

LANGUAGE ENDANGERMENT AND LANGUAGE ECOLOGIES

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Abstract

Most of the 6,000-7,000 languages spoken across the world are under threat. In some cases, the few remaining speakers are elderly and the languages are not being transmitted to new generations. In other cases, the speakers are shifting to dominant languages. The result of these events is a crisis in linguistic diversity leading many scholars to predict that between 50%-90% of all the world's languages will be extinct by the end of this century. Although various approaches have been developed to examine the issues underlying this crisis, no one has yet proposed a unifying framework. To address this gap, this paper proposes an ecological framework through which the processes of language attrition, shift and extinction can be examined and evaluated.

Ever since ecological approaches were introduced to sociolinguistics by Einar Haugen in 1971, they have found broad application in the field. Various interpretations have been developed: for example, in terms of correlations between the niche-width of languages and latitude (Mace & Pagel, 1995), or biodiversity and linguistic diversity (Gorenflo et. al., 2012), or between rainfall and density of social networks (Nettle, 1999); or approaches from the perspective of population genetics (Mufwene, 2006). While each of these studies has its merits, an ecological framework that both serves to function across both time and space, and provides a basis to explain the multitude of processes within its purview has yet to be developed.

This paper proposes a typology of language ecologies based on a consideration of the relative impact of bottom-up factors (e.g., biogeography, cultural practices such as exogamy or multilingualism) and top-down factors (e.g., institutional policy, linguistic nationalism). Two prototype ecologies are identified: stable and competitive. Stable ecologies are best characterized as bottom-up systems in relative equilibrium influenced principally by local conditions, whereas competitive ecologies are top-down systems associated with punctuation events and influenced predominately by external conditions. The framework is useful because it not only succeeds in indicating successional stages from one ecological type to another from a chronological perspective (thus being broadly explanatory across time and space), but related considerations of morphological complexity (Trudgill, 2011) and semantic development (Halliday, 1990) can also be integrated into the framework.

For example, stable ecologies typically comprise languages with comparatively small speaker populations, low areal coverage, and little contact with other language communities (Lupyan & Dale, 2010); these languages also tend to have high levels of morphological complexity. Within the context of endangered languages, the focus of this paper, the framework is especially productive because it suggests fresh perspectives on the processes that either sustain or undermine language diversity, and in particular, language shift, attrition, and extinction.

Keywords: Language, Language endangerment, Ecology, Extinction.

1 INTRODUCTION

It is now a commonplace among studies in linguistics that languages and their speakers are treated from the perspective of ecology, much like a population of a particular species of bird or plant in the context of its environmental setting. This wasn't always the case. When the ecological perspective was originally proposed by Einar Haugen in the early 1970s, the scientific study of language (especially in North America) typically referred to the study of the underlying mental representation of language in a speaker's head, a speaker's idealized competence. There was less interest in studies that considered how people actually used language on a day-to-day basis, and no patience with research that looked for the social and cultural correlates of language change. Until very recently, there was strong resistance among most academic linguists to any suggestion that not all languages enjoy equivalent capacities in syntax, that not all languages are equally

complex, or that culture shapes the conceptual, semantic, and structural dimensions of language. But times have changed. Ecological approaches have put the light on properties of language that have been denied or ignored too long; they show how language is dynamic, adaptational, responsive to cultural and environmental contingencies, a significant player in human history.

Haugen defined the ecology of language as “the study of interactions between any given language and its environment” (Haugen, 1972 [1971], p). What he intended was that investigators give greater attention to social and functional considerations of languages, and not focus exclusively on structural matters. There have since been many interpretations and extensions of Hagen’s original formulation. For example, ecological frameworks have been used in the context of language evolution studies, tracking the spread of the big languages such as Spanish and English, linguistic human rights, language planning, to name a few.

