

Łukasz Stolarski

Jan Kochanowski University in Kielce

An Experiment in Size-Sound Symbolism: /i/ versus /a/ in Polish Diminutive Suffixes

Abstract: The theory of size-sound symbolism holds that certain phonetic and/or acoustic features of linguistic sounds are able to symbolise the smallness or largeness of different objects. For instance, it has been established that palatal consonants tend to be perceived as “smaller” than non-palatal ones. Similarly, a number of experiments have demonstrated that high front vowels tend to be associated with the notion “small in size,” and open back vowels are more suitable for representing objects which are big. This tendency is supposed to be universal across languages, but some exceptions to the rule have also been noted (cf. Ultan 1978; Diffloth 1994). This article is a continuation of the research described in Stolarski (2011), which showed that palatality is a very important factor in size-sound symbolism in Polish. The palatal /j/ was perceived as “smaller” than the non-palatal /n/ in over 95% of cases. The present paper deals with a similar tendency among vowels. Pairs of artificial words containing natural Polish diminutive suffixes were presented to a representative group of respondents whose task was to choose the “smaller” forms. The obtained results clearly indicate that the high front /i/ is interpreted as much more likely to indicate a diminutive than the open back /a/. The conclusion which emerges from this research is that size-sound symbolism plays a significant role within the Polish diminutive system.

Keywords: sound symbolism, diminutive suffixes, Polish diminutives

1. Introduction

This article focuses on sound symbolism which may be defined as “direct linkage between sound and meaning” (Hinton et al. 1994: 1–2) or “a general term for an iconic or indexical relationship between sound and meaning, and also between sound and sound” (Asa 1999: 4). Marchand additionally claims that: “The principle of sound symbolism is based on man’s imitative instinct which leads us to use characteristic speech sounds for name-giving” (1960: 13). The term, therefore, is understood to comprise all possible cases of sound-shape harmony which, as claimed by some authors, comes naturally from the nature of human psychology.

As outlined in Stolarski (2012), although phonetic symbolism was even occasionally discussed in ancient texts, it has really become a focus of research interest since the 20th century. For instance, many authors have commented on various semantic associations of selected consonants and vowels in poetic language (cf. Lucas 1955; Householder 1960; Jakobson 1960; Hymes 1960; Ullmann 1962; Murdy 1966; Nash 1980; Chapman 1982; Frazer 1982; Caltvedt 1999, etc.). There are also numerous publications dealing with “phonesthemes,” also called “submorphemes” (McCune 1985), “sound symbols” (Nordberg 1986) or “psychomorphs” (Markell and Hamp 1960). These terms refer to consonant clusters which appear in semantically related words. For instance, the cluster “fl-” at the beginning of the words flicker, flutter, flip and flail tends to denote “quick movements.” An extensive discussion on phonesthemes may be found in Åsa 1999, and some interesting views on this topic are also put forward in Bolinger (1950, 1965), Marchand (1960), Jakobson and Waugh (1979), Rhodes (1994). Additionally, the theory of sound symbolism has been tested in various experiments designed to explore a possible association of selected phonetic and/or acoustic features and the meaning of potential or real words in which such features are present. For example, Jones (1983) suggests an association between the features “acute/grave” and the semantic contrasts “small/large,” “light/dark” and “happy/sad.” Other investigations of this kind may be found in Newman (1933), Brown et al. (1955), Maltzman et al. (1956), Brackbill and Little (1957), Klink (2000), Yorkston and Menon (2004), Lowrey and Shrum (2007), Wichmann et al. (2010), Urban (2011), etc.

Hinton et al. (1994) divide sound symbolism into four kinds: corporeal, imitative, synesthetic and conventional. Of particular interest to the previous two publications (Stolarski 2011, 2012) as well as to the present one is synesthetic variety. This refers to situations in which “certain vowels, consonants, and suprasegmentals are chosen to consistently represent visual, tactile, or proprioceptive properties of objects, such as size and shape” (Hinton et al., 4). A particular sub-type of synesthetic sound symbolism, referred to as size-sound symbolism, or magnitude symbolism (Nuckolls 1999), deals with associations between various articulatory and/or acoustic features of speech sounds and the size of objects such features are thought to symbolise. One of the most frequently quoted examples is the potential of palatality to represent “small size” (cf. Nichols 1971; Ultan 1978; Jones 1983; Ohala 1984; Hamano 1986, 1994). The experiment described in Stolarski (2011) focuses on the role of this feature in the Polish diminutive system. The obtained results support the assumptions of size-sound symbolism: words with the palatal /ɲ/ were chosen as “smaller” than words with /n/ in over 95% of the cases. It is, therefore, evident that palatality has great potential to symbolise diminutive size in Polish.

