“Conveying meaning in brand names by using time-inverted messages”

AUTHORS	Robert Schorn https://orcid.org/0000-0002-9580-0558 Mathias Streicher

ARTICLE INFO	Robert Schorn and Mathias Streicher (2013). Conveying meaning in brand names by using time-inverted messages. *Innovative Marketing* , *9*(3)
RELEASED ON	Friday, 27 December 2013
JOURNAL	"Innovative Marketing "
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
0	0	0

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Robert Schorn (Austria), Mathias Streicher (Austria)

Conveying meaning in brand names by using time-inverted messages

Abstract

The selection and creation of brand names plays an important role in marketing. The tremendous level and rate of growth of brands being introduced year by year suggests a heightened need to understand how to create effective new brand names. As significant brand names associating desired meanings might already be trademarked or not allowed to be registered, new ways of creating promising brand names conveying desired meanings seem to be necessary. One way of creating new brand names is to use time-inverted words. The results of our study show that the forward meaning of time-inverted single words has an influence on people's evaluations of these sounds. Contrary to former studies, the authors found that participants' evaluations of sounds of backward speech were influenced by the semantic content of the messages. Furthermore, participants' evaluations of backmasked messages were also influenced by sound symbolism. The results demonstrate that people's evaluations can be influenced by applying time-inverted messages. Implications for creating new brand names are discussed.

Keywords: branding, nonconscious influencing, backmasking, sound symbolism.

Introduction

The selection of brand names plays an important role in introductory marketing programs (Kapferer, 2012). Choosing the "right" brand name can enhance awareness and create a favorable image for a product (Aaker, 1991; Kazmi, 2007). The tremendous level and rate of growth of brands being introduced year by year suggests a heightened need to understand how to create effective new brand names (Klink, 2000). As significant brand names associating desired meanings might already be trademarked or not allowed to be registered, new ways of creating promising brand names conveying desired meanings seem to be necessary. One way of conveying meaning in so far unused brand names could be the use of backward masked messages, that is, creating new brand names by backmasking meaningful concepts. The aim of this study is to find out whether the semantic content of time-inverted messages has an influence on people's evaluations of words or sounds which could be used in creating effective new brand names that – without the consumers' conscious awareness – could convey desired meaning in otherwise artificially made-up words.

Since the late 1950s popular belief in nonconscious manipulation, and corresponding fears, have steadily increased (Bornstein, 1989; Brannon and Brock, 1994; Packard, 1957). One of the myths has been the claim that the forward meaning of time-inverted messages (words with an inverted time-structure) – also referred as "backmasking" or "backward masked messages" – could enter someone's cognitive system without being consciously perceived, thus possibly remote-controlling behavior on a later occasion. Backmasked speech can be produced by either inverting the time structure of a recorded speech segment with common audio software or by talking backwards by rapidly reversing the order of the speech units (Cowan, Braine and Leavitt, 1985). Early attempts to study the effectiveness of backmasked speech have been made, for example, by Vokey and Read (1985) in contrast of a fairly unscientific controversy on the threatening influence of satanic messages said to be hidden in rock music. Forerunner of this debate was Gary Greenwald, a fundamentalist preacher from California, who set out in 1982 to hold two days of public lectures on the satanic content of rock music hidden in backward masked messages (Vokey, 2002). The trial against the British heavy metal band Judas Priest in the early nineties marked the climax of a widespread belief that the human mind is vulnerable to hidden messages wrapped in reversed spoken messages: Teenagers allegedly committed suicide after listening to the rock music but the case was dismissed by the court (Loftus and Klinger, 1992; Moore, 1996). In an experimental study, Vokey and Read (1985) exposed their participants to simple sentences and passages played backwards. Although participants were able to make discriminations based on the physical properties of the sounds of backward speech, such as discriminating between different speakers, sex, or language, they were not influenced either consciously or unconsciously by the semantic content of backward messages. Another study conducted by Begg, Needham and Bookbinder (1993) showed that none of the forward meaning of backmasked statements "leaked" through, although old-new discrimination showed that the acoustic patterns of the backward messages themselves were memorable. In an attempt to examine the role of suggestion in perceiving satanic messages in rock-and-roll recordings presented backwards, Thorne and Himelstein (1984) showed that the apparent presence of backward messages in rock-and-roll music is a function more of active construction on the part of the perceiver than of the existence of the messages themselves. A study designed to measure the effects of subliminal backward messages on attitudes showed that backwards-recorded messages from a popular song had no influence on

