Rethinking Introductory Linguistics

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0 Introduction

Teaching the entry-level introductory course of any discipline presents both unique challenges and special opportunities. On the one hand, there is the core challenge of leading a new generation of students into a new subject matter, finding a path that is logically sound, intellectually vital and personally engaging. Concurrently, there is the special opportunity to revisit fundamentals – basic data, core assumptions, biggest ideas, and larger narratives. Introductory courses invite instructors to reconsider whether traditional divisions of the subject matter remain conceptually sound and/or pedagogically appropriate, whether material perhaps long viewed as central hasn't in fact become ancillary, with new content assuming a more important place; whether new framing concepts have arisen that offer a more unified narrative arc for the topic choices, and so on. For linguists involved with efforts to introduce linguistics into High Schools (Ginsberg et al 2011; Denham and Lobeck. 2010; Lidz and Kronrod 2014; Loosen 2014; Mulder 2007; O'Neil 2007, 2010; Plackowski 2020; Stewart and Kuhlemann Cárdenez 2010), these questions assume a special force. They are part of the larger question of what a compelling and appropriate introductory curriculum should be for a new audience of 21st century linguistics students.

This article reports on a project at Stony Brook University begun in the latter context. The author, former chair the Linguistics Society of America's AP Linguistics Committee, together with a small set of professional colleagues and a network of US teachers, are considering curricula for a one-semester or one-year, introductory linguistics course appropriate for upper-level High School students (11th & 12th grade). The specific goal of the Rethinking Introductory Linguistics (RIL) project is to create a template introductory linguistics curriculum for a High School honors course. In pursuing this project, ideas have emerged that suggest a significant reframing of the intro curriculum. These ideas have relevance, I believe, for the teaching of introductory linguistics generally, including as the college/university level, although I emphasize that the discussion below is not to be understood as prescriptive in any sense. RIL is presented as simply one possible (and hopefully interesting) way of reframing introductory linguistics.

In section 1, I sketch the core content of RIL and how it was determined. In section 2, I very briefly note the design framework that RIL adopts. In sections 3 and 4, I outline the two framing concepts of the RIL curriculum – Human Language and human languages – and the major ideas and essential questions organizing this content. In section 5, I compare the curriculum RIL with more standard treatments of the subject matter. Section 6 summarizes the major change in outlook.

1 RIL Content

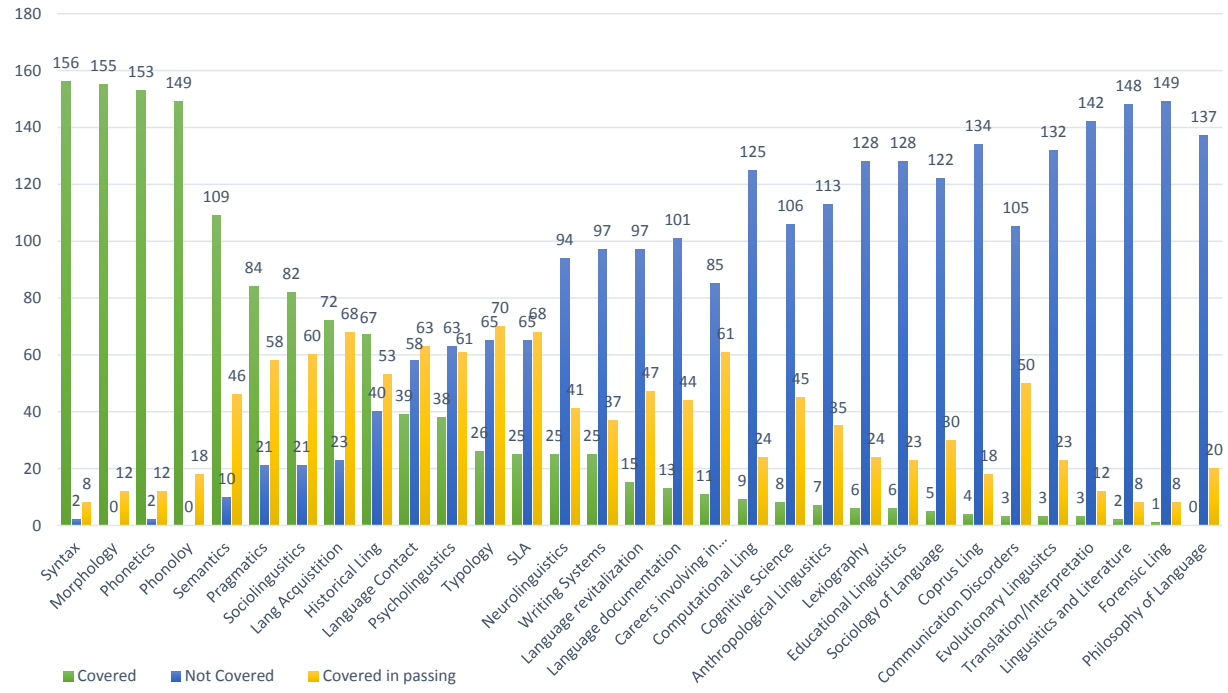
Upper-level high school honors courses are often intended to give college-bound students experience with college level subject matter, and thus often align in coverage and approximate level with college-level offerings. In creating an honors introductory linguistics curriculum, a natural starting point for RIL was to examine the content and approximate level of college level

introductory linguistics courses.

In many STEM and social sciences fields, introductory course content at the college level is highly standardized, allowing alignment of the kind just discussed. Introductory calculus courses universally cover functions, infinite series, limits, derivatives, integrals, etc. Introductory physics courses (or course sequences) universally cover kinematics, optics, electricity, magnetism, thermodynamics, etc. In the nearly 100 years since the appearance of Bloomfield's *Language*, arguably the first modern introduction to the field, many introductory linguistics textbooks have appeared, and continue to appear. The RIL project considered the question of whether something like a standardized curriculum for introductory linguistics courses had in fact emerged in this period.

In 2018, the Linguistics in Higher Education Committee (LiHEC), a standing committee of the Linguistic Society of America (LSA), surveyed approximately 180 linguistics departments, programs and instructors in the U.S. to determine the content of their introductory linguistics courses. The results showed a significant degree of uniformity as depicted in Figure 1 (due to Gailynne Clements of LiHEC).

Figure 1 – Introductory Linguistics: Topics Covered/Not Covered/Covered in Passing



According to the LiHEC survey, syntax/morphology/phonetics/phonology are covered in 80% or more of intro linguistics courses. Semantics is covered in more than 60% of intro linguistics courses. Pragmatics/sociolinguistics/language acquisition/historical linguistics are covered in 40% or more courses. After that, topic coverage becomes more variable, dropping to 20% or lower.

The distribution in Figure 1 is unsurprising in broad respects. In the United States, the modern field of linguistics derives from mid-20th century American structuralism, which, as its

name implies, took analysis of language structure to be the core of the discipline. American structuralism identified phonetics, phonology, morphology and syntax, as the key structural "parts," "components," "building blocks," "levels," "layers," "strata," etc. of a language. In privileging these areas, the modern curriculum can be seen as retaining the focus on language structure of its intellectual predecessor. Interestingly, semantics and pragmatics were not regarded by American structuralism as components of structural linguistic description proper. But in the last fifty years, particularly with the growth of formal semantics, there has been a dramatic shift of view so that semantics is now widely regarded as a core area for any linguistics department or program. The significant presence of semantics/pragmatics in Figure 1 presumably reflects this. Of the three remaining areas, historical linguistics/philology is a traditional subarea of linguistics, predating American structuralism, and presumably retaining its place in the curriculum due to the intrinsic interest of language histories and language origins, and because the charting of human linguistic history represents one of the enduring achievements of the field – indeed, one of the great intellectual triumphs of the 18th and 19th centuries. Finally, the core status of language acquisition and sociolinguistics also appears to reflect post-Structuralist developments. The period after *Aspects of the Theory of Syntax* (Chomsky 1965) saw a dramatic expansion of research into 1st and 2nd language acquisition due to the increasingly central role of notions like "explanatory adequacy," "poverty of the stimulus," and the "logic of language acquisition" in the development of generative grammar. Language acquisition is now widely regarded as a core domain of inquiry into the nature of human language. Likewise, the dramatic successes of Labov and his collaborators during the 1960s-70s in documenting and describing linguistic variation as it relates to "language change in progress" has propelled sociolinguistics to the forefront of linguistic description and research.

