

FROM A MYTH TO AN ARTICLE OF FAITH

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Born in obscurity and nurtured by mystique, myths develop an inordinate capacity to persevere over time. This is the story of one such fable that became an article of linguistic faith.

The twentieth century was barely a decade old. In discussing American Indian languages, Franz Boas noted that "it is important to emphasize the fact that the group of ideas expressed by specific phonetic groups show very material differences in different languages, and do not conform by any means to the same principles of classification" (1911:25-26). Boas pointed out that water can be described in a variety of forms: liquid, lake, river, brook, rain, dew, or even wave foams. Hence, English uses separate roots for water in its various manifestations. In the case of Eskimo, Boas noted that different root words are used for snow, namely, *aput* ("snow on the ground"), *qana* ("falling snow"), *piqsirpoq* ("drifting snow"), and *qimuqsuq* ("snowdrift").

Three decades elapsed. Benjamin Whorf published his oft-cited remarks, which Geoffrey Pullum says were responsible for "the unleashing of the xenomorphic fable of Eskimo lexicography" (1991:159-171). Whorf stated that English uses the "same word for falling snow, snow on the ground, snow packed hard like ice, slushy snow, wind-driven snow, To an Eskimo, this all-inclusive word would be unthinkable; he would say falling snow, slushy snow, and so on ... he uses different words for them and for other kinds of snow" (1940:216). To Boas' four kinds, Whorf added three more terms: packed hard, slushy, and flying. In his zeal to demonstrate his hypothesis that a language is the reflection of a people's perception of reality, Whorf somehow appears to have forgotten that English uses a number of different words such as sleet, drift, slush, flurry and blizzard.

During the half-century since Whorf's pronouncement, the myth has persisted, and has been endemic in introductory course textbooks in linguistics. For example, Ronald Langacker repeated it: "Eskimos use a number of words to designate different kinds of snow where English has a single word" (1967:39). More recently, H. Douglas Brown used Whorf's count of seven, stating: "Eskimo tribes commonly have as many as seven different words for snow to distinguish among different types of snow" (1980:142). Still more recently, Pullum says he has seen the number reach as high as 400 (1991:164).

The fascination of the people for the novelty is understandable. The inclusion of a supposedly extensive Eskimo vocabulary for snow in introductory textbooks is comprehensible. It may even be commendable if it achieves the salutary effect of dispelling the notion that the so-called "primitive" peoples somehow speak a "primitive" (hence, inferior) language. To use hyperbole, and thereby inflating the vocabulary, however, merely enshrines the myth as an article of faith.

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THIRD PERSON INDICATIVE /-s/:
CONSTRAINTS ON SECOND LANGUAGE ACQUISITION
P. Hironymous

Introduction: Problems with /-s/

The third person indicative /-s/ is generally viewed as a basic introductory concept for second language (L2) learners of English. It can be found at the beginning of almost any first year grammar text (Molinsky & Bliss, 1983; Azar, 1985; Elbaum, 1986) along with a straightforward explanation of its use. The concept of /-s/ is both understandable and teachable, and the first few days of beginning level instruction are often filled with a variety of exercises, games, and communicative activities for first year students. Stephen Krashen (1982:17) labels the third person /-s/ as one of the "easy" forms, and most teachers would probably agree; it is considered so "easy" that, after those first few days, /-s/ is seldom the focus of any lesson again. It is clear to teachers of English as a Second Language (ESL), however, that few students actually seem to apply this simple concept consistently. Elaine Tarone agrees, noting that omission of this morpheme "continues to occur even in the production of advanced learners" (1988:97). Problems with /-s/ might be expected in natural speech and free writing, but teachers are often perplexed when students fail to use /-s/ even after careful editing. Even more perplexing are students who will omit /-s/ while reading aloud; the /-s/ here seemingly requires nothing more than pronunciation of the printed letter.

Researchers, ESL teachers, and students seem to agree that the rule of third person indicative /-s/ is simple, and the form is readily available in the language environment. What then is causing variability in the use of third person indicative /-s/? I suggest that acquisition of third person /-s/ is not as "easy" as most believe. I propose that semantic and syntactic complexity in the context of general /-s/ and constraints in phonology, perhaps those dealing with universals, can inhibit complete acquisition for many L2 learners of English.

Meaning and Syntax: Complexities of /-s/

Brown's (1973) study of Adam, Eve, and Sarah acquiring English as a first language was one of the first to provide a rank order of morphemes acquired in children. Dulay and Burt (1980) followed by investigating eight of these ordered morphemes for Spanish speaking children and found a similar order. Of the eight morphemes investigated by Dulay and Burt, six were concerned with the use of /-s/: contractible copula ('s), plural (-s), contractible auxiliary ('s), possessive ('s), third person (-s), and long plural (-s). Although Dulay and Burt were concerned with the acquisition order of these morphemes and not semantics or syntax, their list points out the frequency and varieties of /-s/ encountered by L2 children in the initial stages of language acquisition. For L2 adults who are confronted with complex language input every day, the task of sorting out the above uses of /-s/ and other English morphemes must seem enormous.

In examining short plural /-s/, for example, we can see that the L2 learners must learn certain syntactic and semantic constraints; short plural /-s/ must attach to the end of a noun, and /-s/ denotes plurality of that noun. Examining possessive /'s/ next to this, we see that it also attaches to the end of a noun, but it can denote plural or singular possession of the following noun. When the contractible copula /'s/ is acquired, the learner has to store this morpheme with similar formation rules to the above two, but the /'s/ here represents a reduction of a whole word, the copula *is*, and may be followed by adjectives, nouns, or prepositional phrases which describe the noun that the /'s/ has been attached to. Sometime during or after the acquisition of the above morphemes, the third person indicative /-s/ is acquired (see discussion below). This use of /-s/ conflicts with the above uses in some important ways; it attaches only to verbs, and it denotes only singular to match a

third person singular subject. From the above examples, we can begin to see that the "easy" third person indicative /-s/ is hardly that when put in the context of just a few of the other conflicting uses of /-s/ in English. To adult L2 learners of English, /-s/ seems to attach to nouns or verbs, denote plural, plural or singular, or singular, and be contextually related to constituents of either the noun or the verb phrase.