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participants' attitudes (Swart and Morgan, 1992). In the 1980s self-help audiotapes became quite popular in the United States. The salient purpose of those tapes was, for instance, to help people improve their memory or self-esteem by using forward messages that were presented below the auditory threshold and masked by music or by reversing the speech on one channel by using dichotic messages. However, later research revealed nothing more than placebo effects (Egermann, Kopiez and Reuter, 2007; Greenwald, Spangenberg, Pratkanis and Eskanazi, 1991).

While evidence for the ineffectiveness of backmasked messages in rock music, self-help audiotapes, film or video seems to be convincing, there is still one question remaining. As already known from visual priming, flashing single words subliminally on a screen can produce priming effects, whereas anything more than a word is doomed to failure (Karremans, Stroebe and Claus, 2006). In the domain of social cognition research there is substantial empirical evidence that exposing participants to single concepts or stereotypes presented subliminally, such as the concept of hostility or the "elderly" stereotype, makes them more likely to rate a stimulus person according to the primed concept or stereotype (Bargh and Pietromonaco, 1982; Dijksterhuis, Aarts, Bargh and van Knippenberg, 2000). Thus, to rule out any possible effects of time-inverted words just because whole messages are exceeding the capacity of the cognitive system would be premature and without empirical verification. Instead we suggest that null findings on backmasking could result from the level of complexity that has been used in previous experimental designs. To our knowledge, all studies on backmasking exclusively tested the effects of holistic messages which are time-inverted sentences or phrases consisting of multiple grammatical and lexical units. As a result, the question of whether the forward meaning of single backmasked words can cause effects or not, still remains unresolved.

1. Method

We tested 262 undergraduates (German native speakers; 136 women, 126 men, M_{age} = 22.4 years, age range: 17-38 years) to determine whether the forward meaning of backmasked single German words influences the evaluation of these sounds or not. Backmasked sounds were created by recording forward spoken words and then time-inverting them, using Macbook Pro and computer software Audacity (Version 1.3.7.1) for Mac OS X. Five bipolar categories, each containing 20 words, served as stimuli. The categories were positive/negative, light/dark, large/small, noisy/quiet, and expensive/cheap. The construction of the item pool took multiple possible independent variables into account that were distributed equally within the bipolar categories: part of speech (nouns/adjectives/verbs), number of syllables (1/2 syllables), and sound symbolism (high-front/low-back vowels). For instance, the categories positive/negative contained 10 positive items and 10 negative items, respectively. All items were selected from a pilot study extracting the strongest representatives (regarding semantic meaning of regular, i.e. non-backmasked words) for the appropriate category. Because in the German language one-syllable verbs do not exist in infinitive form, we only used two-syllable verbs. Categorization of vowels (high-front versus low-back) for words with more than one vowel was made by considering the most emphasized vowel of the respective words. We only employed words whose backward sound did not resemble a meaningful word. Table 1 displays the words used for the category positive/negative.