Recently, however, ecological approaches have been invigorated and their scope broadened in particular as an outcome of the availability of large online databases (e.g., Ethnologue: Languages of the World <www.ethnologue.com>; The World Atlas of Language Structures Online <wals.info>; UNESCO’s website on endangered languages) which have given investigators access to large amounts of information on languages across a wide range of variables in systematic formats. Although not yet in any sense comprehensive (there is little known about the great majority of the worlds 6,000-7,000 languages), these databases have nonetheless enabled investigators to establish patterns and correlations heretofore unachievable. Several applications follow: in the first, investigators focused their studies on environmental variables and the relationships between these variables and language diversity; in the second, studies concerning the relative vitality and classification of language ecologies.

1.1 Ecologies and the environment

In the early 1990s, the relationship between languages and the physical or biogeographical environment was given particular emphasis. This perspective emerged in tandem with the alarm raised by biologists concerning the extinction of biological species, now commonly referred to as the “The Sixth Extinction” (e.g., Kolbert, 2014). In an explicit comparison between languages and biological organisms, linguists found parallels between biodiversity extinction and the extinction of languages. Two signal volumes opened up a new research area, these papers redefining for many scholars the focus of language studies. In each volume, the lead article articulated the insecure state of most of the world’s languages. Writing in the journal *Diogenes*, Stephen Wurm observed: “Less violent, but potentially of equally disastrous consequences for given languages are phenomena broadly coming under the heading of changes in the ecology of the languages concerned. There are close parallels in the circumstances surrounding the decimation and eventual extinction of animal or plant species and in those languages in this respect.” (Wurm, 1991, p. 2).

And Ken Hale, after pointing out that eight of the languages on which he had done linguistic field work had become, by 1992, extinct, wrote in the journal *Language*: “The process is not unrelated to the simultaneous loss of diversity in the zoological and botanical worlds. An ecological analogy is not altogether inappropriate. We understand to some extent the dangers inherent in the loss of biological diversity on this earth. It is correct to ask, I think, whether there are also dangers inherent in the loss of linguistic diversity.” (Hale, 1992, p. 1).

Following these publications, studies began to appear that sought to characterize and catalogue correspondences between species diversity and language diversity across the world. In one analysis, Mace and Pagel (1995) found that the distribution of languages in pre-Colombian contact North America responds to the same biogeographical constraints that do biological species in three ways: (1) languages conformed to Rapoport’s rule—that is, languages occupied a wider range of territory in the northern latitudes than in the southern, (2) conversely, more individual languages (six times or more) were found in the southern latitudes per unit of area than in the northern, and (3) based on a categorization of distinct habitat types, greater language diversity was found in areas of greater habitat diversity, a finding that held independent of latitude. Together, these findings suggest strong linkages between cultural groups on the one hand, and environmental factors on the other. The authors explained these correspondences from two directions: “factors that promote diversity in the number of habitats may also promote diversity in language-cultural groups, or that diversity in the number of habitats may even somehow encourage language-culture diversity” (Mace & Pagel, 1995, p.120)—explanations that point to the greater availability or elaboration of bio-cultural niches in regions having, for example, longer growing seasons. In another such study, Johanna Nichols (1997) found that the diversity of language stocks (i.e., genetically-based language-assemblages such as the Indo-European group that were equivalent in terms of both diversity and time depth) were found to be higher in “coastal regions, at lower latitudes, and in wetter and less seasonal climates,” but lower “in continental

interiors, high latitudes, and in dryer and seasonal climates” (Nichols 1997, p. 368). Other studies focusing on environmental variables looked at correlations between the numbers of plant, bird, or mammal species and the number of individual languages across countries or regions. Along these lines, a recent study found that biodiversity hotspots and biodiversity wilderness areas account for 70% of all languages across the planet (Gorenflo, et. al., 2012).

