

# Mikołaj Kruszewski: Theory and Vision (Part One)<sup>†</sup>

Daniel Silverman\*  
San José State University

---

## Abstract

Although it prefigures many advances in linguistic theory, the scholarship of nineteenth century scholar Mikołaj Kruszewski is today largely forgotten. In these papers I hope to partially rectify this situation by introducing Kruszewski's insights to modern discourse on phonology. In addition to a detailed summary of Kruszewski's major work, *An Outline of the Science of Language* (*Očerk Nauki O Jazyke*) (1883), I place his work in the context of subsequent (mostly post-war) approaches to language structure. Some of Kruszewski's major insights include (1) the *arbitrary* relationship between sound and meaning, (2) the *non-teleological* nature of the linguistic system, (3) the *generative* or creative character of language, (4) the *connectionist* organization of the lexicon, and (5) the *optimality-theoretic*-esque proposal that linguistic systems may be analyzed as the product of pressures and constraints in inherent conflict with one another. This, Part One of a two-part presentation, considers the first five chapters of Kruszewski's ten-chapter book.

---

## 1. Introduction

~~As noted in Part Two of this two-part presentation (Silverman 2012),~~ Mikołaj Kruszewski's brief career in linguistics – spanning only 8 years, from 1876 to 1884, and cut short by illness and his premature death in 1887 – sits prominently alongside the finest scholars' of any era, in terms of both the theoretic fruit it bore, and the sweep of its prescience. Although geographic and linguistic isolation limited the extent to which Kruszewski's ideas were disseminated among European and American thinkers (Kruszewski studied in Kazan and usually wrote in Russian), his scholarship has nonetheless slowly trickled into the linguistic mainstream by indirect means, among them, through the slightly-better-known scholarship of Kruszewski's teacher, Jan Baudouin de Courtenay. Still, the actual scope of Kruszewski's influence is exceedingly difficult to gauge, since many subsequent scholars (the present author among them) have clearly been unaware that certain of their insights are prefigured – or, sometimes, fully explicated – in Kruszewski's work.

Kruszewski's most ambitious and important work, *An Outline of the Science of Language* (*Očerk Nauki O Jazyke*) was written in 1883 and served as his doctoral dissertation. Therein, Kruszewski presents a summation of his ideas on linguistic structure, with an emphasis on the interaction of phonetic and semantic pressures on lexical structure; in a word, morphology.

In his introductory essay to the only collection of Kruszewski's work to be published in English (*Writings in General Linguistics*; John Benjamins 1995) editor Konrad Koerner asserts that “since disciplines evolve through ... changes of the intellectual climate of a period, it is the duty of the historian to offer at least a sketch of the particular time and

---

<sup>†</sup> Due to an error during the production process, Part One and Part Two of Daniel Silverman's paper were published in two separate issues. Part One is included in the June 2012 issue of *Language and Linguistics Compass* (6. 330–342). Part Two can be found in the May 2012 issue (5. 296–309).



“Sounds and words *do not exist, but are pronounced.*” (1883:56)

place during which a scientist or scholar developed his ideas and made his proposals for subsequent research. Without contextualization it is impossible to do justice to someone who has contributed to knowledge” (1995:XIII). Koerner proceeds to provide just such a historical context to Kruszewski’s scholarship, remarking on his background in psychology and philosophy at the University of Warsaw, where he wrote a thesis on Russian folklore. His studies encompassed – and his writing bears the mark of – the work of Francis Bacon, John Locke, David Hume, and especially John Stuart Mill. As will be seen, the impact of both Lamarck’s and especially Darwin’s scholarship must also be emphasized. With respect to contemporaneous scholarship in linguistics proper, Kruszewski cites the Neogrammarian hypothesis as a bold step forward in linguistic theorizing, with its emphasis on the “discovery” of linguistic laws, and its (pretensions to) scientific rigor. Kruszewski further positively cites August Schleicher, Eduard Sievers, Karl Brugmann, Hermann Osthoff, and especially Hermann Paul. A complete list of works cited by Kruszewski may be found on pages 175–8 of the Koerner-edited volume.

Koerner further notes that Kruszewski’s work was not especially well-received among the few who had the opportunity to study it, among them Slovenian Vratislav Jagić, Berlin-based Slavist Alexander Brückner, French scholar Louis Havet, and Karl Brugmann. The problem for a majority of these scholars was, apparently, that Kruszewski’s work was too theoretical in orientation, insufficiently emphasizing description and linguistic reconstruction. Kruszewski’s work was also criticized for being too narrow in scope with respect to the languages investigated.

Koerner briefly discusses the intellectual legacy of Kruszewski up to the mid-20th century, considering linguistic scholars who either knowingly or unknowingly explored

theoretical issues that occupied him. Among these scholars are Saussure (and his emphasis on linguistic structures and systems), Kuryłowicz (on the role of word frequency and memory), and Allen, Hoenigswald, and Bazell (on the pre-conditions for sound change). The emphasis herein, however, is on the extent to which Kruszewski's scholarship may be seen as pre-figuring more recent linguistic theorizing.