The RIL project regards the 9 content areas identified by the LiHEC survey with 40%+ national coverage as plausibly constituting the "core" of introductory linguistics as defined by contemporary U.S. teaching practice. As such they represent content with which a template honors High School linguistics course might reasonably align.

2 Curriculum Design Framework

K-12 curricula are typically developed within a specific design framework, often mandated by a school or school district. Currently popular with many U.S. teachers, education schools and administrations is "Understanding by Design" (UbD), which emphasizes "teaching for understanding" and "backwards design" (Wiggins and McTighe 2005).[1] UbD advocates a 3-step development cycle wherein curriculum designers begin in step 1 with the broadest questions about their goals, including:

- What should students know, understand, and be able to do as a result of the curriculum?
- What enduring meanings should they have created for themselves?
- What essential questions will be explored in-depth and provide a focus for all the learning?

In step 2, developers consider what kinds of "authentic performances" by learners, whether

[1] UbD is the framework employed by the College Board for the design of all of its AP curricula and exams.

guided or autonomous, would provide evidence of having met these goals. What assessments, in the widest sense, would show that students had internalized the desired content, mastered the desired skills, achieved the desired understandings, constructed the desired meanings, reflected thoughtfully on the essential questions? Finally, and only in the 3rd step, developers consider the question of content. What instructional materials and events are appropriate to prepare students for the assessments identified in the 2nd step that will confirm their having met the learning goals identified in the 1st step? This cycle is indeed "backwards" from the standpoint of much college/university course delivery, wherein the instructor often begins with course content in the form of a textbook, parcels out that content among the weeks of an academic semester or quarter, decides upon some periodic schedule of exercises, quizzes and exams to assess uptake, and typically considers learning objectives only in context of constructing a syllabus, and perhaps then only because such information is required to appear in syllabuses by college or university administrations.

Given its target audience, RIL development has followed a UbD model. Below I sketch the conceptual framing of RIL in terms of its big ideas and essential questions that "spiral" through the full curriculum or some sub-level of it.[2] The largest organizing idea of RIL is its dual outlook on the subject matter of linguistics as concerning both Human Language (capital "H", capital "L") and human languages (small "h", small "l").

3 Human Language

In the course of maturation, humans develop a physical structure that enables bodily life and interaction with the world, including locomotion, intake of air and food, visual, auditory and tactile perception of surrounding objects, among many other things. Despite superficial diversity, humans exhibit a common physical body plan whose features – specific tissues and other structural components, internal functioning and interactions with other systems – are the result of shared human genetics. This commonality permits us to speak meaningfully of "the Human Musculo-skeletal System," "the Human Circulatory System," etc., and not just of the individual anatomical systems of individual humans.

Likewise, humans develop a cognitive structure that enables mental life and interaction with the world, including thinking, planning, visualization, self-expression, communication with other humans, unique & shared social identity, among many other things. And likewise, despite superficial diversity, all humans exhibit a common, "cognitive body plan" that includes an auditory system, a visual system, and a linguistic system, whose shared features – specific components, their internal functioning and their interactions with each other - are also presumably the result of shared human genetics. This commonality permits us to speak meaningfully of "the Human Linguistic System" or "Human Language", and not just of the individual linguistic systems of individual humans. Essential questions that arise with the Human Linguistic System/Human Language, include at least the following:

[2] UbD design templates specifying essential questions, key features and concepts, and formative and summative assessments for each major RIL topic area are included in the appendix.

1. What is the nature of this cognitive subsystem?
2. What are its subparts, how do they function individually, and how do they interact with each other and with other systems of human cognition?

The answers adopted by RIL are those broadly adopted within the tradition of generative grammar (Chomsky 1957, 1965):

1. Human Language is part of our common biological "human nature". It is a "natural object" which, like many natural objects, is used by humans for cultural purposes.
2. Human Language itself is a cognitive capacity – a mental "tool box" – allowing individuals to create systems of linguistic expressions (henceforth "linguistic systems").
3. A linguistic system is a formal structure of elements (technically, an algebra) whose atoms and products are linked to articulations and conceptual content.
4. "Human Linguistic Anatomy" comprises the three subsystems corresponding to the three aspects of linguistic expressions: combinatorics, articulation and content.

3.1 Human Language as a "Natural Thing"

The realization that language is a natural thing – a part of biologically determined "human nature" – arose only midway through the 20th century with the work of Lenneberg (1967) and Chomsky (1965). Prior to that point, language had been widely regarded as a human "discovery" or cultural "invention" similar to the making of tools, the domestication of animals, the discovery of agriculture, or the invention of writing.

One source of the "cultural invention" view is doubtless the overly close association often drawn between spoken and written language – the idea that these are just alternative versions of the same thing in different media: sound vs orthography. Since writing, like tool-making, quite definitely was a human invention, arguably occurring only three times independently in human history, it's an easy misstep to take spoken language as an antecedent version of the same invention made with writing.

A separate source of the "cultural invention" view is more subtle. Although natural structures and capacities are quite different from cultural inventions and practices, humans don't keep them apart. Humans constantly make cultural use of natural things. Thus, human skin, the layer of tissue forming the outer covering of human bodies, is a biological structure formed in the course of embryological growth. Nonetheless, humans do many things to and with skin as part of their specific cultural practices, including inking it (tattooing), scarifying it (cicatrization), lightening it (bleaching), darkening it (tanning), painting it (make-up), even making artifacts with it.

Analogously, human language is a biologically-based "mental structure" that develops in the normal course of human growth. As with skin, humans do many things with language as part of their specific cultural practices, including telling stories, making poetry, keeping historical or financial records, creating songs, making people laugh, performing ceremonies, forming communities, among countless other things. Indeed, the specific sounds that spoken languages adopt in their phonological inventories, and the many words that individual cultures create for their community to delineate emotions, social relations, environment, spirituality,

science – are arguably cultural things. They embody specific distinctions that humans draw within their vocal and cognitive "spaces" using their natural capacity for human language. In all these cases, humans are using a natural structure or capacity to produce a cultural product. And since the products are plainly cultural, it's an easy mistake to conclude that the material or capacity itself – Human Language – is a cultural product as well. But it is a mistaken – just as it's a mistake to think that because humans can use their hands to fashion diverse cultural products, human hands themselves are cultural products. Human Language, like the human hand, is a natural thing.

The "naturalistic" perspective on language is one of the most profound and fundamental developments in modern linguistic science, affecting thinking on the most basic questions. Examine the two objects shown in Figure 3, one of which is an awl and the other an ice pick. Which is which?

Figure 2 – Cultural Objects

Both are tools with a wooden handle and a metal shaft ending in a sharp point. Intuitively, both could be used for either task. What then makes them one thing rather than the other, and hence described differently? The only answer seems to be: the use their maker intended. Their identity doesn't lie in their parts, materials or structure, but rather in their intended function. With cultural objects or artifacts, what an object is = what it was intended to be by its creator, and not infrequently this is its only means of identification.