Even if the /-s/ morphemes are not sequenced, but clustered in hierarchical groups as Dulay and Burt propose, the L2 learners are still faced with conflicts between and within acquired clusters (1980:356). Learners of English will eventually sort out the various uses for general /-s/ and even continue to add others not covered in Dulay and Burt's study, that is, the contractible auxiliary /'s / of third person auxiliary *has* + /-en/ and the contractible auxiliary /'s/ of third person indicative passive constructions. First language learners eventually acquire and use /-s/ without difficulty, but as noted earlier (Tarone, 1988:97), even very advanced L2 learners will still omit them at times. Semantic and syntactic complexity may account for some omissions of the various uses of /-s/, but it cannot account for variability within the use of one of these, namely the third person indicative. Perhaps some aspects of the phonology of /-s/ may be able to account for this kind of variability.

Phonology: Constraints on /-s/

The continued variability of third person indicative /-s/ in L2 production of English may be related to phonological constraints concerned with the reduction of word-final consonant clusters and the influence of the sonority hierarchy.

Fred Eckman collected and examined data concerning production of final consonant clusters of English spoken by native speakers of an L1 which does not allow these clusters (1987:144). In his study, he draws on universal generalizations (1987:151-52; from Greenberg, 1978) as the basis for proposing the following optional cluster reduction rule in (1)(=Eckman's [7]). Eckman admits that the rule as stated does not predict which consonant is deleted and adds a markedness constraint, in (2).

- (1) *Cluster Reduction* (CR) (optional)
 $C\ C\ (C)\ \# \rightarrow C\ (C)\ \#$
 Optionally delete one member of a first tri-literal consonant cluster; optionally delete one member of a final bi-literal consonant cluster. (1987:152)
- (2) *Marked Cluster Constraint* (MCC)
 Given the set CC_i , which contains all logically-possible bi-literal clusters obtainable by applying CR to a final tri-literal cluster, a cluster CC_j , which is a member of CC_i , will be an output of CR only if CC_j is not more marked relative to the other members of CC_i . (1987:154)

He found, however, that several forms produced by the L2 learners of English violated the MCC; among the forms were final clusters of stop-stop-fricative reduced to stop-stop, as in the following examples of third person indicative /-s/, in (3).

- (3)

<i>accepts</i>	/aksepts/ → /aksept/
<i>acts</i>	/ækts/ → /ækt/

Although Eckman is concerned with a much larger issue than this in his study, his comments are pertinent since they focus on /-s/ as a morpheme. When L2 speakers of English were given a list of words to pronounce, Eckman reports that the final cluster was reduced to stop-stop, and it "almost invariably involve[d] the deletion of a final fricative; that is either the plural or third person marker." (See Appendix A.) He further states that

"there are no instances in which a stop-stop cluster is produced by deleting /s/ where it is not a morpheme" (1987:154). Native speakers, however, do not reduce consonant clusters in this way; Eckman reports, for example, that the L1 English speakers may reduce *opts* /apts/ to [aps] where the stop is deleted but the fricative would be retained and the morpheme kept intact.

This brings us to the interesting conclusion that there is something about the very nature of /-s/ as a morpheme which will act to preserve /-s/ in the first language but delete it in L2 English. Only when /-s/ is a morpheme, such as the third person indicative /-s/ in Eckman's study, will L2 learners delete it and thus violate Eckman's proposed rules for reduction and markedness. Eckman is careful to describe his CR rule as optional and his markedness constraints as only tendencies in interlanguage (IL), but if they do operate as he claims in this study, then, we see that the deletion of /-s/ by L2 learners of English violates Eckman's CR rule and markedness constraints. According to Eckman, the L2 speakers should preserve it. Why are they so eager to delete it? The answer does not seem to lie within Eckman's study of consonant reduction and markedness constraints, but perhaps phonology of third person indicative /-s/ with regard to the sonority hierarchy might provide more insights into his data.

As seen above, L2 learners of English will allow final consonant clusters even though their languages may not, but they seem to violate Eckman's proposed universal constraints by deleting third person indicative /-s/. A study by Herbert Tropic (1987) might provide some reasons for these deletions. Tropic proposes that the sonority hierarchy may influence consonant clusters and syllable structure; his summary of the sonority hierarchy follows in (5) and is depicted in (6).

- (5) Each syllable has a peak, mostly a vowel. If additional segments are present at the beginning or the end of the syllable, then they have a tendency to be ordered in such a way that the sonority declines from the syllable peak to the peripheral segments. (Tropic, 1987:175; cf. Hooper, 1976; Kiparsky, 1979; Selkirk, 1984)

- (6) *Sonority Hierarchy* (Tropic, 1987:176):

C	C	N	L	G	V	G	L	N	C	C
plosive	fricative	nasal	liquid	glide	vowel	glide	liquid	nasal	fricative	plosive

(less sonorous) ←----- (most sonorous) -----→ (less sonorous)

In a study of Spanish L1 learning German as an L2, Tropic investigated whether sonority affects the L2 phonological acquisition and if this can explain "certain 'free' variants which cannot be explained through [native language] or [target language] restrictions" (1987:177). Since Tropic's study does not investigate English as an L2, third person indicative /-s/ is not addressed directly. However, from Tropic's demonstration that the sonority hierarchy contributes to variability in consonant clusters, we can infer similar effects on consonant clusters in English.

With regard to omission of syllable final consonants, Tropic reports that "the more sonorant a final target consonant, the more likely it is realized as a (possibly deviant) variable in the IL, but not omitted ... a similar observation holds for final target clusters" (1987:188). Given this information, we can return to the data from Eckman's study and examine examples from those data which contain final clusters formed from adding third person indicative /-s/. Eckman's list contains almost thirty third person indicative verbs, six of which are listed in (7) (taken from Appendix A), representing each of the final consonant clusters involved. In each case, the sonority hierarchy is violated in the final consonant

cluster by addition of the fricative morpheme /-s/.

