

From the Bob/Kirk effect to the Benoit/Éric effect: Testing the mechanism of name sound symbolism in two languages



David M. Sidhu^{a,*}, Penny M. Pexman^a, Jean Saint-Aubin^b

^a University of Calgary, Canada

^b Université de Moncton, Canada

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ABSTRACT

Although it is often assumed that language involves an arbitrary relationship between form and meaning, many studies have demonstrated that nonwords like *maluma* are associated with round shapes, while nonwords like *takete* are associated with sharp shapes (i.e., the Maluma/Takete effect, Köhler, 1929/1947). The majority of the research on sound symbolism has used nonwords, but Sidhu and Pexman (2015) recently extended this effect to existing labels: real English first names (i.e., the Bob/Kirk effect). In the present research we tested whether the effects of name sound symbolism generalize to French speakers (Experiment 1) and French names (Experiment 2). In addition, we assessed the underlying mechanism of name sound symbolism, investigating the roles of phonology and orthography in the effect. Results showed that name sound symbolism does generalize to French speakers and French names. Further, this robust effect remained the same when names were presented in a curved vs. angular font (Experiment 3), or when the salience of orthographic information was reduced through auditory presentation (Experiment 4). Together these results suggest that the Bob/Kirk effect is pervasive, and that it is based on fundamental features of name phonemes.

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1. Introduction

1.1. Arbitrariness, sound symbolism and the Maluma/Takete effect

The notion that language is arbitrary has long been considered one of its defining features (Hockett, 1963; Saussure, 1916; for a review, see Perniss, Thompson, & Vigliocco, 2010). According to this view, there is no a priori reason for any meaning to be denoted by any particular set of phonemes. Thus there is nothing restricting the pairing of words and meaning, and no requirement that the features of words—or the phonemes they contain—reflect their meaning. Because of this, small words like *sky* can denote big things, while large words like *Parastratiosphecomyia sphaemyioides* can denote small things (a type of fly). Further evidence for arbitrariness comes from the fact that a word like *tree*—without any tree-like features—can nevertheless denote the concept tree. Moreover, different languages can denote this same concept with entirely different word forms (e.g., *tree* is translated to *arbre* in French, and *fa* in Hungarian). In fact, there is some evidence from computational modeling studies that arbitrariness within a lexicon is beneficial (Gasser, 2004; Monaghan, Christiansen, & Fitneva, 2011).

While there may not be a requirement for the features of words to reflect their meaning, there is a good deal of evidence that certain phonemes can seem to be a better match for certain kinds of meanings than others. Sound symbolism is a phenomenon in which the features of phonemes reflect, and thus lead to an association with, particular meanings. Perhaps the most well documented example of this is the Maluma/Takete effect, first alluded to by Köhler (1929, 1947). Köhler suggested that nonwords such as *maluma* seem to be inherently associated with roundness, while others such as *takete* seem to be associated with sharpness (See Fig. 1). Holland and Wertheimer (1964) demonstrated this experimentally some years later when they found that participants indeed rated *maluma* as being extremely rounded, and *takete* as being extremely angular. More recently, Ramachandran and Hubbard (2001) investigated the effect using the nonwords *bouba* and *kiki*; they found that when shown a round and sharp shape, 95% of their participants paired *bouba* with the round shape, and *kiki* with the sharp shape. These findings suggest that some features of the phonemes in *maluma/bouba* and *takete/kiki* are associated with roundness and sharpness, respectively.

The Maluma/Takete effect also extends beyond a few carefully chosen nonwords. Studies have demonstrated that the consonant phonemes /b/, /l/, /m/ and /n/ all seem to be associated with roundness, while /k/, /p/ and /t/ seem to be associated with sharpness (Maurer, Pathman, & Mondloch, 2006; Nielsen & Rendall, 2011). Thus in general sonorant consonants are associated with roundness, while

* Corresponding author at: Department of Psychology, University of Calgary, 2500 University Drive NW, Calgary, AB, T2N1N4, Canada.
E-mail address: dsidhu@ucalgary.ca (D.M. Sidhu).

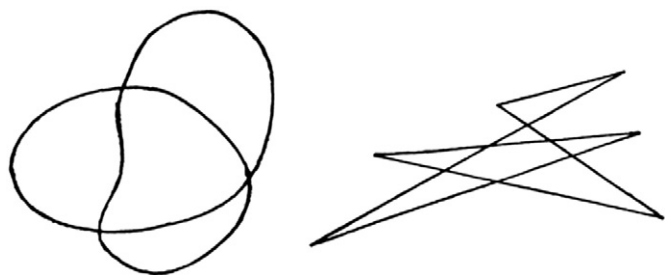


Fig. 1. Reproductions of Köhler's (1929, 1947) original stimuli. He suggested that *maluma* would be associated with the shape on the left, and that *takete* would be associated with the shape on the right.

obstruents—and in particular voiceless stops—are associated with sharpness. An exception to this pattern is the voiced stop /b/, which has demonstrated an association with roundness despite being an obstruent. It may be that the particular combination of being voiced, and articulated bilabially, leads to its association with roundness (see D'Onofrio, 2013, for a discussion of this topic). In terms of vowels, /u/ and /o/ (and to a lesser extent /ɔ/) are associated with roundness, while /i/, /e/ and /ə/ are associated with sharpness (Maurer et al., 2006; Nielsen & Rendall, 2011). Therefore, rounded vowels show an association with roundness while unrounded vowels show an association with sharpness.