Table 1. Words for the category positive/negative

Part of speech	Number of syllables	Vowel	Positive	Negative
Noun	1	High-front	Sex (sex)	Krieg (war)
Noun	1	Low-back	Lob (praise)	Not (distress)
Noun	2	High-front	Liebe (love)	Elend (misery)
Noun	2	Low-back	Erfolg (success)	Folter (torture)
Adjective	1	High-front	lieb (endearing)	mies (grotty)
Adjective	1	Low-back	froh (happy)	krank (sick)
Adjective	2	High-front	lieblich (lovely)	giftig (toxic)
Adjective	2	Low-back	wohlig (comforting)	boshaft (malicious)
Verb	2	High-front	retten (to rescue)	killen (to kill)
Verb	2	Low-back	loben (to praise)	morden (to murder)

In order not to reveal the real purpose of the study (and so avoiding the participants intentionally trying to reverse the perceived sounds), participants were asked to take part in a study about the development of language in different cultures. Participants listened to the sounds individually via headphones. They could start the playing of each sound autonomously by tapping a key. After each sound, they were asked to evaluate the sound on two 6-point rating scales. One scale was applicable to the forward meaning of the backmasked word, the other scale was testing for the inherent meaning of the sound that could be conveyed by sound symbolism. Finally there was a control question to detect any participants who had recognized the reversed sounds and, if so, to omit all data for that participant. After participants had completed the study they were debriefed and informed that the sounds were backmasked words.

2. Results backward

Initially, we discuss the results we achieved with a question according to the relevant category (e.g., for the category positive/negative, the question was: "This sound appears…" 1 = *very positive*; 6 = *very*

negative). For each of the five bipolar categories we compared the ratings using *t*-tests. Table 2 summarizes the results of the category-relevant question (alpha level for all tests = 0.05).

For instance, with the category of positive versus negative we put all sounds generated from positive words into one group and all sounds generated from negative words into another and then compared those two groups applying *t*-tests. The same was done with the other four categories. As can be seen in Table 2, the ratings for the backmasked positive words were more positive than for the backmasked negative words ($M_{positive}$ = 3.28, $M_{negative}$ = 3.42, $t(2470) = -2.768$, p (2-tailed) = 0.006, $\eta^2 = .003$), consistent with the forward meaning of the sounds. Also the categories large versus small (M_{large} = 3.25, M_{small} = 3.39, $t(2535) = -2.854$, p (2-tailed) = 0.004, $\eta^2 = .003$), noisy versus quiet (M_{noisy} = 3.03, M_{quiet} = =3.13, $t(2543) = -1.994$, p (2-tailed) = 0.046, $\eta^2 = .002$) and expensive versus cheap ($M_{expensive}$ = 3.35, M_{cheap} = = 3.52, $t(2508) = -3.042$, p (2-tailed) = 0.002, $\eta^2 = .004$) yielded significant results ($p < 0.05$), also consistent with the forward meaning of the sounds. Only one out of five categories, light versus dark, did not yield a significant difference (M_{light} = 3.22, M_{dark} = 3.20, $t(2471) < 1$, p (2-tailed) = NS).

Table 2. Results of *t*-tests regarding evaluation of the backmasked sounds for the five categories

Scale	Mean		Standard deviation		*n*	*p* (2-tailed)
	Positive	Negative	Positive	Negative		
Positive 1-2-3-4-5-6 Negative	3.28	3.42	1.31	1.23	2472	0.006
	Light	Dark	Light	Dark		
Light 1-2-3-4-5-6 Dark	3.22	3.20	1.21	1.28	2473	0.626
	Large	Small	Large	Small		
Large 1-2-3-4-5-6 Small	3.25	3.39	1.21	1.26	2537	0.004
	Noisy	Quiet	Noisy	Quiet		
Noisy 1-2-3-4-5-6 Quiet	3.03	3.13	1.16	1.22	2545	0.046
	Expensive	Cheap	Expensive	Cheap		
Expensive 1-2-3-4-5-6 Cheap	3.35	3.52	1.37	1.40	2510	0.002