It must be stressed that the initial experiments on sound symbolism (cf. Sapir 1929; Newman 1933) examined mainly vocoid articulation. Eventually, it was

determined that high front vowels tend to be perceived as “smaller” than open low ones. Convincing explanations of this phenomenon were proposed by Sapir, who suggested that in the production of high front vowels the reduced space between the roof of the mouth and the tongue corresponds to the diminutive size such vowels symbolise. Alternatively, he suggested that the inherent “‘volume’ of certain vowels is greater than that of others” (Sapir, 235). His second proposal referring to the acoustic characteristics of vowels was later developed by Ohala, who incorporated it into his “frequency code” theory (cf. Ohala 1983, 1984, 1994). Among other things, the theory holds that there is an association between low acoustic frequency and the meaning “large vocalizer.” Conversely, high acoustic frequency is naturally connected with “small vocalizer.” Ohala discusses various aspects of human speech which are affected by this general rule and concludes his account by suggesting that high front vowels should be perceived as “smaller” than open back ones, because in the former case F2 is higher than in the latter.

This publication is a continuation of the research described in Stolarski (2011). Again, magnitude symbolism is studied in the Polish diminutive system, but this time the focus of attention shifts to vowels. As mentioned above, in initial studies on sound symbolism it was mainly vocoid articulation that was investigated, and vowels also played a crucial role in many later publications. Consequently, in order to establish the degree to which magnitude symbolism operates within the Polish diminutive system, an analysis of vowels is a necessary next step.

The experiment described below concentrates on the contrast of /i/ versus /a/. These particular segments constitute the most extreme points on both the vertical and horizontal articulatory scales among Polish vowels and are appropriate for testing the major assumptions of the theory of size-sound symbolism.

2. Methods

The methods applied in the current experiment are similar to those used in the previous research (cf. Stolarski 2011: 46–49). The test materials include natural Polish diminutive suffixes which are added to artificial stems. Such a solution reduces the risk of the bias resulting from factors which are not purely phonetic. In order to find suffixes appropriate for research purposes, a list of all the possible Polish diminutive suffixes needed to be compiled. There are numerous studies on the Polish morphological system which could have been used for this purpose (cf. Mańczak 1983; Waszakowa 1993, 1994; Kreja 1999; Blicharski and Fontański 1999; Jadačka 2001; Ohnheiser 2003; Kaczorowska 2012, etc.), but, as in Stolarski (2011), the list was prepared on the basis of the following three sources: Dobrzyński (1988), Grzegorzczkova and Puzynina (1979) and Domin (1982). It is important to stress that the task was not easy. New diminutive suffixes may occasionally be created by joining existing affective morphemes.

Because of this, diminutive suffixes should be treated as a partially open class and the list does not include all the possible elements. In some cases, there were also problems with determining whether or not a given morpheme is really affective. The descriptions for each suffix provided by Grzegorzcykova and Puzynina, who report that a given morpheme often has multiple functions, with the “affective” function being only one of them, were particularly useful. Still, in some cases the decision whether or not to include a suffix was subjective. In Polish the affective function is gradable and some morphemes are clearly diminutive while others are less so.

The next step was to find minimal pairs with the contrast /i/ — /a/. Eventually, the following four candidates were identified:

- ik — ak
- iszek — aszek
- íś — aś
- siczek — siaczek

Out of these four pairs the first three are used in various types of words. The suffixes in the last pair, however, may be found exclusively with proper names of people. Such a restriction results in “-siczek” and “-siaczek” being rather infrequent and, consequently, the two morphemes are not taken into consideration in the current study.

It should also be noted that in the bisyllabic suffixes “-iszek” and “-aszek” only the vowels in the first syllables are crucial to the experiment. The syllable “ek” is identical in both elements and, consequently, it should not affect the participants’ choices.