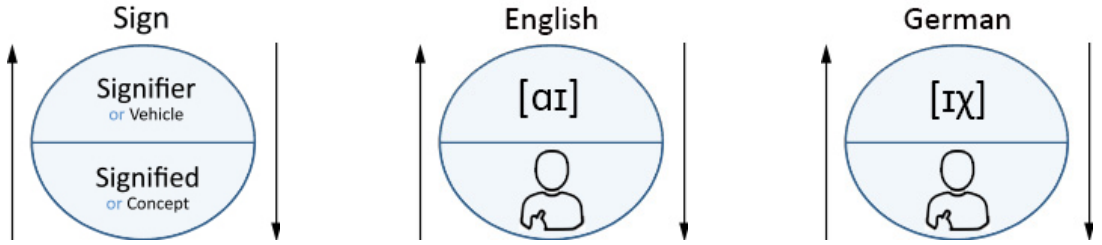
With natural things, "What is it?" questions have a very different answer. Even though hands can be used for many different things – to grasp a cup, push a button, poke someone in the ribs, shake someone's hand, wave goodbye, make an obscene gesture – this is not what hands are. What a hand is, as any dictionary will attest, is the end portion of the arm beyond the wrist, including the palm, fingers and thumb. The identity of hands, like other natural objects, is a matter of their parts, materials and structure. This same point can be made about human language. In answer to the question, what is a language? one will sometimes hear, "A language is a communication system". But if language is a natural thing, this answer is like identifying a hand as a "cup-grasping appendage". Communication is certainly something languages can be used for, but it's not what languages are. As a natural thing, a language is defined by its parts, materials and structure. And what a language is is a mental system of linguistic expressions.

3.2 Linguistic Expressions

Saussure (1916/1959) famously analyzed linguistic expressions as signs, which he conceived as the mental fusion of a signifier (or vehicle) with a signified (or concept). Saussure asserted the

connection between the two components to be arbitrary in both directions, allowing for the variation seen across languages in expressions with the same sense (Fig-1).[3]:

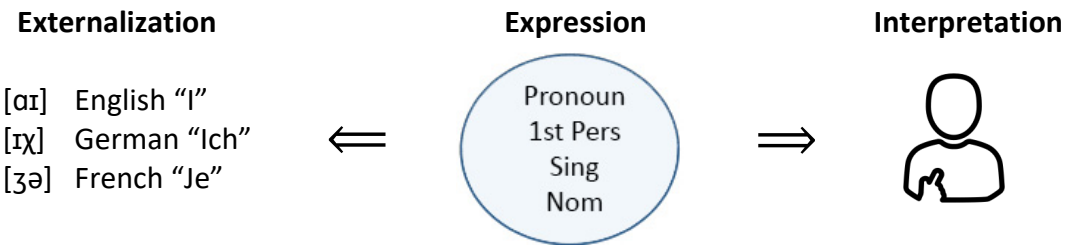
Figure 3 - Linguistic Expressions: Saussurean View



Saussure's view of the sign is often termed "semiotic" since it takes the linking of form and meaning to constitute the essence of linguistic expressions.

But while Saussure's semiotic analysis captures important features of linguistic expressions, it is also incomplete, as any dictionary will confirm. In addition to articulation and meaning, linguistic expressions possess formal grammatical properties. These include part of speech, case features (nominative, accusative, etc.), agreement features (person, number, gender, noun class, definiteness, etc.), tense features (past, non-past), aspectual features (perfect, imperfect), co-occurrence features (intransitive, transitive), among many others. These properties crucially concern the combinatory possibilities of expressions – how they join together to form larger expressions. In fact, more modern conceptions of the linguistic sign, following Chomsky (1965), focus on the very material that Saussure omitted – the grammatical information. These views see the latter as primary, with connection to externalization – Saussure's signifier/vehicle – and interpretation – Saussure's signified/concept – secondary and secured by independent mapping or linking rules (Fig-4). The latter once again allow for the variation in form/meaning association seen across languages.

Figure 4 - Linguistic Expressions: Modern View



The modern view thus takes the essence of linguistic expressions to lie, not in their signification – their fusion of externalization and concept, but rather in their combinatorics: how they join with other linguistic expressions to form larger units. It is precisely grammatical information that encodes these combinatory possibilities.

[3] Related ideas were proposed contemporaneously by Charles Sanders Peirce.

3.3 "Linguistic Anatomy"

The modern three-fold parse of linguistic expressions – the expression proper, its externalization, and its interpretation – yields a corresponding three-fold parse of "Human Linguistic Anatomy" – its basic functional subdivisions. Following ideas by Chomsky (2005,2016) RIL identifies:

1. A Subsystem of Expressions and Expression-building
2. A Subsystem of Externalization
3. A Subsystem of Interpretation

This constellation of topics may be understood as comprising a major subunit on "Language Structure". We describe each of 1-3 briefly below, returning in more detail when we compare RIL to more standard approaches.

3.3.1 Language Structure: The Subsystem of Expressions and Expression-building

Linguistic expressions come in various "sizes," ranging from the smallest units or "atoms" – bound and free morphemes – to larger complexes including words, phrases, sentences and complex clauses. RIL adopts the largely traditional view that expression-building involves two different kinds of outputs, words and sentences. But it views them both as produced by a single, unified set of operations applied to a common substrate. More figuratively, the subsystem of expressions is taken to constitute a single "shop," employing a single set of building-materials and a fixed inventory of operations to construct two different kinds of products serving two different cognitive functions. Words (simple or complex) are expressions serving the basic cognitive function of categorization: the organizing of experience by classifying entities into larger, abstract groups. As Lenneberg (1967) puts it, "words label categorization processes." Sentences are (complex) expressions serving the cognitive function of representation: the portrayal of entities as being of a certain nature or in a certain state, as having certain properties, or as standing in certain relations to certain other objects. As Wittgenstein (1922/1961) succinctly states it, sentences "picture" a world.[4]

All expression-building, whether of words, phrases or sentences, creates hierarchically structured, labeled objects, typically represented as trees, whose form and labeling reflects the combinatory properties of their constituent expressions. This structure and labeling determine how expressions are externalized and how they are understood.

RIL identifies the following essential questions regarding human linguistic expression-building that students should (re)consider throughout the semester:

[4] A potential analogy here is a wood shop, which contains a specific building material (wood), tools for working it (saws, drills, planes, hammers, glues, etc.), and techniques and operations optimized in the same way across all wood-working (e.g., planing, sawing, joinery, etc.). A single wood shop can produce both bookcases and sailing dinghies, using the same materials and operations, and with good/optimal wood-working amounting to the same. Nonetheless, bookcases are not vessels and sailing dinghies are not furniture. In the first case, the wood shop produces objects intended for the domain of "habitation," in the second case, it produces objects intended for the domain of "conveyance by water".

1. What is a linguistic expression? What are expressions made of?
2. How are expressions built up, and from what kinds of parts?
3. What is the relation between the formal features of an expression, its externalization, and its meaning?
4. What is the relation between word-building and sentence-building?

3.3.2 Language Structure: The Subsystem of Externalization

Human Language is not a purely internal algebra of symbols, involved in private, wholly mind-internal processes, operations and calculations. Human expression-building is linked to a system by which its products are externalized and made potentially perceptible to ourselves and others.[5] In broadest terms, externalization pairs a production system creating bodily movements with a perceptual system appropriate for detecting those movements. For the vast majority of humans, this pairing is oral−aural; words, phrases and sentences of language are vocalized by speakers and (primarily) heard by listeners. However, some human populations, even speaking ones, deploy alternative pairings, including manual-visual, manual- tactile, and oral-tactile ones. In these systems, the expressions of language are signed−seen, signed−felt, or vocalized−felt, respectively (see Table 1).