In a direct connection with the greater availability of niches to exploit, explanations for these high correlations vary from region to region, but most investigators see a role for functional linkages between biogeographical factors and social practices. For example, Smith (2001, p. 105) hypothesizes that small-scale societies may have engaged in “subsistence-related enhancement of biodiversity” through such activities as “plant-breeding, active transplanting, soil enrichment, maintenance of habitat patchiness or successional disturbance through clearing or burning”; or from a non-anthropogenic point of view, he hypothesizes that, “high biodiversity, by providing an increased number of niches, may encourage greater cultural diversification through niche partitioning.”

Such studies have yielded insights into the embeddedness of languages in environmental settings leading to rather impressive claims. John Richard Stepp, an anthropologist researching the interrelationships between cultures and plants in Mesoamerica, declared, “The single biggest predictor of how many plants are in an area are how many languages are spoken there, and vice versa. If you tell me how many languages are in an area, I can give you a pretty good estimate of how many plants you’ll find there as well” (Stepp, 2008).

1.2 Ecological typologies and ecological viability

In his 1972 essay, Haugen included a concern for the viability of language ecologies. He concluded his essay with, “Finally we may wish to sum up its status in a *typology of ecological* classification, which will tell us something about where the language stands and where it is going in comparison with the other languages of the world” (Haugen, 1972, p. 337). Here, Haugen resonates with a statement made earlier in his essay: “Ecology suggests a dynamic rather than a static science, something beyond the descriptive that one might call predictive or even therapeutic” (1972, p. 329). He believed that ecological orientations would permit evaluations of the health of ecologies, much like ecological approaches were doing for the biological sciences, and thereby enable measures to be implemented that would restore compromised ecologies. Among other things, his view suggests an activist stance. Investigators following Haugen’s lead in this respect have attempted to characterize the viability of language ecologies for maintaining and sustaining diversity. The work of Peter Mühlhäusler (1996, 2000, 2003) is exemplary.

Spanning a wide range of interests, much of Mühlhäusler’s research has tracked the effects of invasive ‘transplanted’ languages of European colonists on the traditional language ecologies and social wellbeing of societies the western Pacific. He was one of the first investigators to promote, from an ecological perspective in the tradition of Haugen, an awareness of the effects of transplanted or exotic languages into traditional language ecologies: “It is ecological factors which bring languages into being, define their boundaries and decide on their growth and survival” (Mühlhäusler, 1996, p. 3). In this respect, Mühlhäusler was especially critical of studies that were narrowly particularistic. His own work has detailed the linguistic and social consequences of genocides, Christian missionary activities, the replacement of native economies and agriculture with monocultural plantations, by the Spanish, British, French, and latterly, the United States in Pacific nations such as Papua New Guinea, New Caledonia, and Vanuatu.

Also within Haugen’s purview, Mühlhäusler was the first investigator to offer a typology of language ecologies, as below (adapted from Mühlhäusler, 2000. pp. 326-327).

Type 1: Balanced equitable ecologies—Traditionally highly multilingual societies such as coastal areas of Papua New Guinea. These are essentially stable ecologies due largely to little power differentials between groups.

Type 2: Mixed endemic/exotic ecologies—The outcomes of mass migrations that brought together, for example, the Austronesian speakers and the Papuan speakers on the island of Timor 3000 years ago. Essentially stable ecologies, as in Type 1.

Type 3: Competitive ecologies—Contact between unequal groups, large power-differentials, that pit larger dominant languages against smaller minority languages.

Type 4: Language continua and networks—Regions where we find dialect chains or Sprachbunds, but without the political borders that isolate these varieties.

Type 5: Artificial ecologies—Where European colonial languages are elevated to the status of ‘national’ languages as was English in the Philippines and Namibia.

Type 6: Isolated monolingual ecologies—Rare today, but Easter Island Rapanui is mentioned as a possible example.