Next, in order to obtain pairs of non-existent words, artificial stems were added to the natural diminutive suffixes listed above. This part required following a clearly-defined method to create words, which would meet the following requirements:

1. The artificial words should not resemble any natural Polish words.
2. The artificial words should provide the most neutral, objective phonetic context for the element which is analysed (the contrast /i/ — /a/).

Fulfilling the first condition is very important because the informants should not be influenced in their decisions by any resemblance of the elements used in the test to naturally occurring words. The effect of such unwanted interference is difficult to predict. Moreover, the second requirement calls for a method different than the one used in the experiment described in Stolarski (2011), since the element currently under investigation is different than that previously examined. After considering several options, the final solution involved creating three different types of artificial words. The precise procedures which were implemented are summarised below:

1. Type 1: Suffix — Suffix (e.g. ik — ak)

- Among the forms quoted in Tables 1, 2 and 3, it is always the first pair. The two “artificial words” are in this case identical to the bare suffixes they represent.

2. Type 2: Consonant + Vowel + Suffix — Consonant + Vowel + Suffix (e.g. keik — keak)

- Among the forms quoted in Tables 1, 2 and 3, it is always represented by the second, third and fourth pair.

- It begins with a random consonant (but the same for both examples in a pair; it has been decided that the exact phonetic value of the consonant should not influence the respondents’ choices in any significant way if the consonant is identical in both words in a given pair) followed by a vowel and then one of the two suffixes to be compared.

- In each case the vowel preceding a suffix is neither /i/, nor /a/. Instead, it is one of the four remaining Polish vowels (/e, i, o, u/).

3. Type 3: Consonant + Suffix — Consonant + Suffix (e.g. wik — wak)

- Among the forms quoted in Tables 1, 2 and 3, it is always represented by the last three pairs.

- It begins with a single consonant, the same for both words in a pair, followed by one of two minimally opposing suffixes.

- This time the choice of a consonant is not random. The first pair in this group begins with either a nasal or an approximant, the second with a fricative and the third with an affricate or a plosive (such an order corresponds with the sonority hierarchy for consonants).

It is crucial to note that the artificial words representing Type 2 frequently violate the rules of Polish phonotactics. Sequences of two adjacent vowels across vowel boundaries are rare in natural words and, as in many other languages (cf. Carr 2008: 71), Polish exhibits hiatus avoidance processes, such as glide formation (e.g. guano ‘guano’, pronounced [guwanɔ] rather than [gwanɔ]). Still, the advantages of employing Type 2 forms vastly outweigh the disadvantages. First and foremost, using such examples will make it possible to test the potential of the vowels under discussion to symbolise “big” and “small” size without the influence of consonant palatalisation in front of /i/. This effect is present in many artificial words of Type 3 and makes establishing the size-sound symbolic value of /i/ particularly difficult. As has been demonstrated in Stolarski (2011), palatality has a considerable potential to symbolise “small size” and, consequently, the artificial words of Type 2 are necessary in the current experiment.

The total number of respondents who took part in the experiment was 86. As a consequence, the digits in the columns titled “Words with /i/” and “Words with /a/” denote the number of choices for a given vowel out of 86. All the participants are native speakers of Polish. Among them there were 52 women, aged 18 to 31, and 34 men, aged 18 to 22.

Before the experiment the respondents were presented with the same piece of information as the one used in the experiment on palatality (cf. Stolarski 2011: 49). The passage was written in Polish. The English version of the text is cited below:

In Polish a group of suffixes serves a double function. First, they may “decrease” or “increase” the size of expressed notions, as in *dom* (‘house’), *domek* (‘little house’), *domisko* (‘big house’). In such cases we talk about the “diminutive” or the “augmentative” suffix function. Second, these suffixes may also indicate our emotional attitude and then we are dealing with their “expressive” function, respectively. Both functions are usually simultaneous and in a given situation it is often difficult to separate one from the other. The “expressive” function, which concerns a positive, friendly, or a negative, contemptuous attitude of the speaker towards the notion referred to, is treated by some authors as a metaphorical extension of the basic dichotomy “small” versus “big.” An object which is perceived as small is harmless and, consequently, it evokes positive feelings. On the other hand, an entity which is ascribed a large size may be dangerous and this is why the feature “big” is metaphorically extended to a negative attitude of the speaker. Your task is to circle one word in each pair which you think is “smaller” or which seems to be associated with a more positive attitude. Please remember, that there are no “good” or “bad” answers in the test — rely on your linguistic intuition.

