs. -.13).

Pretest. We conducted a pretest with 201 participants on Prolific to further confirm that consumers perceived the fluent version as more fluent than the disfluent version. Participants viewed either the fluent or disfluent version of the slogan and rated its fluency, using the same single-item measure as in Study 2 ("how easy is it to process this slogan?"; adapted from Graf et al. 2017). As intended, participants rated the fluent slogan as being significantly more fluent than the disfluent slogan (M = 4.50 vs. 3.48, $t(199) = 4.31$, $p < .001$, $d = .61$).

Results and Discussion. The experiment allocated the same budget to the fluent ($275.86) and disfluent ($275.87) versions of the ads, and the fluent and disfluent versions received a similar number of impressions (50,523 and 50,701, respectively). As predicted, however, the fluent version of the ad earned more clicks (841 vs. 658), a higher CTR (1.66% vs. 1.30%; $\chi^2 = 23.34$, $p < .001$), and a lower cost-per-click (CPC: $.33 vs. $.42).

A field experiment using the Facebook Ads platform revealed that slogans' fluent (vs. disfluent) linguistic properties have a similar effect on clicking behavior as they have on slogan attitudes. Specifically, a slogan that contained less concrete and more frequently used words attracted more clicks, a higher CTR, and a lower CPC than a synonymous slogan that contained more concrete and less frequently used words. Slogan words matter, not only for upper-funnel measures like slogan liking and recognition, but also for lower-funnel behavior.

General Discussion

We respond to the call to challenge the boundaries of consumer research (MacInnis et al. 2020) by using multiple methods and harnessing knowledge from cognitive psychology and linguistics to illuminate a marketing-relevant phenomenon. Slogans are an integral part of a

brand's DNA. Firms want to write slogans that consumers remember and like, but marketers do not have clear advice for how to do this. Our research gives marketers an objective method by which they can improve attitudes toward or memory of slogans: change the lexical and semantic properties of the words.

Consumers have more favorable attitudes towards slogans that use fewer words, omit the brand name, and contain words that are more frequently used, perceptually distinct, and abstract (Studies 1, 2, and 4). However, the same linguistic properties that make slogans more likable also make them less memorable (Studies 1, 2 and 4). This is because consumers more fluently process slogans that are shorter, omit the brand name, and contain frequently used, perceptually distinct, and abstract words. Specifically, they fixate less often and for less time on slogan words that are frequently used, perceptually distinct, and less concrete (Study 3). Consequently, when consumers encounter fluent slogans, they are more likely to like (Study 4a) and click on (Study 5) the ads but remember them less accurately (Study 4b). Our research thus advances the literature, which has explored only a limited range of linguistic characteristics of slogans (i.e., slogan length and inclusion of the brand name), and only in isolation, to provide an integrative framework documenting how fluency helps explain which linguistic characteristics make slogans more likable, and which characteristics make slogans more memorable. Our research moves beyond the advice to write slogans that are "creative" or that "capture the soul of the brand" by showing how advertisers, public policy makers, and organizations of all types can craft likable or memorable slogans.

Conceptual Implications: A Framework for Understanding Slogan Linguistics

We contribute to scholars' understanding of brand slogans by identifying fluency as a mechanism that can explain how different linguistic characteristics influence the extent to which consumers like and remember a slogan. Previous research has either examined slogans holistically, by focusing on their overall meaning rather than the properties of their individual words (Allard and Griffin 2017; Dimofte and Yalch 2007; Kohli et al. 2007; Kronrod et al. 2012), or disjointedly, by investigating how one or two particular characteristics (e.g., slogan length and/or brand name inclusion) influence one particular type of consumer response (i.e., liking or memory but not both; Dass et al. 2014; Kohli et al. 2013). In contrast, we develop a parsimonious framework that explains how a range of linguistic characteristics influence both liking and memory of brand slogans.

By investigating both slogan liking and memory, we demonstrate that the linguistic characteristics that facilitate liking hinder memory, and vice versa. We thus reveal an unrecognized trade-off between the extent to which consumers like a slogan and the extent to which they remember it. Our research thereby helps explain why studies that have measured slogan memory (Kohli et al. 2013) report different results than studies that have measured attitudes (Dass et al. 2014): The same characteristics that make a slogan more memorable (e.g., slogan length) may not make it more likable, and vice versa.

As advances in natural language processing continue to unearth additional measurable linguistic characteristics, our framework offers a promising guide to predict how emerging linguistic variables are likely to influence consumers. If the variable makes a slogan (or sentence, brand name, etc.) easier to process, its effects should be similar to including words that are frequently used yet visually distinct: Consumers will have a more favorable attitude towards the slogan. In contrast, if the variable makes a slogan harder to process, its effects should be more

similar to including the brand name or using words that are concrete: Consumers will better remember the slogan.

Practical Implications: How Can Brands Improve Their Slogans?

Before they can answer this question, marketers need to set their objective: Do they want their slogan to be more liked or better remembered? Our research reveals a trade-off: The linguistic properties that improve attitudes towards slogans tend to also impair memory, but words that make a slogan easier to remember also make them harder to like (see Table 2).

Whether marketers should seek to improve attitudes towards or memory of slogans depends on whether the brand is already well-known. Memorable slogans help brands build awareness, which is the initial stage in the customer decision journey (Batra and Keller 2016). Unknown brands benefit when more consumers become aware of them. Thus, brands that are new, have a small market share, or are trying to expand to new markets would benefit by using less-fluent slogans that include the brand name along with words that are less-frequently used, less distinctive, and more concrete.

Established brands, in contrast, have less to gain from a memorable slogan, and more to lose from an unlikable slogan. Brands that are already well-known should therefore create fluent slogans that are shorter, omit the brand name, and use words that are frequent, perceptually distinct, and abstract. Coca-Cola has generally followed this strategy over its 130-year history. When Coke was young, its slogans tended to be longer, mention the brand name, and rely on less-frequently used, (relatively) concrete words: "Coca-Cola revives and sustains" (1905); "The great national temperance beverage" (1906); "Whenever you see an arrow think of Coca-Cola" (1910). By the 21st Century, Coke had become ubiquitous, and its slogans tended to be shorter, omit the brand name, and rely on frequently used, abstract words: "Enjoy" (1999); "Open happiness" (2010); "Taste the feeling" (2016).

Our research calls for marketers to evaluate their current slogans in light of their objectives. If their primary objective is to increase awareness, then marketers should try to create slogans with less-fluent linguistic properties. Marketers can revise the words in a slogan to make it more memorable without changing the meaning of the slogan, as we did in Studies 2, 3, 4, and 5. If the slogan does not include the brand name, the simplest fix would be to add it. Cerebos (a brand of salt and spices) could change "See how it runs!" to "See how Cerebos runs!" Greggs (a bakery chain) could change "Ready when you are" to "Greggs is ready when you are." Brands can also look to add words (e.g., "Greggs is ready when you are hungry"), swap more-frequent for less-frequent words (e.g., "Greggs is prepared when you are famished"), or make the words more concrete (e.g., "Greggs is at your fingertips when your stomach aches").

Analogously, managers can improve attitudes towards slogans by changing the words to be more fluent, as we did in Studies 2, 3, 4, and 5. Brands that are already well-known could first look to drop their name. "Guinness is good for you" could become "It is good for you." "Like a good neighbor, State Farm is there," could become "Like a good neighbor, we are there." Established brands could also look to cut words (e.g., "Like a ~~good~~ neighbor") or use words that are more frequent and abstract (e.g., "Like a friend"). Marketers can use existing databases to check the extent to which the words in their slogans are frequently used (Brysbaert and New 2009), perceptually distinct from other words (Balota et al. 2007), and abstract (Brysbaert et al. 2014) and a thesaurus to identify synonyms with linguistic properties that make the slogan more or less fluent, depending on whether the brand wants to be liked or remembered.

Table 2. Managerial Guide: What words should a brand use in its slogan?

	Brand Type	
	New / Earlier in lifecycle Unfamiliar brands Niche / Seek controversy	**Established / Later in lifecycle Familiar brands Market leaders / Seek broad audience**
Which objective should the brand pursue?	*Craft a memorable slogan*	*Craft a likeable slogan*
Should the slogan be long?	Yes	No
Should the slogan use common words?	No	Yes
Should the slogan use distinct words?	Probably not (more data needed)	Yes
Should the slogan use concrete words?	Yes	Probably not (more data needed)
Should the slogan include the brand name?	Yes	No

Limitations and Opportunities for Future Research

Our research is limited and leaves questions unanswered. For instance, is the trade-off that we find between liking and memory specific to the linguistic characteristics of slogans, or are disliked things generally remembered better? Scholars have explored the relationship between liking and memory in prior research (e.g., Lynch, Alba, and Hutchinson 1991; Eagly et al. 1999). Unsurprisingly, some factors, such as fluency (Alter and Oppenheimer 2009) and the congruence of a product placed within a television program (Russell 2002), tend to help liking while hurting memory, whereas other factors, such as prior exposure (Hintzman 1970; Zajonc 1968) and being a pioneer brand (Alpert and Kamins 1995), tend to boost both liking and memory. A detailed discussion of this literature is beyond the scope of our paper, but we encourage scholars to identify ways to potentially make slogans both more likable and more memorable.

One such way could be to give the slogan a meaning that resonates with consumers. Thus, a second question that we do not address is what message should a brand attempt to convey with its slogans? We know that a slogan should reinforce the core value proposition, personality, or story that the brand hopes to communicate (Keller 1993), but marketers may not know what, specifically, about their brand they want their slogan to communicate. Future research should continue to investigate which meanings slogans should convey in addition to which words they use to do so, as a resonant meaning might help brands design slogans that are both remembered and liked.