The individual ecologies listed above offer a bird’s-eye view of the disparate socio-political and environmental settings in which speech communities (or better, in Mühlhäusler words, “communication communities”) would appear. There are, however, several problems with Mühlhäusler’s typology:

1. The individual ecologies are not exclusive. For example, artificial ecologies (Type 5) are essentially a special case of competitive ecologies (Type 3), as are mixed/endemic ecologies (Type 2).
2. As a whole, the ecologies do not cohere under any one theme apart from the fact that each ecology identifies a particular case. In this sense, the types listed above are little different from the many papers in the literature that begin with the title ‘The Language Situation in X’.

2 ECOLOGIES AND SOCIAL ORGANIZATION

2.1 Social organization and morphology

Linkages between language and social variables were proposed as far back as the mid-1970s. Kay (1977, p. 29) proposed that “the major mechanism underlying the process of language evolution is that social evolution produces speech communities in which situations calling for autonomous speech occur with increasingly frequency.” By autonomous, Kay is referring to a higher levels of transparency and less reliance on immediate context for ease of comprehension. There have since been many papers published which confirm these specific claims and relationships. In his detailed examination of the communities in northwestern New Britain, Papua New Guinea, Thurston (1987) drew attention to the effects of language contact on language structure. His investigations revealed that communities whose languages were exclusively learned as a mother tongues were considerably more complex than those communities whose languages were learned not only by children as mother tongues, but also by adults from other language communities as inter-village lingua francas. Those languages that served only for communication within villages Thurston called *esoteric* languages and those that served as regional lingua francas he called *exoteric* languages. He reasoned that exoteric languages were less complex because, simply put, adults are poor second-language learners: the more adults learning a given contact language, the less complex it becomes over time.

Taken from the perspective of the evolution of human cultures, Wray and Grace (2007) suggest that the languages of hunter-gatherer cultures, and the communicative mode that characterized their interactions, were, following on Thurston (1987) above, primarily *esoteric*, while the languages of more complex societies such as modern industrial societies are associated with communicative modes that are primarily *exoteric*. “Languages that are used predominately for *esoteric* (intra-group) communication tend to have features that are semantically and grammatically ‘complex’, while those used also (or even exclusively) for *exoteric* (inter-group) communication become ‘simplified’ towards rule-based regularity and semantic transparency” (Wray & Grace, 2007, p. 543). Significantly for our purposes, these differences can be explained in terms of the communicative context in which early language users operated which “was fundamentally different from that of most modern humans” (2007, p. 543). Greatly extending Thurston’s ideas, their argument brings several lines of evidence together, psycholinguistic and sociocultural.

On psycholinguistic grounds, Wray and Grace’s (2007) ideas rest on the claim that early languages were themselves not characterized by the same high degree of compositionality as modern languages. Compositionality refers to the extent to which a language can be constructed and thus reducible to a set of rules; compositional languages are ones for which “some reasonable rule-based account is possible to predict and explain their arrangement” (546). Thus in a position contrary to mainstream theoretical approaches in linguistic, the default setting is for languages characterized by irregularity, not fully describable in terms of words and combinatory rules.

“[W]e shall propose that the capability that needs to be accounted for ... is restricted to only a subpart of the capability that is customarily assumed to be universal [in languages]. The rest of what we observe in the majority of languages today is a result of secondary influences such as the interaction with strangers, language contact, and the stratification of society” (2007:545).

There is a clear age-related effect here. Children learn their primary language seemingly effortlessly and completely, without metalinguistic awareness, no matter its typological structure, the level of complexity, or

the extent or nature of irregularities. Because of their neurolinguistic plasticity, children are uniquely positioned to be faithful perpetuators of the languages of pre-settlement, pre-literate hunter-gatherer bands, which, on this account, were relatively non-compositional. Adults, however, face multiple challenges when attempting to learn these languages for reasons already enumerated, not the least of which is the high degree of irregularity and extent of culturally embedded information.

