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How to project action through the sound of brand names?

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How to project action through the sound of brand names?

Abstract:

Objectives/ research questions	Brand names not only serve to identify specific products and services, but also to convey information. Such information may depend on the sound of the word—independent of its semantic meaning. In this research, we propose that plosive consonants such as [b], [d], [p], and [t] (vs. fricative consonants such as [f], [l], [s], and [ʃ]) elicit the feeling of doing something because of the articulatory movements their pronunciation requires.
Method/ approach	We ran three experimental studies in a behavioral lab with samples composed of French-speaking participants.
Results	Study 1 relies on implicit measures to demonstrate that plosive consonants are unconsciously associated with the semantic concept of action. Studies 2 and 3 put this property to the test in the context of threats to personal control. If plosive consonants can simulate action, threats to personal control should increase the perceived attractiveness of brand names that include such sounds since threats to personal control have been shown to trigger a willingness to act.
Managerial/ societal implications	Our results suggest that managers can project action based on the sounds of their brands—independently of their semantic meaning.
Originality	The demonstration of the capacity of plosive consonants to evoke action relies on the use of implicit measures and the replication of the observed effect across several studies.
Keywords	action, brand linguistics, brand management, brand name, personal control, sensory marketing

Introduction

Managers and entrepreneurs understand that a brand name goes far beyond the mere function of identifying a product or a service. A brand name can explicitly convey information depending on the meaning attached to the words that compose said brand name. For example, the retailers Decathlon and Go Sport signal their specialization in selling sporting goods, American Airline and British Airways do the same with air travel, and Vinci promises its know-how in construction by taking advantage of a homonymy with the famous artist and inventor of the Renaissance. As such, brands can strengthen the knowledge that has been created in consumers' mind by activating associations linked to their activity or their values (Michel, 2004).

However, many brand names do not have an obvious semantic meaning (e.g., Adidas¹); their number has grown considerably with the rise of the digital economy: Badoo, Botim, Koober, Totok, etc. The absence of semantic meaning does not mean that the sounds such pseudo-words carry do not convey meaning to consumers. To explore this possibility, brand linguistics has emerged as a sub-discipline of marketing borrowing from linguistics, psychology, and semiotics in order to better understand how language influences consumer-brand relationships (Carnevale, Luna, and Lerman, 2017). As such, research has already established that certain sounds can convey specific characteristics. For example, vowels with a high sound frequency like [i] (in "hit") would evoke what is small and should therefore be preferred for products having this characteristic (Lowrey and Shrum, 2007).

While vowels have received special attention, consonants have essentially been studied by assuming the same properties apply (e.g., Coulter and Coulter, 2010; Klink, 2000). In this research, we investigate in a property that is unique to certain consonantal sounds due to the articulatory movements necessary for their pronunciation. Specifically, we examine the so-called plosive consonants. We propose that plosives evoke action, or the feeling of doing something, due to the abrupt explosion made in the mouth by the sudden release of air blocked by the lips for sounds such as [b] and [p] or by the tongue against the palate for sounds such as [d] and [t] (Schwartz, Boë, Badin, and Sawallis, 2012). As such, we suggest

¹ *Adidas* takes its name from the contraction of its founder Adolf "Adi" Dassler's nickname and the first syllable of his name.

that brand names containing plosives are unconsciously associated with the semantic concept of action.

We further examine this proposition by measuring the perceived attractiveness of plosive-based brand names in situations that call for action, that is, when people's sense of personal control is threatened. People have a fundamental need to perceive that they can influence their environment to achieve their goals (Landau, Kay, and Whitson, 2015). However, they must often deal with situations that threaten this need. In such circumstances, they combat perceptions of chaos and randomness by striving to regain perceptions of control (Landau et al., 2015). A prolific literature in social and cognitive psychology suggests that a basic response to a loss of personal control lies in taking action, including in situations that are objectively out of control (Langer, 1975) or in domains unrelated to the source of personal control loss (Greenaway et al., 2015b). Hence, we reasoned that if a loss of personal control triggers a preference for action, such situations should increase the perceived attractiveness of brand names whose sound evokes action.

The remainder of this article is organized as follows. We begin by laying the theoretical foundations leading to the proposition that the sound of brand names containing plosives can evoke action. We then present our methodology and the results of three experimental studies. Using implicit measurements, Study 1 demonstrates that plosives are unconsciously associated with the semantic concept of action. Two additional studies put this effect to the test by showing that a loss of personal control increases the perceived attractiveness of fictitious brand names containing plosives (Study 2) and the preference for such names over others containing a different category of consonants (Study 3). After presenting the theoretical and managerial contributions of our work, we conclude with a discussion of its limits and explore possible avenues for further research.

How can plosive consonants evoke action in a brand name?

The sound of brand names

In recent years, the marketing literature has known a surge of research investigating the effect of brand names on mechanisms of perceptions and judgments because of their

sound and beyond the semantic meaning of the word(s) they use (Carnevale et al., 2017; Spence, 2012). This approach is consistent with work in linguistics suggesting that sounds carry meaning (Jakobson, 1976). The meaning that consumers may attribute to sounds has mainly been studied from the perspective of sound symbolism, that is, the phenomenon by which a sound is arbitrarily associated with certain characteristics such as shape or size (Table 1).

For instance, Sapir's (1929) ground-breaking study showed that the majority of individuals ($\geq 80\%$) in different cultures choose the pseudo-word "Mil" to describe a small table and the pseudo-word "Mal" to describe a large table. The demonstration is based on the fact that only the vowel ([i] and [a], respectively) varied between the two words whereas other factors remained constant such as the arbitrary choice of a table as an object, the choice of the other sounds that made up the words (i.e., [m] and [l]), the choice of their location, and the choice of words that have no semantic meaning. Explanations for this effect are based on the notion that high-frequency vowels such as [i] (called front vowels because they require the tongue in the front of the mouth) evoke what is small and light whereas low-frequency vowels such as [a] (called back vowels because they require the tongue at the back of the mouth) are associated with what is large and heavy. As such, consumers may prefer brands because the attributes connoted by the sound of their name are congruent with the attributes of the product (Lowrey and Shrum, 2007).