(7)					
<i>claps</i>	C	G	V	C	C
	stop	glide	vowel	stop	fricative
<i>eats</i>	V	C	C		
	vowel	stop	fricative		
<i>cooks</i>	C	V	C	C	
	stop	vowel	stop	fricative	
<i>asks</i>	V	C	C	C	
	vowel	fricative	stop	fricative	
<i>tests</i>	C	V	C	C	C
	stop	vowel	fricative	stop	fricative
<i>acts</i>	V	C	C	C	
	vowel	stop	stop	fricative	
<i>sifts</i>	C	V	C	C	C
	fricative	vowel	fricative	stop	fricative
<i>accepts</i>	C	V	C	C	C
	fricative	vowel	stop	stop	fricative

Considering Eckman's data in light of Tropic's study, it becomes clear that there is a tendency for these L2 learners of English to omit /-s/ when it violates the sonority hierarchy, thereby overriding Eckman's consonant reduction and markedness constraints. If the sonority hierarchy is a universal, then it would seem to be a powerful constraint which can act to inhibit complete acquisition of third person indicative /-s/ for many L2 learners of English. This may answer the original question concerning the variability of the third person indicative /-s/ by even advanced L2 learners; they may delete third person indicative /-s/ when it violates the sonority hierarchy, but retain it when it does not.

Conclusion: A proposed study of /-s/

The above claim is obviously open to empirical investigation. After L2 learners of English have sorted out the semantic and syntactic complexities of general /-s/ in English and begin to use third person indicative /-s/, we can investigate the variability of this morpheme in a variety of language functions. Through free writing and editing, reading aloud, and natural speech we can examine learners' omissions of /-s/ from final consonant clusters in relation to the sonority hierarchy. If we find that /-s/ is retained in vowel final verbs, for example, but deleted after stops, we may be able to explain the variability in terms of sonority constraints. As Tropic pointed out in his investigation of an interlanguage, variations which are not explained by the function or by the native or target language may show that "a universal factor is operative" (1987:174-175). If we can demonstrate that the sonority hierarchy operates to inhibit productions of third person indicative /-s/, then this "easy" rule in English could be under a powerful universal constraint; the inherent tendency of /-s/ to violate a possible universal such as the sonority hierarchy can make third person indicative /-s/ one of the most difficult things for many adult L2 learners of English to acquire.

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APPENDIX A

WORD LIST Final Clusters (Eckman, 1987:160)

st test nest post dust cost	erased released passed missed bussed	sts costs tests nests posts sits	ts eats cats puts sits abets
sk ask bask husk mask tusk	sks husks asks basks tusks masks	ks box tax fix wax mix	kst taxed mixed boxed waxed fixed text context next
skt masked asked tusked basked husked	kt duct fact pact act sect	tucked packed backed booked cooked	kts acts facts ducts pacts sects
sp clasp rasp gasp lisp grasp	sps grasps clasps rasps gasps lisps	spt lisped gasped rasped grasped clasped	pst eclipsed relapsed elapsed collapsed lapsed
ps perhaps lapse eclipse elapse collapse	rips claps grips laps gaps	pt opt adopt sept accept adept	pts opts adepts adopts accepts septs
	ft tuft gift haft sift raft	fts gifts rafts sifts tufts hafts	

AMERICAN SIGN LANGUAGE
AND THE SECOND LANGUAGE LEARNER:
THE INFLUENCE OF MODALITY
ON ADULT SECOND LANGUAGE ACQUISITION
Gigi McGuire Leach

The acceptance of American Sign Language (ASL) as a natural language which has all the grammatical characteristics of spoken languages has come gradually over the past thirty years. Research into the structure of ASL was pioneered by William Stokoe's *Sign Language Structure* (written in 1960) and with the publication of *A Dictionary of American Sign Language on Linguistic Principles* (written in 1965), which he co-authored with two deaf colleagues at Gallaudet University. It was not until the 1970's, however, that linguists began to focus their attention on ASL and produce detailed analyses of its phonology, morphology and syntax. Research into the structure of ASL is still in its infancy compared with work on spoken languages, and research into the acquisition of ASL as a second language is scant compared to that written on spoken languages.

It is the purpose of this paper to investigate the acquisition of ASL as a second language by hearing adult learners. While we assume that the acquisition of any second language will present roughly the same set of problems, at least for the adult learner, it is of interest to find out in what ways, if any, the difference in modality, visual-gestural as opposed to auditory-vocal, may affect second language (L2) acquisition. As Newport and Meier (1985:882) have suggested, comparisons of the acquisition of ASL and spoken languages "may help to delineate those aspects of acquisition which are universal and those which are specific to certain linguistic and modality related typologies."

Part I of this paper will briefly introduce the reader to ASL and establish that it is a grammaticized, fully propositional language. Part II will examine first language (L1) acquisition of ASL in order to have an interesting basis for comparison with second language acquisition. Part III will develop the hypothesis about what effect the difference in modality will have on second language acquisition for hearing learners. Part IV will review responses from interviews with two hearing learners of ASL as a second language, and observations on the ASL interlanguage of three hearing graduate students. Part V will summarize the writer's modality/L2 acquisition hypothesis in light of the cumulative data of the paper's earlier sections.

Part I: An introduction to ASL

In 1816, Thomas Gallaudet brought Laurent Clerc to teach at the American Asylum for the Deaf in Hartford, Connecticut. Clerc, himself deaf, brought with him years of experience both learning and teaching at the National Institution for Deaf-Mutes in Paris and a sign language that had developed within the French Deaf community, French Sign Language. In contact with indigenous forms of sign used by Deaf communities in America, French Sign Language began to change and, within the first fifty years of its introduction, a new creolized form emerged--American Sign Language.

William Stokoe was the first to propose a linguistic parallel between the phonemes of spoken languages and the parameters of ASL which consist of handshape, location in relation to the signer's body (also often referred to as place of articulation), and movement within the signing location. Battison later suggested the addition of a fourth parameter, orientation of the palm. He estimated that there are twenty-five distinct locations, forty-five distinct handshapes, ten distinct movements and ten distinct palm orientations (cited in Tartter, 1986).