Table 1. Human Language Production-Perception Pairings

Perception / Production	Hearing	Vision	Touch
Vocal	Spoken Language	Lip-reading	Tadoma
Manual	——	Visual Sign Language	Protactile Sign Language

Linguistics has gained important insights into Human Language by the study of alternative externalization "channels". It is becoming increasingly clear that, despite the ubiquity of spoken language, Human Language itself is neither simply, nor perhaps even fundamentally, a "speech system," but instead something considerably more general, more flexible and more abstract.

Externalization provides perceptible bodily movements (or suites of them) as correspondents of expressions. The average native speakers is estimated to know 10-15,000 words, of which, on average for any language, 4% are homophones (e.g., *coach* 'sports trainer' vs. *coach* ('bus'), *bat* 'sports equipment' vs. *bat* 'flying mammal', etc.) (Trott and Bergen 2020).

[5] The term "externalized language" is naturally construed as referring to expressions made "public" or "publicly perceivable." And in many cases humans do, of course, externalize expressions publicly, for example, when communicating with others via words and gestures, or when speaking aloud in trying to clarify thoughts, recollect a past conversation, or simply vent one's emotions. Nonetheless, it is important to note that the large bulk of externalized language, no matter the channel, is entirely "silent" – internal monologue or self-directed dialogue – with no public indication at all. See Fernyhough 2016 for extensive discussion.

This means that, on average, native speakers of any language know 9,600 – 14,400 distinct word forms. To accommodate these expressive demands, languages typically identify a small set of distinct articulatory elements (sounds, gestural features), and construct distinct correspondents of expressions (words, manual signs) from combinations of them. Human languages are therefore typically "doubly articulated" (Martinet 1960), insofar as both expressions and their externalizations are composed of smaller elements (morphemes and phonemes, resp.).

RIL identifies the following essential questions regarding human externalization that students should continue to (re)consider throughout the semester:

1. How are human linguistic expressions externalized and perceived?
2. How are externalizations constructed and from what parts?
3. What is the relation (if any) between the structure of expressions and the structure of their externalizations.
4. What is the relation between the externalization of an expression and its meaning?

3.3.3 Language Structure: The Subsystem of Interpretation

Human linguistic expressions are "psychoactive"; they affect the thoughts of their speakers/signers and those around them.[6] More simply, they have meaning. An attractive approach to meaning proceeds "wholistically" from the various things that humans convey when they speak or sign, subdividing this among:[7]

- What they assert
- What they entail
- What they assume (or presuppose)
- What they suggest (or implicate)
- What they do (i.e., what "speech act" they commit)

Some of this conveyed content is explicit, "on the table," and up for challenge or discussion (assertions, entailments). Other content is implicit, and "off the table" and only challengeable by meta-linguistic moves (presuppositions, implicatures). Some is tied by convention to the expressions or constructions employed (most asserted and entailed content, presuppositions, speech acts involving performatives); other is nonconventional and calculated online from the context situation (assertion involving context-dependent items, implicatures, speech acts with constatives). The Subsystem of Interpretation can be seen as responsible for the mapping of expressions to content of the various kinds.

The core notions of reference, truth and predication, which form the basis of modern logic, play the central role throughout the domain of Interpretation, figuring not only in the conventional content associated with assertion, entailment and presupposition, but also in implicature, for example, through the Gricean Maxims of Quality and Quantity, and in

[6] Even speech or gesture whose content we can't decipher generates recognition as human language and as such quite distinct from noise or other bodily movement.

[7] I am grateful to William Ladusaw (p.c.) for this framing.

understanding the content of various categories of speech acts, for example, that a directive instructs the addressee to make something true, that a commissive obligates the speaker to making something true, etc.

RIL identifies the following essential questions regarding human language interpretation that students should continue to (re)consider throughout the semester:

1. How are expressions interpreted, both alone and in context?
2. How are the interpretations for various expressions (simple & complex) computed, from what parts, and according to what principles?
3. What is the relation between the structure of an expression and the various aspects of content associated with it?

4 Human Languages

From the standpoint of biology, humans comprise a single population. But like other primates, humans readily (perhaps instinctively) subdivide themselves into smaller subpopulations based on features of physical appearance, mental and social life, and so on. Among the key group-individuating features for humans are specific aspects of their linguistic systems. These interact with other human group-forming mechanisms to produce subpopulations of speakers associated with "languages," "language varieties," "dialects," etc.

As discussed by Anderson (2010), individuation and classification of languages and language varieties in linguistics is parallel in key respects to individuation and classification of species and subspecies in biology. A species can be defined, on a first pass, as a genetically similar population of organisms that exchange genes and interbreed fertilely. A language can likewise be defined, on a first pass, as a linguistically similar population of speakers that exchange thoughts and communicate intelligibly. Key to both definitions, however, is the existence of a "community" practicing active exchange. Species are not simply sets of individual organisms with genomes similar enough to support fertile interbreeding; species presume a "genetic community" that is behaviorally defined. Lions and tigers can be interbred by artificial means to produce "ligers", which are interfertile with each other and their parent populations. But this fact alone does not constitute lions and tigers (and ligers) as one species. Lions and tigers live in different geographical areas and can't interbreed. More the point, when brought together they <u>don't</u> interbreed. They do not spontaneously form a single genetic community. Presumably, morphological differences (body size, coloration, pelage, etc.) and behavioral differences (tigers "chuff" in greeting offspring and mates; lions don't) conspire to make them identify each other as "different" and isolate accordingly.

In a similar way, languages are not simply sets of individual speakers with individual internal languages similar enough to support meaningful communication; languages presume a "linguistic community". Two populations of speakers may be sufficiently alike in their vocabularies and grammars to be able to communicate meaningfully and fluently, but also sufficiently distinct in specific linguistic forms and other behaviors so as to dispose their members not to do so. The Hindi and Urdu speaking populations of India and Pakistan, respectively, and the Serbian and Croatian speaking populations of the former Yugoslavia, are

well-known examples. Despite a very high degree of mutual intelligibility, minor linguistic differences, plus associated cultural/behavioral differences of religion, writing system, etc. combine to dispose these populations to isolate from each other and to form distinct "linguistic communities" rather than a single one. Accordingly, Hindi and Urdu, Serbian and Croatian constitute separate languages.[8]

There are many other important species-language parallels. Species play an essential role in biological description. They are the basic unit of both taxonomic and phylogenetic classification – how groups of organisms are related contemporaneously, and how they are related historically/evolutionarily, respectively. Biological diversity is assessed in terms of numbers and types of extant species. Extinction events are described in terms of the disappearance of species, and species threatening to go extinct are described as "endangered". Languages play the same central role in linguistic science. The language is the basic unit in the description of how populations of speakers are related contemporaneously and historically. Likewise, we assess linguistic diversity in terms of numbers and types of extant languages, and we describe their precariousness and eventual disappearance in terms of language "endangerment" and "extinction".

Essential questions that arise with human languages, conceived as linguistic communities, therefore include:

1. What is a linguistic community?
2. How do linguistic communities (or various sizes) form?
3. How and why does the language of a community change?
4. How do linguistic communities eventually decohere? Can they be reconstituted?
5. What are the relations and interactions between individual linguistic systems and the linguistic communities they belong to?
6. What languages have arisen during human history and what are their biographies and relationships?