Although consumer research has paid less attention to consonants, a similar reasoning rooted in sound symbolism has prevailed (Coulter and Coulter, 2010; Klink, 2000). Specifically, this approach suggests that plosives (e.g., [b], [d], [p] and [t]) evoke perceptions of large size because they produce low frequencies compared to fricatives (e.g., [f], [l], [s] and [v]), which produce high frequencies and thus evoke perceptions of small size. Nevertheless, and to our knowledge, such associations between sounds and meanings have been empirically demonstrated in a single study using explicit measures and testing 31 hypotheses in a row by asking as many questions grouped in the same page of a questionnaire (Klink, 2000) (Table 1). While we do not question the validity of the results, we argue that such a study cannot suffice to build the foundations on which rely the basic premises of research on the sound of brand names. In this article, we focus on a property that we propose to be associated with plosives: the ability to evoke action.

Table 1: Overview of the associations between sounds and meanings based on sound symbolism.

Sounds		Meanings ^a																					Examples of observed effects ^b		
		Bitter	Friendly	Mild	Weak	Feminine	Thin	Pretty	Light (heavy)	Light (dark)	Small	Fast	Sweat	Unfriendly	Harsh	Strong	Masculine	Thick	Ugly	Heavy	Dark	Large		Slow	
Vowels	Front	[i] in hit	×	×	×	×	×	×	×	×	×	×													<ul style="list-style-type: none">• A brand name containing vowels whose meaning (e.g., small) is associated with product attributes (e.g., compact car) increases brand preference (Lowrey and Shrum, 2007). <i>Language:</i> English (collect: USA)• Prices involving numbers made up of front vowels (e.g., \$11.00 → \$7.88; i.e., -28.4% vs. back vowels (e.g., \$10.00 → \$7.01; i.e. -29.9%) may lead to overestimating reductions due to their association with perceptions of small size (Coulter et Coulter, 2010). <i>Language:</i> English, Chinese, Spanish (collect: USA)
	[ē] in bee	×	×	×	×	×	×	×	×	×	×														
	[e] in <i>test</i>	×	×	×	×	×	×	×	×	×	×														
	Back	[a] in <i>cat</i>											×	×	×	×	×	×	×	×	×	×	×		
	[ō] in <i>put</i>												×	×	×	×	×	×	×	×	×	×	×		
	[ũ] in <i>food</i>												×	×	×	×	×	×	×	×	×	×	×		
	[ō] in <i>home</i>												×	×	×	×	×	×	×	×	×	×	×		
Consonants	Fricatives	[f] in <i>fog</i>				×			×		×	×													<ul style="list-style-type: none">• The right combination of vowels and consonants (for example, the front vowel [i] and the constrictive consonant [f] to refer to what is small) reinforces the effects on the estimation of price reductions (Coulter et Coulter, 2010). <i>Language:</i> English, Chinese, Spanish (collect: USA)
	[l] in <i>lab</i>					×			×		×	×													
	[s] in <i>sec</i>					×			×		×	×													
	[v] in <i>vet</i>					×			×		×	×													
	Plosives	[b] in <i>bow</i>															×			×		×	×		
	[d] in <i>doc</i>																×			×		×	×		
	[p] in <i>pan</i>																×			×		×	×		
	[t] in <i>tax</i>																×			×		×	×		

^a The proposed meanings are based on Klink's (2000) study.

^b These articles constitute examples whose purpose is to illustrate the effects of the sounds of brand names in research theoretically rooted in sound symbolism.

Plosive consonants and the concept of action

Recent research suggests that the articulatory movements involved in the pronunciation of sounds carry sensory information and might influence how consumers perceive brands (Topolinski, 2017). Bodily experiences constitute a source of information that affect consumers' perception, judgment, and behavior (Barsalou, 2008; Daucé and Rieunier, 2002). That is, products, brands, and advertisements can trigger responses based on mental representations associated with sensory and motor experiences that consumers have lived and kept in memory. For example, words containing the sound [i] have been shown to simulate a smile thereby fostering positivity (Strack, Martin, and Stepper, 1988). Other examples include Topolinski (2017) who demonstrated that words requiring consonantal articulations starting in the front of the mouth and finishing in the rear (e.g., *Bodika*) elicited positive attitudes because such words simulated ingestion. Conversely, words requiring consonantal articulations starting in the rear of the mouth and finishing in the front (e.g., *Kodiba*) elicited avoidance because of the similarity with the sequence of articulatory places involved in coughing or vomiting.

Articulatory movements are especially conducive to simulating meanings when they involve the pronunciation of consonants. While vowels only require modulation of the shape of the oral cavity (e.g., open wide for [a]), consonants require articulations mobilizing different muscles, at different places in the mouth to completely or to partially obstruct the passage of air (Topolinsky, 2017). In many languages including English and French, consonants are essentially classified into two categories: plosives and fricatives (Schwartz et al., 2012). Plosives—which include in particular [b] (in “bow”), [p] (in “pan”), [d] (in “doc”) and [t] (in “tax”)—are abrupt popping sounds made by the complete closure of the articulators (i.e., lips or tongue against palate) followed by a sudden explosive release of air from the mouth. Fricatives—which include in particular [f] (in “fog”), [v] (in “vet”), [l] (in “lab”) and [s] (in “sec”)—are sounds made by restricting, but not stopping, airflow through the mouth.

In other words, plosives alternate silence and explosion of air while fricatives involve a single relatively monotonous articulatory movement consisting in releasing air through the mouth without interruption. This distinction suggests that plosives involve a dynamic sensory experience more likely to simulate action than the more static sensory experience associated

with fricatives. This proposition finds an empirical basis in the neuropsychology literature. Based on functional magnetic resonance imaging (fMRI), studies found that merely hearing phonemes containing [p] and [t] activated motor regions of the brain although participants were perfectly still (Pulvermüller et al., 2006). These regions were the same as those activated when participants subsequently had to use their lips or tongue without making any sound. Likewise, D'Ausilio et al. (2009) showed that exposure to plosives activates areas of the brain associated with motor functions because of the important articulatory movements these sounds require. Their study relied on a different method designed to study brain activity (i.e., transcranial magnetic stimulation) and consisted in measuring the excitability of the motor cortex (responsible for the execution of bodily movements) during the passive listening to phonemes starting with [b], [d], [p] or [t].