Readers of the present paper are strongly encouraged to seek out fuller discussion of the *Zeitgeist* in which Kruszewski was ensconced by reading Koerner's introductory essay in the 1995 volume. Additionally, a book-length investigation of Kruszewski's scholarship – including a very extensive summary of *Očerki* – was written in 1993 by Joanna Radwańska Williams, and a comparably-themed long essay was written by Arleta Adamska-Sałaciak in 1996. I also encourage readers to seek out these two fine historiographies, and further, to seek out Baudouin de Courtenay's obituary-cum-critique of Kruszewski, published in two parts (1888–9), and translated into English by Wayles Browne. Additional works on Kruszewski accessible to English readers include Berezin 2001, and Radwańska Williams 1996, 2002, 2006.

## 2. Summary of *An Outline of Linguistic Science*

In this summary of *Očerki*, I often let K(ruszewski) speak for himself, liberally quoting from Gregory M. Eramian's English translation from the Russian, which appears in the 1995 Koerner volume.

I have also largely avoided commenting on K's theorizing in these chapter summaries, as I do not want to break the flow of K's ideas. However, the remarkable prescience of K's scholarship with respect to modern linguistic thinking is indeed considered: each chapter is followed by a quite brief discussion of an element of K's scholarship that has resurfaced in more modern theoretic guises.

### 2.1. CHAPTER ONE: THE MOST BASIC ANALYSIS OF SPEECH; ITS VARIOUS ELEMENTS AND THEIR NATURE

The *indeterminacy* of linguistic elements plays a fundamental role in K's view of language structure and language change. Although this indeterminacy exists at a number of different levels of structure, it should never be confused with an absence of *categoricity* at any of these levels. Clearly, linguistic categories exist for K, but they are not static. Rather, they are mutable – for example, over time, and between speakers and hearers – due in part to the simple fact that listeners do not have direct access to the minds of speakers, but instead must (imperfectly) reconstruct speakers' mental states. Whole sentences surely have this quality of indeterminacy, but morphological units do as well.

Upon leaving behind the *realm of the spirit* and entering the *realm of physiology*, indeterminacy persists: due to the imperfect correlation between articulation and acoustics, “we receive one acoustic impression” (12), but at the articulatory level, a number of distinct and vacillating articulatory components are involved. “Thus, the acoustically indivisible sound is physiologically complex; there is a group of varied but coordinated operations” (12). (Throughout, page numbers refer to K's original pagination, as specified in the Koerner volume.)

It is this inherent indeterminacy of linguistic units that establishes the preconditions for language change: “*the whole, which consists of such units, must be unstable and capable of change*; the development of a language is explained by the nature of its elements” (13).

### 2.1.1. The Articulation – Acoustic Mismatch, and the Listener as a Source of Sound Change

In this brief opening chapter, K introduces his proposals regarding the complex relationship between articulation and acoustics; a manifestation of linguistic *indeterminacy*.

This mismatch has been explored by any number of subsequent scholars in various theoretical guises, among them, Stevens' (1972) quantal theory and Ohala's (1981) listener-based approach to sound change, though, to be sure, both technology and the scholarship it has engendered have advanced considerably from K's mere speculation on the subject.

The articulatory-acoustic mismatch bears an intimate relationship to K's uncontroversial assertion that listeners do not have direct access to the minds of speakers, but instead must (imperfectly) reconstruct speakers' mental states. Indeterminacy at this level of analysis has come to play a prominent role in self-organizational approaches to language structure and language change, among them the computational models of Steels (2000), de Boer (2001), Liberman (2002), and Wedel (2004, 2006). Here, assuming an element of "noise" that induces a constant gentle pressure towards mismatches between (computer-simulated) "speakers" and "hearers", the iterative nature of the production-perception loop may come to self-organize the communicated objects into a dispersed system, thus yielding "order out of chaos" (Prigogine and Stengers 1984).

## 2.2. CHAPTER TWO: SOUNDS AND THEIR LAWS

As already noted, a sound (K, having coined the term *phoneme* in his 1881 master's thesis to refer specifically and solely to sounds in alternation, abandons the term in his doctoral thesis) necessarily fluctuates within certain parameters in terms of its articulation, but such fluctuations do not necessarily possess isomorphic analogs in terms of their acoustic impression. Minor articulatory variations may go unnoticed by a listener, perhaps due to inherent sensory limitations; again we see the indeterminacy of elements that possess linguistic significance.

With respect to the cognitive evaluation of the physiology of speech production, K points out that we likely retain a memory of the muscle sensations involved. He suggests that, even upon thinking, the muscle memories are activated, "striving to be released as muscle movements" (15), and points to the dream and ruminative states of deaf mutes – during which hand movements are readily visible – in support of this proposal. Speech acts, then, entail a recycling of remembered muscle movements. Such motor routines become entrenched, and are readily re-summoned as necessary: "This quality of our organism is very advantageous: it contributes to the self-preservation of the organism with the least possible loss of strength" (15).

The role of memory – and in particular the memory of recent versus remote speech acts – comes to the fore when considering the phenomenon of accent shift upon prolonged interaction with new speech communities: "we unconsciously reproduce the sound we hear in the speech of those around us". Yet still, there exists a well-defined opposing tug towards stasis. K mentions the (Russian) Jewish guttural *r* as an example of a sound that persists "in several generations which have people of Jewish origin among their ancestors despite the admixture of outside blood" (16).