There is also evidence that the Maluma/Takete effect generalizes to speakers of languages besides English. Davis (1961) demonstrated the effect in school children from the Mahali peninsula of Lake Tanganyika, on the Congo-Tanganyika border, using the nonwords *uloomu* and *takete*, presented both visually and auditorily. These children both spoke and were educated in Swahili. Similarly, Bremner et al. (2013) studied the effect in the Himba tribe of Northern Namibia, a group known for their remoteness from outside cultural influence. Members of the Himba tribe speak Otjiherero but have no written language, and so the stimuli were presented auditorily. Nevertheless they too showed the association between the nonwords *bouba* and *kiki*, and round and sharp shapes, respectively. These results suggest that the Maluma/Takete effect is a general phenomenon, observable across a variety of diverse cultures.

Despite the generalizability of the Maluma/Takete effect across cultures, it has primarily been studied with nonwords (e.g., Maurer et al., 2006; Ramachandran & Hubbard, 2001). In terms of patterns in existing lexicons, there has been no substantial evidence that round-sounding (or sharp-sounding) phonemes are more common in words with meanings related to roundness (or sharpness). Monaghan, Mattock, and Walker (2012) compared the phonemes in English words related to curvature vs. angularity, and found only a few small differences. Similarly, studies using a lexical decision task have revealed little evidence that this association can affect responses to real words on behavioural measures (Sučević, Janković, & Ković, 2013; Sučević, Savić, Popović, Styles, & Ković, 2015; Westbury, 2005). Those results seem to suggest that real words, with learned meanings, might somehow be processed differently than nonwords like *bouba* and *kiki* (Westbury, 2005). It may be that real words' existing semantic content overshadows any meaning that may be sound symbolically associated with their phonemes.

To approach this issue, Sidhu and Pexman (2015) examined the Maluma/Takete effect in a specific set of real words: first names. This was a way of testing if effects would emerge for words with some associated information. That is, while names can't be said to have associated semantics, they are assumed to have associated episodic information (Cohen & Faulkner, 1986). Thus they are somewhat of an intermediary between nonwords and real words. If words with any existing associations are somehow processed differently, precluding congruency effects from arising, then they should not emerge for real first names. The Sidhu and Pexman study used phonemically round (e.g., *Bob* and *Molly*) and phonemically sharp (e.g., *Kirk* and *Kate*) male and female names. On

each trial, participants were visually presented with a single name along with a round and sharp silhouette, and asked to choose the silhouette that the name best suited. Results indicated that participants were more likely to associate phonemically round (or sharp) names with round (or sharp) silhouettes. In addition to this 'Bob/Kirk effect', participants were also more likely to associate male names with sharp silhouettes, and female names with round silhouettes. So far, this effect has only been demonstrated in English. The purpose of the present study was to test the generalizability of the Bob/Kirk effect to another language (French names and French speakers), and to further investigate the mechanism underlying it.

1.2. The roles of phonology, articulation and orthography in the Maluma/Takete effect

Despite the long history of the Maluma/Takete effect, its underlying mechanism remains a subject of debate. The phonological/articulatory explanation is that the Maluma/Takete effect arises out of a crossmodal association between these features of the phonemes and the visual features of the shape stimuli. That is, on the one hand, the consonant phonemes in sharp-sounding nonwords such as *takete* consist of abrupt changes in sound, and are articulated with abrupt movements of the tongue. On the other hand, the consonant phonemes in round-sounding nonwords such as *maluma* involve relatively more continuous sounds, as well as less punctuated articulations. In addition, the vowel phonemes in round-sounding nonwords are typically articulated with a rounding of the lips (e.g., /u/ or /o/). In both cases, these features of sharp- and round-sounding nonwords' phonemes resemble the visual features of the shapes they are associated with (i.e., abrupt changes in direction, or continuous smooth curves). Some have suggested that this association may be a sort of "weak synesthesia" that arises out of connections between brain areas responsible for processing stimuli in these different modalities (Ramachandran & Hubbard, 2001). Others have suggested that it may emerge after observing these kinds of stimuli co-occurring in the world numerous times (e.g., visually round objects feeling softer; Spence, 2011).

However, an alternate explanation is that the Maluma/Takete effect arises out of a similarity between the orthography of typically round-sounding nonwords and round shapes, and typically sharp-sounding nonwords and sharp shapes (Cuskley, Simner, & Kirby, 2015). That is, nonwords such as *bouba* contain predominantly rounded letters, while nonwords such as *kiki* contain predominantly angular letters. Thus, it may be that participants simply match the visual appearance of a given nonword with a candidate shape. The fact that the phonological and articulatory features of phonemes are often confounded with their orthography has made these two possibilities difficult to untangle.

Several of the previously mentioned studies showing generalization of the Maluma/Takete effect have been put forth as evidence against an explanation based in orthography. For instance, the finding reported by Bremner et al. (2013), that non-English speaking individuals without a writing system show the Maluma/Takete effect, demonstrates that it can emerge even in the absence of orthography. Also pointing to this conclusion is a study by Ozturk, Krehm, and Vouloumanos (2013), in which there was evidence of the Maluma/Takete effect in the looking times of four-month-old infants. A study by Nielsen and Rendall (2011) attempted to control for the orthographic roundness of letters such as *m* and *n* by presenting these letters in their capitalized form (*M* and *N*). Even though round-sounding nonwords no longer had relatively rounder orthographies, participants still showed the typical Maluma/Takete effect. Lastly, a study by Westbury (2005) used more implicit methodology, and demonstrated that participants were faster to process round- or sharp-sounding letters if they were presented inside of congruent frames (i.e., rounded or angular, respectively). However participants were no quicker to process visually-round or visually-sharp letters inside of congruent frames. These studies suggest that features of the nonwords beyond their orthography (i.e., their

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