Furthermore, this body of research suggests that the dynamic sensory experience characterizing plosives is not constrained by pronouncing sounds aloud but can be activated by silent reading. Sounds, the articulatory movements to produce them, and their phonetic transcriptions as letters are all connected in the brain. Sensorimotor experiences (such as reading or listening to other people speak) are recoded and stored in a “semantic memory” which organizes the knowledge of the world that individuals store into a system of representations (Brunel, Labeye, Lesourd, and Versace, 2009). For instance, upon reading the word “giraffe,” people may think of the animal, its long neck, the savanna, or the *Lion King* movie. Thus, when a stimulus activates a representation, all the representations associated with it in people’s semantic memory are also activated (Barsalou, 2008; Topolinski, 2017). Let us consider a pseudo-word containing plosives such as “dotdot.” Merely reading the letters *d* and *t* evokes the sounds they represent (i.e., [d] and [t]) and the feeling of having to stick one’s tongue against one’s palate without actually having to read the word aloud.

Putting to the test plosives’ ability to evoke action through threats to personal control

To the extent that brand names containing plosives (vs. fricatives) can evoke action, this property should lead consumers to prefer such names under threats to personal control. Personal control refers to the belief that one can obtain desired outcomes and achieve goals

through their own efforts (Landau et al., 2015). The belief that one can exert control over life and their immediate environment is a basic psychological need (Landau et al., 2015) which, if satisfied, contributes to people's well-being (Greenaway et al., 2015a) as well as positive life experiences such the pleasure derived from experiences of autonomous consumption (Lunardo and Saintives, 2020). Given the benefits that personal control entails, it is not surprising that individuals seek as much as possible to maintain this belief intact (Landau et al., 2015; Greenaway et al., 2015a; 2015b).

However, perceptions of personal control are not immune to changing circumstances and may vary depending on situational factors. People may feel in control if they perceive that performing a particular action reliably produces the expected outcomes. Otherwise, they experience a loss of personal control. Individuals may respond to such situations using a variety of socio-cognitive strategies designed to combat the anxiety-inducing fear of perceiving the world as random and chaotic and restore baseline levels of perceived control (Landau et al., 2015). In that vein, Compensatory Control Theory suggests that individuals are fundamentally motivated to compensate for a loss of personal control by striving to affirm worldviews in which the world is orderly, predictable, and understandable (Landau et al., 2015). For example, individuals may rely on religion (Khenfer, Roux, and Tafani, 2014), trust brands portrayed as reliable (Khenfer et al., 2017), or believe in conspiracy theories (Whitson and Galinsky, 2008).

Individuals can also implement strategies where they seek to regain the perception of being in control through their own actions. These strategies tend to be dominant in Western cultures where individuals prefer to rely on their personal stock of resources rather than on external sources of control such as the government or supernatural entities (Landau et al., 2015). For example, individuals may convince themselves that they can control a situation that is objectively uncontrollable (Langer, 1975). Feeling in control through individual actions is consistent with research on motivation and self-regulatory processes. When individuals perceive a discrepancy between a desired outcome and their current state, making efforts to reduce this discrepancy strengthens feelings of personal control and further increases the motivation to provide further efforts (Bagozzi and Dholakia, 1999).

Another strategy that relies on one's readiness to act consists in bolstering the perception of being in control in domains unrelated to the source of reduced control. Greenaway et al. (2015b) demonstrated that when people experience a loss of personal control in a particular domain such as a hearing test, they reported a higher willingness to provide efforts toward non-specific goals. That is, they compensated for their loss of personal control in one domain by reasserting their control in other domains. This boost in motivation is immediate and relatively short-lived but allows individuals to combat the frustration of control deprivation through compensatory action (Greenaway et al., 2015b). Hence, when people face a loss of personal control, they seek to act even in domains unrelated to the source of reduced control.

In sum, to the extent that plosives can evoke action, a loss of personal control should lead consumers to prefer brand names containing such sounds since a loss of personal control triggers a preference for action.

Methodological considerations

We tested our propositions using three experimental studies conducted in a behavioral lab. In doing so, we sought to control unwanted sources of external influences such as the presence of noise or musical background. All three studies were conducted in French on French-speaking samples with students in metropolitan France. Table 2 provides the objectives for each of them.

Table 2: Overview of experimental studies

Study	Objective	Experimental design
1	Demonstrating that plosives (<i>vs.</i> fricatives) evoke the concept of action.	<i>Independent variable:</i> Within-subjects manipulation (plosives <i>vs.</i> fricatives) <i>Dependent variable:</i> Implicit measure of semantic association between plosives and the concept of action.

2	Demonstrating that a loss of personal control increases the preference for plosives by <i>measuring the perceived attractiveness</i> of fictitious brand names containing plosives.	<i>Independent variable:</i> Between-subjects manipulation of feelings of personal control (low vs. neutral) <i>Dependent variable:</i> Evaluation of 6 plosive-based pseudo-words.
3	Demonstrating that a loss of personal control increases the preference for plosives by <i>measuring preference</i> for fictitious brand names containing plosives (vs. fricatives).	<i>Independent variable:</i> Between-subjects manipulation of feelings of personal control (low vs. neutral) <i>Dependent variable:</i> 12 choices of plosive (vs. fricative)-based pseudo-words.

To strengthen internal validity, we created fictitious brand names based on a specific structure that respected three principles. First, we used the same category of consonants within a same brand name. Plosives and fricatives can be categorized according to the place where articulatory movements occur in the mouth. The plosives [b] and [p], as well as the fricatives [f] and [v] are categorized as labial consonants due to the mobilization of the lips to produce these sounds. The plosives [d] and [t], as well as the fricatives [l] and [s] are categorized as dental consonants due to the mobilization of the tongue against the palate. Second, we used the same vowel within a same brand name. Third, we used pseudo-words that were easy to read and that did not convey any obvious semantic meaning. As such, our fictitious brand names doubled the same syllable to avoid monosyllabic words whose possible confusion with onomatopoeia would have been a source of noise in our studies. This structure was in part inspired by past research on the effect of the sound of brand names (Klink, 2000; Lowrey and Shrum, 2007).