Wray and Grace (2007) suggest that it is only larger political or economic units (i.e., more complex societies, in this context, 'societies of strangers') that bring people into contact with strangers, in contrast to societies with little outside contact (traditional societies, known as 'societies of intimates'). Contact with strangers means that 'societies of intimates' cannot rely on the same high degree of implicitness in their interactions for maintaining comprehensibility between speaker and hearer. The need to be more transparent pushed languages toward greater explicitness—less irregularity, a higher degree of predictability, rule-bound—in a word, compositional. Thus Wray and Grace, on sociocultural grounds, find that, over time, greater compositionality in language is one consequence of talking with strangers.

The esoteric-exoteric language continuum was confirmed in a statistical analysis of 2,236 languages in a study by Lupyan and Dale (2010) using combined demographic and morphological language variables. They showed that languages with smaller speaker populations spoken over smaller areas and having less contact with other language communities have overall more complex morphological systems than languages having larger speaker populations, greater geographical coverage, and greater language contact. Their *Linguistic Niche Hypothesis* proposes that "the level of morphological specification is a product of languages adapting to the learning constraints and the unique communicative needs of the speaker population" (2010: 7). Adaptation to the esoteric niche is the outcome of facilitating language learning by infants who benefit from the high levels of redundancy inherent in morphological overspecification; in contrast, language features that are difficult for adults to acquire have less chance of being transmitted, resulting in the formation of languages that are more rule-bound, transparent, and compositional. Their study demonstrates a clear linkage between linguistic structure and social structure where languages adapt to social and psycholinguistic contingencies—pre-settlement languages (i.e., those spoken before the development of agriculture, languages of hunter-gatherer societies) are predominately esoteric; post-settlement languages are predominately exoteric. Research results in Perkins (1992), Lyon, et. al. (2005), Sampson et. al. (2009,) and elegantly summarized in Trudgill (2011) have given further support to the claim that there are clear linkages between the type of society and the level of complexity in languages.

2.2 Social organization and the semantic dimension

Studies have demonstrated that, in the words of M.A.K. Halliday (1990, p.179), "our 'reality' is not something readymade and waiting to be meant – it has to be actively construed," and "language evolved in the process of, and as the agency of, its [reality's] construal." The work summarized in Peter Mühlhäusler's *Language of Environment: Environment of Language* (2003) and Nicolas Evans' *Dying Words* (2009) confirm Halliday's essential intuitions here. The implications of Halliday's perspective for language ecologies are profound. Languages (conceived in their totality: their use, functions, underlying semantic and structural organization) are neither the product of some universal blueprint set deep eons ago within the minds of speakers, nor are they mirrors passively reflecting changes in sociocultural and material conditions. Instead languages are at the "intersection of the material with the symbolic" (Halliday, 1990:179) where meaning-making is forged. In the evolutions of languages from their presumed protolinguistic roots to their modern-day realizations, along the same lines of "ratchet effect" for cultural evolution (Tomasello 1999, pp. 37-40), languages have been enablers of ever more sophisticated cognitive achievements while, at the same time, being themselves transformed by material conditions that, over time, grew ever more complex within the human living environment. Hence languages *are* history and, at the same time, are *of* history: they are both historical artifacts and embodiments of the impact of human consciousness with experience. And when material conditions change, "the forms given by language to consciousness also change" (Halliday, 1990, p. 180).

On a conceptual level, Halliday proposes that it is possible tease out "syndromes, assemblies of features from different parts of the grammar" that contribute to making up "one rather than another among the 'possible worlds' into which our experience could be construed" (1990, p. 183). These assemblies are organized across layers within the grammar, defined partly in terms of the awareness of speakers to the meaning-making work done at any given layer. For example, the first layer of meaning-making, the surface, is transparently open to conscious reflection, and is there where we easily grasp language play, puns, and anomalies. The fourth layer, however, the "inner layer of grammar" (1990, p. 193), is the one least accessible to reflection and constitutes, according to Halliday, "a hidden theory of experience on which we

unconsciously base our actions and our strategies for survival” (1990, p.193). It is at this “cryptogrammatic fourth level” that the real work of reality construction and meaning-making takes place.