It must be emphasized that the way in which the informants were instructed to act may result in a bias in the results. The task was to choose the “smaller” form, which automatically imposes the idea that there is some association between the words being compared and the semantic contrast “big” versus “small”. Nevertheless, such a solution has certain advantages. At this stage it is difficult to predict how strong the tendency to perceive /i/ as “smaller” than /a/ in the Polish diminutive system really is. Indeed, the theory of size-sound symbolism does not really deny that, generally speaking, the association between the phonetic form and the meaning of the linguistic sign is arbitrary. Therefore, the effects of magnitude symbolism are always secondary to the commonly recognised form-meaning associations and should be treated only as a tendency rather than an absolute rule. In some cases they may be weak and difficult to pinpoint. What is more, the articulatory aspects which are analysed in the current experiment may be associated with semantic domains other than “size.” Indeed, many other contrasts are discussed in the literature on sound symbolism, e.g. “dark” versus “bright” (cf. Newman 1933; Jones 1983), “strong” versus “weak” (cf. Jespersen 1922; Murray 1961) or “heavy” versus “light” (cf. Murray 1961; Nichols 1971; Hamano 1986). Additionally, the informants’ responses may be influenced by such factors as the morphological rules governing the behaviour of the suffixes used in the experiment. Because of all these issues the task given to the respondents had to draw attention to the phono-semantic association under discussion.

The test consisted of 21 pairs of words which were randomly mixed. In about 50% of the cases the first artificial word in a pair contained one of the suffixes with /a/ and the second artificial word one of the suffixes with /i/. In the other half of the examples the order was reversed.

3. Results and discussion

Table 1 summarises the results concerning the artificial words which represent the contrast “ik — ak”. On average, the forms with the former suffix were chosen in 94% of the cases, and the 95% interval for the percentage of all speakers of Polish who perceive the morpheme “-ik” as smaller than “-ak” is $94\% \pm 5\%$. Consequently, there is no doubt that the suffix with /i/ has got more diminutive potential than the suffix with /a/.

It should be underlined that individual results for the pairs in Table 1 are similar to each other. In fact, the standard deviation of the data amounts to only 3.2 percentage points. This additionally shows that the tendency to perceive /i/ as “smaller” than /a/ is very strong.

The results grouped according to the three different kinds of artificial words generated for the experiment indicate that the discussed phenomenon is most clearly visible in Type 3, which involves the palatalisation of vowels preceding the high front vowel /i/. In such cases words with “-ik” were chosen as smaller than words with “-ak” in 95.3% of the cases, which is slightly more frequently than in Type 2 (94.2%), but the sample analysed in this part of the experiment is too small to prove that this difference is statistically significant ($p = 0.5532$). Type 1, however, was chosen in 89.5% of the cases, which is much less frequently than Type 3, and this difference should be regarded as statistically relevant ($p = 0.0512$).

Table 1. Results of the comparison of the suffixes “-ik” and “-ak”

Pairs of words	Participants' responses				Word type		
	Words with /i/	Percentage	Words with /a/	Percentage	Type 1	Type 2	Type 3
ik — ak	77	89.5%	9	10.5%	*		
keik — keak	82	95.3%	4	4.7%		*	
syik — syak	77	89.5%	9	10.5%		*	
toik — toak	84	97.7%	2	2.3%		*	
nik — nak	83	96.5%	3	3.5%			*
wik — wak	82	95.3%	4	4.7%			*
gik — gak	81	94.2%	5	5.8%			*
Total for Type 2	243		15				
Average for Type 2	81	94.2%	5	5.8%			
Total Type 3	246		12				
Average for Type 3	82	95.3%	4	4.7%			
Total for all	566		36				
Average for all	80.9	94.0%	5.1	6.0%			

In Table 2 the results concerning the contrast of “-iszek” versus “-aszek” also confirm that the informants interpret /i/ as more diminutive than /a/. Words with the former suffix were chosen, on average, in 88.5% of the cases, and the predicted percentage of all speakers of Polish who perceive the forms with the suffix “-iszek” as “smaller” than forms with “-aszek” is $88.5\% \pm 6.7\%$. Again, the results leave no doubt as to which vowel has more potential to symbolise diminutive size, although the tendency is slightly weaker than in the previous case. Also, the standard deviation (5.1 percentage points) is somewhat higher than for the pair “-ik” — “-ak”, which suggests that the informants’ choices were less stable.