A third question: Do the effects of a slogan's linguistic properties interact with the image or positioning of a brand? For example, given that luxury brands are more congruent with abstract words whereas utilitarian brands are more congruent with concrete words (Hansen and Wänke 2011; Massara, Scarpi, and Porcheddu 2020), might luxury brands benefit more from relying on slogans with abstract words? Similarly, might exciting brands benefit more from disfluent slogans, in the same way that they benefit from asymmetric logo designs (Bajaj and Bond 2018; Luffarelli, Stamatogiannakis, and Yang 2019)? Are there other types of brands or situations in which disfluent slogans might increase slogan liking (Labroo and Pocheptsova

2016)? Indeed, recent research has shown that consumers may interpret experiences of disfluency positively in certain contexts (Song and Schwarz 2009; Thompson and Ince 2013).

A fourth question: How do the individual linguistic properties interact? Although we find that linguistic word properties that make a slogan more fluent make it more likable but less memorable, evidence for the individual effect of some of the linguistic variables is less consistent. For instance, words that are more frequently used also tend to be less distinct, which means that for most words frequency and distinctiveness will have competing effects. Which effect is likely to dominate? While investigating each of these variables simultaneously provides for a conservative estimate of their collective and individual effects, future research could explore the extent to which these individual effects are robust as well as identify potential factors that moderate them.

A fifth question: How does repeated exposure to a slogan influence how consumers respond to slogans with different linguistic properties? One possibility is that repeated exposure to a slogan will make it more fluent, which could make even slogans with relatively disfluent linguistic properties more likable over time. Another possibility is that the optimal number of exposures to a slogan could depend on whether the words in the slogan have relatively fluent or disfluent linguistic properties. Just as consumers begin to respond negatively after fewer exposures to simpler advertisements compared to complex advertisements (Anand and Sternthal 1990), consumers might become annoyed with slogans that have fluent linguistic properties sooner than they become annoyed with disfluent slogans.

Finally, would our results persist over time? We encourage future research to collect longitudinal data to test whether the effects of slogan linguistics on liking and memory endure over time. Research on advertising suggests that memory effects tend to remain stable, but liking for ads can change, especially for ads that consumers see frequently (Kronrod and Huber 2019).

Conclusion

Firms spend millions trying to craft slogans that bolster the equity of their brand. Historically, cultivating an effective slogan has been more art than science. Our research attempts to give science a larger role by offering marketers, advertisers, and creatives objective guidance on how to pick the words in a slogan. Brands that want to be remembered should create slogans that are longer, include the brand name, and that use less frequent, less distinct, and more concrete words. Brands that want their slogans to be more liked should create slogans that are shorter, omit the brand name, and that use frequent (yet visually distinct) and less concrete words. BMW, for instance, could craft a more memorable slogan by changing “the ultimate driving machine” to “the peak driving machine,” but this would also make the slogan less well-liked. By choosing words strategically, brands can craft more likeable or memorable slogans.

Words – so innocent and powerless as they are, as standing in a dictionary, how potent for good or evil they become in the hands of one who knows how to combine them.

Nathaniel Hawthorne, 1848

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Intel Inside: The Linguistic Properties of Effective Slogans

Web Appendices

Web Appendix A: Slogan Dataset Collection, Study 1

We collected a large dataset of actual brand slogans for analysis in Study 1 from the public repositories of various online slogan consultancy firms and websites. The initial collection resulted in 1,243 brand slogans, of which 830 brand slogans were unique. We then collected liking, memory, and familiarity ratings, as described in Study 1.

Lewis Silkin – AdSlogans Search Database
https://www.lewissilkin.com/en/cmi/services/intellectual-property/adslogans

Eric Swartz – TaglineGuru (The Byline Group Inc.) Database
https://www.taglineguru.com/sloganlist.html

Adglitz – Online Slogan Repository
-http://www.adglitz.com/blog/2010/08/top-n-best-100-ad-slogans-taglines-punchlines-advertising-campaigns
-http://www.adglitz.com/blog/2011/01/top-n-best-100-ad-slogans-taglines-punchlines-advertising-campaigns-part-2-of-2

Online Slogan Repositories
-http://www.workplace-communication.com/top-100-slogans.html
-http://www.ad-mad.com/slogans

Web Appendix B: Additional Analyses, Study 1

I. Additional Variables: Full Model

In the main text we present results of a "linguistic model" (Table 1B) that included five key linguistic properties that we found to predict slogan liking and/or memory. As is standard in psycholinguistic research (e.g., Balota et al. 2004; Kuperman et al. 2014), however, we also analyzed a host of additional factors known to influence word processing. Here we describe the full set of possible predictor variables that we examined, and in subsequent sections of Web Appendix B we explain how we selected those five key variables included in our "linguistic model," we describe alternative methods for selecting variables, and we report comparisons to other possible models.

In total, we examined fifteen lexical, semantic, and affective variables for each slogan. We measured *slogan length* in two ways, as the number of (i) words and (ii) characters in the slogan. We used four measures to assess *word length*: the average number of (i) letters, (ii) phonemes, (iii) syllables, and (iv) morphemes of the words in the slogan (Balota et al. 2007). We used two measures to assess how *frequent* each word is in language: (i) the number of times the word appears in the SUBTLEX-US corpus (i.e., word frequency; Brysbaert and New 2009), and (ii) the number of different semantic contexts in which the word occurs in the SUBTLEX-US corpus (i.e., contextual diversity; Adelman, Brown, and Quesada 2006). As is standard, we log-transformed the frequency measures to correct for skew. We determined the *perceptual distinctiveness* of the words using both orthographic Levenshtein distance, which measures visual distinctiveness, and phonological Levenshtein distance, which measures auditory distinctiveness (Balota et al. 2007). We obtained values for two semantic properties of the words: *age-of-acquisition* and *concreteness*, from the databases collected by Kuperman, Stadthagen-Gonzalez, and Brysbaert (2012) and Brysbaert, Warriner, and Kuperman (2014), respectively. We retrieved two affective properties of the words: *arousal* and *valence*, from the database collected by Warriner, Kuperman, and Brysbaert (2013). Finally, we created a *brand name* variable by dummy coding whether the brand name was present in the slogan (1) or not (0).

We regressed slogan liking and slogan memory on all fifteen lexical, semantic, and affective variables, plus slogan familiarity (as a control factor). Note that because affective scores (i.e., arousal and valence) were not available for 28 of the slogans, analyses that include these factors have $N = 792$ slogans. As shown in Table A1, the full model explained a significant amount of variance in both slogan liking, $R^2 = 0.52$, $F(16, 775) = 51.65$, $p < .001$, and slogan memory, $R^2 = 0.25$, $F(16, 775) = 16.18$, $p < .001$.

Perhaps unsurprisingly, slogan familiarity significantly predicted both slogan liking ($b = 0.47$, SE = 0.02, $t = 25.52$, $p < .001$) and slogan memory ($b = 1.45$, SE = 0.31, $t = 4.62$, $p < .001$). Of the two measures of slogan length, number of words predicted both slogan liking ($b = 0.11$, SE = 0.04, $t = 3.02$, $p = .003$) and slogan memory ($b = 1.32$, SE = 0.62, $t = 2.14$, $p = .033$), whereas number of characters predicted liking ($b = -0.02$, SE = 0.01, $t = 3.28$, $p < .001$) but not memory ($b = 0.00$, SE = 0.11, $t = 0.03$, $p = .973$). None of the four measures of word length predicted either liking or memory of the slogans. Of the two measures of word frequency, contextual diversity significantly predicted slogan liking ($b = 0.42$, SE = 0.20, $t = 2.05$, $p = .041$) and marginally predicted slogan memory ($b = -6.57$, SE = 3.48, $t = 1.89$, $p = .060$). Of the two measures of perceptual distinctiveness, orthographic (visual) distinctiveness marginally predicted slogan liking ($b = 0.36$, SE = 0.19, $t = 1.89$, $p = .059$), whereas phonological (auditory) distinctiveness did not predict liking or memory. Concreteness significantly predicted both slogan liking ($b = -0.13$, SE = 0.06, $t = 2.14$, $p = .033$) and slogan memory ($b = 3.94$, SE = 1.00, $t = 3.93$, $p < .001$). Age of acquisition, arousal, and valence

had no effect on either liking or memory. Finally, brand name inclusion significantly predicted both slogan liking (b = -0.33, SE = 0.06, t = 5.82, p < .001) and slogan memory (b = 6.80, SE = 0.97, t = 7.04, p < .001).

Table A1. Results of the full model.

	Dependent Variable	
Predictor	(1) Slogan Liking	(2) Slogan Memory
Control: Slogan Familiarity[a]	0.47*** (0.02)	1.45*** (0.31)
Slogan Length		
Number of Words[a]	0.11** (0.04)	1.32* (0.62)
Number of Characters	-0.02*** (0.01)	0.00 (0.11)
Word Length		
Number of Letters	0.08 (0.08)	-2.23 (1.37)
Number of Phonemes	-0.06 (0.09)	-0.59 (1.50)
Number of Syllables	-0.20 (0.14)	1.84 (2.44)
Number of Morphemes	0.10 (0.14)	-1.88 (2.35)
Word Frequency		
Word Frequency	-0.15 (0.13)	-2.63 (2.19)
Contextual Diversity[a]	0.42* (0.20)	-6.57† (3.48)
Perceptual Distinctiveness		
Orthographic[a]	0.36† (0.19)	1.76 (3.22)
Phonological	0.04 (0.15)	1.87 (2.63)
Age of Acquisition	0.04 (0.04)	-0.47 (0.59)
Concreteness[a]	-0.13* (0.06)	3.94*** (1.00)
Arousal	0.00 (0.04)	-0.31 (0.71)
Valence	0.05 (0.03)	-0.76 (0.53)
Brand Name[a]	-0.33*** (0.06)	6.80*** (0.97)
Intercept	1.78** (0.68)	111.90*** (11.56)
R^2	0.52***	0.25***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). † p < .06, * p < .05, ** p < .01, *** p < .001.
[a]Variable selected for inclusion in the "linguistic model."