Each of these parameters has a limited number of values which Stokoe called *primes*. Primes and their possible combinations vary for sign languages around the world. (ASL and British Sign Language, New Zealand Sign Language, Chinese Sign Language, etc. are not

mutually comprehensible.) Combinations of the four parameters form morphological units which, when they vary contrastively by just one parameter, constitute minimal pairs.

Newport and Meier (1985) point out that ASL phonology differs from the phonology of spoken languages in that the four parameters occur simultaneously in a sign rather than sequentially as in speech. Simultaneity is attributable to ASL's modality. Speech is about twice as fast as sign when measured word by word or sign by sign, but ASL matches speech in the number of propositions it can convey within the same time frame (Bellugi & Fischer, 1972). Simultaneity, ASL signers report, also makes ASL easier to process than forms of signing that are sequential like Signed English.

Like spoken languages, ASL includes grammatical categories such as noun, pronoun, verb, adjective and adverb; however, it does not have signs for function words (e.g., articles, prepositions, inflections). Content words, spatial relations, movement direction, movement size and repetition, and facial expressions are used to express the notions conveyed by function words in English. For example, topics, questions, negatives and subordinate clauses are marked by facial expressions; tense is marked by the positioning of the sign in relation to the signer's body (directly in front of him/her for the present, further forward for the future and near the shoulder for the past); aspect (durative and habitual) is indicated by repeating the sign movement; pronouns are established by the signer's pointing to a spatial locus and referring back to it.

ASL does not make as sharp a distinction between nouns and verbs as English does. Stokoe (1975) gives the example that the sign SUITCASE also means CARRY.¹ "The same sign is noun, or verb, or both together. (T)he indeterminacy of word and sentence boundaries ... gives all of us a second way of looking at how experience, the contents, in part, of the intellect, gets put into symbols" (Stokoe, 1975:212).

Although ASL has canonical (SVO) word order (possibly due to the influence of English), in practice, word order is quite flexible. With intransitive verbs, all orders of subject, auxiliary and verb are possible, although slight changes in meaning will occur. With transitive verbs which have a non-reversible subject and object, word order is free. With transitive verbs which have a reversible subject and object, some restrictions apply. (See Fischer (1974) for a more detailed discussion of word order possibilities.)

Part II: First language acquisition of ASL

Children acquiring ASL as a first language follow a similar developmental pattern to children acquiring a spoken language: babbling, a one word/sign stage, a two word/sign stage, and finally a gradual move toward the adult grammar, with greater control of the syntax and morphology of the language (Newport & Meier, 1985).

Stage 1: Babbling with the hands

Deaf infants produce hand configurations that approximate ASL phonological forms, but have no apparent meaning.

Stage 2: One sign stage

There is an early preference for those handshapes that involve contact of the thumb and index finger or whole hand. This nicely parallels the preference of hearing children for stops, which have oral configurations they can feel, over fricatives of liquids, which have less exact, felt tongue or oral cavity positions. Early lexical signs are simplified; they have little or no internal morphology. This drive to make things simple is typical of hearing children also. As one might expect, early lexical signs are similar semantically to those words first acquired by hearing children:

¹Capitalization is typically used to indicate the English gloss for a sign.

MOMMY, DADDY, MILK.

Stage 3: Two sign stage

Young children use the least marked (canonical) word order with uninflected (i.e., morphologically simplified) lexical signs. At this stage, children acquire preverbal negation, but tend to use NO rather than NOT which is the appropriate adult grammar negator. Pronominal reference, pointing to self or others to designate reference, is acquired late in this stage, despite the fact that one might expect the iconicity of pointing to facilitate learning.

Stage 4: Acquisition of ASL syntax and morphology

The acquisition of syntax and morphology begins at around age 2.5 years and continues beyond age 5 years. Verb agreement with real-world noun subject and object and the morphology of aspect and number are acquired between 3 and 3.5 years of age. Verb agreement involving abstract anaphoric reference is not acquired until around 5.5 years of age, and errors involving the morphemes of complex verbs of motion continue for two or three years beyond that. Acquisition of ASL classifiers, which mark the semantic category of size and shape of relevant nouns, begins around age 3 and continues until age 8. Newport and Meier point out that "acquisition of the classifier system ... requires that the child have the ability to categorize objects into semantic or size/shape classes: human, animate nonhuman, plant, vehicle, and the like, or straight, round, large, small and the like" (1985:915). These are cognitive skills that mature over time.

While some research indicates that first signs are acquired somewhat earlier than spoken language (McIntire, 1977; Holmes & Holmes, 1980; Meier & Newport, 1990), this precocity does not appear to extend beyond the earlier stages of acquisition. One study of a hearing child learning English from his parents and ASL from his deaf grandmother, reported the acquisition of the child's first sign at 5.5 months, but his first word not until 11.5 months (Newport & Meier, 1985).

Newport & Meier (1985) offer three possible explanations for the earlier appearance of signs: "(1) earlier maturation of the motor or receptive systems involved in gesture than speech; (2) greater perspicuity, to the infant learner, of gestured than spoken words; and (3) greater recognizability, to the adult observer, of the ill-formed attempts of infants in gesture than in speech."

The same set of problems face the deaf child as the hearing child in filtering out gestures or sounds which are not part of the makeup of his/her language. However, it seems likely that deaf children will see a far greater range of non-linguistic gestures than the non-language-specific sounds to which hearing children are exposed. The innate linguistic faculty functions equally well in either situation to eliminate what is not language specific for ASL or English. Certainly, there is clear evidence of some set of principles that constrain the options from which a deaf child must choose when learning ASL.

Hearing children pay attention to the edges of sentences; deaf children must attend to the face of the signer as well as to his/her hand gestures and body position. What constitutes the edge of a sign or sequence of signs is likely to be, as in speech, what comes at the beginning and at the end of a sign sequence.

Deaf children make use of pantomime to express concepts for which they have not yet learned the signs. Klima and Bellugi note, however, that these invented signs "exhibit certain formal qualities not characteristic of free pantomime; the handshapes, the locations, and the movements are conventional in ways characteristic of existing ASL signs" (1979:11). In other words, there appears to be a strong pull towards conformity with underlying language specific conventions even when, superficially at least, invented signs may appear to

be just mimetic.