3. Sound symbolism

As already mentioned above, another source that may convey inherent meanings of backward speech is sound symbolism. Sound symbolism – or phonetic symbolism – refers to the idea that there is a non-arbitrary relationship between a word's sound and its meaning (Lowrey and Shrum, 2007; Westbury, 2005). Particular word sounds or phonemes are supposed to convey information and hence influence perceptions (Eysenck, 1979). For example, the effects of sound symbolism on consumers' evaluation of fictitious and unfamiliar brand names have been well documented. Consumers gather information from the phonetic structure of brand names to infer product attributes and to evaluate brands (Klink, 2000; Lowrey and Shrum, 2007; Yorkston and Menon, 2004). A widely recognized sound symbolism refers to size relationship that is attached to vowels (Coulter and Coulter, 2010; Klink, 2000). Vowel sound can be distinguished by the front or back position of the tongue during pronunciation. Higher vowel sounds are created by a front position of the tongue, communicating smaller size, whereas back vowels convey larger proportions (Fischer-Jørgensen, 1978). Sound symbolism generates meanings that follow a similar pattern from high-front to low-back. Front: [ē] bee, [i] hit, [ā] hate, [e] test; Back: [a] ban, [ü] food, [u] put, [ō] home, [o] caught, [ə] dusk, [ä] cot. The front/back vowel distinction corresponds to a number of contrasts: e.g., small-large, light-dark, soft-hard, thin-thick, weak-strong, light-heavy, fast-slow, cold-warm (Klink, 2000). This particular relationship of sound symbolism has been observed across many languages, such as English, Finnish, French, German or Japanese (Hinton, Nichols and Ohala, 2006). The majority of research on sound symbolism has focused on vowels, but similar effects have been found for consonants. Even though consonants can also be classified in terms of the front/back distinction, they are more typically categorized as fricatives versus stops and voiced versus voiceless. Fricatives evolve when air flows past the articulators (f, s, v, z), whereas stops evolve when air flow is impeded (p, t, b, g, d, k, hard c). Consonants pronounced with vibrating vocal cords (b, d, g, v, z) are termed voiced, consonants pronounced without vocal cord vibration (p, t, k, f, s) are termed voiceless (Coulter and Coulter, 2010; Lowrey and Shrum, 2007). Voiceless consonants have been found to be perceived as smaller, less potent, lighter, and sharper than voiced consonants, and fricatives have been found to be perceived as smaller, lighter, and faster than stops (Klink, 2000; Lowrey and Shrum, 2007; Newman, 1933). Research has shown that compared to consonants, vowels display stronger evidence for sound symbolism (Klink, 2000).

In order to see whether any effects of sound symbolism exist in backmasked words, participants were also asked to answer a question regarding sound symbolism for each sound ("This sound appears…" 1 = *very large*; 6 = *very small*). As we were constrained by only using words belonging to the semantic categories and the fact that vowels

display stronger evidence for sound symbolism than consonants, we only varied sound symbolism by means of the vowels, but checked for sound symbolism using consonants.

4. Results sound symbolism

We put all sounds containing high-front vowels into one group and all sounds containing low-back vowels into the other and compared the ratings of those two groups with respect to how the sound was perceived as (1 = *very large*; 6 = *very small*) for each of the five categories by applying *t*-tests. As can be seen in Table 3, the sounds of backmasked words containing low-back vowels for the category positive/negative were rated larger (= lower values, as 1 = large and 6 = small) than the sounds of back-masked words containing high-front vowels ($M_{low\text{-}back}$ = 3.37, $M_{high\text{-}front}$ = 3.62, $t(2469) = 5.195$, p (2-tailed) < 0.001, $\eta^2 = .01$), consistent with theory. We obtained similar results for the categories light/dark ($M_{low\text{-}back}$ = 3.35, $M_{high\text{-}front}$ = 3.50, $t(2468) = 3.034$, p (2-tailed) = 0.002, $\eta^2 = .004$) and large/small ($M_{low\text{-}back}$ = 3.24, $M_{high\text{-}front}$ = 3.40, $t(2535) = 3.327$, p (2-tailed) = 0.001, $\eta^2 = .004$). We did not obtain significant results for the categories noisy/quiet ($M_{low\text{-}back}$ = 3.28, $M_{high\text{-}front}$ = 3.24, $t(2530) < 1$, p (2-tailed) = NS) and expensive/cheap ($M_{low\text{-}back}$ = = 3.48, $M_{high\text{-}front}$ = 3.53, $t(2500) < 1$, p (2-tailed) = NS).