II. Model Reduction

As described above, the full model included fifteen linguistic predictors (plus slogan familiarity). Models with many variables tend to face two fundamental limitations, one conceptual and one statistical. Conceptually, models with many predictor variables tend to be theoretically complex and difficult to interpret. Statistically, models with many predictor variables tend to exhibit multicollinearity. Indeed, our full model included multiple measures of some variables. For instance, we measured word length in four ways: number of letters, number of syllables, number of phonemes, and number of morphemes. We also had two measures of slogan length (number of words, number of characters), two measures of word frequency (prevalence, diversity), and two measures of word distinctiveness (visual, auditory). Although this approach maximizes the variance explained (R^2), it can also distort the effect sizes of the individual predictors due to their inherent multicollinearity. For example, because the four different measures of word length are naturally and highly intercorrelated, that multicollinearity can artificially suppress the effect size of all four individual measures, potentially obscuring effects that otherwise would be significant.

To address these limitations of conceptual complexity and multicollinearity, a common practice when analysing the effects of a large number of predictor variables is to simplify the model by reducing the number of predictors. There are several methods for model reduction. One general approach (i.e., *variable selection*) is to simply select the best predictors and exclude all predictors that add little or no predictive value to the model. We performed two such analyses. The simplest approach is to enter all the individual predictors simultaneously into a standard OLS regression (i.e., the full model reported above), and retain only those variables that significantly predict slogan liking and/or memory (i.e., *significant predictors*). This corresponds to the "linguistic model" that we report in the main text. An alternative and more sophisticated method for simultaneously reducing collinearity and identifying the most predictive variables is *penalized regression,* such as Lasso and Ridge, which essentially penalize regression models that have too many predictor variables.

A second general approach (i.e., *factor reduction*) is to identify latent factors that combine several of the previously separate predictors and create weighted factor scores for each latent factor (e.g., via principal components analysis, or *PCA*). We again performed two such analyses. First, in an *unconstrained* factor-analytic model, all fifteen linguistic variables were simultaneously entered into the same PCA without any constraints. An alternative and more constrained approach is to specifically combine only the various measures of each linguistic variable. That is, in the *constrained* factor-analytic model, we conducted separate PCAs for each variable that had multiple measures (i.e., slogan length, word length, word frequency, and perceptual distinctiveness).

Thus, below we report four methods of model reduction: (i) selection of significant predictors, (ii) penalized regression, (iii) unconstrained factor analysis, and (iv) constrained factor analysis. We also statistically compared these four different methods, with the goal of identifying the model that best predicted slogan liking and memory with the fewest variables. In short, the best method was the "linguistic model" that retained only five linguistic predictors. This linguistic model converged with the results of the Lasso and Ridge penalized regressions, and it also significantly outperformed both the unconstrained and constrained factor-analytic models in predicting both slogan liking and slogan memory.

III. Variable Selection

A. Significant Predictors: Linguistic Model

Results of the full model (Table A1) reveal that whereas some of the individual linguistic variables are important for predicting slogan liking and memory, others appear less predictive. For theoretical parsimony, and to reduce multicollinearity among the variables, we selected for presentation in the main text ("linguistic model") only those linguistic variables (in addition to slogan familiarity) that significantly or marginally predicted either slogan liking or slogan memory. Specifically, we selected (1) slogan length (number of words), (2) word frequency (contextual diversity), (3) perceptual distinctiveness (orthographic), (4) concreteness, and (5) inclusion of the brand name. We included number of words instead of number of characters as our measure of slogan length because the former significantly predicted both liking and memory, whereas the latter only predicted liking and not memory.

To compare the "full model" of all fifteen linguistic variables (Table A1) to the "linguistic model" of the five selected linguistic variables (Table 1B of main text), we conducted a stepwise regression with slogan familiarity and the five selected variables entered in a first block and the remaining ten non-selected linguistic variables (Table A1) entered in a second block. Results revealed that adding the ten variables increased the variance explained by only 1.1%, from 50.5% in the linguistic model to 51.6% in the full model. This difference was only marginally significant, $F(10, 775) = 1.78$, $p = .061$, indicating that the linguistic model represented a negligible loss of predictive power despite the large decrease in model complexity. A stepwise regression on slogan memory yielded similar results: Relative to the linguistic model ($R^2 = 23.7\%$), the full model increased the variance explained by only 1.3% ($R^2 = 25.0\%$), despite including ten additional factors. This difference was not significant, $F(10, 775) = 1.33$, $p = .21$, indicating no loss of predictive power for the linguistic model.

B. Penalized Regression: Lasso and Ridge

Lasso regression uses L1 regularization to set the weighting of less predictive variables to zero, thereby effectively selecting the subset of predictors that are most important for explaining the variance in the dependent variable. Rather than setting those less predictive variables to zero, Ridge regression instead retains all predictors but uses L2 regularization to shrink less predictive ones toward zero. Thus, whereas Lasso excludes the less important predictors from the model, Ridge merely minimizes their weighting. And conversely, factors that are retained in Lasso and that have coefficients in Ridge that diverge from zero are those identified as important for the predictive accuracy of the model.

We therefore conducted Lasso and Ridge regressions on slogan liking and slogan memory, as a robustness test of the variable selection in our "linguistic model" in the main text (cf. Packard and Berger 2021). If our five key linguistic variables are retained in the Lasso models, and if their coefficients do not approach zero in the Ridge models, this would suggest that those variables are important for predicting slogan liking and/or slogan memory. We used the glmnet package in R, with an 80% training set and 20% hold-out sample, and we used cross-validation to identify the optimal value for lambda. See Table A2 for results.

Overall, there was little difference between Lasso and Ridge in terms of amount of deviance explained (interpretable as R^2), and both were comparable to the variance explained by the full model (see Table A1). More importantly, both Lasso and Ridge regressions indicate that all five of the selected linguistic variables (i.e., "Linguistic Model" in Table A2) are important for predicting slogan liking and/or slogan memory. In Lasso, each of the five

linguistic variables was retained in the model predicting either liking or memory. Critically, nearly all of the other linguistic variables were dropped from the Lasso models, indicating that any increase in predictive accuracy that they might provide would not justify the increase in model complexity that they would require. Similarly, in Ridge, the coefficients of our five key linguistic properties tended to diverge substantially from zero. Thus, our linguistic model was robust to penalized regression.

Table A2. Results of penalized regression models.

	Dependent Variable			
	Slogan Liking		Slogan Memory	
Predictor	(1) Lasso	(2) Ridge	(3) Lasso	(4) Ridge
Control: Slogan Familiarity	0.46	0.44	1.19	1.27
Linguistic Model				
Slogan Length (words)		0.03	1.25	0.84
Word Frequency (diversity)	0.13	0.20	-8.07	-6.22
Distinctiveness (visual)	0.14	0.24		0.83
Concreteness	-0.12	-0.11	4.08	3.73
Brand Name	-0.34	-0.33	6.49	6.28
Additional Variables				
Slogan Length (characters)	-0.002	-0.01		0.08
Word Length (letters)		0.02	-0.68	-1.43
Word Length (syllables)		-0.12		1.02
Word Length (phonemes)		-0.02		-0.61
Word Length (morphemes)		0.06	-0.93	-1.88
Word Frequency (frequency)		-0.002		-1.88
Distinctiveness (auditory)		0.04		1.13
Age of Acquisition		0.03		-0.36
Arousal		0.01		-0.22
Valence	0.03	0.05	-0.54	-0.79
Intercept	2.83	2.26	99.55	108.65
Deviance (R^2)	0.506	0.510	0.243	0.247

Note. Unstandardized coefficients. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms).

Interestingly, although valence was not a significant predictor in the standard OLS regressions of the full model (see Table A1), these penalized regressions indicate that this variable could be important for predicting both liking and memory of slogans. Specifically, as with brand names (Guest, Estes, Gibbert, and Mazursky 2016), slogans with more positive words appear to be liked more but remembered less. The valence of the words within a slogan thus may be a fruitful topic for further research.

IV. Factor Reduction

A. Unconstrained Factor-Analytic Model

We submitted the fifteen lexical, semantic, and affective properties to a PCA with Varimax rotation. The analysis identified four latent factors with eigenvalue greater than 1. Rotated factor loadings are shown in Table A3. The first factor, which included mostly lexical properties (i.e., word length, word frequency, distinctiveness, and age of acquisition), accounted for 45.41% of the variance among the predictors' scores. The second factor corresponded solely to slogan length and explained an additional 13.51% of variance. The third factor consisted of concreteness and the two affective properties (i.e., arousal and valence) and explained 9.56% of residual variance. Finally, the fourth factor loaded on brand name inclusion, explaining 7.16% of residual variance. Collectively the four latent factors explained 75.64% of the variance in the fifteen properties.

Table A3. Factor loadings.