Thus, our brand names used the following structure: labial consonant 1 (or dental 1) - vowel - labial consonant 2 (or dental 2) - labial consonant 1 (or dental 1) - vowel - labial consonant 1 (or dental 2). To avoid raising suspicion, we consistently informed participants that the brand names they were dealing with were those of mobile applications; this domain is known for the originality of the names that consumers face on a daily basis.

Study 1: How to project action in a brand name

Study 1 (Box 1) tests the proposition that plosive-based brand names are more likely to evoke the semantic concept of action than fricative-based brand names. As such, we conducted a repeated measures analysis of variance (RM ANOVA). The dependent variable was the time participants spent recognizing words as real or made up in milliseconds. When participants were exposed to plosive-based prime words (i.e., Dotdot and Todtod), they were faster to recognize the word “action” as a real word than when they were exposed to fricative-based prime words (i.e., Loslos, Solsol), $F(1, 84) = 4.50, p = .037$ ($M_{plosives} = 517.25$ vs. $M_{fricatives} = 543.94$). We did not find this effect when participants were asked to recognize a neutral word such as “furniture,” $F(1, 84) = 0.01, p = .922$ ($M_{plosives} = 505.19$ vs. $M_{fricatives} = 506.24$). These results therefore confirm our main proposition. Specifically, they provide evidence that pseudo-words containing plosives evoke the semantic concept of action to a greater extent than pseudo-words containing fricatives.

Box 1: Method implemented in Study 1.

Study 1 ($N = 85$; females: 69.4%; mean age: 20.4 [range: 19-25]) involved a lexical decision task (LDT), programmed in Implicit-Studio. LDT provides an implicit measure of association between an attitude-generating object, or prime (here, words containing plosives or fricatives) and a semantic concept (here, *action*) by asking participants to decide whether a series of letters represents a real word or not after exposure to the prime (Ackermann and Mathieu, 2015). This technique assumes that the strength of association between the prime and the semantic concept depends on how quickly participants respond correctly. If the prime activates the semantic concept in participants’ memory, this activation should enable them to recognize words associated with the semantic concept more quickly. In other words, the more plosives evoke the semantic concept of action, the faster participants should be at recognizing the word “action” after having been exposed to a word containing plosives (vs. fricatives). Participants were successively exposed to sixteen sequences. Each included: (1) a fixation point at the center of the screen, (2) a prime word (plosives: Dotdot, Todtod; fricatives: Loslos, Solsol), and (3) a real word (“action”) or a pronounceable pseudo-word (“antio”). Participants were told that their job was to categorize as quickly and accurately as possible the

letter strings as real words by pressing the “L” key or non-existing word by pressing the “S” key.

Studies 2 and 3: Further demonstration through personal control loss

Studies 2 and 3 further examine our proposition that plosives evoke the concept of action by measuring the perceived attractiveness of plosive-based brand names after the experience of personal control loss. We reasoned that if the sound of brand names containing plosives simulates the feeling of doing something, a loss of personal control should increase the perceived attractiveness of such names. On the one hand, Study 2 tests this proposition by measuring the perceived attractiveness of a series of fictitious brand names containing plosives (Box 2). On the other hand, Study 3 tests this proposition by measuring brand preference for fictitious names containing plosives over names containing fricatives (Box 3). Because perceptions of personal control tend to be high when they are not altered (Cutright, 2012), we only compared perceptions of low and neutral personal control.

Box 2: Method implemented in Study 2.

Study 2 ($N = 105$; female: 58.1%; mean age: 20.9 [range: 19-25]) was presented as two independent studies. The “first study” was used to manipulate perception of personal control using an auditory task. Participants were asked to solve simple math problems (e.g., “ $16 + 4 - 12$ ”) while listening to a series of unpleasant noises (e.g., sirens). All noises lasted 2 seconds and were randomly played over headphones at a bearable volume. The silence between noises varied randomly from 1 to 13 seconds. Participants were randomly assigned to conditions. Low-control participants were instructed not to interfere with audio playback or volume whereas those in the neutral condition were instructed that we would prefer that they did not interfere with volume or audio playback, but that they were free to do so. Our reasoning was that placing formal restrictions on whether participants could or could not influence the unpleasant sound environment would negatively affect their perception of personal control. Following past recommendations (Greenaway et al., 2015b), we ran a

pretest² ($N = 69$) to confirm the effectiveness of our manipulation using two items measuring the extent to which participants felt they had an influence over the volume and audio playback. The pretest further showed that our manipulation did not affect positive mood, negative mood, the perceived difficulty of the task, participants' perceived intelligence, or the perceived unpleasantness of the noises. (The details and results of the pretest are provided in Appendix 1). The subsequent "unrelated study" was used to measure the dependent variable. Participants were asked to rate a series of six pre-selected names for a new mobile application (one at a time and randomly presented): Datdat, Tadtad, Dotdot, Todtod, Dutdud, and Tuditdud (1 = "I don't like it at all," 7 = "I like it a lot," $\alpha = .80$).

First, we analyzed the results of Study 2 by running an independent t-test on the aggregated scores of the evaluation of the six brand names (ranging from 7 to 42). Let us note that using the mean score did not change the following results. The experimental factor was the manipulation of personal control (low vs. neutral). Low-control participants ($n = 53$) rated brand names more favorably than those in the neutral condition ($n = 52$), $t(103) = 2.66$, $p = .009$ ($M_{low} = 13.56$ vs. $M_{neutral} = 11.00$). These results confirm our second proposition. Specifically, they suggest that individuals rate plosive-based brand names more favorably when perception of personal control is threatened (vs. neutral).