A *static law* of sound is one that is relevant at the synchronic level of analysis: "any sound which occurs acoustically and physiologically under identical conditions is approximately the same among all individuals of a given dialect and time" (17), where "approximately" may readily be omitted, provided it is understood that "identity" is not absolute.

K likens such “identity” to Darwin’s laws of inheritance and variation: “If children were completely identical to their parents, no *development* could take place. The situation is entirely the same in language...” (17:fn.6).

Such patterns are not limited to particular sounds in isolation, but rather, languages consist of systems *in harmony*, in the sense that sounds exist in series or complexes that may be grouped together due to the common motor routines that underlie them. Such motor routines, note, are quite comparable to other mundane activities such as “walking, dressing, etc.”, the only difference being that speech motor routines have no goal or end in themselves, but instead are harnessed towards *symbolic* ends; “a substitute for an idea ... a word owes its meaning only to the laws of association” (18).

K insightfully observes that changes in the symbolic (semantic) system are far more consequential than changes in the sound system, since there is a necessary functional change upon symbolic change. Though comparatively infrequent, symbolic changes never take place in a saltatory manner: “The symbolic series of a word can change and simplify indefinitely under one condition – *gradualness of change*, because *the continuity of the association* which gives meaning to the word is possible only with gradual change” (19).

Meanwhile, there is no inherent functional (symbolic, semantic) consequence of a shift in sound. Motoric laxing is tolerable, though only within certain limits [“If we hold an object too loosely, it will fall out of our hands” (19)]. When sounds enter into a relationship of syntagmatic contiguity, they may readily influence each other in a form of articulatory simplification. For example, in the (Russian) sequences *ti* and *ta*, “the operations of the preceding sound are often changed to such an extent that an acoustic effect is involved” (20), and thus *ti* possesses palatalization at consonantal release.

Such simplifications may readily take the form of static syntagmatic *laws* operating on the sound system: “*only sound z<sub>1</sub>, never sound z<sub>2</sub>, can be combined with sound x*” (22). Such static (i.e. synchronic) laws governing the distribution of sounds may derive from one or both of two sources. Some such laws may be *physiologically necessary*, while others may be *historically necessary*. In the Russian case just considered, a certain degree of palatalization may be physiologically necessary, but also, it has taken its current form due to historical precedent.

Each language possesses an overall “*uniformity in sound complexes*” (23). In any given language, the apparent impossibility of certain gestural sequences (not K’s terminology) is due solely to the fact that “*they [are] absent in the language*, i.e., the habits of articulating the sounds in the order indicated [are] absent among this people” (24).

For K, the accommodation of one sound to another yields a very important *reintegration* of the units involved, one that may produce new acoustic effects; “a sound complex cannot be considered a mechanical juxtaposition of a certain quantity of independent sounds. When combining with one another, sounds – we have in mind here not only their acoustic, but also their physiological aspect – accommodate themselves to one another. This accommodation is the *cement* which transforms several sounds into one integral complex” (25). The functional relevance of this “cement” is considered in detail in Chapter Seven.

### 2.2.1. Remembered Motor Routines and “Articulatory Phonology”

The emphasis that K places on articulation, and in particular, the “recycling of remembered muscle movements”, is a perennial favorite among linguists as a domain of description in phonology, for example, as when distinctive feature theory was altered to consist of articulatory features (Chomsky and Halle 1968), rather than acoustic ones (Jakobson et al. 1952). In more recent years, the work of Browman and Goldstein (1986, 1989)

(which grew out of work on motor theory (Lieberman et al. 1967; Liberman and Mattingly 1985) specifically point to the *dynamic* aspects of speech production, in the form of “articulatory gestures” – that is, recycled motor routines – as the abstract building blocks of phonological structure. Comparable to K’s emphasis on motor routines themselves, Browman and Goldstein propose that a “gesture” is “an abstract characterisation [sic] of co-ordinated task-directed movements of articulators within the vocal tract” (1989:206). These gestures are both the atomic units of phonological contrast, and serve to characterize the actual movements involved in speech production.

As will be seen though, whereas for Browman and Goldstein’s “Articulatory Phonology” (at least in its early incarnations), speech gestures serve as explanatory endpoints, for K, these routinized muscle activities should not be viewed as primitives in and of themselves, but instead are, rather, minor players in the grand scheme of phonological things.

### 2.3. CHAPTER THREE: THE HISTORY OF SOUNDS AND SOUND COMPLEXES

Regarding the origins of sound changes – K’s *dynamic laws*; he refers to such diachronic changes as “vertical”, as opposed to the “horizontal” differences observed across dialects – K implicates the crucial importance of both speech variation (another manifestation of “indeterminacy”), and also the asymmetrical memories of recent versus remote speech. From his chapter summary:

The spontaneous changes of a sound depend on the gradual change of its articulation. We can pronounce a sound only when our memory retains an imprint of its articulation for us. If all our articulations of a given sound were reflected in this imprint in equal measure, and if the imprint represented an average of all these articulations, we, with this guidance, would always perform the articulation in question approximately the same way. But the most recent (in time) articulations, together with their fortuitous deviations, are retained by the memory far more forcefully than the earlier ones. Thus, negligible deviations acquire the capacity to grow progressively greater.... (51–2)

If articulatory “deviations” (from their historical antecedent) become sufficiently great, a sound may change its acoustic character as well. For example, if a palatalized velar becomes increasingly palatalized, it may eventually sound like an alveolar. Similarly, if a velar stop gradually loses its oral closure, it may end up an affricate (*kx*) or even a spirant (*x*). Such changes are called *spontaneous* by K, and are characterized by their gradual nature.