Property	Factor 1	Factor 2	Factor 3	Factor 4
Slogan Length (Words)	-0.25	**0.94**	-0.02	0.06
Slogan Length (Characters)	0.03	**0.97**	-0.03	0.09
Word Length (Letters)	**0.94**	-0.09	0.00	-0.05
Word Length (Syllables)	**0.92**	-0.04	0.10	-0.07
Word Length (Phonemes)	**0.95**	-0.09	0.00	-0.03
Word Length (Morphemes)	**0.82**	0.00	0.01	-0.02
Word Frequency (Prevalence)	**-0.78**	0.22	0.33	-0.31
Word Frequency (Diversity)	**-0.75**	0.17	0.32	-0.34
Distinctiveness (Visual)	**0.91**	-0.01	0.11	-0.09
Distinctiveness (Aural)	**0.91**	-0.03	0.13	-0.10
Age of Acquisition	**0.73**	-0.10	0.00	0.06
Concreteness	-0.02	-0.13	**-0.73**	0.28
Arousal	0.21	-0.13	**0.45**	0.41
Valence	-0.06	-0.11	**0.66**	0.19
Brand Name	-0.13	0.20	0.01	**0.74**

We then regressed slogan liking on these four weighted factor scores plus slogan familiarity. As shown in Table A4, the overall model was significant, $F(5, 786) = 156.51$, $p < .001$, and explained 50% of the variance in slogan liking. In addition to slogan familiarity ($b = 0.47$, SE = 0.02, $t = 25.45$, $p < .001$), factors 3 (concreteness, arousal, and valence; $b = 0.10$, SE = 0.02, $t = 4.26$, $p < .001$) and 4 (brand name; $b = -0.16$, SE = 0.02, $t = 6.52$, $p < .001$) significantly predicted liking: Slogans that use words that are less concrete, more arousing, and more positive, and that exclude the brand name, tend to be liked more. (Note: the loading of concreteness on factor 3 is negative, so the positive coefficient of factor 3 indicates a negative relation between concreteness and liking.)

We also regressed slogan memory on these four factors plus slogan familiarity. As shown in Table A4, the overall model was significant, $F(5, 786) = 46.64$, $p < .001$, and explained 23% of the variance in memory accuracy. In addition to slogan familiarity ($b = 1.39$, SE = 0.31, $t = 4.44$, $p < .001$), factors 2 (slogan length; $b = 3.57$, SE = 0.42, $t = 8.50$, $p < .001$), 3 (concreteness, arousal, and valence; $b = -3.14$, SE = 0.41, $t = 7.60$, $p < .001$), and 4

(brand name; b = 4.19, SE = 0.41, t = 10.12, p < .001) significantly predicted slogan memory. Slogans that are longer, that include the brand name, and that use concrete words (that are low in arousal and valence) tend to be more memorable. These factor-analytic results are generally consistent with those of the "linguistic model" reported in the main text.

Table A4. Results of unconstrained factor-analytic model.

	Dependent Variable	
Predictor	(1) Slogan Liking	(2) Slogan Memory
Control: Slogan Familiarity	0.47*** (0.02)	1.39*** (0.31)
Factor 1	0.03 (0.02)	0.05 (0.41)
Factor 2	-0.04 (0.03)	3.57*** (0.42)
Factor 3	0.10*** (0.02)	-3.14*** (0.41)
Factor 4	-0.16*** (0.02)	4.19*** (0.41)
Intercept	3.25*** (0.05)	83.54*** (0.87)
R^2	0.50***	0.23***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). *** p < .001.

Finally, we compared this unconstrained factor-analytic model (Table A4) to the linguistic model with the five individual linguistic properties reported in the main text (Table 1B). We conducted a stepwise regression, with slogan familiarity and the four latent factors (Table A4) entered in a first block and the five individual linguistic properties (Table 1B, linguistic model) entered in a second block. The linguistic model significantly outperformed the unconstrained factor-analytic model in predicting both slogan liking, ΔR^2 = .014, F(5, 781) = 4.33, p < .001, and slogan memory, ΔR^2 = .015, F(5, 781) = 3.18, p = .008.

In sum, results of these analyses (i.e., with four unconstrained latent factors) generally converged with those reported in the main text (i.e., with five linguistic properties). Further, the linguistic model in the main text outperformed this factor-analytic model in predicting both slogan liking and slogan memory.

B. Constrained Factor-Analytic Model

For each variable that was measured in multiple ways, we submitted all measures of that variable to PCA (with Varimax rotation), and crucially, we then used only the weighted factor score to represent that variable in our statistical model. For example, we used PCA to create a weighted index of the four measures of word length, thereby reducing that variable to a single measure. We similarly created weighted indexes of slogan length, word frequency, and word distinctiveness. Each of these four PCAs yielded a single latent factor (eigenvalue > 1), confirming the reliability of the various measures within each factor.

For each variable that we originally measured via only a single measure (i.e., brand name, age of acquisition, concreteness, arousal, and valence), we retained those single measures in the analysis. Thus, in this analysis, the original fifteen lexical, semantic, and affective variables were reduced to nine variables, each with a single measure. We then regressed slogan liking and slogan memory on these nine variables, plus slogan familiarity. Results are shown in Table A5.

Table A5. Results of constrained factor-analytic model.

	Dependent Variable	
Predictor	(1) Slogan Liking	(2) Slogan Memory
Control: Slogan Familiarity	0.47*** (0.02)	1.43*** (0.31)
Slogan Length (factor)	-0.03 (0.03)	3.77*** (0.43)
Word Length (factor)	-0.06 (0.06)	-3.68*** (1.06)
Word Frequency (factor)	0.08 (0.04)	-4.38*** (0.74)
Distinctiveness (factor)	0.11 (0.06)	1.64 (0.95)
Age of Acquisition	0.03 (0.03)	-0.55 (0.58)
Concreteness	-0.12* (0.06)	3.41*** (0.98)
Arousal	0.01 (0.04)	-0.25 (0.70)
Valence	0.05 (0.03)	-0.86 (0.53)
Brand Name	-0.36*** (0.06)	6.88*** (0.95)
Intercept	3.22*** (0.39)	81.30*** (6.70)
R^2	0.51***	0.24***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). * $p < .05$; *** $p < .001$.

Finally, we compared this constrained factor model (Table A5) to the linguistic model (Table 1B). We conducted a stepwise regression, with slogan familiarity and the nine constrained factors (Table A5) entered in a first block and the five individual linguistic variables (Table 1B) entered in a second block.[4] The linguistic model significantly outperformed the constrained factor model in predicting slogan liking, $\Delta R^2 = .007$, $F(3, 778) = 3.79$, $p = .010$. The difference in predicting slogan memory was directional but nonsignificant, $\Delta R^2 = .006$, $F(3, 778) = 2.02$, $p = .109$.

Thus, results of this constrained factor analysis (i.e., with nine single-measure factors) generally converged with those reported in the main text (i.e., with five linguistic properties). Further, that linguistic model in the main text outperformed this constrained factor-analytic model in predicting slogan liking.

In sum, of the four approaches to model reduction, simply selecting the significant predictors from the full model is the most theoretically parsimonious approach, while also providing the most accurate prediction of slogan liking and slogan memory. This approach, which we call the "linguistic model" in the main text, was robust to both Lasso and Ridge penalized regression, and it significantly outperformed both the unconstrained and the constrained factor-analytic models. Therefore, in all subsequent analyses reported below, we use only this linguistic model.

[4] Because the brand name and concreteness variables were measured via a single item each, entering them in both the first block and the second block was redundant, so actually the second block added only slogan length (number of words), word frequency (diversity), and distinctiveness (visual).

V. Recognition Memory: Hits and False Alarms

In the main text we report analyses of *memory accuracy*, which is calculated by subtracting each slogan's false alarm rate from its hit rate (Cortese, Khanna, and Hacker 2010). The *hit rate* is the percentage of participants who correctly reported that they had seen the slogan after having actually seen it. The *false alarm rate* is the percentage of participants who incorrectly reported that they had seen the slogan despite having not actually seen it. Here we report results of the hit rate and the false alarm rate separately (Table A6).

Table A6. Results of hit rates and false alarm rates.

	Dependent Variable	
Predictor	(1) Hits	(2) False Alarms
Control: Slogan Familiarity	1.52*** (0.25)	0.18 (0.16)
Linguistic Variable		
Slogan Length	1.19*** (0.12)	-0.16* (0.08)
Word Frequency	-6.24*** (1.06)	1.50* (0.68)
Distinctiveness	-1.25 (1.06)	0.19 (0.68)
Concreteness	3.44*** (0.69)	-0.71 (0.44)
Brand Name	7.44*** (0.74)	0.13 (0.48)
Intercept	91.73*** (5.75)	-0.41 (3.69)
R^2	0.28***	0.02*

Note. Unstandardized coefficients; standard errors appear in parentheses. * $p < .05$; *** $p < .001$.

In sum, the linguistic factors that significantly predicted overall memory accuracy (Table 1B of main text) also predicted hit rates better than false alarm rates (Table A6). Thus, the effects observed on overall memory accuracy are largely attributable to hits rather than false alarms.

VI. Non-Average Models

The analyses that we present in the main text are based on measures that are averaged across individual words in the slogan. For instance, for the slogan "Just do it", we retrieved the linguistic properties (e.g., word frequency) of "just", "do", and "it", and then we averaged across the three words of the slogan to create an *average* value for each property (e.g., an *average* word frequency). But of course, averaging is not the only way to examine these properties, and although averaging does examine the linguistic properties of *individual* words, it does not examine the properties of *single* words.