Furthermore, we ran a multivariate analysis of variance (MANOVA) to account for the change in vowels used across the six brand names (i.e., [a], [o], and [u]). MANOVA is designed to carry out comparisons between experimental conditions on several dependent variables. As such, we considered three dependent variables by aggregating the evaluation scores of the two brand names containing the vowel [a] (i.e., Datdat, Tadtad), the evaluation scores of the two brand names containing the vowel [o] (i.e., Dotdot, Todtod), and the evaluation scores of the two brand names containing the vowel [u] (i.e., Dutdud, Tuditdud). Analyses revealed that low-control participants rated brand names more favorably than those in the neutral condition regardless of the vowel used in the brand names: vowel [a]: $F(1, 102) = 4.90$, $p = .029$ ($M_{low} = 4.41$ vs. $M_{neutral} = 3.55$); vowel [o]: $F(1, 102) = 4.04$, $p = .047$ ($M_{low} = 5.15$ vs. $M_{neutral} = 4.28$); vowel [u]: $F(1, 102) = 4.91$, $p = .029$ ($M_{low} = 4.00$ vs. $M_{neutral} = 3.32$).

² In Studies 2 and 3, we relied on pretests rather than manipulation checks. If plosives can evoke action, one could argue that merely exposing participants to plosives in an environment perceived as uncontrollable could bolster feelings of personal control. In sum, using manipulation checks would not have made it possible to ascertain that the observed effects could be attributed to the manipulation alone.

In other words, the perceived attractiveness of plosive-based brand names in the face of a loss of personal control remained unchanged despite the different types of vowels we used to create the fictitious brand names.

An important limitation of Study 2 is that all brand names contained plosives. In doing so, we sought to show that our effect was not constrained by a need for systematic contrast between plosives and fricatives. However, a doubt remains as to whether a loss of personal control could increase the perceived attractiveness of any type of sound. Study 3 (Box 3) addresses this limitation by comparing plosives and fricatives, and by using a larger variety of consonantal sounds.

Box 3: Method implemented in Study 3.

Study 3 ($N = 123$; female: 59.1%; mean age: 21.0 [range: 19-33]) was presented as a deductive reasoning test adapted from Whitson and Galinsky (2008). Participants were told that the computer would select a concept (e.g., uppercase, square) embedded in one of the two symbols on the screen (example below). Their job would be to determine which of the symbols contained the correct concept based on the feedback the computer would provide. They further read that they would participate in four independent tasks in addition to a practice trial. While each task contained ten pairs of symbols, they were asked to do their best to guess the correct concept as soon as possible. Participants were randomly assigned to conditions. Low-control participants received random feedback (50% correct and 50% incorrect) while those in the neutral condition received feedback contingent on their responses. Our reasoning was that giving participants feedback that did not depend on their responses would cause an altered perception of their ability to influence the expected outcome of the task, that is, finding the correct answer. Following past recommendations (Whitson and Galinsky, 2008), we ran a pretest ($N = 90$) to confirm the effectiveness of our manipulation without affecting positive mood, negative mood, participants' perceived intelligence, or self-esteem. (The details and results of the pretest are provided in Appendix 2).



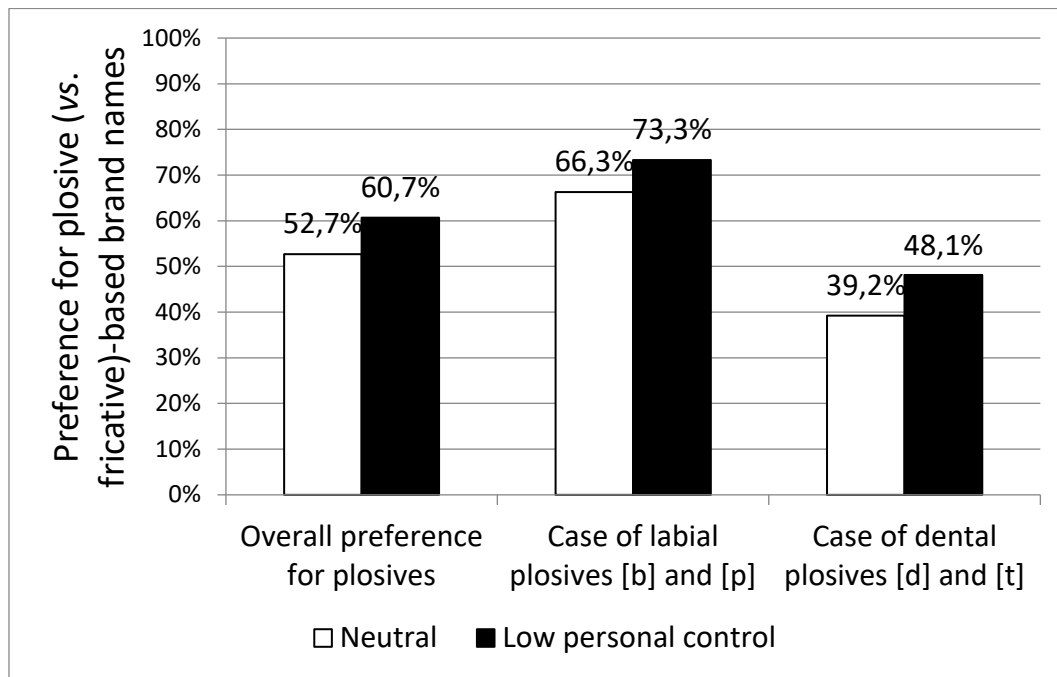
Example of a pair of symbols:

Participants were further told that, to facilitate concentration, the concept identification task would be interrupted after the 2nd, 3rd, and 4th time to complete a short unrelated pretest. This was used as our dependent variable. At each interruption, they were presented with a series of four choices between two fictitious mobile applications systematically opposing a name containing plosives with a name containing fricatives. The first set included Bapbap and Pabpab, each randomly opposed to Favfav or Vafvaf, as well as Tadtad and Datdat, each randomly opposed to Laslas or Salsal. The 2nd and 3rd set replaced [a] with [o] and [u], respectively. Presentation order (left, right) and positions within a set (1st, 2nd, 3rd or 4th) were randomized. Participants were asked to provide their responses by typing in their preferred name to ensure that the choice was inherent to reading the name.