Just as parents or caretakers modify their speech for young hearing children, so adult signers modify their signing for the young deaf child. Signs are often slightly exaggerated in size, and sign movements are repeated. The caretaker register in ASL may also involve signing directly on the child's body and molding a child's handshape and moving it through the appropriate sign motion. How much effect the caretaker's shaping of signs has on the child's acquisition of ASL has not been studied.

Obviously, the ability to physically guide a child through an oral speech act is not possible to the same degree as it is with ASL. However, L1 acquisition research indicates that children will acquire only what they are ready to acquire developmentally, regardless of caretaker input.

Research by Boyes-Braem (cited in McIntire, 1977) suggests that there is an order in the acquisition of ASL handshapes. The model developed by Boyes-Braem (see below) is based on "the gradually increasing ability, both physical and cognitive, of the child to control the weaker fingers, making possible the positive specification (production) of more and more *difficult* features" (McIntire, 1977:16). McIntire's research confirms that children will substitute handshapes from the earlier stages for those in later stages, until he/she is developmentally ready to produce these in signs. These substitutions, McIntire points out, are rule governed, not arbitrary.

As was noted above, this kind of substitution has parallels in spoken language. The order of preference in the model, moves from manipulation of only the thumb and index finger or the whole hand, to use of the ulnar group of fingers (middle, ring and pinky). Developmentally, children gain control of the ulnar fingers later than the thumb and index finger; likewise, it may be that control over the ulnar group is earliest lost by adults, which suggests that we might find similar handshape preferences in adult L2 learners of ASL.

Part III: Second language acquisition of ASL

It is this paper's hypothesis that the acquisition of a second language, whatever its modality, will pose roughly the same set of problems for the post-pubescent learner. While errors will be made with the hands, face and body rather than with the vocal or auditory apparatus, this suggests that L2 learners of ASL will experience very similar problems with articulation, with the identification of sign boundaries, with complex morphology and so forth, that adult L2 learners of spoken languages experience. Also, it is likely that parallels will be found between the deaf child's L1 and the adult's L2 acquisition of ASL.

It must be noted that only about ten percent of the deaf community learn ASL at home as their first language. These are the deaf children of deaf ASL-signing parents. Studies of the deaf who have acquired ASL only after entering school, at the age 5 or slightly older, have found that these individuals never attain native competence in ASL (Newport, 1990). This seemingly earlier critical or sensitive period for the acquisition of ASL, I believe, can be attributed to a lack of exposure to any language during the years prior to entering school and learning ASL.

These points are raised because there are few, if any, language communities in which the majority of its members are non-native speakers, by virtue of not acquiring their first language from birth. This factor might be worth considering when looking at the ultimate attainment of hearing adult L2 learners of ASL. It could be argued though that the lack of availability of native-speakers of a target language is similar to that found in the many schools and colleges in the United States where foreign languages are taught by non-native speakers. It would seem then that for most instructional goals, high proficiency, but not necessarily native, input is adequate in the formal classroom setting.

Comments that were interpreted following a taped lecture, *Factors to Successful ASL Acquisition*, by Dr. Mike Kemp, Chairman of the Sign Communication Department at Gallaudet, left the impression that many deaf students are impatient with beginning learners

of ASL and switch into Signed English when conversing with them. This, I believe, may also affect the ultimate attainment of hearing learners of ASL as a second language. Instead of the foreigner talk that learners of spoken languages receive, it may be the case that learners of ASL do not get much ASL input outside the classroom, even in a reduced register.

Oliver Sacks in his book on the deaf, *Seeing Voices* (1989), quotes Barbara Kannapell on the protectiveness that many deaf feel about ASL:

ASL has a unifying function, since deaf people are unified by their common language. But the use of ASL simultaneously separates deaf people from the hearing world. ... This separatist function is a protection for deaf people. For example, we can talk about anything we want, right in the middle of a crowd of hearing people. They are not supposed to understand us. It is important to understand that ASL is the only thing we have that belongs to deaf people completely. It is the only thing that has grown out of the deaf group. Maybe we are afraid to share our language with hearing people. Maybe our group identity will disappear once hearing people know ASL. (cited in Sacks, 1989:129)

One area in which L2 learners may be found to diverge significantly from L1 acquirers of ASL is in the use of the iconicity of signs. Young children do not or perhaps cannot, because of lack of world knowledge, make use of iconicity as a learning strategy, even though they do invent mimetic signs. Adult L2 learners of ASL, because of their broader world knowledge and need for a mnemonic device to store and recall visual language, may reinvest signs with iconicity. Remembering in a different modality, especially spatial relations, may prove to be one of the major hurdles an adult ASL learner faces.

While spatial relations are processed by the right hemisphere of the brain in hearing people, the deaf may store spatial relations differentially in the brain's two hemispheres: linguistic spatial relations are left hemisphere functions, while non-linguistic spatial relations are right hemisphere functions. Bellugi, Klima and Poizner (1988) in a study of ASL aphasics report of a woman with right hemispheric damage, who had no difficulty using all the linguistic aspects of spatial relations in either a left or right direction from her body. But when asked to describe the layout and contents of her room, she was not able to make sense of the non-linguistic spatial relations involving areas to her left. "Apparently, it is not the physical nature of the stimuli but their functional interpretation that determines which hemisphere will process them" (Fromkin, 1988:5).

Part IV: Evidence from second language acquisition of ASL

In order to gather evidence on second language acquisition and ASL, two hearing learners of ASL were interviewed.² Both women were highly motivated and had positive feelings about the deaf community because of experiences they had as children with deaf classmates. They also had studied Signed English prior to learning ASL at Gallaudet University.

While self-reporting is always a questionable source of empirical data, it may not be beyond the bounds of reasonable research practices to report on impressions drawn from casual interviews, keeping in mind that these are just impressions, not facts. Impressions

²The two hearing learners of ASL included a current graduate student in the Sign Communication Department at Gallaudet and someone who studied and worked at Gallaudet a number of years ago.

from these two interviews contributed to the belief that ASL is perceived as different because of its modality and the pervasiveness of English language surrounding it.