We therefore replicated our analyses, but using alternative, non-average measures. These alternative models provided a test of whether the "average" model (i.e., the model in which the linguistic properties are averaged across words within the slogan) is actually the best model for predicting slogan liking and/or memory. First we tested a "Max" model that took as its value for each predictor the maximum value among all words in the slogan. For instance, given that "it" is the most frequent word in "Just do it", we used the frequency of "it" as the measure of word frequency for that slogan. For visual distinctiveness, however, we used the value of "just", because it was the most distinctive word in the slogan. This model tested whether the *average frequency* (and length, and concreteness, etc.) of words in the slogan best predicts liking and memory, or alternatively whether the *single most frequent* word is a better predictor. We similarly created a "Min" model by taking, for each linguistic variable, the minimum value among all words in the slogan.

Or perhaps rather than the average, max, or min, the *range* of values best predicts slogan liking and memory. That is, perhaps having some words stand out from other words within the slogan is especially effective. To test this, we also created a "Range" model that took as its values the range (i.e., max – min) of values for each linguistic variable. In this model, higher numbers indicate greater variation on the given linguistic variable within the slogan. Finally, we note that some of the linguistic properties are predicted to increase liking (and decrease memory), whereas other properties are predicted to decrease liking (and increase memory). We therefore created a "MiniMax" model that took as its values the maximum value within the slogan of word frequency and visual distinctiveness, but took the minimum value of concreteness.

We conducted standard OLS regressions for each type of model (i.e., average, max, min, range, minimax). Note that because slogan familiarity, slogan length, and brand name are all slogan-level variables, only word frequency, visual distinctiveness, and concreteness varied across the models. Results are summarized in Table A7.

Table A7. Comparison of average and non-average models.

	Liking		**Memory**	
	F	$\boldsymbol{R^2}$	***F***	$\boldsymbol{R^2}$
Average	**137.54**	**0.504**	**40.36**	**0.229**
Max	133.76	0.493	36.18	0.211
Min	135.87	0.501	34.44	0.203
Range	134.16	0.498	35.93	0.210
MiniMax	135.57	0.500	25.25	0.157

Note. DF = 6, 813. All models were $p < .001$.

As shown above, although the differences among models were small, the "average" model (i.e., the model in which the linguistic properties are averaged across words within the

slogan) was the best performer for both slogan liking and slogan memory. In other words, averaging the linguistic properties across multiple words within the slogan better predicts the slogan's liking and memory than using measures based on a single word within the slogan (e.g., the most frequent word, or the least concrete word).

VII. Robustness Test: Brand Attitude

To test the robustness of the results of Study 1, we replicated the linguistic model, but with one alternative predictor variable and one alternative dependent variable. First, in Study 1 we measured not only *slogan familiarity* ("Prior to this survey, how familiar were you with this slogan?"), which is reported in the main text, but also *brand familiarity* ("Prior to this survey, how familiar were you with this brand?"). In this robustness test, we replaced slogan familiarity with brand familiarity. Second, in Study 1 we also measured not only *slogan liking* ("Overall, how much do you like this slogan?"), which is reported in the main text, but also *brand attitude* ("Based on this slogan, what is your attitude toward the brand?"). In this robustness test, we replaced slogan liking with brand attitude. Despite these differences, the results were similar (see Table A8).

Table A8. Robustness test.

	Dependent Variable	
Predictor	(1) Brand Attitude	(2) Slogan Memory
Control: Brand Familiarity	0.26*** (0.01)	0.49* (0.19)
Linguistic Variable		
Slogan Length	-0.01 (0.01)	1.29*** (0.15)
Word Frequency	0.18* (0.08)	-7.45*** (1.32)
Distinctiveness	0.08 (0.08)	-1.58 (1.32)
Concreteness	-0.06 (0.05)	4.30*** (0.85)
Brand Name	-0.28*** (0.05)	7.26*** (0.93)
Intercept	2.85*** (0.41)	92.63*** (7.16)
R^2	0.46***	0.22***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). * $p < .05$; *** $p < .001$.

The overall model remained highly significant, with comparably large effect sizes, in both brand attitude and slogan memory. Of the five key linguistic variables, four were again significant in the robustness test, and in the same directions as in the original analyses. The sole exception was distinctiveness, which was in the same direction as in the original analyses, but was no longer significant in predicting either brand attitude or slogan memory.

VIII. Online Replication and Combined Analysis

We tested the reliability of the results reported in the main text by conducting an exact replication with an online sample of 404 participants on Mechanical Turk. See Table A9 for results of this online replication, as well as results from the original lab sample and the online replication sample together. The results of the online replication were highly consistent with those of the main study; all five of the key linguistic variables significantly predicted liking and/or memory in this replication study. All five linguistic variables also predicted slogan liking and memory in the combined analysis.

Table A9. Regression results from the online replication of Study 1, and from a combined analysis of the original lab study (N = 594 students) and the online replication study (N = 404 Mechanical Turk workers).

	Online Replication		Combined Analysis	
Predictor	(1) Slogan Liking	(2) Slogan Memory	(3) Slogan Liking	(4) Slogan Memory
Control: Slogan Familiarity	0.39*** (0.02)	2.08*** (0.36)	0.44*** (0.02)	1.73*** (0.32)
Linguistic Variable				
Slogan Length	-0.02** (0.01)	1.61*** (0.19)	-0.01 (0.01)	1.49*** (0.15)
Word Frequency	0.12 (0.07)	-8.49*** (1.63)	0.18** (0.07)	-8.16*** (1.33)
Distinctiveness	0.16* (0.07)	-3.68* (1.64)	0.19** (0.07)	-2.61* (1.33)
Concreteness	-0.06 (0.04)	3.63*** (1.07)	-0.08† (0.04)	3.90*** (0.87)
Brand Name	-0.26*** (0.05)	9.30*** (1.16)	-0.31*** (0.05)	8.31*** (0.94)
Intercept	2.73*** (0.37)	82.36*** (8.94)	2.53*** (0.36)	87.45*** (7.25)
R^2	0.49***	0.22***	0.53***	0.26***

Note. Unstandardized coefficients; standard errors appear in parentheses. Slogan Liking was rated on a scale from 1 (dislike) to 7 (like); Slogan Memory is % correct (Hits – False Alarms). † $p < .075$, * $p < .05$, ** $p < .01$, *** $p < .001$.

IX. Interaction Model with Brand Familiarity

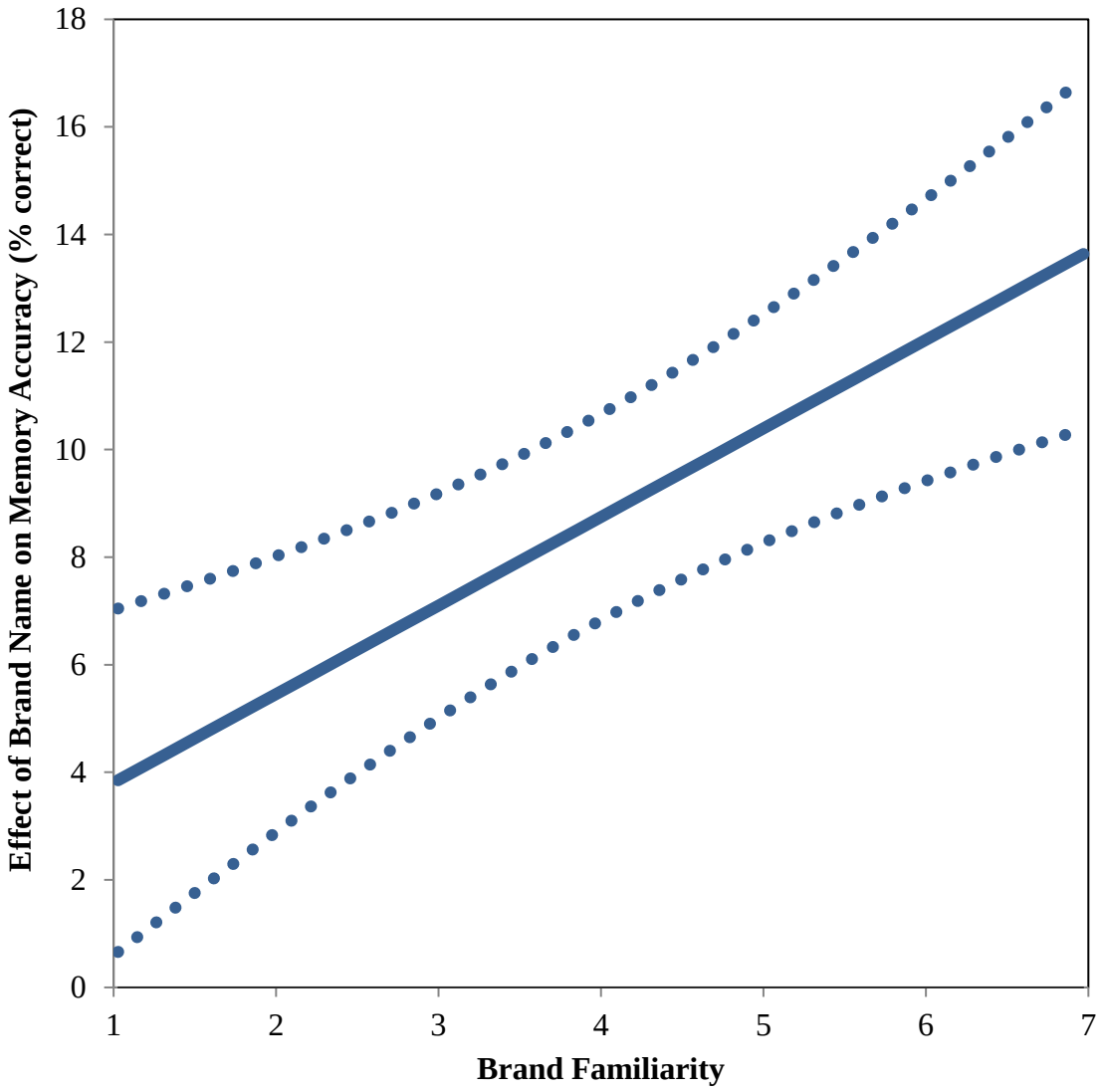
Brand familiarity might interact with the linguistic variables of interest in important ways. For instance, the linguistic effects of slogans might be accentuated among less familiar brands, or perhaps among more familiar brands with which consumers already have much experience. To test this possibility, we conducted a stepwise regression in which we entered our linguistic model but with brand familiarity instead of slogan familiarity (i.e., brand familiarity, slogan length, word frequency, word distinctiveness, concreteness, and brand name) in the first block, and we entered in a second block five interaction terms corresponding to the interaction of brand familiarity with the each of the five linguistic properties.