The comparison of the results for different types of artificial words provided in Table 2 reveals the same phenomenon as the one discussed above. In the case of Type 3 the tendency to choose words with /i/ is stronger than in Type 2 and Type 1. Nevertheless, these differences cannot be statistically confirmed. The *p*-value for the difference between the mean result for Type 1 and Type 3 is 0.244; between Type 2 and Type 3 it amounts to 0.7772.

Table 2. Results of the comparison of the suffixes “-iszek” and “-aszek”

Pairs of words	Participants' responses				Word type		
	Words with /i/	Percentage	Words with /a/	Percentage	Type 1	Type 2	Type 3
iszek — aszek	73	84.9%	13	15.1%	*		
keiszek — keaszek	74	86.0%	12	14.0%		*	
syiszek — syaszek	82	95.3%	4	4.7%		*	
noiszek — noaszek	73	84.9%	13	15.1%		*	
miszek — maszek	74	86.0%	12	14.0%			*
fiszek — faszek	83	96.5%	3	3.5%			*
biszek — baszek	74	86.0%	12	14.0%			*
Total for Type 2	229		29				
Average for Type 2	76.3	88.8%	9.7	11.2%			
Total Type 3	231		27				
Average for Type 3	77	89.5%	9	10.5%			
Total for all	533		69				
Average for all	76.1	88.5%	9.9	11.5%			

The mean preference of “-iś” over “-aś” (cf. Table 3) is less definite (81.6%) than in the other two cases discussed above, but still shows that /i/ is interpreted as considerably more diminutive than /a/. Based on the sample analysed in this part of the experiment, the 95% interval for all speakers of Polish who perceive the forms with the former morpheme as smaller than the forms with the latter is $81.6\% \pm 8.2\%$. One of the possible reasons for the tendency under discussion to

be less marked could be the fact that both suffixes contain the palatal consonant /ɛ/. As has been reported in Stolarski (2011), palatality has considerable potential for symbolising diminutive size. The presence of /ɛ/ may, in fact, limit the direct influence of the vowels on the respondents' choices. Such a presumption could be tested in a separate experiment in which the potential of vowel height and/or advancement is compared to the corresponding potential of consonantal palatality. The results gathered in Stolarski (2011) and in the present publication suggest that, indeed, the latter aspect may be more consequential than the former. It has been shown that diminutive suffixes with the palatal /ɲ/ are interpreted as “smaller” than suffixes with /n/ by over 95% of respondents, while the current data indicate that the tendency to perceive /i/ as “smaller” than /a/ is relatively weaker and typically does not exceed 95% of the cases. However, in order to prove that palatality is really the major factor in Polish size-sound symbolism, an additional experiment should be performed (for an initial idea on the way such a test could be prepared, see the section “Final conclusion”).

Table 3. Results of the comparison of the suffixes “-iś” and “-aś”

Pairs of words	Participants' responses				Word type		
	Words with /i/	Percentage	Words with /a/	Percentage	Type 1	Type 2	Type 3
iś — aś	69	80.2%	17	15.1%	*		
seiś — seaś	59	68.6%	27	14.0%		*	
nyiś — nyaś	69	80.2%	17	4.7%		*	
guiś — guaś	75	87.2%	11	15.1%		*	
liś — laś	67	77.9%	19	14.0%			*
wiś — waś	81	94.2%	5	3.5%			*
biś — baś	71	82.6%	15	14.0%			*
Total for Type 2	203		55				
Average for Type 2	67.7	78.7%	18.3	21.3%			
Total Type 3	219		39				
Average for Type 3	73	84.9%	13	15.1%			
Total for all	491		111				
Average for all	70.1	81.6%	15.9	18.4%			

The results for individual pairs of words representing the suffix pair “-iś” — “-aś” are also not consistent. While, for instance, “wiś” was selected as more “diminutive” than “waś” by 96.5% of the respondents, “seiś” was perceived as “smaller” only in 68.6% of the cases. Indeed, the standard deviation of the results summarised in Table 3 is higher than in the two former cases and reaches 7.9 percentage points.