Juxtaposed to spontaneous changes are what K calls *sound substitutions*, which, according to K, are not gradual at the phonetic level (though presumably, may be gradual at the level of *frequency of usage*, i.e., the sound substitution may gradually become more frequently observed over time). K exemplifies such changes with Latin liquid dissimilation, whereby a suffix liquid dissimilates with a root liquid in terms of laterality/centrality.

Both spontaneous changes and sound substitutions, K asserts, have their origins in *speaker production*: “Our speech organs do not always perform the operations that we want to make them perform”. Sound changes rooted in *listener perception* or “error in hearing” (“*lapsis auris*”) are considered as well. Sounds that bear an inherent perceptual similarity may be sporadically confused with each other – they are “*indistinct for everyone*” (31) – and may, over time, result in the change of one or both, especially in cases when the word is infrequent or unfamiliar. K considers the palatalized velars and the palatalized alveolars of Russian as an example. The Russian post-vocalic lateral – which may sporadically be confused with zero – is also considered, though it should be emphasized that this second example crucially involves the syntagmatic context of the sound in question.

K points out that there is a strict interdependence between speaker-initiated and listener-initiated sound changes: “It would be strange to accept fluctuations in the pronunciation of a sound without accepting the same kinds of fluctuation in the perception of that sound” (31). Indeed, K seems to suggest that these two loci of sound change may come to feed off each other, inducing *the acceleration of sound change*.

*Apparent sound change* seems to be analogous to Darwin’s discussion of “the imperfection of the geological record”. For example, Latin  $dv > b$  likely passed through an intermediate stage for which we have no record. Comparably, a common change of word-final  $m > n$  is superficially difficult for K to explain, though it must be admitted that his proposals for both these cases’ intermediate stages are not especially compelling.

In his ambitious attempt to make linguistics a true science, K emphasizes the physical basis of so-called *sound laws*: “only *physiological* laws are independent and primary”, but “every phenomenon in the physiology of speech is echoed in its acoustics” (33).

Given the typically gradual nature of sound change, the sound laws that operate on linguistic systems have miniscule effects, though, over generations of language use, such laws may iterate, and negligible changes thus have the capacity to grow in a decidedly accretive fashion: “no matter how negligible the individual results of the operation of sound laws may be, the laws themselves operate in the course of enormous periods of time; enormous differences can occur with the accumulation of negligible changes in the course of centuries. Everywhere in nature we see the enormous results of the operation of individually negligible causes which are potent in their duration” (34).

In consonance with Lyell’s Uniformitarian hypothesis, K asserts that the “linguistic harmony” alluded to earlier may have its origin, at least in part, in the “uniformity in the deposits of sound laws” (where “deposits” is a clear reference to the geological record): “*identical sounds* (static laws) [are] subject to *identical changes* (dynamic laws)” (35). Both paradigmatic regularities (individual sounds) and syntagmatic regularities (sound sequences) – and also sub-regularities – may have their origins in this linguistic Uniformitarianism.

These accretive deposits do not proceed on an undisturbed trajectory, however. There are always pressures acting in a disruptive manner. For example, certain sounds possess a “kinship” to others that might induce changes that destroy regularity. Russian *s*, German *h*, and Greek *k*, are cognate, and thus presumably bear a historic “anthropophonic tie” that has been destroyed by language-specific spontaneous changes. How then to reconcile such idiosyncratic diachronic trajectories with the notion of (exceptionless) “sound law”? In Lamarckian fashion – that is, in the sense that there is a single “ladder” of descent, such that species at different levels of development are merely at different rungs along this ladder – K suggests that a sound change proceeds in a singular direction over time, but may proceed further along this set trajectory in one language, and not as far in another language: “in the course of time, sound  $n_1$  is replaced by sound  $n_{10}$ ; or: in the course of time, sound  $n_1$  is replaced by sound  $n_5$  ... This in itself is still not an exception to the law, but only a *limitation* of the law...” (39).

As noted, sound laws do not apply such that change proceeds inexorably to some predictable outcome, since one law may act to change a sound during one period, and another law may re-introduce this very sound at some later period. For example, although Polish *r* has changed to ʒ when immediately followed by *e*, *re* has been reintroduced due to another internal change, short  $u > e$ . Analogy and borrowing are other sources of re-introduction. For example, Russian, in which velars have historically palatalized before front vowels, has subsequently acquired loans possessing exactly the sequence that spontaneously devolved, for example *gigant* (“giant”).

Thus, sound laws may still be viewed as exceptionless at the proper level of analysis, but sounds will inevitably encounter pressures that destroy these laws' exceptionless application: "in our formula 'in the course of time the sound  $n_1$  is replaced by sound  $n_{10}$ '...we are observing not a law but only an *ordinary but unessential uniformity of sequence* ..." (41). Thus, one sound and its distant descendent are not connected by the single application of a single sound law. At most, they are connected by the iterative application of such a law. In other words, sound laws do not directly relate one sound to its historic reflex, *contra* the Neogrammarian proposal. Rather, sound laws operate on speech itself.