Results revealed that the addition of the five interaction terms did not significantly improve the model fit for slogan liking, $\Delta R^2 = 0.005$, $F(5, 808) = 1.38$, $p = .23$. For slogan memory, however, the interaction model significantly outperformed the reduced model, $\Delta R^2 = 0.020$, $F(5, 808) = 4.18$, $p < .001$. Of the five interaction terms, only the brand familiarity × brand name interaction was significant, $b = 1.53$, SE = 0.42, $t = 3.63$, $p < .001$. The positive coefficient indicates that including the brand name in the slogan improves memory of the slogan more for highly familiar brands than for less familiar brands.

To explore this interaction further, we conducted bootstrap analyses (Hayes 2013, model 1, 10K samples) with brand name (0 = absent, 1 = present) as independent variable, memory accuracy as dependent variable, and brand familiarity as moderator. The interaction of brand familiarity and brand name was again significant, $b = 1.65$, SE = 0.45, $t = 3.70$, $p < .001$, replicating the result of the linear regression reported above. We then examined the interaction via floodlight analysis, shown in Figure A1. The effect of brand name on memory accuracy was significant at all levels of brand familiarity. Importantly, however, the more familiar the brand, the larger its effect on slogan memory. At the extremes, including a completely unfamiliar brand name in the slogan increased memory for that slogan by about 4%, whereas including a completely familiar brand name increased slogan memory by about 14%.

In sum, although brand familiarity did not moderate the linguistic effects on slogan liking, brand familiarity did moderate the effect of including the brand name on memory for the slogan.

Figure A1. Interaction of brand familiarity and brand name inclusion on memory for slogans. The solid line indicates the effect size and the dotted lines indicate CI_{95}.



Web Appendix C: Slogan Stimuli in Studies 2-4

Study 2 Slogan Stimuli

Attitude Targets: Edited to Improve Slogan Attitudes

Brand	Slogan
Club Med	The antidote for civilization *The cure for mankind
Budweiser	The genuine article *The real deal
Western Airlines	The only way to fly *The exclusive way to travel
Listerine	Stops halitosis *Kills bad breath
Chevrolet	The road isn't built that can make it breathe hard *No road can challenge it
Jacob's Club	If you like a lot of chocolate on your biscuit join our club *Chocolate lovers wanted
Buick	When better automobiles are built, Buick will build them *Building better automobiles
Fairy Dish Soap	Now hands that do dishes can feel soft as your face *Clean dishes. Soft hands.
	Original *Edited

Memory Targets: Edited to Improve Slogan Recognition

Brand	Slogan
Epiphany	See your way forward *Envision your path forward
Toyota	Get the feeling *Snag the sensation
Compaq	Has it changed your life yet? *Has it transformed your world yet?
Butterfinger	Break out of the ordinary *Flee the mundane
Hyundai	Always there for you *Absolutely positively dependable
DHL	We keep your promises *Your word is our wedding ring
Burger King	It just tastes better *Simply souped up taste
Fancy Feast	Good taste is easy to recognize *Your taste buds know the difference
	Original *Edited

Brand Name Targets: Edited to Remove or Add the Brand Name

	Brand	Slogan
Brand Name Removed	Morrisons	More reasons to shop at Morrisons *More reasons to shop
	Ice Lolly	What could be nicer than a Pendleton's Twicer *What could be nicer?
	Watney's	What we want is Watney's *What we want
	Anadin	Nothing is more effective than Anadin *Nothing is more effective
	Horlicks	Horlicks guards against night starvation *Guards against night starvation
		Original *Edited
Brand Name Added	Hai Karate Aftershave	Be careful how you use it! *Be careful how you use Hal Karate!
	Alkaseltzer	Try it, you'll like it *Try Alkaseltzer, you'll like it
	Greggs	Ready when you are *Greggs is ready when you are
	Cerebos	See how it runs! *See how Cerebos runs!
		Original *Edited

Study 3 Slogan Stimuli

Version*	Slogan
L	For a living planet (WWF)
M	For a living world
L	It's good to chat
M	It's good to talk (BT)
L	Echo around the globe
M	Echo around the world (Edison Records)
L	A vital part of your world (Tyco)
M	A crucial part of your world
L	The remedy for civilization
M	The antidote for civilization (ClubMed)
L	Don't you just love being in charge
M	Don't you just love being in control (British Gas)
L	I'd rather fight than switch (Tareyton)
M	I'd rather fight than change
L	The first time is never the tops
M	The first time is never the best (Campari)
L	Horlikcs guards against night starvation (Horlicks)
M	Horlicks guards against evening starvation
L	Now they whisper to her…not about her (Cashmere)
M	Now they gossip to her…not about her

*L=Less-fluent, M=More-fluent

Study 4 Slogan Stimuli

Version*	Slogan
L	The Genuine Article (Budweiser)
M	The Real Deal
L	The antidote for civilization (ClubMed)
M	The remedy for mankind
L	Snag the Sensation
M	Get the Feeling (Toyota)
L	Flee the Mundane
M	Break out of the Ordinary (Butterfinger)
B	Nothing is more effective than Anadin (Anadin)
N	Nothing is more effective
B	Try Alkaseltzer, you'll like it
N	Try it, you'll like it (Alkaseltzer)

*L=Less-fluent, M=More-fluent, B=Brand Name Included, N=No Brand Name

Study 4 Bumper Ads

Web Appendix D: Linguistic Fluency Validation Measure

To validate our slogan edits, we created a measure that we called *linguistic fluency*, which is the extent to which a given slogan has linguistic properties associated with processing fluency. Based on the results of Study 1, we operationalized linguistic fluency as the extent to which the slogan contained relatively (a) few words, (b) frequent words, (c) distinctive words, and (d) abstract words. These are the linguistic properties shown in Study 1 to predict higher liking and lower memory. In Studies 2-5, we manipulated those properties to test whether they causally affect slogan liking and memory. This measure of linguistic fluency serves as a manipulation check of our slogan manipulations.

The four linguistic properties used different scales. For instance, slogan length is unbounded, theoretically ranging from one word to infinity, whereas concreteness was rated on a scale from 1-7 (Brysbaert et al. 2014). Thus, to create a single score of linguistic fluency that incorporated all four measures, we first *Z*-transformed all four measures.

In Study 1, some of the measures had larger effects (i.e., regression coefficients) than others. For instance, word frequency generally had larger effects on liking and memory than distinctiveness did. Because it was impossible to manipulate one property of a slogan without also affecting its other properties – e.g., manipulating frequency naturally affects distinctiveness, because they are moderately correlated – we sought to weight our measure of linguistic fluency such that the properties that had larger effects in Study 1 would carry more weight in our linguistic fluency manipulations of the slogans in Studies 2-5. Moreover, because we intended to affect both liking and memory, we wanted these factor weights to reflect the factors' influence on both liking and memory in Study 1.

Thus, to create a single weight (i.e., accounting for both liking and memory) for each the four variables, we averaged each factor's effects across liking and memory. We took the standardized coefficients (β) from the combined analysis of Study 1, reversed the sign of the coefficients for memory (so that higher numbers indicated higher fluency), and then simply averaged the two coefficients. To illustrate, distinctiveness had β = .09 in liking and β = -.07 in memory. If we simply averaged the two coefficients ($\beta_{average}$ = .01), that would incorrectly imply that distinctiveness failed to predict liking and memory, when in fact it significantly predicted both liking and memory. By reversing the sign of the memory coefficient, however, we see that distinctiveness had a small but real combined effect on liking and memory ($\beta_{average}$ = .08). Slogan length had a larger combined effect ($\beta_{average}$ = -.19), whereas word frequency ($\beta_{average}$ = .165) and concreteness ($\beta_{average}$ = -.095) had moderate combined effects in opposite directions. Positive signs indicate that frequency and distinctiveness increase fluency, whereas negative signs indicate that slogan length and word concreteness decrease fluency.

Finally, for each slogan, we weighted each of the four linguistic variables (*Z*-transformed for common scale) by those averaged regression coefficients, and then summed the four weighted scores to produce a single measure of linguistic fluency that reflected its expected combined effect on liking and memory. This formula is expressed as follows:

Linguistic Fluency = α Length + β Frequency + γ Distinctiveness + δ Concreteness

where α, β, γ, and δ are the weights determined from the results of Study 1 (i.e., -.19, .165, .08, and -.095 respectively).