Data in Table 3 support the observation that the respondent's choices may be influenced by consonant palatalisation in the artificial words of Type 3. Again, in these pairs the preference of forms with /i/ is stronger than in other "Types". In fact, assuming a slightly less rigorous alpha level than 0.05, the difference between the average result for Type 2 and Type 3 could even be considered statistically significant ($p = 0.068$). Such results fully justify the need to include artificial words of Type 2 in the experiment. Although these forms violate the rules of Polish phonotactics, they allow us to establish the strength of the size-sound symbolic potential of the vowel /i/ without the influence of consonant palatalisation present in the words of Type 3.

Table 4. Summary of the results for all the data analysed in the experiment

Pairs of words	Participants' responses			
	Words with /i/	Percentage	Words with /a/	Percentage
Total for Type 1	219		39	
Average for Type 1	73	84.9%	13	15.1%
Total for Type 2	675		99	
Average for Type 2	75	87.2%	11	12.8%
Total Type 3	696		78	
Average for Type 3	77.3	89.9%	8.7	10.1%
Total for all	1590		216	
Average for all	75.7	88.0%	10.3	12.0%

Finally, the overall results of the current experiment summarised in Table 4 further confirm that the analysed forms with /i/ are interpreted as "smaller" than forms with /a/. The 95% interval for all speakers of Polish who perceive the close front vowel as more diminutive than the open central one is $88\% \pm 4\%$. Therefore, the discussed tendency may be accepted as a fact. The general results also indicate that the consonant palatalisation in words of Type 3 has an additional effect on the respondents' perceptions. The 95% interval for the difference between the choices of /i/ as "smaller" than /a/ among words of Type 3 (89.9%, $n = 774$) and words of Type 1 and 2 grouped together (86.6%, $n = 1032$) is $3.3\% \pm 2.97\%$. This difference should be regarded as statistically significant ($p = 0.0328$).

4. Final conclusion

This study has shown that the theory of size-sound symbolism is relevant to the Polish diminutive system. Suffixes containing the high front /i/ have been selected as "smaller" than suffixes containing the open central /a/ in all of the analysed

cases. It is important to emphasize that the only possible conditioning of such preferences is the phonetic factor. The suffixes which were compared to each other in pairs are identical from a morphological point of view. They are all potentially diminutive morphemes and the only aspect which makes them dissimilar is their phonetic form.

It would be interesting to design an experiment in which the potential of height and/or advancement of vowels to represent objects of given sizes is compared to the corresponding potential of palatality. So far, it has been confirmed that both aspects play an active role in sound symbolism, but it has not been determined which of the two factors is more significant. Such an experiment could also involve pairs of natural Polish diminutive suffixes. This time, however, the differences should not be minimal. Suffixes containing high front vowels and non-palatal consonants could be contrasted with suffixes containing open back vowels and palatal consonants. Such a test would reveal which of the two factors is predominant.