As sound symbolism is also applicable for the category light versus dark, we further compared the answers for sounds containing high-front vowels with the answers for sounds containing low-back vowels for the question: "This sound appears…" (1 = *very light*; 6 = *very dark*). The sounds of backmasked words containing high-front vowels were rated lighter than the sounds of backmasked words containing low-back vowels ($M_{high\text{-}front}$ = 3.07, $M_{low\text{-}back}$ = 3.36, $t(2471) = -5.897$, p (2-tailed) < 0.001, $\eta^2 = .01$), consistent with theory.

Table 3. Results of *t*-tests regarding evaluation of the backmasked sounds concerning sound symbolism

Scale	Mean		Standard deviation		*n*	*p* (2-tailed)
Large 1-2-3-4-5-6 Small	Low-back	High-front	Low-back	High-front		
(Positive/Negative)	3.37	3.62	1.18	1.25	2471	0.000
(Light/Dark)	3.35	3.50	1.28	1.27	2470	0.002
(Large/Small)	3.24	3.40	1.22	1.26	2537	0.001
(Noisy/Quiet)	3.28	3.24	1.28	1.26	2532	0.438
(Expensive/Cheap)	3.48	3.53	1.32	1.31	2502	0.328
	High-front	Low-back	High-front	Low-back		
Light 1-2-3-4-5-6 Dark	3.07	3.36	1.22	1.26	2473	0.000

5. Discussion and conclusion

Our results provide support that – contrary to former studies concerning backmasking – the semantic content of time-inverted messages has an influence on people's evaluations. In contrast to former studies that did not find effects of the semantic content of backmasked messages, we reduced the complexity by only using single words instead of phrases or whole sentences.

One phenomenon that could explain this finding is the phonemic restoration effect. This refers to the mechanism that sounds actually missing from a speech signal can be synthesized by the brain and clearly heard (Kashino, 2006). It has been shown that the intelligibility of speech is resistant to time reversal of local segments of a spoken sentence. A spoken sentence was subdivided into segments of fixed duration (20 to 300 ms). Every segment was then time-reversed which led to locally time-reversed sentences. Perfect intelligibility of the sentences for segment durations lasting up to 50 ms was reported, whereas no intelligibility was found for segment durations longer than 200 ms (Saberi and Perrott, 1999). Because, in our study, we reversed whole words instead of segments and the duration of each time-reversed sound was longer than 200 ms, the phoneme restoration effect would not account for our results at first glance. Nevertheless, it could be conjectured that, on a nonconscious level, this time-reverse mechanism could also operate on longer sounds, even without the words being embedded in a context. Another possible explanation is that single words could show an effect because of the partial correlation between backward and forward sounds (Begg et al., 1993). In that case short words should yield stronger effects than longer words or whole sentences. We only used monosyllabic and disyllabic words and found significant effects for both types. Begg et al. (1993) also mention the example: "We are reminded of the dyslexic philosopher who spent his life in search of 'doG.'" In that case, it is easier to recognize the forward meaning of the reversed word "doG", but especially because of the context. In our study, however, backmasked words were presented without any suggestive context. Furthermore, in our study, stimuli were presented acoustically and not visually. According to the unconscious thought theory (Dijksterhuis and Nordgren, 2006), conscious thought and unconscious thought have different characteristics. Whereas conscious thought is constrained by the low capacity of consciousness, unconscious thought does not have this constraint because it has a much higher capacity. Consciousness can process between 10 and

60 bits per second. The entire human system combined (consciousness + unconsciousness), however, can process about 11,200,000 bits per second. Studies have shown that – under certain circumstances – unconscious thought leads to better decisions than conscious thought, due to its higher capacity, and also produces more creative and unusual thoughts, due to the divergence principle (Dijksterhuis, Bos, Nordgren and van Baaren, 2006; Dijksterhuis and Nordgren, 2006). The higher capacity of the unconscious and its divergent kind of thinking could also be an explanation why the semantic content of time-inverted messages could be decoded.