For example, Epiphany's slogan "See your way forward" had a length of 4 words, frequency of 3.78, distinctiveness of 1.51, and concreteness of 2.65, yielding a linguistic fluency score of .106:

"See your way forward" = (4 × -.19) + (3.78 × .165) + (1.51 × .08) + (2.65 × -.095) = .106

In Study 2, this slogan was one of our "memory targets;" i.e., we intended to decrease its linguistic fluency in order to increase memory of it. We therefore edited it to create an alternative slogan that was semantically similar but lower in linguistic fluency. For this particular slogan, we targeted word frequency as the primary variable to manipulate, with a decrease in frequency expected to decrease liking and increase memory. Our edited version of the slogan was as follows:

"Envision your path forward" = (4 × -.19) + (2.92 × .165) + (2.00 × .08) + (2.96 × -.095) = -.020

We used a similar procedure to edit the other slogans, although we targeted different variations of the four linguistic properties for each slogan. Across the sixteen pairs of attitude targets and memory targets in Study 2, the slogans that we intended to be more fluent indeed were significantly higher in linguistic fluency (M = .08, SD = .14) than the slogans that we intended to be disfluent (M = -.08, SD = .19), $t(30) = 2.72$, $p = .01$. Across the ten slogan pairs in Study 3, the slogans that we intended to be more fluent also were significantly higher in linguistic fluency (M = .11, SD = .14) than the slogans that we intended to be disfluent (M = -.11, SD = .13), $t(18) = 3.72$, $p < .01$. And, despite the small N, across the four slogan pairs in Study 4, again the slogans that we intended to be more fluent were indeed significantly higher in linguistic fluency (M = .13, SD = .18) than the slogans that we intended to be disfluent (M = -.13, SD = .08), $t(6) = 2.64$, $p < .05$. Also in Study 5, the slogan intended to be more fluent was indeed higher in linguistic fluency (M = .13) than the disfluent slogan (M = -.13). Thus, we successfully manipulated the linguistic fluency of the slogans in Studies 2-5.

Web Appendix E: Memory and Liking of Individual Slogans

To provide additional clarity on the relationship between memory and liking, we conducted contrasts on memory and liking for each individual slogan pair in addition to reporting the overall test statistics for these experimental stimuli groups in the manuscript.

Study 2: Attitude Targets

		Liking			Memory		
Brand	Slogan	Mean (SE)	F	*p*	Mean (SE)	F	*p*
Club Med	The antidote for civilization	3.09 (.17)	6.00	.02	.82 (.04)	.51	.47
	*The cure for mankind	3.69 (.17)			.79 (.04)		
Budweiser	The genuine article	3.43 (.15)	37.82	.001	.69 (.04)	.66	.42
	*The real deal	4.78 (.15)			.64 (.04)		
Western Airlines	The only way to fly	4.22 (.15)	.92	.34	.90 (.03)	.84	.36
	*The exclusive way to travel	4.42 (.15)			.86 (.03)		
Listerine	Stops halitosis	2.56 (.15)	148.4	.001	.95 (.02)	.72	.40
	*Kills bad breath	5.08 (.15)			.93 (.02)		
Chevrolet	The road isn't built that can make it breathe hard	2.98 (.17)	49.26	.001	.87 (.03)	.10	.75
	*No road can challenge it	4.72 (.18)			.88 (.03)		
Jacob's Club	If you like a lot of chocolate on your biscuit join our club	2.86 (.18)	36.89	.001	.94 (.03)	3.00	.08
	*Chocolate lovers wanted	4.37 (.17)			.88 (.03)		
Buick	When better automobiles are built, Buick will build them	3.49 (.16)	11.88	.001	.95 (.02)	3.73	.05
	*Building better automobiles	4.26 (.16)			.88 (.02)		
Fairy Dish Soap	Now hands that do dishes can feel soft as your face	3.16 (1.9)	33.36	.001	.97 (.02)	1.29	.26
	*Clean dishes. Soft hands.	4.56 (1.9)			.94 (.02)		
	Original	3.22 (.11)	230.1	.001	.89 (.03)	6.38	.01
	*Edited	4.48 (.11)			.85 (.03)		

Study 2: Memory Targets

		Liking			Memory		
Brand	Slogan	Mean (SE)	F	*p*	Mean (SE)	F	*p*
Epiphany	See your way forward	4.17 (.16)	.55	.46	.60 (.04)	1.47	.23
	*Envision your path forward	4.33 (.16)			.67 (.04)		
Toyota	Get the feeling	3.96 (.17)	2.20	.14	.41 (.04)	31.44	.001
	*Snag the sensation	3.61 (.17)			.75 (.04)		
Compaq	Has it changed your life yet?	3.38 (.17)	5.14	.02	.72 (.04)	.95	.33
	*Has it transformed your world yet?	3.92 (.17)			.66 (.04)		
Butterfinger	Break out of the ordinary	4.92 (.16)	19.32	.001	.51 (.04)	31.85	.001
	*Flee the mundane	3.90 (.16)			.83 (.04)		
Hyundai	Always there for you	4.30 (.16)	.53	.47	.58 (.04)	20.58	.001
	*Absolutely positively dependable	4.14 (.16)			.84 (.04)		
DHL	We keep your promises	4.36 (.17)	28.06	.001	.74 (.03)	17.60	.001
	*Your word is our wedding ring	3.06 (.17)			.93 (.03)		
Burger King	It just tastes better	3.80 (.16)	30.40	.001	.82 (.03)	5.91	.02
	*Simply souped up taste	2.59 (.15)			.93 (.03)		
Fancy Feast	Good taste is easy to recognize	4.23 (.16)	.56	.46	.59 (.04)	31.53	.001
	*Your taste buds know the difference	4.40 (.16)			.89 (.04)		
	Original	4.14 (.15)	22.54	.001	.62 (.04)	94.43	.001
	*Edited	3.74 (.15)			.81 (.04)		

Study 2: Brand Name Targets

	Brand	Slogan	Liking			Memory		
			Mean (SE)	F	*p*	Mean (SE)	F	*p*
Brand Name Removed	Morrisons	More reasons to shop at Morrisons	3.20 (.16)	4.54	.03	.95 (.03)	48.45	.001
		*More reasons to shop	3.67 (.16)			.61 (.03)		
	Ice Lolly	What could be nicer than a Pendleton's Twicer	2.75 (.16)	4.27	.04	.80 (.04)	14.82	.001
		*What could be nicer?	3.22 (.16)			.58 (.04)		
	Watney's	What we want is Watney's	2.88 (.16)	.17	.68	.91 (.04)	77.06	.001
		*What we want	2.98 (.16)			.45 (.04)		
	Anadin	Nothing is more effective than Anadin	2.57 (.14)	4.59	.03	.89 (.04)	32.29	.001
		*Nothing is more effective	3.01 (.15)			.58 (.04)		
	Horlicks	Horlicks guards against night starvation	2.88 (.17)	7.27	.01	.91 (.03)	.32	.57
		*Guards against night starvation	3.52 (.17)			.89 (.03)		
		Original	2.85 (.12)	17.99	.001	.89 (.04)	137.3	.001
		*Edited	3.28 (.12)			.62 (.04)		
Brand Name Added	Hai Karate	Be careful how you use it!	3.13 (.17)	2.17	.14	.70 (.03)	29.16	.001
		*Be careful how you use Hal Karate!	2.77 (.18)			.95 (.03)		
	Alkaseltzer	Try it, you'll like it	3.70 (.16)	13.19	.001	.81 (.03)	10.55	.001
		*Try Alkaseltzer, you'll like it	2.90 (.15)			.94 (.03)		
	Greggs	Ready when you are	4.13 (.17)	14.03	.001	.63 (.04)	28.56	.001
		*Greggs is ready when you are	3.22 (.17)			.91 (.04)		
	Cerebos	See how it runs!	2.64 (.14)	.64	.42	.47 (.04)	51.33	.001
		*See how Cerebos runs!	2.48 (.14)			.86 (.04)		
		Original	3.40 (.25)	23.74	.001	.65 (.05)	115.1	.001
		*Edited	2.84 (.25)			.92 (.05)		

Study 4a and 4b: YouTube Banner Ads Slogan Stimuli

		Liking			Memory		
Brand	Slogan	Mean (SE)	F	*p*	Mean (SE)	F	*p*
Budweiser	The genuine article *The real deal	3.36 (.12) 4.62 (.11)	58.86	.001	.42 (.03) .52 (.03)	4.89	.03
ClubMed	The antidote for civilization *The remedy for mankind	3.12 (.12) 3.72 (.13)	11.37	.001	.44 (.03) .44 (.03)	.01	.93
Toyota	Snag the sensation *Get the feeling	3.37 (.13) 3.50 (.13)	.52	.47	.53 (.03) .35 (.03)	16.67	.001
Butterfinger	Flee the mundane *Break out of the ordinary	3.25 (.13) 4.72 (.13)	63.68	.001	.67 (.03) .50 (.03)	16.51	.001
Anadin	Nothing is more effective than Anadin *Nothing is more effective	3.30 (.13) 3.81 (.12)	8.57	.004	.68 (.03) .29 (.03)	89.39	.001
Alkaseltzer	Try Alkaseltzer, you'll like it *Try it, you'll like it	2.92 (.14) 3.52 (.14)	9.18	.003	.81 (.03) .55 (.03)	39.33	.001
	Less-fluent *More-fluent	3.22 (.13) 3.98 (.13)	105.2	.001	.59 (.04) .44 (.04)	71.65	.001

Web Appendix F: Study 2 Replication—Brand Name Repetition

As an additional robustness test of the brand name added/removed slogan condition in Study 2, we conducted a replication of Study 2 in which we removed the brand name from being shown beneath all of the slogans. It was brought to our attention that a potential alternative explanation for the increased memory we find for slogans that included the brand name (e.g., Try Alka-Seltzer, you'll like it) is that individuals see the brand name twice in these slogans (i.e., embedded in the slogan and paired with the slogan). While this is often the case in real life, it nonetheless warrants further investigation in order to theoretically rule out that our effects for the brand name slogans in Study 2 were not merely driven by this repetition of the brand name.