Observing comparable sound changes over and over again (K presents a long list of similar vowel changes affecting many European and Siberian languages), provides strong evidence for the existence of exceptionless sound laws, according to K. In certain of these cases, as when one sound splits into two or more without an apparent intervening pressure, K, to be expected now, proposes that the divergence has its origin in very minor articulatory deviations that have been acted upon iteratively by (exceptionless) sound laws. Thus, for example, German  $s > r$ , a change unattested in Slavic, may be due to slightly different tongue postures at the earliest stage of the divergence, a difference that has been acted upon by universally applicable laws of change in German, laws that would have applied in Slavic as well had these tongue postures been non-distinct before the divergence. Whence the original "slight deviation" K does not comment upon.

Accompanying the attrition of old sounds, perhaps to zero, languages necessarily possess "deposits" that may ultimately accrete into new sounds. Thus, for example, the loss of geminate stops in Latin, which triggered entire series to shift in stepwise fashion, has ultimately been reversed in Italian by the development of new geminates, historically deriving from heterorganic consonant clusters: "The category which has disappeared ... reappears .... By examining sounds in their historical development, we can establish *the reintegration of a sound system*" (48–9), just as seen above in Polish.

K concludes this chapter with a brief discussion of the source of lexical exceptions to sound laws. He notes that word-medial and -final sounds are more readily subject to attrition in such forms, and moreover, that such exceptional forms are often more frequent, and often pronounced more quickly and/or in a reduced fashion, in comparison to non-exceptional forms. Indeed, "*a sound complex changes variously in various conditions*" (51). Moreover such exceptional words may act as pioneers, as "harbingers of the future", leading the way to a future state of the system as a whole.

### 2.3.1. Spontaneous Versus Apparent Changes (Sound Substitutions): "Rule Telescoping" "Crazy Rules", "Natural Phonology"

The distinction that K observes between "spontaneous changes" (resulting in alternations that are phonetically "natural") and "apparent changes" or "sound substitutions" (resulting in alternations that do not lend themselves to phonetic explanation at the synchronic level) has been subsequently considered by Bach and Harms (1972) in a discussion of so-called "crazy rules", by Hyman and Schuh (1974) in the form of "rule telescoping", and by Donegan and Stampe (1979) under the guise of "processes" ("of the speaker") versus "rules" ("of the language").

Working in the generative framework, Bach and Harms (1972) operate under the assumption that so-called "rule systems" simplify – that is, become "more general" – over time, due to children constructing the simplest grammar possible. One consequence of the increased generalizability of rule application is that a rule comes to apply in increasingly less natural contexts, thus becoming "implausible" or "crazy".

The source of Bach and Harms' "crazy rules" is thus the supposed tendency for rules to generalize such that they come to encompass increasingly less natural contexts, where "natural" for these authors involves reference to both distinctive feature theory and so-called "marking conventions", which have been suggested as a formal way of characterizing phonetic naturalness.

An alternative route to the distinction between "natural and "unnatural rules" is explored by Hyman and Schuh (1974), whose proposals on the matter are far closer in spirit to the "spontaneous change" – "sound substitution" distinction proposed by K himself. Hyman and Schuh propose that phonetically implausible synchronic rules may enter a language due to a series of diachronic processes that may be quite phonetically natural in and of themselves. Over time, such a series of natural changes may result in an alternation that lacks phonetic plausibility. Learners, having no knowledge of the history of the pattern, observe the alternation and establish their grammar based on this superficial patterning, thus "telescoping" the series of natural diachronic processes into an all-at-once synchronic alternation.

A comparable proposal is made by Donegan and Stampe (1979), who quite admirably cite K as an influence on their own thinking on the matter. Comparable to K, Donegan and Stampe propose a distinction between what they term "processes" and "rules". Processes are phonetically natural, having their origin, according to the authors, in the sorts of phonetically natural tendencies of children as they are first acquiring their language. "Rules", by contrast, "lack phonetic motivation and which therefore substitute one phoneme for another regardless of the number of feature changes involved" (1979:127).

Indeed, even more generally, the rule-ordering phenomena known as counter-feeding and counter-bleeding, which may result in "opacity" among paradigmatic and syntagmatic relatives (Kiparsky 1968), also harken back to K's distinction between "spontaneous changes" and "sound substitutions". Such opacity effects, though rendered transparent by treating rule orderings as diachronic processes (rather than synchronic ones), are even more opaque within the optimality framework, which eliminates the ordered rule component altogether. For example, a proposal involving "sympathy" (McCarthy 1999), a sub-component of the optimality approach, stipulates that an output form may mismatch an input form due to its faithfulness to a candidate that is distinct from the underlying form itself.