Halliday and others have investigated this fourth layer, the “cryptogrammatic”, of language in a series of studies which track the development of the writing of science (Halliday and Martin, 1993), and the standardization of language (Halliday, 2003). They demonstrate how grammar is truly a ‘theory of experience’ and not exclusively, as others would have it, a ‘theory of language.’

2.3 Social organization and syntax

The realm of syntax has been the last to fall, in the sense that linguists have been most strongly opposed to any suggestion that the syntax of languages, specifically sentence embedding and subordination, is not equivalent across languages—the idea summarized in the claim that “syntactic universals reveal that every language has a way of forming sentences such as...’You know that I know that linguistics is an interesting subject’” (Rodman and Fromkin, 2003, p. 35)—or that syntax is in anyway subject to cultural or social influences. However, a study by Guy Deutscher (2000) shows otherwise.

Deutscher found no evidence of subordination in early Akkadian texts, which dated back to the earliest writing in 2500 BC. Instead, scribes relied on concatenative and coordinate structures, those forms that predominate in the oral languages. Deutscher traces the evolution of subordination spanning a 2,000 year period from the earliest Akkadian writing on clay tablets. He shows how one type of subordination, finite complements, began to emerge through a process of grammaticalization in Old Akkadian (from written clay tablets dated 2500-2200 BC) and very gradually developed to mature form in neo-Babylonian (from written clay tablets dated 1000-500 BC). Deutscher writes, “Finite complements are a more effective tool for conveying elaborate propositions especially when less information can be left to the context and more explicitness and accuracy are required.” “The hierarchical structure of finite complements” (2000, p. 125) can make clear and explicit the relationships between the propositions. Complex societies require clarity and explicitness in their communications. Grammatical subordination enables people to be clear and explicit in our exchanges with others. Deutscher writes that “finite complements are more likely to emerge under communicative pressures of a more complex society.” (2000, p. 125) That is, social organization impacts on the syntax of language. The conclusion is that the languages of less complex cultures do not employ the kind of ‘syntactic technology’ that we commonly find in the languages of complex agricultural and industrial societies.

2.4 A framework for the ecology of language

Table 1 summarizes the discussion above in the form of a typology of language ecologies. Up to this point, two main ecologies have been identified which we can label ‘stable’ and ‘competitive’ ecologies (after, Wendel and Heinrich, 2012). Stable ecologies were formerly found among pre-settlement hunter-gatherer bands and are found more-or-less intact among the few remaining regions around the world (e.g., remote areas in New Guinea and Amazon basin) where traditional societies survive today. Such communities tend to be egalitarian, exogamous, and practice multilingualism. These ecologies are essentially language diversity sustaining or language diversity creating. Lingua francas seldom emerge among these groups, and if they do, the lingua francas are local languages.

Table 1. A typology of language ecology (adapted from Wendel and Heinrich, 2012, p. 148)

Language ecologies	Socio-political characteristics	Dominant language processes	Structural linguistic correlates
Stable	<ul style="list-style-type: none"> Societies of intimates Small groups, acephalous social organization: bottom up. No power differentials Contact limited to neighboring communities. 	<ul style="list-style-type: none"> Processes of language divergence: egalitarian multilingualism. Lingua francas are local languages. Language as a badge of identification 	<ul style="list-style-type: none"> Greater morphological elaboration Reliance on concatenation and coordinating structures Typical discourse: Oral genealogies.
Competitive	<ul style="list-style-type: none"> Societies of strangers 	<ul style="list-style-type: none"> Processes of language convergence: 	<ul style="list-style-type: none"> Less morphological elaboration