Method

Participants. Five hundred twenty-nine undergraduates at a U.S. university participated.

Stimuli. We used the same 25 slogan pairs as in Study 2, but added an additional between-subjects condition in which the brand name no longer appeared beneath the slogans for half of the participants.

Procedure. The procedure was the same as in Study 2, except that half the participants (i.e., those who were not shown the brand name beneath the slogan) did not rate brand familiarity.

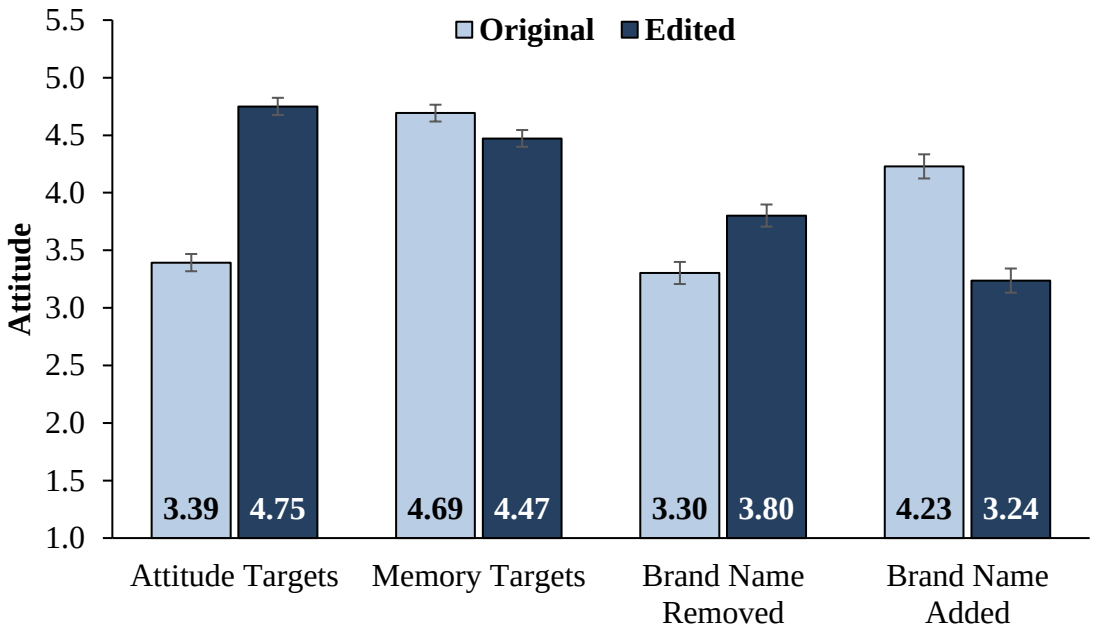
Results

The results of Study 2 were replicated. Specifically, when participants saw the slogans with the brand names paired beneath the slogans (i.e., a repeat of our Study 2 design) they again demonstrated increased memory for slogans that contained the brand name (*Brand Name Removed Targets*: $M_{\text{Original}} = .84$, SE = .03, $M_{\text{Edited}} = .59$, SE = .03, $b = .24$, $t(1318.69) = 10.23$, $p < .001$. *Brand Name Added Targets*: $M_{\text{Edited}} = .87$, SE = .06, $M_{\text{Original}} = .64$, SE = .06, $b = .23$, $t(1054.98) = 9.26$, $p < .001$). When participants saw the slogans without the brand name paired beneath the slogans, the results again replicated (*Brand Name Removed Targets:* $M_{\text{Original}} = .90$, SE = .02, $M_{\text{Edited}} = .77$, SE = .02, $b = .13$, $t(1313.83) = 6.36$, $p < .001$. *Brand Name Added Targets*: $M_{\text{Edited}} = .93$, SE = .03, $M_{\text{Original}} = .81$, SE = .03, $b = .13$ $t(1050.86) = 6.37$, $p < .001$). In sum, regardless of whether the brand name was shown beneath the slogan or not, participants better remembered slogans that embedded the brand name in the slogan. Repetition of the brand name, therefore, cannot explain the effects on memory in Study 2.

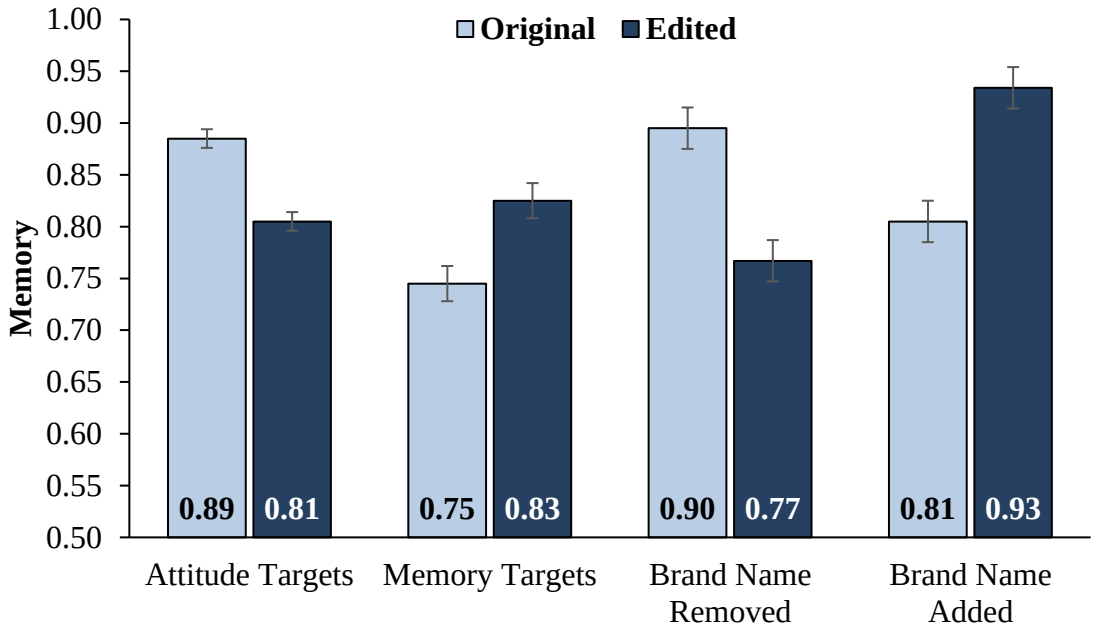
We also note that the results of the other stimuli (e.g., "attitude targets", "memory targets"), as well as the results of the slogan liking dependent variable, also replicated the pattern reported in the main Study 2. Results of the condition in which the brand name did *not* appear beneath each slogan are shown in Figure A2, demonstrating the same pattern of significant results as in the main Study 2 (where the brand name *did* appear beneath each slogan). In sum, removing the brand name from beneath the slogan had no effect on the pattern of significant effects on either liking or memory of the slogans.

Figure A2. (**A**) Mean attitude ratings and (**B**) memory accuracy (proportion correct). Study 2 replication (no brand name). Error bars indicate ±1 *SE*.

A.



B.



Web Appendix G: Study 4b Replication—Slogan Recall

As an additional robustness test of our Study 4 results, we conducted a modified version of Study 4b that employed an alternative memory measure—free recall. Specifically, we were interested in how often the manipulated target words were correctly recalled in the disfluent vs. fluent versions of the slogans after incidental exposure during the brief YouTube bumper ads.

Method

Participants. Five hundred thirty-two undergraduates (44% females) at a U.S. university participated.

Stimuli. We used the same six bumper ads as in Study 4b, minus the two brand-name added/removed bumper ads (the latter differed only on the presence or absence of a single brand word, precluding them from target word recall comparison). We also decreased the number of filler ads to a single filler ad (the first filler ad in Study 4b) to reduce cognitive load.

Procedure. We altered the surprise memory test in the final step of the experiment to be a free recall task instead of the previous recognition task. All else was identical to Study 4b.

For the surprise recall task, we presented participants with a scrubbed version of each bumper ad with the slogan removed and asked them to "please write the slogan that you remember seeing in this advertisement (the slogan has been removed)". Participants responded to each advertisement one by one in the same order as they were presented during the YouTube video portion of the study.

Results

Two graduate research assistants at a U.S. university independently coded the free recall responses for the number of target words correctly recalled in each bumper ad slogan. Because each slogan contained two manipulated target words, participants' responses were coded as 0, 1, or 2 (2=correctly recalled both target words) for each slogan. Memory accuracy was then calculated as the proportion of correctly recalled slogan words within the fluent and disfluent conditions separately.

The results fully corroborated those of Study 4b, with participants better recalling the disfluent versions (M = .17, SE = .01) of the slogans than the fluent versions (M = .12, SE = .01), $t(531) = 4.43$, $p < .001$, and confirming once again that slogans with less-fluent words are better remembered, even when individuals are incidentally exposed to the slogans in a more realistic context.