Using one's body to express oneself, though perhaps daunting for someone shy or self-conscious, certainly is not foreign to most people. People use body language throughout the day to enliven our words or clarify them. Of course, this kind of body language has no linguistic content, but there appears to be some positive transfer or association here which is modality-specific. Both interviewees reported having far more difficulty with learning a spoken foreign language than with ASL. Naturally, there are many other factors to be considered, but the perception that ASL is not really a foreign language may have a positive effect on L2 acquisition.

Dr. Kemp's taped lecture mentioned earlier focused on social and affective variables in the acquisition of ASL. He specifically mentioned learner's problems with facial expressions and tied these to language shock, the fear of looking foolish and making mistakes in the target language. He felt that the learners's attitude toward the deaf community, integrative motivation, length and depth of acquaintance with the deaf community or culture, and lots of language practice in social settings were key to acquiring ASL. The chairman of any language department would, to be sure, have very similar observations on learning a spoken language.

Finally, examining the findings by Irene Koshik (1982) attempts to add to the data of ASL as a second language. Koshik studied the interlanguage of three English-speaking graduate students, including herself, who were studying ASL. She video-taped two conversations, the first after five days of class instruction and the second after five weeks of instruction. Classroom methodology employed Direct Method (British Audio-Visual adapted to visual-visual requirements), with some Grammar-Translation and some Total Physical Response. Spoken English was used on the board or in handouts. Students were taught to mouth English while signing ASL.

The conversation that Koshik taped of herself and two friends after five days of instruction in ASL had "very little content and little sustained discourse" (1982:19), which is hardly surprising, although all three women had studied several other foreign languages and taught ESL. Each of the participants tried to introduce chunks of dialogue learned in class, but when questioned about these, none of them was able to keep the conversation going. Topics shifted abruptly and finally the conversation completely broke down.

By contrast, after five weeks of instruction, these three women were able to hold a fairly elaborate conversation on a wide range of topics. Although their grammar was still limited at this stage, they had acquired a large vocabulary which they were able to use imaginatively to sustain conversation. (Whether the same level of conversational success would have been possible with a stranger who spoke only ASL was not tested.) The pattern of both these conversations was largely narrative, story-telling. This is far different from the typical pattern found in native/non-native conversations, but it was the format typically used in these students' ASL classes.

Transfer errors were seen in the transfer of English syntax, lexical items and discourse pragmatics. Koshik notes that "discourse features such as segmentation of utterances and pause time between utterances can subtly influence attitude toward the conversation partner.... When English rules (of permissible length of eye contact) are transferred into ASL, deaf persons perceive hearing addressees to be inattentive and uninterested in what is being said. (H)earing people who do not make full use of ASL facial expression may be perceived as being boring monotones while signing, and uninterested in conversational partners when another is signing (1982:39).

The most common lexical errors Koshik found were those involving spatialization and classifier usage, "two grammatical categories absent from English" (1982:106) and late learned by first language ASL acquirers. Prepositions, for example, are expressed by spatialization in ASL, but learners tended to lexicalize these function words.

The conversational strategies found by Koshik in this study were similar to those common to learners of spoken languages: paraphrase, conscious transfer from L1, mime, appeals for assistance, comprehension checks and requests for clarification (Koshik 1982). However, as we noted above, these strategies do not appear to characterize native/non-native conversations in ASL, where switching from ASL to Signed English appears to be the preferred conversational strategy.

Koshik concludes by stating that the origin of errors and conversational strategy types were similar to those occurring in the acquisition of spoken languages, though evidenced in slightly different ways due to the difference in modality.

Part V: Conclusions

It appears that phonology, in whatever modality, will be difficult for adult learners to acquire, and that mastery of the syntax of ASL will make special demands on the learner's visual acuity, sensitivity to timing and manual dexterity in much the same way that spoken language does on the auditory and vocal faculties. The adult learner's ability to note the iconicity of signs and to use pantomime may be helpful as mnemonic devices, but are not of long term value in learning ASL. However, if it is true that learners of ASL perceive it as less foreign than a spoken language, this may have an effect on the rate, but not the route, of acquisition.

As research on the structure of languages continues, we may begin to find that the two modalities, visual-gestural and auditory-vocal, are really not as different as they seem on the surface. One can already point to parallels between autosegmental phonology's description of spoken language and the simultaneity of ASL's phonology.

More research is needed to verify the similarities between first and second language acquisition of ASL. What has been reported in this paper suggests that it is likely that some similar acquisition orders will be found.

For too long ASL went unnoticed and unappreciated and the term *language* was reserved only for auditory-vocal modalities. The last thirty years have seen welcomed changes in this view. No one any longer doubts that American Sign Language is language-rich in wit, plays on signs, poetry, drama, and even songs without sound. Unlike spoken language, we can choose not to attend to the visual-gestural language modality, but, as this paper has hopefully illustrated, not to pay attention would mean ignoring a fruitful line of research which promises to shed new light on language structure and language learning.

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SOME NOTES ON STALNAKER'S POSSIBLE-WORLD THEORY OF PROPOSITIONS*

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The notion of the proposition is somehow traditional in philosophy. Frege noticed the natural connection between the things we believe and the meanings of sentences (Frege's *thought*). In this paper I will not be focussing on Frege however, but rather on Robert Stalnaker's (1976) definition of *proposition*. There are two fundamental parts to this paper. Firstly, I will introduce some of the concepts underlying Stalnaker's view, and point out the roles of some attendant theories. Secondly, I will discuss what Stalnaker calls the serious difficulties of his view, which interestingly enough, amount to near analogues of the problems that Frege noticed arose with identity statements and statements with substituted coreferring terms, especially in opaque contexts. Throughout the paper we will see basically how his account synthesizes ideas of Russell's time, as well as the current speculation.