The effects achieved by sound symbolism are easier to explain. The quality of the vowel sounds obviously retains the meanings when words are played backwards. Yet it should be kept in mind that meaning conveyable via sound symbolism is not infinite but restricted to a few contrasts.

One limitation of our study is that the effects are rather weak, which however is quite common when researching nonconscious phenomena. As the very few academic studies in the field of backmasked words conducted so far did not find effects, there exists no established theory that can explain our results in a straightforward and direct way.

Nevertheless, our findings have important implications for the question of whether or not time-inverted messages can be decoded nonconsciously and automatically by listeners and so be capable of influencing people's attitudes, intentions, or behavior. Our results are not sufficient – and not intended – to grist the mill of those who, for instance, argue that backmasked messages have the power to prompt people to commit suicide against their virtual will. Rather, they show that the process of evaluation can be influenced without people being aware of it. The effects of backmasking of single words could be seen as similar to priming effects, which enable certain feelings, thoughts, or behavior to be pre-activated and so be more predominant than others. In this sense, backmasked single words could also be used in creating effective new brand names that – without the consumers' conscious awareness – could convey desired meaning in otherwise artificially made-up words, like backmasked versions of love, peace, or power. Our findings also refer to diverse capabilities of nonconscious mental processes which could be utilized to find new ways to support learning processes, facilitate communication, or to develop new possibilities to help people suffering from mental disorders.

On the other hand, backmasked single words could, under certain conditions, be (mis-)used to pre-activate certain mental structures of the brain and so nonconsciously influence or manipulate people. Therefore, our results – together with results of further research in this field – could provide the basis for company policies as well as the political decision making to prevent the misuse of influencing techniques such as backmasking.

References

1. Aaker, D.A. (1991). *Managing Brand Equity*, New York, NY: Free Press.
2. Bargh, J.A. and Pietromonaco, P. (1982). Automatic information processing and social perception: The influence of trait information presented outside of conscious awareness on impression formation, *Journal of Personality and Social Psychology*, Vol. 43, No. 3, pp. 437-449.
3. Begg, I.M., Needham, D.R., and Bookbinder, M. (1993). Do backward messages unconsciously affect listeners? *Canadian Journal of Experimental Psychology*, Vol. 47, No. 1, pp. 1-14.
4. Bornstein, R.F. (1989). Subliminal Techniques as Propaganda Tools: Review and Critique, *Journal of Mind and Behavior*, Vol. 10, No. 3, pp. 231-262.
5. Brannon, L.A. and Brock, T.C. (1994). The Subliminal Persuasion Controversy: Reality, Enduring Fable, and Polonius's Weasel. In S. Shavitt and T.C. Brock (eds.), Persuasion. Psychological insights and perspectives. Boston: Allyn and Bacon, pp. 279-294.
6. Coulter, K. and Coulter, R. (2010). Small Sounds, Big Deals: Phonetic Symbolism Effects in Pricing, *Journal of Consumer Research*, Vol. 37, No. 2, pp. 315-328.
7. Cowan, N., Braine, M.D.S., and Leavitt, L.A. (1985). The phonological and metaphonological representation of speech: Evidence from fluent backward talkers, *Journal of Memory and Language*, Vol. 24, No. 6, pp. 679-698.
8. Dijksterhuis, A., Aarts, H., Bargh, J.A., and van Knippenberg, A. (2000). On the Relation between Associative Strength and Automatic Behavior, *Journal of Experimental Social Psychology*, Vol. 36, No. 5, pp. 531-544.
9. Dijksterhuis, A., Bos, M.W., Nordgren, L.F., and van Baaren, R.B. (2006). On Making the Right Choice: The Deliberation-Without-Attention Effect, *Science*, Vol. 311, No. 5763, pp. 1005-1007.
10. Dijksterhuis, A. and Nordgren, L.F. (2006). A Theory of Unconscious Thought, *Perspectives on Psychological Science*, Vol. 1, No. 2, pp. 95-109.
11. Egermann, H., Kopiez, R., and Reuter, C. (2007). Is there an effect of subliminal messages in music on choice behavior? *Journal of Articles in Support of the Null Hypothesis*, Vol. 4, No. 2, pp. 29-45.
12. Eysenck, M.W. (1979). Depth, Evaluation, and Distinctiveness. In L.S. Cermak and F.I.M. Craik (eds.), Levels of Processing in Human Memory. New Jersey: Lawrence Erlbaum, pp. 89-123.
13. Fischer-Jørgensen, E. (1978). On the universal character of phonetic symbolism with special reference to vowels, *Studia Linguistica*, Vol. 32, No. 1-2, pp. 80-90.