RIL addresses these questions in terms of the interaction between three domains, which may be jointly termed "Language Dynamics":

1. Language Growth & Development
2. Language Variation
3. Language Change

In brief, language growth within a linguistic community already characterized by variation yields speakers who generate further variation of their own (sometimes termed "imperfect" or "innovative" learning). Some linguistic variants propagate and become widespread under forces

[8] It's perhaps worth noting that neither species nor languages as discussed here represent "externalist" conceptions in the sense of Chomsky (1986). To my knowledge, no biologist defines a species simply as a collection of existing (or potentially existing) organisms, still less as a collection of specimens in a museum (the equivalent of a finite linguistic corpus). Furthermore, the externalist conceptions of language entertained by structuralists or formal language theorists seem remote, so far as I can see, from the views of the wider public, which typically associates languages with communities of speakers identified by a complex set of historical, geographical, socio-political, etc. factors, much like species.

of “social selection” in the wider community, resulting in their becoming input to later generations of speakers and incorporated into their individual grammars. This yields language change over time – a dynamic relation between individual speakers and their communities. Again, as with species, geographic or social isolation in the presence of change can result in separation and divergence of “exchanging communities,” yielding separate languages. Alternatively, wholesale mixing of hitherto separate linguistic communities can yield hybridization and the emergence of entirely new languages (creolization), forming the nucleus of new linguistic communities.

5 RIL Curriculum and the Standard Curriculum

The six core RIL areas enumerated above align with the nine content areas identified by the LSA survey of US linguistics introductory courses approximately as shown below.

Standard Subareas		**RIL Subareas**
Phonetics Phonology	}	Externalization
Morphology Syntax	}	Expression-building
Semantics Pragmatics	}	Interpretation
Language Acquisition	←	Language Growth & Development
Sociolinguistics	←	Language Variation
Historical Linguistics	←	Language Change

The three RIL subareas of Language Structure correlate with the three standard topic pairs of phonetics/phonology, morphology/syntax, semantics/pragmatics. The three subareas of Language Dynamics correlate with the three standard areas of Language Acquisition, Sociolinguistics and Historical Linguistics. RIL thus aligns with the core areas of introductory linguistics – it “aligns with standards”. Nonetheless, the alignment above is rough and only approximate. The RIL curriculum is a neither a retitling, nor a mechanical re-sorting, of familiar material. How its areas are laid out, points of emphasis within them, and in many cases, the core content itself, is substantially different.

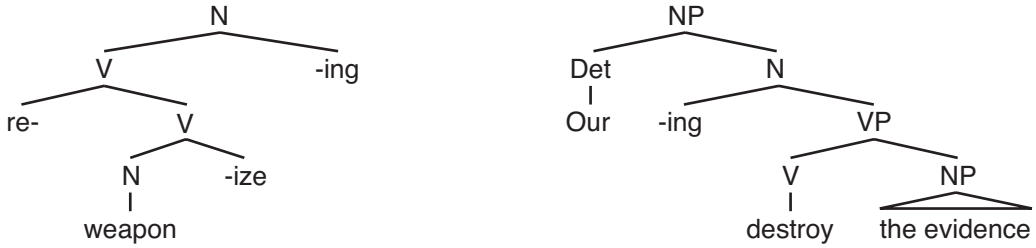
5.1 Expression building vs. Morphology/Syntax

Morphology and syntax are traditionally distinguished as the study of words vs. sentence structure. As noted earlier, words and phrases do seem to execute fundamentally different cognitive functions, with words serving to categorize objects, kinds, events, actions, etc. – to “name” in the broadest sense – and sentences serving to represent world states – to “picture”. There are further empirical differences that appear to correlate with this. Semantic compositionality and rules of prosody are known to apply differently in the two domains. Likewise, words are syntactically and referentially “opaque” (Di Sciullo and Williams 1987).

At the same time, morphology and syntax plainly share many important elements,

concepts, processes and phenomena. Both appear to compose expressions out of the same kinds of units, although proportions differ across languages. Thus, composition with bound morphemes occurs in both word and phrase-building in English, but is more common in the domain of words (Fig-5).

Figure-5 Bound Morphemes in Word- & Phrase-Building



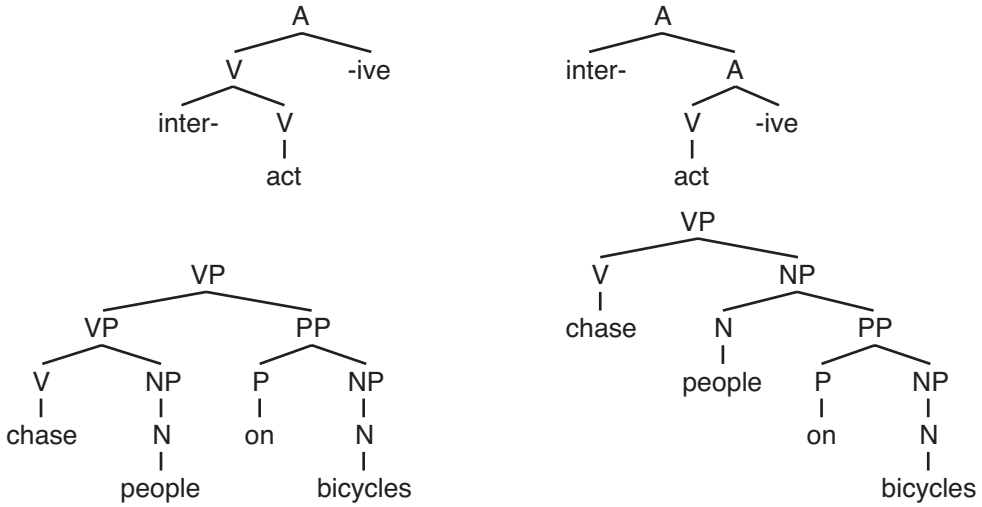
Conversely, composition with free morphemes is found in both domains, but more common in English in the domain of phrases (Fig-6).

Figure-6 Free Morphemes in Word- & Phrase-Building

In other languages, (e.g., Inuit and Mandarin) these proportions are quite different.

Basic notions of merge, constituency, category, order, categorial selection, semantic selection, and structural ambiguity likewise appear to apply nearly identically in derivational word- building and in sentence-building (Fig-7).

Figure-7 Structural Ambiguity in Word- & Phrase-Building



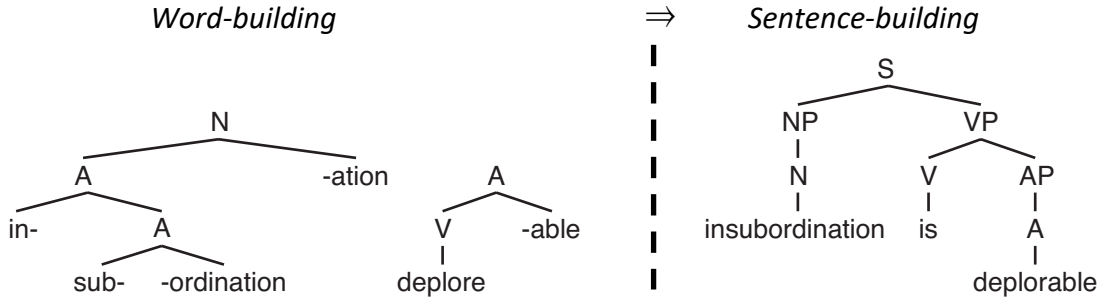
Finally, the notations linguists use to describe structural relations formally – tree diagrams – are virtually identical in the two domains. From a conceptual point of view, it is therefore reasonable to present word-building and phrase-building together as "expression-building".