References

- Åsa, A. 1999. *Studies in Sound Symbolism*. Gotheburg Monographs in Linguistics 17. Göteborg: Göteborg University.
- Blicharski, M. and H. Fontański (eds.) 1999. *Słowotwórstwo, semantyka i składnia języków słowiańskich*. Volume 1. Katowice: Wydawnictwo Uniwersytetu Śląskiego.
- Bolinger, D. 1950. "Rime, assonance and morpheme analysis". *Word* 6. 117–136.
- Bolinger, D. 1965. *Forms of English: Accent, Morpheme, Order*. Tokyo: Hokuou Publishing Company.
- Brackbill, Y. and K.B. Little, 1957. "Factors determining the guessing of meanings of foreign words." *Journal of Abnormal and Social Psychology* 54. 312–318.
- Brown, R.W., A.H. Black and A.E. Horowitz. 1955. "Phonetic symbolism in natural languages." *Journal of Abnormal and Social Psychology* 50. 388–393.
- Caltvedt, L. 1999. "The poetics of synaesthesia in Rilke and Handke." *Modern Austrian Literature* 32.1. 53–66.
- Carr, P. 2008. *A Glossary of Phonology*. Edinburgh: Edinburgh University Press.
- Chapman, R. 1982. *The Language of English Literature*. London: Edward Arnold Publishers Ltd.
- Diffloth, G. 1994. "I: Big, a: Small." In: Hinton, L., J. Nichols and J.J. Ohala (eds.) *Sound Symbolism*. Cambridge: Cambridge University Press, 107–114.
- Dobrzyński, W. 1988. *Z badań nad rozwojem polskich deminutywów. 2. Apelatywne spieszczania dezintegralne*. Warszawa and Wrocław: Państwowe Wydawnictwo Naukowe.
- Domin, J. 1982. "Słowotwórstwo hipokorystyków od imion własnych osobowych w języku polskim i rosyjskim." *Zeszyty Naukowe (Uniwersytet Gdański). Rozprawy i Monografie* 34. Gdańsk.
- Frazer, J.M. 1982. "The phonetic symbolism of Arnold's 'Wragg is in custody'." *American Notes & Queries* 21.13.
- Grzegorzczkowska, R. and J. Puzynina. 1979. *Słowotwórstwo współczesnego języka polskiego: rzeczowniki sufiksalne rodzime*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Hamano, S. 1986. *The Sound-Symbolic System of Japanese*. A dissertation presented to the graduate school of the University of Florida.
- Hamano, S. 1994. "Palatalization in Japanese Sound Symbolism." In: Hinton, L., J. Nichols and J.J. Ohala (eds.) *Sound Symbolism*. Cambridge: Cambridge University Press, 148–160.

- Hinton, L., J. Nichols and J.J. Ohala (eds.) 1994. *Sound Symbolism*. Cambridge: Cambridge University Press.
- Householder, F.W. 1960. "From the Viewpoint of Linguistics." In: Sebeok, T.A. (ed.) *Style in Language*. Cambridge, Massachusetts: MIT Press, 339–349.
- Hymes, D.H. 1960. "Phonological Aspects of Style: Some English Sonnets." In: Sebeok, T.A. (ed.) *Style in Language*. Cambridge, Massachusetts: MIT Press, 109–131.
- Jadacka, H. 2001. *System słowotwórczy polszczyzny (1945–2000)*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Jakobson, R. 1960. "Linguistics and Poetics." In: Sebeok, T.A. (ed.) *Style in Language*. Cambridge-Massachusetts: MIT Press, 350–377.
- Jakobson, R. and L. Waugh. 1979. *The Sound Shape of Language*. Sussex: Harvester Press.
- Jespersen, O. 1922. *Language — Its Nature, Development and Origin*. London: Allen and Unwin.
- Jones, L.G. 1983. "Distinctive Features and Sound Tropes in Russian Verse." In: Eekman T. and D.S. Worth (eds.) *Russian Poetics: Proceedings of The International Colloquium at UCLA, September 22–26*, Columbus, Ohio: Slavica Publishers, 195–208.
- Kaczorowska, H. 2012. *Słowotwórstwo w języku polskim: teoria i praktyka. Szkoła podstawowa — gimnazjum — szkoły ponadgimnazjalne*. Kielce: Oficyna Wydawnicza "Marka".
- Klink, R.R. 2000. "Creating brand names with meaning: The use of sound symbolism." *Marketing Letters* 11.1. 5–20.
- Kreja, B. 1999. *Słowotwórstwo polskie na tle słowiańskim*. Studia. Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego.
- Lowrey, T.M. and L.J. Shrum. 2007. "Phonetic symbolism and brand name preference." *Journal of Consumer Research* 34.3. 406–414.
- Lucas, F.L. 1955. *Style*. London: Cassell & Co Ltd.
- Maltzman, I., L. Morrisett and L.O. Brooks. 1956. "An investigation of phonetic symbolism." *Journal of Abnormal and Social Psychology* 53. 249–251.
- Mańczak, W. 1993. *Polska fonetyka i morfologia historyczna*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Marchand, H. 1960. *The Categories and Types of Present-Day English Word-Formation*. Wiesbaden: Otto Harrassowitz.
- Markell, N.N. and E.P. Hamp. 1960. "Connotative meanings of certain phoneme sequences." *Studies in Linguistics* 15. 47–61.
- McCune, K. 1985. *The Internal Structure of Indonesian Roots*. Atma Jaya: Universitas Katolik Indonesia.
- Murdy, L.B. 1966. *Sound and Sense in Dylan Thomas's Poetry*. The Hague and Paris: Mouton & Co.
- Murray, S.M. 1961. "A cross-linguistic investigation of phonetic symbolism." *Journal of Abnormal and Social Psychology* 62.3. 623–630.
- Nash, W. 1980. *Designs in Prose*. London and New York: Longman.
- Newman, S.S. 1933. "Further experiments in phonetic symbolism." *American Journal of Psychology* 45. 53–75.
- Nichols, J. 1971. "Diminutive consonant symbolism in western North America." *Language* 47.4. 826–848.
- Nordberg, B. 1986. "The use of onomatopoeia in the conversational style of adolescents." *FUMS Rapport* no. 132. Uppsala: Uppsala University, FUMS.
- Nuckolls, J.B. 1999. "The case for sound symbolism." *Annual Review of Anthropology* 28. 225–252.
- Ohala, J.J. 1983. "Cross-language use of pitch: An ethological view." *Phonetica* 40. 1–18.
- Ohala, J.J. 1984. "An ethological perspective on common cross-language utilization of F0 of voice." *Phonetica* 41. 1–16.
- Ohala, J.J. 1994. "The Frequency Code Underlies the Sound-Symbolic Use of Voice Pitch." In: Hinton, L., J. Nichols and J.J. Ohala (eds.) *Sound Symbolism*. Cambridge: Cambridge University Press, 325–347.