#### 2.4. CHAPTER FOUR: CONCERNING THE PREVAILING VIEWS ON SOUND LAWS

Received opinion at the time of K's writing was that "two different sounds can develop from one sound under the same phonetic conditions" (54). Although running a risk of self-serving circularity, K proposes (along with the Neogrammarians) that, if linguistics is to be a valid scientific discipline, then complete regularity must exist, admitting of no exceptions at the relevant level of analysis. Thus, as previewed in Chapter Three, K operates under the assumption that sound laws are exceptionless, and thus if a sound splits into two, then it wasn't a single sound to begin with. He briefly alludes to Grimm's and Verner's Laws as an illustrative case in point.

K proposes no difference between the origins of sound changes that come to have morphological consequences (resulting in alternations that signal a morphological or "psychic" change) and those that don't ("mechanical" changes): "phonetically speaking, these changes are in no way distinguishable from each other" (55). He correctly notes that no sound change takes place *in order to* serve a morphological function, rejecting in full any teleological pressures on language development, and observing that "sounds in

and of themselves are incapable of expressing anything; only associations give them this capacity” (56). However, a sound change, though having its origin in phonetically-based sound laws, may indeed come to be harnessed (or, in contemporary parlance, exapted) toward morphological ends. Thus, the vowel alternation in Russian *končit’* (“to finish” perfective)–*okančivat’* (“to finish” imperfective) has purely phonetic origins, but has evolved a morphological function, “the sound *o* [is] used to express a completed action, [and] the sound *a* [is] used to express the same action with the nuance of duration” (56).

K thus once again establishes a sharp distinction between “the realm of the history of sounds” (diachrony) and “the realm of sound laws ... which are not now conditioned by anything in the (geological) deposit of lengthy phonetic processes” (synchrony) (57). Genuine lexical exceptions, then, are not exceptions to sound laws, but have instead been subject to other pressures of a decidedly non-phonetic nature, pressures that ultimately need to be accounted for in terms of their etiology and their time of onset. Two such non-phonetic, external factors are *derivation* – analogically creating new words from old – and *borrowing*. It is derivation that, according to K, unlocks the key to the *creative* – or generative – nature of linguistic knowledge.

#### 2.4.1. The Non-Teleological Nature of the Linguistic System

It may be safe to say that the divide between the teleological and the non-teleological is very much tied to the synchronic versus diachronic locus of explanation regarding the pressures that purportedly shape and change the linguistic system. K, having been influenced by the evolutionary biological proposals of Darwin (note his metaphorical mention of the geological record), clearly falls into the diachronic (non-teleological) camp: while the linguistic system bears the mark of both speaker- and listener-based constraints, these constraints manifest themselves only at a great diachronic distance. Speakers’ intent – whether involved in easing their own articulatory burden or easing their interlocutors’ burden, or whether a sound change has phonological or morphological consequences – is fully absent from this scenario. Rather, ease-of-articulation and ease-of-perception are, at most, the evolutionary by-products of slow-acting iteratively applied microscopic erosions and accretions, due to iterative speaker-listener interactions.

K’s strict proscription against any teleological influences on the linguistic system (“We do not know any facts in language which would have...a teleological nature”) has been opposed by many thinkers over the intervening years. In recent times, advocates of teleological pressures on phonological systems include Kingston and Diehl (1994) (who propose that speakers’ “phonetic knowledge” influences their choice of certain allophonic values over others), Jun (1995) and Steriade (2001) (who have similar proposals regarding the role of speakers’ knowledge of cue robustness affecting their supposed choice of allophone), and Kirchner (2004) (who, adapting the long-proposed “articulatory undershoot” and “articulatory anticipation” hypotheses, considers speaker “laziness” as an active pressure on the linguistic system). Indeed, Kingston (2002) actually goes so far as to suggest that speaker “altruism” plays a role in the acoustic dispersion of phonological values.

By contrast, a number of scholars, among them Martinet (1952), Vincent (1978), Ohala (1981), Labov (1994), Johnson (1997), Bybee (2001), Blevins (2004), Silverman (2006), and Wedel (2006), reassert K’s proposal that the functionally beneficial structural properties of the linguistic system are an emergent consequence of passive diachronic pressures, and in no way whatsoever point to any teleological factors that affect such structures.

## 2.5. CHAPTER FIVE: WORDS

K begins this chapter by remarking how quickly and effortlessly we acquire the words of our language, and suggests that the source of this amazing ability lay in the proposal that “every word is tied to other words by bonds of similarity association” (65). Words are similar to each other in *external* ways (in terms of their phonetic properties) and also in *internal* ways (in terms of their semantic properties): referencing Mill, K writes, “because of a special psychological law, every word is capable both of calling forth in our mind other words to which it is similar and of being called forth by these words” (65). In addition to these “laws of similarity” that affect the mental organization of words, there are “laws of contiguity” which prompt mental associations among words that tend to be contiguous in the speech stream. Thus *horse* and *neigh*, *dog* and *bark*, for example.

*If, as a result of the law of similarity association, words must be stored in our minds into systems or nests, then, because of the law of contiguity, the same words must be arranged into series.* Thus, every word is connected by twofold bonds: by innumerable ties of similarity ... and by equally numerous ties of contiguity with its fellow travelers in every possible kind of phrase. A word is always a member of certain nests or systems of words and at the same time is a member of certain series of words (65)

It is no accident to K that, supposedly, proper nouns are most resistant to memorization (i.e., are most readily forgotten), as these tend to be isolated in terms of both their internal and external properties. And to the extent that foreign loans are not incorporated into the native phonetic and morphological systems – thus decreasing their embeddedness in the system – these too tend to be more poorly remembered.