Presenting the two together also has attractions from a pedagogical point of view. Anecdotally and in formal course evaluations, students often identify syntax as the most challenging content area in an introductory course. They struggle with tasks like category identification, tree diagramming, recognition of selection, etc. Given this, it's natural to exploit conceptual overlaps wherever present to strengthen student grasp of the relevant notions. More fully, it makes sense pedagogically to introduce the key notions of merge, constituency, category, order, categorial selection, semantic selection and productivity initially in a domain-neutral way, and then to "spiral" them into the specific areas of word-building and phrase-building as a strategy of serial reinforcement. This in turn allows instruction to spiral back to the broader notion of linguistic expressions, their combinatorics and constraints, returning to the core issues noted earlier. Are linguistics expressions fundamentally semiotic in Saussure's sense of pairing an externalization concept with a meaning? If so, what is the status of function morphemes (bound and free) and interjections? What is the difference between a simple meaningful gesture, like pointing to oneself with the first and second finger, and the ASL linguistic expression meaning 'I'? Is someone who doesn't know ASL inadvertently speaking ASL when they make the gesture? If not, why not? Is the pairing of externalization and concept arbitrary in a linguistic expression, as Saussure claimed, or can it be motivated? What about sound symbolism in spoken languages and iconicity in signed languages? Is the pairing of externalization and concept necessary to a linguistic expression. Could one have a wholly internal language consisting of symbols that are meaningful and manipulated mentally but never externalized at all? Do we have to "hear ourselves" in order to think?

Finally, having introduced word and sentence-building together as expression-building, we can, of course, raise the question of their relationship. Are words, a separate thing,

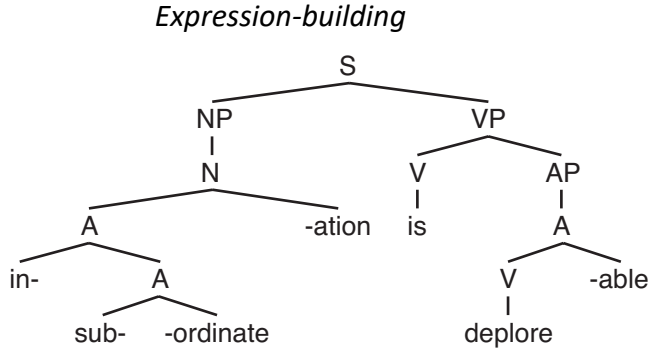
manufactured separately in their own "work space" and shipped to sentence-building as finished, "pre-fabricated" units (Fig-8)?

Figure-8 Words & Sentences in Separate Work Spaces



Or do word- and sentence-building occur together in one common "work space", so that *in-, sub- -ation, -ordination*, and *-able* are not just word components, but also sentence components, and words (as it were) are simply "very small constituents" built along the way (Fig-9)?

Figure-9 Words & Sentences in a Single Work Space



All these fascinating issues (and more) can be raised in the context of an approach like RIL's that takes "linguistic expression" and "expression-building" as its foundational concepts, and doesn't assume the pre-theoretic division of linguistic objects (morphemes, words, phrases, sentences) and composition operations (affixation, phrase-formation) of the standard curriculum.[9]

[9] A shift from morphology-syntax to expression-building does not imply commitment to a theory like Distributed Morphology (DM), which collapses the two into a single domain. As I noted, there are important distinctions between word-building and phrase-building including semantic compositionality, prosody, opacity, etc. The move to expression building is understood as entirely neutral in this regard, compatible with DM, but equally compatible with theories of morphology like that of or Anderson (1992), Aronoff (1994).

5.2 Externalization vs. Phonetics/Phonology

Classical American Structuralism, in part because of its close connection to linguistic fieldwork, regarded phonetics and phonology as the starting point for all linguistic description. The standard introductory linguistics curriculum and its textbooks continue to accord a central role to sound and vocalization. This is reflected in the extensive terminology of "sound inventories", "sound systems", "sound correspondences", "sound change", "sound laws", etc. found in all textbook glossaries. It is also seen in the significant time that introductory linguistics courses routinely devote to the phonation process, IPA symbols & charts, IPA transcription, "solving phonology problems" by reference to IPA chart-related features and classes, and sometimes even attention to acoustic physics and sound spectrographs.

The traditional, "phono-centric" curriculum has long been overtaken by advancing understanding of signed languages, which project human linguistic capacity through a manual/visual channel (in the case of the Deaf) or a manual/tactile channel (in the case of the deafblind), rather than an oral/aural channel. It is becoming increasingly clear that for human language, the latter has no conceptual priority over the former, and that nearly every key concept, process and phenomenon of traditional phonetics and phonology, whether contrast, features, feature hierarchies, feature classes, syllables, syllable structure, tactic constraints, processes (assimilation, dissimulation, epenthesis, etc.) amplitude/loudness, suprasegmental structure, etc., has a counterpart in sign languages. Emerging research is making increasingly clear that the correct framing of the subject matter of what has been called "phonetics" and "phonology", and the correct level of abstraction for discussing it, should factor out language modality and present these elements in a channel-independent way. Nonetheless current introductory textbooks typically cover sign languages only as a side-bar in their phonology-phonetics sections, or as a separate topic area in a discrete chapter. In the author's own department, the undergraduate and graduate introductory courses typically cover manual languages as a separate area delivered in a single lecture during the course of a term. Manual languages remain apart, unintegrated into the core subject matter.

Among its departures from the standard curriculum, perhaps RIL's sharpest is its elimination of phonetics and phonology as discrete content areas for intro linguistics in favor of the broader area of "Externalization". This change entails a sharply reduced emphasis on sound and vocalization and a corresponding new emphasis on the broader notion of "articulation", understood neutrally with respect to oral vs. manual channel. Correspondingly, RIL shifts to speaking neutrally about "parameters of articulation", "natural classes of articulations", "co-articulations" (and constraints on them), "rules of articulation" (rather than "phonological rules"). RIL approach notions like 'amplitude'/'loudness' as neutral between decibel level and intensity of/range of motion, notions like 'syllable' as timing phenomena, notions like 'tactic constraints' as grammaticalized articulatory sequences, etc.

Moving students away from thinking about externalization as sound and toward the broader notion of articulation raises fascinating new questions. For example, much prior research on human language has assumed double articulation – the dual organization of linguistic systems into a combinatory structure of externalizations (phonemes) and a combinatory structure of expressions (morphemes) – to be foundational. Charles Hockett

famously labeled “double articulation” as a “design feature” of human language – one every human language could be expected to show. Nonetheless, recent research has revealed the existence of a sign language without dual articulation, whose discoverers have conjectured that the superior discriminatory power of the human vision vs. audition makes the need for dual articulation unnecessary, at least in the early stages of sign language development (Sandler, Aronoff, Meier and Padden 2011). Focus on externalization therefore offers foundational insight into what is and what isn’t central to human language.

5.3 Interpretation vs. Semantics/Pragmatics

Classical structuralist language description introduced semantics only in the context of lexical meanings recorded in dictionaries. Compositional semantics was unheard of and pragmatics was not recognized at all. This attitude persists in the modern era insofar as many instructors who wouldn’t dream of omitting a phonetics unit from an introductory linguistics course appear comfortable devoting no space to semantics or pragmatics in their syllabus. RIL views semantics or pragmatics as central to the description of linguistic structure, in line with the developing national trends noted above.