	<ul style="list-style-type: none"> • Large groups, hierarchical social organization, nation states: top down. • Large power differentials • Broad contact across communities 	asymmetrical bilingualism. <ul style="list-style-type: none"> • Language shift to dominant language; • Language ideologies, language standardization. 	<ul style="list-style-type: none"> • Syntactic subordination • High degree of nominalization • Typical discourse: Scientific theorizing.
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In contrast, competitive ecologies are found all across the globe today and are, on one scale level, constituted as nation-states. Typically, modern societies are socially stratified, politically centralized, and practice asymmetrical bilingualism or monolingualism. In contrast to stable ecologies, competitive ecologies are essentially language diversity eroding, promoting as they typically do, language monocultures through the spread of standard language or regional lingua francas. Many such nations support vehicular languages and di- or triglossic conditions. Power differentials between language groups are much greater within competitive ecologies, and smaller within linguistically stable environments.

Significant to our purposes, stable ecologies tend to be found among societies of intimates where there are shared cultural assumptions, whereas societies of strangers are found among competitive ecologies. This is important because it means that we typically find languages that are morphologically elaborated possessing many of the features Dahl (2004, p. 54) has called “cross-linguistically dispensable”—essentially referring to the fact that minimally efficient languages get along without such features. Cross-linguistically dispensable features include extended noun class and gender systems, syntactic agreement, evidentials, alienable / inalienable possession, large pronominal systems, dual number, and highly developed deictic systems. According to Dahl, these are systems that take very long periods of uninterrupted time to develop, periods with little outside contact during which inter-generational transmission is continuous. On the other hand, less complex languages not possessing cross-linguistically dispensable features and other elaborate morphologies tend to be found in large societies where contact with other language groups is a frequent occurrence and in which second languages are acquired by adult members. It is in these circumstances, for example, that pidgin and creole languages tend to emerge.

3 LANGUAGE ENDANGERMENT AND LANGUAGE ECOLOGIES

On the basis of the socio-political conditions and linguistic processes evidenced in competitive ecologies (as outlined in Table 1), is easy to predict the outcomes for the smaller, minority, typically oral languages. It is likely that they will succumb to the pressures that inhere within competitive environments. Such environments are found in nearly every country today, and nearly every country has minority and/or indigenous languages within its borders. Note that 94% of the world’s languages (around 6,500) are spoken by only 5% of the world’s population; around 1,600 languages have fewer than 1,000 speakers. It should therefore not be surprising that investigators believe between 50%-90% (e.g., Hale, 1992) of the currently estimated 7,106 living languages on our planet today (according to the Ethnologue database: see, Lewis, 2014) will be extinct by the end of this century.

When traditional language ecologies are disturbed through sustained contact with powerful languages, it will not only be the more obvious and measurable parameters of language use that signal decline (e.g., a decrease in the numbers of first-language speakers; an increasing tendency towards bilingualism their own and in the dominant language), the underlying structure and meaning-making potential of these smaller languages will likely be eroding as well. These meaning-making potentials are typically embodied in the elaborated grammatical structures noted above that Dahl (2004) calls ‘cross-linguistically dispensable.’

There have been several studies detailing these phenomena. Annette Schmidt’s (1985) thorough study of the Dyirbal language spoken in north-east Queensland, Australia is considered a classic example. Schmidt visited the Dyirbal speaking community some 20 years after the publication of the first complete study of the language (Dixon, 1972). Schmidt discovered many changes had occurred to this language during the 20 year interval including a loss of creativity in discourse and reliance on formulaic speech, and reductions in culturally significant vocabulary and grammatical proficiency. The foregoing characterization is a familiar portrayal of languages in decline, but behind the deficits just noted is (typically undocumented and undetected) a lost world-view—a view embedded, in Halliday’s words, in the ‘cryptogrammar.’