14. Greenwald, A.G., Spangenberg, E.R., Pratkanis, A.R., and Eskanazi, J. (1991). Double-Blind Tests of Subliminal Self-Help Audiotapes, *Psychological Science*, Vol. 2, No. 2, pp. 119-122.
15. Hinton, L., Nichols, J., and Ohala, J.J. (2006). Introduction: sound-symbolic processes. In L. Hinton, J. Nichols, and J.J. Ohala (eds.), Sound Symbolism, Cambridge: Cambridge University Press, pp. 1-12.
16. Kapferer, J.N. (2012). The New Strategic Brand Management: *Creating and sustaining brand equity long term*, 5th edition, London: Kogan Page.
17. Karremans, J.C., Stroebe, W., and Claus, J. (2006). Beyond Vicary's fantasies: The impact of subliminal priming and brand choice, *Journal of Experimental Social Psychology*, Vol. 42, No. 6, pp. 792-798.
18. Kashino, M. (2006). Phonemic restoration: The brain creates missing speech sounds, *Acoustical Science and Technology*, Vol. 27, No. 6, pp. 318-321.
19. Kazmi, S.H.H. (2007). *Marketing Management*, New Delhi: Excel Books.
20. Klink, R.R. (2000). Creating Brand Names With Meaning: The Use of Sound Symbolism, *Marketing Letters*, Vol. 11, No. 1, pp. 5-20.
21. Loftus, E.F. and Klinger, M.R. (1992). Is the unconscious smart or dumb? *American Psychologist*, Vol. 47, No. 6, pp. 761-765.
22. Lowrey, T. and Shrum, L.J. (2007). Phonetic Symbolism and Brand Name Preference, *Journal of Consumer Research*, Vol. 34, No. 3, pp. 406-414.
23. Moore, T.E. (1996). Scientific Consensus and Expert Testimony: Lessons from the Judas Priest Trial, *Skeptical Inquirer*, Vol. 20, No. 6, pp. 32-38.
24. Newman, S.S. (1933). Further Experiments in Phonetic Symbolism, *American Journal of Psychology*, Vol. 45, No. 1, pp. 53-75.
25. Packard, V.O. (1957). *The Hidden Persuaders*, New York: McKay.
26. Saberi, K. and Perrott, D.R. (1999). Cognitive restoration of reversed speech, *Nature*, Vol. 398, No. 6730, p. 760.
27. Swart, L.C. and Morgan, C.L. (1992). Effects of Subliminal Backward-Recorded Messages on Attitudes, *Perceptual and Motor Skills*, Vol. 75, pp. 1107-1113.
28. Thorne, S.B. and Himelstein, P. (1984). The Role of Suggestion in the Perception of Satanic Messages in Rock-and-Roll Recordings, *Journal of Psychology*, Vol. 116, No. 2, pp. 245-248.
29. Vokey, J.R. (2002). Subliminal Messages. In J.R. Vokey and S.W. Allen (eds.), Psychological Sketches (6th ed.), Lethbridge, Alberta: Psyence Ink, pp. 237-250.
30. Vokey, J.R. and Read, D.J. (1985). Subliminal Messages: Between the Devil and the Media, *American Psychologist*, Vol. 40, No. 11, pp. 1231-1239.
31. Westbury, C. (2005). Implicit sound symbolism in lexical access: Evidence from an interference task, *Brain and Language*, Vol. 93, No. 1, pp. 10-19.
32. Yorkston, E. and Menon, G. (2004). A Sound Idea: Phonetic Effects of Brand Names on Consumer Judgments, *Journal of Consumer Research*, Vol. 31, No. 1, pp. 43-51.