In addition to the direct ties among words in terms of similarity and contiguity, there are indirect ties as well: if A and B are related concepts or representations, and a and b are the words we use to designate these, respectively, then, even if a and b bear no direct associations, they are nonetheless indirectly associated due to the relatedness of A and B. Again referencing Mill, “Thus, *the two laws of association have the same significance for linguistics as they do for psychology.* And this is understandable: a word only exists in the human spirit, and everything which exists in the human spirit is subject to these laws” (68).

Here, K takes a step back. He observes that language in its ideal state possesses a one-to-one correspondence “*between the world of words and the world of ideas*” (68). And although language never achieves this one-to-one match-up, there are usage-based pressures that prompt movement toward this idealized state, and others that prompt movement away from it. It is these pressures that K turns to next.

## 2.5.1. Laws of Similarity, Laws of Contiguity, and Connectionism

K’s *laws of similarity* (phonetic and semantic) and *laws of contiguity* (which prompt the mental association of words that tend to be contiguous in the speech stream) establish a highly structured associative network of elements that language users exploit in their acquisition and use of lexical forms. Thus, whereas Chomsky places the generative ability of language users at an intrinsic mental – even genomic – level completely independent of the “systems and nests” that characterize the extrinsic properties of linguistic structure, K proposes that the extrinsic structural organization of language actually drives the generative capacity.

Such an approach is far closer in spirit to connectionist models of learning, including (neural) networks, spreading activation, and probabilistic learning as factors in ontogenetic representational change. A fine overview of connectionist thought may be found in Elman et al., 1997. See also the Cohort Model of Marslen-Wilson (1987).

*Short Biography*

Daniel Silverman is the author of *Phrasing and Recoverability* (Garland 1997), *A Critical Introduction to Phonology: Of Sound, Mind, and Body* (Continuum 2006), and *Neutralization (Rhyme and Reason in Phonology)* (Cambridge University Press 2012). He has also published widely in journals, including *Language*, *Journal of Linguistics*, *Phonology*, *Laboratory Phonology* (series), and *Phonetica*, among many others.

*Acknowledgement*

For their support and their generosity of spirit, I extend my sincere thanks to Arleta Adamska-Sałaciak, Wayles Browne, Joanna Radwanska-Williams, and to Helen Ashton and Cathie Ringen.

*Note*

\* Correspondence address: Daniel Silverman, San José State University, One Washington Square, San Jose, CA 95192-0093, USA. E-mail: daniel.silverman@sjsu.edu

*Works Cited*

- Adamska-Sałaciak, Arleta. 1996. Language change in the works of Kruszewski, Baudouin de Courtenay, and Rozwadowski. Motiwex: Poznan.
- Bach, Emmon, and R. T. Harms 1972. How do languages get crazy rules?. *Linguistic change and generative theory*, ed. by R. Stockwell and R. Macaulay, 1–21. Bloomington: Indiana University Press.
- de Courtenay, Baudouin, and Jan Niecisław. 1888–1999 (2005). *Mikołaj Kruszewski, his life & scholarly work*. Vol. 6, Trans. Wayles Browne, Krakow: Analecta Indoeuropaea Cracoviensia.
- Berezin, Fedor M. 2001. Mikołaj Kruszewski and 20th century linguistics, Towards a history of linguistics in Poland: from the early beginnings to the end of the 20th century, ed. by K. Koerner and A. Szwedek, 209–31. Amsterdam and Philadelphia: John Benjamins.
- Blevins, Juliette. 2004. *Evolutionary phonology: the emergence of sound patterns*. Cambridge: Cambridge University Press.
- Browman, C. P., and L. Goldstein. 1986. Towards an articulatory phonology. *Phonology yearbook 3*, ed. by C. Ewen and J. Anderson, 219–52. Cambridge: Cambridge University Press.
- , and ———. 1989. Articulatory gestures as phonological units. *Phonology 6*. 201–51.
- Bybee, Joan. 2001. *Phonology and language use*. Cambridge: Cambridge University Press.
- de Boer, Bart. 2001. *The origins of vowel systems*, Oxford: Oxford University Press.
- Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York: Harper and Row.
- Darwin, Charles. 1859. *The origin of species by means of natural selection*. London: John Murray.
- Donegan, Patricia J., and David Stampe. 1979. The study of natural phonology. *Current approaches to phonological theory*, ed. by D. Dinnsen, 126–73. Bloomington: Indiana University Press.
- Elman, Jeffrey, Elizabeth A. Bates, Mark H. Johnson, Annette Karmiloff-Smith, Domenico Parisi, and Kim Plunkett. 1997. *Rethinking innateness: a connectionist perspective on development*. Cambridge, MA: MIT Press.
- Hyman, Larry, and Russell Schuh. 1974. Universals of tone rules: evidence from West Africa. *Linguistic Inquiry 5*. 81–115.
- Jakobson, Roman, Gunnar Fant, and Morris Halle. 1952. *Preliminaries to speech analysis*. Cambridge, MA: MIT.
- Johnson, Keith. 1997. Speech perception without speaker normalization: an exemplar model. *Talker variability in speech processing*, ed. by K. Johnson and J. W. Mullennix, 143–66. New York: Academic Press.
- Jun, Jongho. 1995. *Perceptual and articulatory factors in place assimilation: an optimality theoretic approach*. UCLA: PhD dissertation.
- Kingston, John. 2002. Keeping and losing contrasts. *Proceedings of the 28th Annual Meeting of the Berkeley Linguistics Society*. ed. by J. Larson and M. Paster, 155–76. Berkeley: Berkeley Linguistics Society.
- , and Randy L. Diehl. 1994. Phonetic knowledge. *Language 70*. 419–54.
- Kiparsky, Paul. 1968. Linguistic universals and linguistic change. *Universals in linguistic theory*, ed. by E. Bach and R. T. Harms, 170–202. New York: Holt, Reinhart, and Winston.
- Kirchner, Robert. 2004. Consonant lenition. *Phonetically based phonology*, ed. by B. Hayes, R. Kirchner and D. Steriade, 313–45. Cambridge: Cambridge University Press.