We analyzed the results of Study 3 by running a repeated measures logistic regression. The dependent variable was the preference for plosive (vs. fricative) brand names, that is, the probability of choosing a brand name containing plosives (coded 1) over a brand name containing fricatives (coded 0) for the twelve pairs. The experimental variable was the manipulation of personal control (coded 0 for neutral and 1 for low). Overall, low-control participants ($n = 65$) preferred mobile applications names containing plosives more than participants in the neutral condition ($n = 58$), $b = 0.32$, $SE = 0.11$, $Z = 9.11$, $p = .003$. In other words, the probability of choosing plosive (vs. fricative)-based brand names was significantly higher in the low-control condition (60.7% of participants) than in the neutral condition (52.7% of participants) (Figure 1). These results support our second proposition and replicate the results of Study 2 by measuring consumer preference for brand names containing plosives (vs. fricatives) on a series of twelve choices.

Furthermore, we ran separate analyses to account for the place where articulatory movements occur in the mouth. We distinguished labial consonants (i.e., mobilization of the lips) and dental consonants (i.e., mobilization of the tongue against the palate). First, we compared labial plosives (i.e., [b] and [p]) with labial fricatives (i.e., [f] and [v]). Next, we compared dental plosives (i.e., [d] and [t]) with dental fricatives (i.e., [l] and [s]). As such, we conducted two repeated measures logistic regressions. We found our effect in the two groups of consonants, labial consonants: $b = 0.33$, $SE = 0.16$, $Z = 4.11$, $p = .043$, and dental consonants: $b = 0.36$, $SE = 0.15$, $Z = 5.72$, $p = .017$. Figure 1 illustrates these results.

Figure 1: Preference for plosive (vs. fricative)-based brand names in context of low (vs. neutral) feelings of personal control.



Discussion

Our three studies support the notion that brands can project action based on the sound of their names, independently of the semantic meaning of the words they use. Specifically, Study 1 revealed that pseudo-words containing plosives are more likely to evoke the semantic concept of action—i.e., the feeling of doing something—than pseudo-words containing fricatives. Studies 2 and 3 further investigated this property in the context of a loss of personal control. We reasoned that if plosives can evoke action, a loss of personal control should increase preference for brand names containing such sounds since a loss of personal control has been shown to trigger a preference for action. Study 2 showed that individuals rated brand names containing plosives more favorably in the face of a loss of personal control. Study 3 replicated the results of Study 2 by measuring consumer preference throughout repeated choices.

Theoretical contributions

Important theoretical contributions stem from this research. First, our research highlights that the study of the sound of brand names exists beyond sound symbolism. In line with other works (e.g., Topolinski, 2017), we explored a different route by building on the notion that consumers extract sensory information from brand names, independently of the semantic meaning of the words they used. We highlighted the role of articulatory movements involved in the pronunciation of brand names to explain the meaning that sounds can have for consumers. While research on the sound of brand names has grown quickly in the last decade, many have based their premises on the notion that certain sounds can be arbitrarily associated with certain characteristics (e.g., Coulter and Coulter, 2010; Lowrey and Shrum, 2007). To ensure the credibility of this field of research, it is crucial that the associations between sounds and meanings be firmly established. This research worked toward that end by examining a property specific to plosive consonants: the ability to evoke action.

Second, this article highlights a novel compensatory control strategy consisting in extracting sensory information from brand names. We showed that a threat to feelings of personal control may trigger a preference for brand names containing plosives because of their association with the concept of action. Existing research has identified a myriad of effects that a loss of personal control can cause, ranging from a greater willingness to believe in conspiracy theories (Whitson and Galinsky, 2008) to a preference for logos with clear boundaries (Cutright, 2012) (see Landau et al., 2015 for an inventory). This research innovates by suggesting that individuals can compensate for threats to personal control by mobilizing their bodily experience (i.e., articulatory movements inherent to reading plosives) to simulate action.

Managerial contributions

Brand names containing plosives evoke action.

The current research has also relevance for practitioners. Our results suggest that the presence of plosives in brand names may contribute to the formation of mental associations related to action. As such, a brand could project dynamism through the sound of its name and independently of the semantic meaning of the words it uses. Likewise, a brand whose

positioning is anchored in relaxation or calm should avoid using plosives in its name and prefer fricatives instead. In sum, brands can strengthen the knowledge that has been created in consumers' mind by ensuring a level of consistency between the associations they cultivate through their marketing communication and the sensory information that their names convey. One can extrapolate this conclusion to other components of a brand such as the slogan. Using alliterations involving plosives could reinforce the semantic meaning of the words used in the slogan to the extent that they convey the notion of action. Such a technique would be particularly relevant in sport-related activities, for example. While many factors are likely to influence consumer preference, this research highlights the role of the sound of brand names among the set of tactics available to practitioners.

Our recommendation is not that existing brands should change their name to be consistent with an image projecting action, especially not when they have successfully managed to cultivate favorable and unique associations in consumers' mind. The results of this research are mainly aimed at brand directors, managers, and entrepreneurs who are in the process of launching a new brand and looking for a name. Given that a new brand requires significant efforts of marketing communication to develop favorable associations, creating brand names that contain plosives can prove to be a cost-effective advantage to project action.

Brand names containing plosives foster positive attitude.

Another managerial implication of this research relates to our finding that plosive-based brand names may compensate for threats to personal control. Such situations are relatively frequent in consumers' lives, ranging from tragic events (e.g., natural disasters, economic crises) to mundane incidents such as disruptions in public transportations. Of course, these examples can have very different consequences for consumers, if only in their severity. They converge, however, in the fact that they lead individuals to question their ability to influence their environment to achieve their goals. As such, they negatively affect feelings of personal control. Findings from Studies 2 and 3 suggest that consumers are then more attracted to brand names containing plosives. To the extent that using plosives in a brand name does not interfere with its positioning (e.g., relaxation), we recommend relying on these consonantal sounds to anticipate situations where consumers may deal with threats to personal control.