The first thing to understand about Stalnaker's conception of propositions is that it comes about in a modal logic where necessity and possibility are defined in terms of a structure of possible worlds. Modal logic is a branch of logic which captures the fact that the changing denotation of an expression is a function of changing facts. That is, the notion of possible worlds is a primitive in his theory. That there are different possible states of the world relative to which statements will be assigned a truth value is actually an extension of model theory. Model theory is one of the components of truth-conditional semantics because it is assumed that certain facts about the world help determine the semantic value of a sentence. Consider the statement in (1), for example.

- (1) Martha is looking at the stars

The statement in (1) will be true in any model where there is an individual named Martha, who is in an appropriate relation to predicates and truth values, that is, whenever the model has Martha looking at the stars. That meaning is thought of as truth conditions is reminiscent of Davidson, Quine and even the existential conditions of Russell's definite descriptions, among others.

Stalnaker points out that once domains of possible worlds and individuals are specified, statements of necessity can have a natural interpretation. If, in all possible worlds in the domain, Martha is looking at the stars, (2) will be true.

- (2) It is necessarily the case that Martha is looking at the stars.

Notice how, on a possible-worlds approach, (1) divides the set of all possible worlds into two: worlds where it is true; and worlds where it is false.

Another natural interpretation that falls out of this view is the distinction between intentions and extensions. The extension of an expression is its denotation relative to a possible world. The intention of the same expression will be a function, or a rule, mapping possible worlds into its denotation. The rule determining the extension of a sentence, then, is the proposition it expresses. That is, a proposition is that function from possible worlds into truth values; it is the function that gives you that set of worlds in which the sentence expressing the proposition is true. The relevance of intentionality will soon be apparent.

Stalnaker first argues that an independent justification for the suggestion that propositions are the objects of propositional attitudes is that the latter are functional states of

*I thank Leora Weitzman for helpful discussion and comments.

a rational agent.¹ Assuming some theory of rationality, the common-sense view of why actions of rational creatures are appropriate is that their beliefs determine their eventual choices of alternative possible courses of events, while their desires might be functioning to order the alternatives in terms of their desirability. On a functional account then, rational creatures are disposed to behave in one way as opposed to another, because of the different features distinguishing possible worlds, which determine that belief and hence that choice of action.

Before delving into the problematical areas of this view, Stalnaker points out that if we believe that creatures such as cats are somehow rational and that they have beliefs and desires, as Jerry Fodor (1987) believes of his Greycat for example, who exhibits instances of wanting food, wanting to go outside and fearing aggressive dogs, then in that case, not only is Stalnaker's definition of proposition based on possible worlds appropriate for the functional account of propositional attitudes, but moreover his theory could not have defined propositions in any way which is dependent on language without excluding the possibility of animal beliefs, among other cases.

In a functional theory of mind we are interested in the organization of the mind, and specifically the roles of propositional attitudes. Animals then, may have beliefs and desires because these objects are understood purely in terms of their role in the rational determination of their action, and thereby are independent of any linguistic form or internal representation.

This is desirable, since it seems that there is a causal link between, say, cats' dispositions to particular behaviors, and external reality, yet it would be counterintuitive to suppose that they have mental language as humans do.

More evidence that the objects of propositional attitudes are essentially nonlinguistic is that, while we normally may speak of true, false, incompatible and independent beliefs, which are properties of statements as well, other linguistic properties such as "the first constituent" or a subordinate clause are not naturally attributable to propositions. On this account, propositions have no syntax, no "exact words." We also know this by the fact that we can have propositional attitudes about people or objects to which we cannot give a name or unique reference.

Now then, besides what Stalnaker calls problems of general skepticism about whether a theory of possible worlds can have productive application, which, according to Stalnaker is not an independent reason to reject the idea (it is simply rejecting the existence of possible worlds), Stalnaker discusses the problem of codesignating terms. Recall that Frege's sense attempted to account for such problems. Here, the problems arise in connection with the logical equivalence and the necessary truth of statements and propositions. Stalnaker explains them separately, but they are closely related enough so as to have parallel solutions, and given this, I will discuss the case of necessary truth because it is more interesting, and indicated where it crucially differs from the case of logical equivalence. Notice how the necessary truth that two objects be identical is similar to the notion of logical equivalence, except that in the first case, two objects of propositional attitudes will be logically equivalent when they hold in exactly the same possible worlds.

We assume that a desideratum of this theory is that the proposition expressed coincide with the proposition believed. Suppose the statement in (3) expresses a necessary truth that can be known a priori, or independently of observation.

(3) The Evening Star is the Evening Star.

¹In this theory, speech acts can, more or less, be thought of as propositional attitudes, as well.

And hence we can say (4).

- (4) It is necessarily the case that the Evening Star is the Evening Star.

Now suppose that (5) is true.²

- (5) Martha believes that the Evening Star is the Evening Star.

This is plausible since (5) will be true if there are one or more certain possible worlds in which (5) is true, and (3) must hold in every possible world in the domain. Now consider Kripke's (1972) claim that there are necessary truths that can only be known a posteriori, that is, only after one has been convinced of the empirical evidence. Suppose that (6) is such a necessary truth.

- (6) The Morning Star is the Evening Star.

Notice that now that we have substituted a coreferring term, which we should be able to do by Leibnitz' Law, the proposition expressed in (6) is only contingently true. To verify it, we go out into the world and look for the relevant facts (i.e., not linguistic objects). We cannot go on to say, analogously to (3), (4) and (5), that the following is true.

- (7) It is necessarily the case that the Morning Star is the Evening Star.
(8) Martha believes that the Morning Star is the Evening Star.

By saying that the proposition expressed in (6) is only contingently true, we are pointing out the fact that the set of true statements is the set of necessary truths together with a complement set of contingent truths: those that are true as a matter of fact, although they might have been otherwise had the world been different. In the case of (7) or (8), we can imagine possible worlds compatible with our knowledge (which Stalnaker suggests might be an aspect of the definition of possible world) in (6) which will be false (making (7) false, as well), namely those in which the relevant facts are different. For example, if two planets different from Venus (the referent of both names in (6)) had been called "the Morning Star" and "the Evening Star," (7) would definitely be false and (8) could very well be false, too.³

The problem arises when we consider what it means to say that the proposition expressed in (6) is not necessarily true. How can an object sometimes not be identical to itself? By appealing to the contingency of naming, Stalnaker argues that we are invoking irrelevant facts. Any argument that the Evening Star itself is distinct from the Morning Star itself is incoherent.