- Kruszewski, Mikołaj. 1881 (1995). On sound alternation. reprinted 1995 *Writings in general linguistics*, ed. by K. Koerner, 7–35. Amsterdam Classics in Linguistics 11. Amsterdam: John Benjamins Publishing Company.
- Kruszewski, Mikołaj. 1883 (1995). *Očerk Nauki O Jazyke (An Outline of Linguistic Science)*. *Writings in general linguistics*, ed. by K. Koerner, 43–173. Amsterdam Classics in Linguistics 11. Amsterdam: John Benjamins Publishing Company.
- Labov, William. 1994. *Principles of linguistic change*, vol. 1: internal factors. Oxford: Blackwell.
- Lamarck, J.B. 1809. *Zoological philosophy: an exposition with regard to the natural history of animals*.
- Lieberman, Alvin, F. S. Cooper, D. P. Shankweiler, and M. Studdert-Kennedy. 1967. Perception of the speech code. *Psychological review* 74. 431–61.
- Lieberman, Alvin M., and Ignatius G. Mattingly. 1985. The motor theory of speech perception revised. *Cognition* 21. 1–36.
- Lieberman, Mark. 2002. Simple models for emergence of a shared vocabulary. Paper presented at Laboratory Phonology VIII. New Haven, CT.
- Lyell, Charles. 1830, 1832, 1833. *Principles of geology, being an attempt to explain the former changes of the earth's surface, by reference to causes now in operation*. London: John Murray.
- Marslen-Wilson, William D. 1987. Functional parallelism in spoken word-recognition. *Cognition* 25. 71–102.
- Martinet, Andre. 1952. Function, structure, and sound change. *Word* 8(1). 1–32.
- McCarthy, John. J. 1999. Sympathy and phonological opacity. *Phonology* 16. 331–99.
- Ohala, John J. 1981. The listener as a source of sound change. *Papers from the parasession on language and behavior*, ed. by C. S. Masek, R. A. Hendrick and M. F. Miller, 178–203. Chicago: Chicago Linguistic Society.
- Prigogine, Ilya, and Isabelle Stengers. 1984. *Order out of chaos*. Toronto: Bantam.
- Radwańska Williams, Joanna. 1993. A paradigm lost: the linguistic theory of Mikołaj Kruszewski. *Amsterdam studies in the theory and history of linguistic science series III: studies in the history of the language sciences*. Amsterdam/Philadelphia: John Benjamins.
- . 1996. Kruszewski's semiotics. *Multiple perspectives of the historical development of language*, ed. by K. R. Jankowsky, 153–9. Münster: Nodus.
- . 2002. The Polish tradition in linguistics. *Historiographica Linguistica* 29(3). 391–430.
- . 2006. Examining our patrimony. *Historiographica Linguistica* 33(3). 357–90.
- Silverman, Daniel. 2006. *A critical introduction to phonology: of sound, mind, and Body*. London/New York: Continuum Books.
- . 2012. Mikołaj Kruszewski: theory and vision (part two). *Language and Linguistics Compass* 6(5). 296–309.
- Steels, Luc. 2000. Language as a complex adaptive system. *Lecture notes on computer science. Parallel problem solving from nature*, ed. by M. Schoenauer, K. Deb, G. Rudolph, X. Yao, E. Lutton, J. Julian Merelo and H.-P. Schwefel, 17–26. PPSN-VI. Berlin: Springer-Verlag.
- Steriade, Donca. 2001. *The Phonology of perceptibility effects: the P-map and its consequences for constraint organization*. UCLA, ms.
- Stevens, K. N. 1972. The quantal nature of speech: evidence from articulatory-acoustic data. *Human communication: a unified view*, ed. by E. E. David Jr., and P. B. Denes, 51–66. New York: McGraw-Hill.
- Vincent, Nigel. 1978. Is sound change teleological?. *Recent developments in historical phonology*, ed. by J. Fisiak, 409–30. The Hague: Mouton.
- Wedel, Andrew B. 2004. *Self-organization and categorical behavior in phonology*. Santa Cruz, University of California: PhD dissertation.
- . 2006. Exemplar models, evolution and language change. *The Linguistic Review* 23. 247–74.