Nevertheless, the results of Studies 2 and 3 suggest that if dental plosives (i.e., [d] and [t]) do lead to a preference for brand names containing such sounds in the face of personal control loss, their appeal seems to be overall rather low. Study 2 revealed that the aggregated score of brand name evaluations was significantly higher in the low-control condition than in the neutral condition. However, these scores were relatively low (13.56 and 11.00, respectively) and contrast with the highest theoretical aggregated score (i.e., 42). Likewise, Study 3 revealed that while low-control participants preferred significantly more brand names containing dental plosives to those containing dental fricatives than participants in the neutral condition, these proportions never exceeded the majority of participants (48.1% and 39.2%, respectively). These results contrast with those related to brand names containing labial plosives (i.e., [b] and [p]) where 73.3% of low-control participants preferred these names to those containing labial fricatives versus 66.3% in the neutral condition. In sum, labial plosives seem to be preferable to dental plosives in building a brand name.

Limitations and further research

Although our findings were replicated across several studies, our methodology and results raise several questions. First, participants read brand names silently, without pronouncing the sounds aloud. While this is how consumers typically deal with brands in real settings, one could argue that the effect that we observed in context of personal control loss can be attributed to sound symbolism. For example, round-shaped letters such as *d*, *p* and *b* might evoke perception of sweetness, and letters with angular shapes such as *t* might evoke vitality (Spence, 2012). These properties could explain the appeal of the fictitious brand names we used in our studies. As such, testing the process underlying the causal relationship between personal control loss and preference for plosive sounds would add further validity to our findings. To this end, a moderation approach (Vancouver and Carlson, 2015) might be better suited than a mediation approach since the latter might make explicit a process that is inherently implicit, and thus, fail to detect the effect. For instance, an additional manipulation designed to restore perceived control could show that plosive-based brand names lose their appeal when perceived control is restored after being reduced in the first place.

Moreover, participants were systematically exposed to fictitious brand names with no apparent meaning (e.g., Dotdot). Further research could investigate the moderating role of congruence between the semantic meaning of words used as brand names and the presence of plosives in these words. Pulvermüller (2005) demonstrated that reading words that denote the concept of action such as lick, pick, and kick activated regions of the brain associated with the corresponding motor functions, that is, tongue, fingers, and feet, respectively. Therefore, a brand name based on a word whose meaning evokes the concept of action might strengthen the effect of plosives in context of personal control loss. Further questions arise. Would consumers prefer a brand name that contains plosives but has no semantic meaning to a brand name that contains no plosive but whose meaning evokes action (e.g., the French political party “En Marche”)? While the consistency of mental representations may boost our effect, a mismatch involving plosives and inaction-related words might hinder it.

Among the remaining questions that future research could address is the role of mastication in our effects. Reading or hearing brand names while eating, drinking, or chewing is not uncommon for consumers. Since mastication involves articulatory movements, plosives may lose their appeal in context of personal control loss. Another line of research to investigate relates to the coexistence of plosives and fricatives in the same brand name. Can the presence of fricatives hinder the effect of plosives when it comes to evoking action? To what extent plosives must predominate in a brand name to ensure it can evoke action? In our studies, we used brand names where plosives were deliberately redundant. The question of how many plosives are needed to trigger our effects also remains unanswered.

Finally, this research gave priority to internal validity, perhaps at the expense of external validity. On the one hand, we tested our propositions only with French-speaking samples. One may then wonder whether our effect exists in languages other than French. While only empirical tests can provide a definitive answer, we suspect that it does. Plosives are consonantal sounds that can be found in many languages across the globe (Schwartz et al., 2012). Furthermore, our argument is based on the unconscious association between oral articulatory movements and a semantic concept (specifically, *action*) whose meaning is not *a priori* constrained by cultural barriers. On the other hand, our studies systematically relied on fictitious brand names and thus raise the question of whether our effect could emerge with real brands that consumers already know. We suspect that the strength of brand associations then plays an important moderating role.

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Appendix 1: Details of the analysis of the pretest used in Study 2.

Table 1.A: Items and psychometric properties of the measures

Measures and items	Factor loadings ³	Cronbach's alpha ⁴	Joreskog's ρ ⁵	ρ_{vc} ⁶
Feelings of personal control (adapted from Greenaway et al., 2015b)				
<i>1 = Pas du tout d'accord; 7 = Tout à fait d'accord</i>				
Au cours des problèmes arithmétiques, j'ai eu le sentiment d'avoir été en contrôle du volume des fonds sonores.	.83	.53*	.71	.55
Au cours des problèmes arithmétiques, j'ai eu le sentiment d'avoir été en contrôle de la lecture des fonds sonores.	.64			
Positive mood (adapted from Watson, Clark, and Tellegen, 1988) ⁷				
<i>1 = Pas du tout; 7 = Extrêmement</i>				
Intéressé	.69	.81	.83	.51
Enthousiaste	.88			
Vigilant	.40			
Déterminé	.82			
Excité	.69			
Negative mood (adapted from Watson et al., 1988)				
<i>1 = Pas du tout; 7 = Extrêmement</i>				
Effrayé	.81	.76	.80	.47
Nerveux	.58			
Coupable	.86			
Honteux	.67			
Hostile	.38			
Perceived intelligence threat (adapted from Han, Duhachek, and Rucker, 2015) ⁸				
<i>1 = Absolument pas; 7 = Absolument</i>				
Vous voyez-vous comme quelqu'un d'incompétent ?	.86	.82	.85	.59
Vous voyez-vous comme quelqu'un qui manque d'intelligence ?	.85			
Vous voyez-vous comme quelqu'un d'ignorant ?	.54			
Vous voyez-vous comme quelqu'un qui a du mal à comprendre les choses ?	.78			
Perceived unpleasantness of the noises				
<i>1 = Pas du tout; 7 = Extrêmement</i>				
Dans quelle mesure avez-vous trouvé les fonds sonores irritants ?	.94	.76*	.88	.79
Dans quelle mesure avez-vous trouvé les fonds sonores déplaisants ?	.83			

Note: * $p < .001$

³ A confirmatory factorial analysis suggested an acceptable fit of the data to the estimated model without item removal (CFI = .88, SRMR = .08, RMSEA = .085 [.058; .109], $\chi^2(125) = 185.76$, $p < .001$).

⁴ Cronbach's alpha (α) assesses the internal consistency of items. It is considered acceptable if $\alpha > .70$.