Semantics and pragmatics are traditionally distinguished as the study of conventional linguistic meaning vs. contextually determined speaker meaning (respectively), the former involving notions like reference, truth and entailment, and the latter involving notions like speaker reference, deixis, presupposition, implicature and speech act. As with morphology and syntax, the division is partly motivated, but also somewhat artificial. For example, although presupposition is typically identified as pragmatics, presumably through its connection to context and “common ground”, it is nonetheless conventional, associated with specific lexical items and constructions, and “projected” in a way parallel to compositionality in semantics. Furthermore, reference plainly figures on both sides of the semantics-pragmatics division with definites, indefinites and proper names typically being handled on the semantics side and pronouns and indexicals handled on the pragmatics side.

Finally, as noted earlier, truth plays a key role not only in the conventional content associated with assertion, entailment and presupposition, but also in the theory of Implicatures and Speech Acts. In the former this comes through the key Gricean Maxims of Quality and Quantity. In the latter it comes through the “representational core” of all basic speech act types – the fact that representatives, expressives, directives, and commissives (warnings) can all be rendered with pictures in the form of icons and emojis (Fig 10). Truth therefore is one of the most important “concept spirals” in this unit.

Figure-10 Picturing Speech Acts

Interestingly, despite introductory linguistic texts universally introducing IPA as a notation for transcribing (vocal) externalization, the same books never (to my knowledge) include logic as a notation for transcribing interpretation. RIL takes the view that logic – what Frege famously termed "Begriffschrit," 'concept writing' – should be taught as "semantics IPA". Thus, standard notions like argument, predicate, predicate valence, quantifier should be key concepts in discussing the Subsystem of Interpretation, and transcription/translation of sentence meanings into formal logic should be among the formative and summative assessments for this area.

5.4 Language Growth & Development vs. Language Acquisition

In RIL, Language growth & development constitutes the interface between Human Language and human languages. From the first perspective, language growth & development exhibits the properties identified by Lenneberg (1967) as reflecting "biologically determined behavior":

- Behavior that emerges before it is necessary for survival.
- Behavior whose appearance is not the result of conscious decision.
- Behavior whose emergence is not triggered by external events (although the surrounding environment must be sufficiently rich for its development).
- Behavior that is relatively unaffected by direct teaching & intensive practice.
- Behavior exhibiting a regular sequence of developmental milestones, usually correlated with age or other aspects of development.
- Behavior that often exhibits a "critical period" for its acquisition.

It therefore firmly establishes Human Language as a "natural thing".

From the second perspective, "imperfect" or "innovative" learning in the language maturation period has been identified as the fundamental source of variability in speech communities (Ringe and Eska 2013; Lightfoot 2020). This variability is the key prerequisite, in the presence of "social selection," for linguistic change.

RIL favors "Language Growth & Development" over the more standard "Language Acquisition" in part because the former more accurately reflects its naturalistic perspective. Biologically determined features of an organism are neither learned (like skills) nor acquired (like habits), rather they grow and develop. More importantly, whereas "language acquisition" focuses attention on language maturation for L1 and on language learning for L2+, "growth and development" embraces all periods of the linguistic history of individuals, including maturity and old age, where aphasias and various degenerative conditions may seriously affect linguistic capacity.

The difference of perspective entails that RIL includes standard topics like L1 and L2 stages and schedules of development in the 3 subsystems across the 2 externalization channels, language deprivation, language emergence in atypical contexts (e.g., creolization), which populations provide input to language growth. But it also naturally includes language decline and deficits in language production such as increased word-finding failures, increased slips of the tongue, increased pauses in speech, increased difficulties with proper name recall, etc. "Language Growth & Development" connects naturally to themes in Speech and Language Pathology.

5.5 Language Variation vs. Sociolinguistics

Courses and textbooks typically equate the study of language variation with dialectology and sociolinguistics. RIL adopts a broader view of linguistic variation that includes at least the following:

- Variation resulting from our shared linguistic capacity and the scope it provides for constructing different grammars (i.e., typological variation).
- Variation resulting from individual pathologies, injuries or developmental differences (conditions, pathologies, syndromes, disorders) (i.e., non-neurotypic variation).
- Variation resulting from classic sociolinguistic and dialectological factors.

This perspective brings together standard sociolinguistic and dialectological variation with the species-level variation permitted by the language faculty and the individual, speaker-specific variation observed in the presence of specific conditions (deafness, ASD), disorders (SLI), pathologies (aphasia), etc. Inclusion of species-level variation is important to the subsequent discussion of language change and history. Identifying the specific kinds of relatedness indicative of historical connection requires factoring out relatedness that derives from general features common to all languages. Likewise, individual, speaker-specific variation induced by specific conditions is important to the understanding of "linguistic communities" and their formation. The presence of social communities of deaf speakers appears to be regularly accompanied by the formation of linguistic communities deploying sign languages. Sign languages therefore represent a case of non-neurotypic variation producing new languages.

Core issues in this unit include the fundamental question of when variation implies a single speech community vs. multiple speech communities, the question of identifying "languages" and the criteria by which they are individuated and counted, when languages are "healthy" or "endangered" and how we tell, and assessing "linguistic diversity". As noted, the wider perspective on variation is also vital for when certain kinds of genetic variation at the individual level yield new linguistic communities and whole new language types at the group level.

5.6 Language Change vs. Historical Linguistics

The notion of language adopted in RIL parallels the biological notion of species. Languages are populations of speakers constituting a "linguistic community," just as species are populations of organisms constituting a "genetic community". The model of language change RIL adopts is based on the same parallel: language change is the product of "selectional forces". The process of linguistic maturation gives rise to variation that is operated on by selection; under the latter, some variants become widespread, resulting in their becoming input to subsequent generations of speakers and incorporated in their individual grammars.

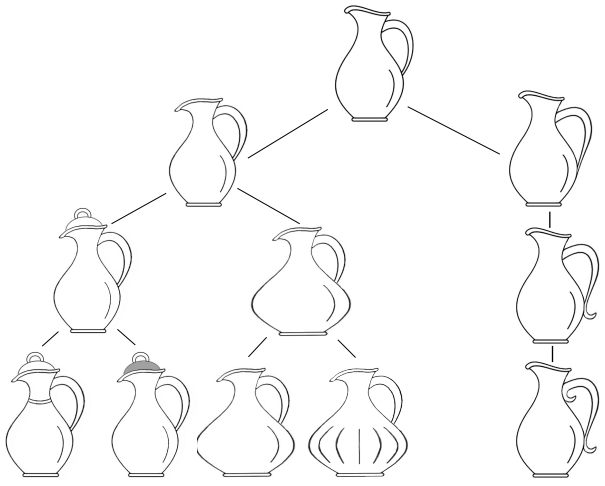
The biological context provides useful analogies for framing ideas about the selectional forces driving language change. Early theories appealed to functional explanation – the idea that languages change and in so doing become more "communicatively efficient". Thus, phonological change involving assimilation, dissimilation, epenthesis, deletion, vowel or consonant harmony, etc. was hypothesized to make forms "easier to pronounce" or

"energetically less costly". Likewise, leveling and back-formation were proposed to reduce memory load, by making morphological paradigms more regular and more transparent. In the biological context, functionalism can be seen to embody an idea of "fitness," and a picture of language change similar (in broad respects) to natural selection. Forms or paradigms survive and come to flourish because they are "fitter" than their competitors in some anatomical, physiological and/or cognitive sense.

More modern theories offer a different picture of linguistic change based on "imperfect" or "innovative" learning. In brief, in the process of language maturation, and in the face of linguistic variation in their environment, children conjecture rules different from those of their care-givers or members of the wider linguistic community. For reasons of social identity formation, these variants get picked up by a subcommunity of speakers (primarily females, according to Labov 2001) also within the maturational period and become their "preferred" forms. The variants persist and subsequently diffuse out into the wider linguistic community. Again, in the biological context, "imperfect"/"innovative" learning can be seen to embody an idea of "preference," and a picture of language change similar (in broad respects) to sexual selection. Forms or paradigms survive and come to flourish, not because they are "fitter" anatomically, physiologically and/or cognitively, but because they enhance the "social success" of their speaker.