In Schmidt’s study, however, the loss of significant cultural information is convincingly demonstrated in the reductions and modifications that Schmidt found to the Dyirbal noun class system. In traditional Dyirbal (spoken 20 years prior) there were four noun classes. Each class was associated with a small number of

number properties such as animateness and human masculine (Class I) or edible fruit and fire (Class III), and each class had own morphological marker for identification. The basis for the noun class semantic system was not at all straight forward and “depends on an intimate knowledge of the beliefs and myths associated with the cultural heritage. ... Many intricacies of the system are based on knowledge of traditional cultural heritage and associated concepts.” (Schmidt 1985, pp. 152-153). Nouns in Dyirbal were generally classified according to their more obvious membership features, but there were many exceptions in traditional Dyirbal: thus we would expect birds to be classified in Class I along with other animate nouns, but because most birds are associated with the spirits of dead human females, most birds were classified with Class II nouns which had the property human feminine; by the same token, we would expect all fish be classified in Class I, but certain fish, because they are harmful, were classified along with Class III nouns.

Schmidt found that the Dyirbal noun classification system had changed dramatically over the two decade period through simplifications to the semantic class system, loss of rules for transferring nouns from one class to another, and a lack of uniformity among speakers. For example, the younger generation in Schmidt's study had collapsed the former four noun classes into a two-way, animate and inanimate, noun class system. The cultural logic and experience embedded in traditional Dyirbal had been transformed in arbitrary ways or lost altogether.

Even though a language may not be considered as endangered by common sociolinguistic criteria (e.g., the language is being transmitted to children, the domains of language use are not contracting), a small, minority language may nonetheless be undergoing reductions and simplifications that will over time transform it into mere shadow of its former self through prolonged pressures of contact with a dominant language and dominant language ideologies.

The point is that through pressures on speakers, ideological or otherwise, to assimilate to mainstream culture and language, or due to the encroachment of standard languages into the minority languages' linguascapes, languages under threat are not just losing speakers or functions or domain use, but their world views are also slipping into oblivion, unnoticed in most cases. Roman Jakobson (1959) famously said that “Languages differ essentially in what they *must* convey and not in what they *may* convey.” He captures the insight that world views are encoded in the very organization of elaborate noun taxonomies and noun classes, in the idiosyncratic divisions in alienable-inalienable possession, in verb tense-aspect systems, in unique geographic coordinate systems—and, crucially, that speakers, in the very grammar they use to shape their every utterance, obligatorily affirm a unique perspective on the world. It is these fragile features, the “cross-linguistically dispensable” grammars, that are the first to be lost when a language goes into decline.

4 CONCLUSION

This paper has shown how ecological approaches to language have developed in ways that provide a useful framework for examining and assessing the vitality of languages and language ecologies. The more recent linkages of the conceptual and structural dimensions of language to social complexity and organization have enabled further refinements to the ecological paradigm. These latter additions have, in particular, enabled us to appreciate how endangered languages, undergoing reductions and simplifications to their conceptual and structural configurations, cease functioning as coherent world views.

In the epilogue to his wonderful book that explores and summarizes many of the themes discussed in this paper, Peter Trudgill (2011) writes, “...our observations in this book suggest that the sociolinguistic-typological matrices [i.e., ecologies] within which linguistic changes occur have changed significantly. It would therefore not be totally unreasonable to suppose that, in the future, we are increasingly unlikely ever again to see the development of highly inflectional, fusional language varieties; and that it is increasingly unlikely that we will ever again witness the growth of languages with 80 consonants, or 31 personal pronouns, or seven-term evidential systems” (Trudgill, 2011, p. 188). Trudgill speaks like one who is taking a last wistful look at a rapidly disappearing world, a world that has found itself tired of its own innovation and will no longer glory in splendor—as if Charles Darwin had visited again the entangled bank he writes about at the end of his 1859 book *On The Origin Of Species*, the bank that had caused him to marvel at all the “elaborately constructed forms” of life, and found that the life of the soil, the plants, and animals had exhausted itself and had ceased evolving “endless forms most beautiful and most wonderful.”

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