Pearson's correlation (r) is provided for measures based on two items.

⁵ Joreskog's rho (ρ) is considered to be more reliable than Cronbach's alpha because of the latter's sensitivity to the number of items. It is considered acceptable if $\rho > .70$.

⁶ Rhô of convergent validity (ρ_{vc}) is another indicator of reliability and assesses if items are correlated. It is considered acceptable if $\rho_{vc} > .50$.

⁷ Watson D., Clark L.A. and Tellegen A. (1988), Development and validation of brief measures of positive and negative affect: the PANAS scales, *Journal of Personality and Social Psychology*, 54(6): 1063-1070.

⁸ Han D., Duhachek A. and Rucker D.D. (2015), Distinct threats, common remedies: How consumers cope with psychological threat, *Journal of Consumer Psychology*, 25(4): 531-545.

Table 2.A: Results of the pretest used in Study 2

		Mean	SD	Test
<i>Perception of personal control</i>				
Experimental conditions	Low personal control	3.63	1.71	$ t(67) = 2.11, p = .038$
	Neutral	4.46	1.53	
<i>Positive mood</i>				
Experimental conditions	Low personal control	4.01	1.30	$ t(67) = 0.15, p = .885$
	Neutral	3.96	1.31	
<i>Negative mood</i>				
Experimental conditions	Low personal control	2.17	1.14	$ t(67) = 0.76, p = .450$
	Neutral	1.99	0.83	
<i>Threat to perceived intelligence</i>				
Experimental conditions	Low personal control	1.95	0.80	$ t(67) = 0.11, p = .912$
	Neutral	1.92	1.19	
<i>Perceived unpleasantness of the noises</i>				
Experimental conditions	Low personal control	4.94	1.46	$ t(67) = 0.59, p = .560$
	Neutral	4.71	1.74	

Details on the sample: $N = 69$ ($n_{\text{low personal control}} = 34$, $n_{\text{neutral}} = 35$); females: 60.9%; mean age: 20.6 (range: 19-34).

Appendix 2: Details of the analysis of the pretest used in Study 3.

Table 3.A: Items and psychometric properties of the measures

Measures and items	Factor loadings ⁹	Cronbach's alpha ¹⁰	Joreskog's ρ	ρ_{vc}
Perception of personal control (adapted from Whitson et Galinsky, 2008) <i>1 = Pas du tout d'accord; 7 = Tout à fait d'accord</i>				
J'ai le sentiment que mes efforts ont été vains au cours des exercices d'identification de concepts. (reversed)	.78	.64*	.78	.64
Mes efforts ont donné des résultats fructueux au regard des attentes données dans les consignes de départ.	.82			
Positive mood (adapted from Watson et al., 1988) <i>1 = Pas du tout; 7 = Extrêmement</i>				
Intéressé	.55	.72	.74	.41
Enthousiaste	.97			
Vigilant	.07			
Déterminé	.60			
Excité	.68			
Negative mood (adapted from Watson et al., 1988) <i>1 = Pas du tout; 7 = Extrêmement</i>				
Effrayé	.41	.81	.82	.49
Nerveux	.67			
Coupable	.72			
Honteux	.75			
Hostile	.86			
Threat on perceived intelligence (adapted from Han et al., 2015) <i>1 = Absolument pas; 7 = Absolument</i>				
Vous voyez-vous comme quelqu'un d'incompétent ?	.54	.80	.84	.57
Vous voyez-vous comme quelqu'un qui manque d'intelligence ?	.91			
Vous voyez-vous comme quelqu'un d'ignorant ?	.71			
Vous voyez-vous comme quelqu'un qui a du mal à comprendre les choses ?	.82			
Self-esteem (adapted from Rosenberg, 1965) ¹¹ <i>1 = Pas du tout d'accord; 4 = Tout à fait d'accord</i>				
Je pense que je suis une personne de valeur, au moins égal à n'importe qui d'autre.	.68	.88	.88	.42
Je pense que je possède un certain nombre de belles qualités.	.60			
Tout bien considéré, je suis porté à me considérer comme un raté. (reversed)	.72			
Je suis capable de faire les choses aussi bien que la majorité des gens.	.64			
Je ne vois peu de raisons d'être fier de moi. (reversed)	.70			
J'ai une attitude positive vis-à-vis de moi-même.	.65			
Dans l'ensemble, je suis satisfait de moi.	.64			
J'aimerais avoir plus de respect pour moi-même. (reversed)	.68			
Parfois, je me sens vraiment inutile. (reversed)	.64			
Il m'arrive de penser que je suis un bon à rien. (reversed)	.54			

Note: * $p < 0,001$
⁹ A confirmatory factorial analysis suggested an acceptable fit of the data to the estimated model without item removal (CFI = .89, SRMR = .08, RMSEA = .067 [.051; .082], $\chi^2(286) = 400.50$, $p < .001$).

¹⁰ Pearson's correlation (r) is provided for measures based on two items.

¹¹ Rosenberg M. (1965), *Society and the adolescent self-image*, Princeton (NJ), Princeton University Press.

Table 4.A: Results of the pretest used in Study 3

		Mean	SD	Test
<i>Perception of personal control</i>				
Experimental conditions	Low personal control	2.73	1.16	t(88) = 6.05, $p < .001$
	Neutral	4.44	1.46	
<i>Positive mood</i>				
Experimental conditions	Low personal control	3.94	0.89	t(88) = 0.15, $p = .910$
	Neutral	3.97	1.21	
<i>Negative mood</i>				
Experimental conditions	Low personal control	1.93	1.00	t(88) = 0.76, $p = .243$
	Neutral	2.19	1.09	
<i>Threat to perceived intelligence</i>				
Experimental conditions	Low personal control	2.35	1.13	t(88) = 0.11, $p = .804$
	Neutral	2.41	1.13	
<i>Self-esteem</i>				
Experimental conditions	Low personal control	3.15	0.57	t(88) = 0.59, $p = .640$
	Neutral	3.09	0.53	

Details on the sample: $N = 90$ ($n_{\text{low personal control}} = 41, n_{\text{neutral}} = 49$); females: 55.6%; mean age: 21.2 (range: 19-27).