Appendix

Table A1. Words for the category light/dark

Part of speech	Number of syllables	Vowel	Light	Dark
Noun	1	High-front	Licht (light)	Teer (tar)
Noun	1	Low-back	Tag (day)	Nacht (night)
Noun	2	High-front	Himmel (sky)	Verlies (dungeon)
Noun	2	Low-back	Sonne (sun)	Kohle (coal)
Adjective	1	High-front	grell (loud)	blind (blind)
Adjective	1	Low-back	klar (clear)	schwarz (black)
Adjective	2	High-front	glitzernd (glittering)	bedeckt (overcast)
Adjective	2	Low-back	strahlend (shining)	verkohlt (charred)
Verb	2	High-front	schimmern (to shimmer)	finstern (to darken)
Verb	2	Low-back	lodern (to flare)	dunkeln (to darken)

Table A2. Words for the category large/small

Part of speech	Number of syllables	Vowel	Large	Small
Noun	1	High-front	Welt (world)	Knirps (manikin)
Noun	1	Low-back	Dom (dome)	Gnom (gnome)
Noun	2	High-front	Riese (giant)	Winzling (mite)
Noun	2	Low-back	Koloss (hulk)	Atom (atom)
Adjective	1	High-front	viel (plenty)	eng (narrow)
Adjective	1	Low-back	hoch (high)	kurz (short)
Adjective	2	High-front	riesig (huge)	mini (mini)
Adjective	2	Low-back	massig (bulky)	mager (meagre)

Table A2 (cont.). Words for the category large/small

Part of speech	Number of syllables	Vowel	Large	Small
Verb	2	High-front	mehren (to augment)	mindern (to lower)
Verb	2	Low-back	wachsen (to grow)	schrumpfen (to shrink)

Table A3. Words for the category noisy/quiet

Part of speech	Number of syllables	Vowel	Noisy	Quiet
noun	1	High-front	Schrei (scream)	Fisch (fish)
noun	1	Low-back	Krach (noise)	Schlaf (sleep)
noun	2	High-front	Gebell (bark)	Stille (silence)
noun	2	Low-back	Rocker (rocker)	Ruhe (calmness)
adjective	1	High-front	schrill (shrill)	still (silent)
adjective	1	Low-back	scharf (harsh)	taub (deaf)
adjective	2	High-front	heftig (intense)	heimlich (secret)
adjective	2	Low-back	donnernd (thundering)	lauschig (snug)
verb	2	High-front	schrillen (to shrill)	wispern (to whisper)
verb	2	Low-back	dröhnen (to drone)	ruhen (to rest)

Table A4. Words for the category expensive/cheap

Part of speech	Number of syllables	Vowel	Expensive	Cheap
Noun	1	High-front	Sprit (gas)	Kitsch (kitsch)
Noun	1	Low-back	Gold (gold)	Ramsch (junk)
Noun	2	High-front	Benzin (petrol)	China (China)
Noun	2	Low-back	Luxus (luxury)	Rabatt (discount)
Adjective	1	High-front	reich (rich)	tief (low)
Adjective	1	Low-back	satt (replete)	arm (poor)
Adjective	2	High-front	edel (precious)	günstig (cheap)
Adjective	2	Low-back	kostbar (valuable)	umsonst (for free)
Verb	2	High-front	steigern (to raise)	feilschen (to bargain)
Verb	2	Low-back	tanken (to fuel up)	knausern (to scrimp)