- Ohnheiser, I. (ed.) 2003. *Komparacja współczesnych języków słowiańskich. Słowotwórstwo / Nominacja*. Opole: Uniwersytet Opolski — Instytut Filologii Polskiej i Opolskie Towarzystwo Przyjaciół Nauk.
- Rhodes, R. 1994. "Aural Images." In: Hinton, L., J. Nichols and J.J. Ohala (eds.) *Sound Symbolism*. Cambridge: Cambridge University Press, 276–292.
- Sapir, E. 1929. "A study in phonetic symbolism." *Journal of Experimental Psychology* 12. 225–239.
- Stolarski, Ł. 2011. "Palatality in Size-Sound Symbolism on the Basis of Selected Polish Examples." In: Mohoń, M. (ed.) *Studia neofilologiczne*. Kielce: Wydawnictwo Uniwersytetu Jana Kochanowskiego, 39–56.
- Stolarski, Ł. 2012. "Size-Sound Symbolism in Names of Cars." In: Newman, J.G. and S. Łodej (eds.) *Token — a Journal of English Linguistics*. Kielce: Wydawnictwo Uniwersytetu Jana Kochanowskiego w Kielcach.
- Ullmann, S. 1962. *Semantics: An Introduction to the Science of Meaning*. Oxford: Basil Blackwell.
- Ullan, R. 1978. "Size-Sound Symbolism." In: Greenberg, J.H., Ch.A. Ferguson and E.A. Moravcsik (eds.) *Universals of Human Language*. Stanford, California: Stanford University Press, 523–568.
- Urban, M. 2011. "Conventional sound symbolism in terms for organs of speech: A cross-linguistic study." *Folia Linguistica* 45.1. 199–213.
- Waszakowa, K. 1993. *Słowotwórstwo współczesnego języka polskiego: rzeczowniki z formantami paradygmatycznymi*. Warszawa: Wydawnictwa Uniwersytetu Warszawskiego.
- Waszakowa, K. 1994. *Słowotwórstwo współczesnego języka polskiego: rzeczowniki sufiksalne obce*. Warszawa: Wydawnictwa Uniwersytetu Warszawskiego.
- Wichmann, S., E. Holman and C. Brown. 2010. "Sound symbolism in basic vocabulary." *Entropy* 12. 844–858.
- Yorkston, E. and G. Menon. 2004. "A sound idea: Phonetic effects of brand names on consumer judgements." *Journal of Consumer Research* 31.1. 43–51.