The biological framing of language change offers many further analogies, including biogeography and population movement, dialect continua/clinal species, hybridization/ creolization, etc. It also focuses attention on important analytical notions. A foundation of taxonomy and phylogenetics is cladistics: the method by which animals, plants, and, more broadly, objects bearing a "descent with modification" relation to each other, are classified according to the proportion of measurable characteristics that they have in common. The greater the proportion of shared characteristics, the more recent their divergence from a common ancestor. Cladistics has long been recognized as relevant to language change, and its mechanisms and underlying logic of shared and derived features are of very wide applicability. Consider the "phylogeny" of water-pitcher designs illustrated in Fig-9. The distribution of shared and derived features suggests the pattern of descent with modification indicated.

Figure-10 Cladogram



RIL takes the view that, given its generality and broad applicability, cladistic classification is among the topics that a unit on language change should cover. It falls within the wider emphasis on linguistic structure (here structure in taxonomic and historical relationships) that spirals throughout the RIL curriculum.

6 Toward a 21st Century Linguistics Curriculum

20th century American linguistics established a series of categories and procedures for language description whose identity and sequencing − Phonetics-Phonology-Morphology-Syntax − have continued for more that 70 years, not only becoming standard in the modern introductory linguistics curriculum, but providing the larger framework for undergraduate linguistics majors in U.S. colleges and universities, with separate courses bearing these labels or the equivalent (Articulatory Phonetics, Intro to Phonology, Intro to Morphology, etc.). In significant part, this heritage reflects the context in which the discipline matured, which included field description of the indigenous languages of the Americas, already in the throes of rapid disappearance. "Analysis of An Uncommonly Taught Language" (AUTL) courses taught today often attempt to replicate the paradigm structuralist fieldwork experience, beginning with phonetic transcription into IPA, followed by phonemic analysis, followed by morphological analysis, followed by some syntax, if time allows. At the author's own institution, the AUTL course is not only required for linguistics majors, it is considered a "capstone" experience in their training. Linguistic fieldwork thus continues to provide the underlying model for language analysis and for much of the broader undergraduate linguistics curriculum.

It is not self-evident that the pre-theoretic objects, categories and sequencing of subareas identified by mid-20th century American Structuralism remain the best ones for organizing the fundamental subject matter of modern linguistics. Nor is it self-evident that linguistic fieldwork, however important in the history of the discipline, represents the best model and/or the capstone experience for linguistics training today. Linguistic science has progressed remarkably in the interval, its interdisciplinary connections expanding dramatically in the process. Linguists now routinely collaborate with colleagues in Psychology, Brain Science, Computer Science, Speech and Language Pathology, Mathematics and Logic, and students now routinely write dissertations and honors theses in these areas. More fundamentally, like all sciences, linguistics has dramatically deepened its understanding of human language as an object of inquiry. It is becoming increasingly clear that "expression-building" represents a unified domain, whether its products are words, phrases or sentences. And it has already become clear that human vocalization represents only one output channel by which linguistic expressions are externalized, and that the proper domain of "phonology" (its title notwithstanding) lies at a higher level of abstraction than lips, teeth and vocal cords. Even in areas falling outside traditional structural analysis, like language acquisition, sociolinguistics and historical linguistics, we are seeing deepening interconnection wherein a dynamics of language growth, variation and change lie at the heart of a developing understanding of how linguistic communities form, persist, fission, intermingle, and ultimately decline.

The Rethinking Introductory Linguistics project, as sketched above, represents one effort to re-envision the foundational narrative of linguistics – its subject matter, division into chapters, and unfolding plot – in the context of introducing a new generation of 21st century

students to linguistics. It is hoped that RIL will stimulate other productive and provocative re-thinkings and re-imaginings.

References

Anderson, Stephen. 1992. *Amorphous morphology*. Cambridge: Cambridge University Press.

Anderson, Stephen. 2010. *Languages*. Oxford: Oxford University Press.

Aronoff, Mark. 1994. *Morphology by itself*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1957. *Syntactic structures*. The Hague: Mouton.

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1986. *Knowledge of language*. New York: Praeger.

Denham, Kristin E., and Anne C. Lobeck. 2010. *Linguistics at school: Language awareness in primary and secondary education*. Cambridge: Cambridge University Press.

Di Sciullo, Anna Maria and Edwin Williams. 1987. *On the definition of word*. Cambridge, MA: MIT Press.

Fernyhough, Charles. 2016. *The voices within*. New York: Basic Books.

Ginsberg, Daniel, Maya Honda and Wayne O'Neil. 2011. Looking beyond English: Linguistic inquiry for English language learners. *Language and Linguistics Compass 5/5*: 249–264.

Honda, Maya, Wayne O'Neil and David Pippin. 2010. On promoting linguistics literacy: Bringing language science into the linguistics classroom. In Denham & Lobeck 2010, 175–88.

Labov, William. 2001. *Principles of linguistic change. Vol. II: Social factors*. Oxford: Blackwell.

Lenneberg, Eric. 1967. *Biological foundations of language*. New York: John Wiley & Sons.

Lidz, Jeffrey and Yakov Kronrod. 2014. Expanding our reach and theirs: When linguists go to High School. *Language and Linguistics Compass 8/10*: 449–463.

Lightfoot, David. 2020. *Born to parse*. Cambridge, MA: MIT Press.

Loosen, Suzanne. 2014. High school linguistics: A secondary school elective course. *Language 90 (4):* 258-273.

Martinet, André. 1960. *Éléments de linguistique générale*. Paris: Armand Colin.

Mulder, Jean. 2007. Establishing linguistics in secondary education in Victoria, Australia. *Language and Linguistics Compass 1/3*: 133–154.

O'Neil, Wayne. 2007. Project English: Lessons from curriculum reform past. *Language and Linguistics Compass 1/6*: 612–623.

O'Neil, Wayne. 2010. Bringing linguistics into the school curriculum: Not one less. In Denham & Lobeck 2010. 24–34.

Plackowski, Amy L. 2020. Using Understanding by Design to build a High School linguistics course. *American Speech 95 (2)*: 235–242.

Ringe, Don and Joseph Eska. 2013. *Historical linguistics. Toward a twenty-first century reintegration*. Cambridge: Cambridge University Press.

Sandler, Wendy, Mark Aronoff, Irit Meier and Carol Padden. 2011. The gradual emergence of phonological form in a new language. *Natural Language and Linguistic Theory 29(2)*: 503–543.

Saussure, Ferdinand. 1916/1959. *Course in general linguistics*. New York: The Philosophical Library.

Stewart, Thomas W., Jr. and Alma B. Kuhlemann Cardenez. 2010. Discovering 'Language Myths and Truths': A Summer Enrichment Course in Linguistics for High-School Students. *Language and Linguistics Compass 4/2*: 80–95.

Trott, Sean and Benjamin Bergen. 2020. Why do human languages have homophones. Cognition 205. https://doi.org/10.1016/j.cognition.2020.104449.

Wiggins, Grant and Jay McTighe. 2005. *Understanding by design 2nd edition*. Alexandria, VA: ASCD.

Wittgenstein, Ludwig. 1922/1961. *Tractatus logico-philosophicus*. Trans. D. Pears and B. McGuiness. London: Routledge & Kegan Paul.