²It is not clear whether we can have false beliefs about tautologies (i.e., a priori necessary truths) on this view, for instance, the problem of *logical omniscience*, the view which seems to entail that everyone knows all logical truths, because they cannot have any false beliefs about them unless these are really false beliefs about which proposition certain sentences express. But, an additional question arises: are there no such things as logically true propositions? If we assume the proposition to be devoid of linguistic structure (constituent structure), you should not be able to say that (5) must be true. But it would be hard to defend the claim that we do not recognize such fundamental concepts.

³Example (7) is false if the Morning Star and the Evening Star are *really* possible worlds. It is not clear what to say about (8), that is, whether its truth depends on really possible worlds or just epistemically possible ones in which the Morning Star is not the Evening Star.

Notice that this is where the similarity of logical equivalence to necessary truth diverges. If Martha believed only a proposition P and not its logical equivalent Q, we need only remind ourselves that P and Q stand for expressions that denote things that express the proposition that P, in order to see that, according to Stalnaker, Martha does believe that Q, but just does not express it that way.

Unfortunately, this same rationale does not extricate Stalnaker from the quagmire that the existence of necessary a posteriori truths is incompatible with a possible-worlds account of knowledge. The thesis that propositions are objects of propositional attitudes predicts that we have beliefs about some possible world, or that we may have no beliefs about some possible world, or that we have false beliefs about these. The paradox is that when there are propositions whose necessary truth can only be discovered by knowing the relevant evidence, any rational agent among us might be inadvertently left in the dark with regard to this proposition and she will have a false belief (i.e., no belief) about the necessary truth of that proposition. That is, there is no way to represent this false belief, since it ought to be a relation to the possible worlds in which the sentence is false, but there *are* no such worlds.

Stalnaker backtracks slightly at this point to distinguish contingent propositions from necessary ones. He argues that the hope for a solution to this problem is to exploit the gap between the statement and proposition. This means that, according to Stalnaker, somewhere in the relation between the propositions and their expressions will be found the fact that there are actually two propositions in the case in question, the contingent one and the necessary one, the first being a function of the rules determining the second. This way, if I edify Martha regarding the relevant identities and she believes it, now when she asserts (6) for example, she is asserting a contingent proposition, whereas the necessary proposition exists somewhere "out there," not contingent on any combination of syllables or sounds for formal instantiation (or, a name). Notice how there actually may be no point in asserting a necessary proposition, which is distinct from a necessary truth, as these are often reasonably asserted.

By way of concluding remarks, let me highlight two features of this possible-worlds approach to propositions. Number one is that we could object to the fact that Stalnaker commits himself neither to the view that meaning can be used to explain modality (i.e., necessity, possibility) as does Carnap (1947), nor to using modality to explain meaning, nor does he commit to the view that we understand necessity and possibility independently of meaning. Secondly, we notice that Stalnaker's account involves something like an intermediate entity. Recall that when Carnap (1947) coined the term "intention," he meant to formalize Frege's notion of sense. While Stalnaker does not explicitly say it, there is an intuitive notion of some level of meaning staying the same, while the referring expression changes, as in the current speculation about the meaning of indexicals where their meaning is just that which stays the same: the function from contexts to referents.

We can see how this intermediate level stays the same in the case of intentions if we substitute a Russellian disguised description for one of the referring expression(s) in (6), something along the lines of (9).

(9) The star that shines bright in the morning

The proposition expressed in (9) is sense-like and description-like in that you understand more detail by it than by the referent alone. In the same way, the intention of a predicate is the property it expresses, not just a class of objects. The properties expressed in (9) can stay constant while names for the referent can vary as a function from possible worlds into

sets of objects.⁴

To summarize this paper, Stalnaker defines the proposition as a set of possible worlds, and as the object of propositional attitudes in a functional theory of mind. The consequence of this is that, not only do we have a common-sense theory of various dispositions to behave in a particular way based on deliberations over possible-world outcomes, but in addition, Stalnaker and Carnap have salvages from Russell and (especially) Frege what it was that was intuitively correct but formally intractable about an informative middle layer of meaning. Even in the paradoxical case of rational agents ignoring necessary truths, which the functional theory allows, we can appeal to their ignorance of the abyss between statements and propositions for a solution, an avenue which Stalnaker clearly hopes can be pursued.

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⁴It is not always clear how much will be different in a possible world compared to the actual world. For example, the referring expression "9" and its referent do not change from possible world to possible world (I am told), while "the number of planets" is changeable. If there could have been any number of planets in the solar system, why does there necessarily exist a planet Venus in every possible world? If we stipulate, even by indicating with examples, what things would be different or similar, this would lessen the force of the theory.

PRACTICAL THEORY:
EFFECTS OF POSTLEXICAL RULES ON
SECOND LANGUAGE PRONUNCIATION*
Thomas Purnell

For some time, the literature on the subject of language teaching has pointed out that language teachers have a tendency to shy away from linguistic theory (Tarone, 1987; Grabe, 1992). Like Hammerly's (1973) assessment of generative phonology, linguistic theory has put on a face of abstractness that appears to be irrelevant to language teachers and learners. Even if one does allow linguistic theory to impact language teaching, one will observe that the theories employed are fairly dated, (Grabe, 1992). Nevertheless, this paper will propose that current linguistic theory does assist in targeting and improving teaching methods. (See Hironymous (this volume) and Leahy (1980) for examples of theory impacting teaching methodology.)

One theory of present interest to linguists is the theory of prosodic features or rules of postlexical phonology. Consider the English words in (1) said in isolation.

- (1) [æD] add
 [æt] at

Spoken in a some select environments by a native speaker of English in conversational speech, *at* becomes [æD], as in (2).

- (2) [æD] ease
 [æD] all
 [æD] open windows
 [æD] umbrellas
 [æD] ice
 [æD] owls

 *[æD] toys
 *[æD] boxes
 *[æD] cars
 *[æD] some windows
 *[æD] lone sharks
 *[æD] no time

If native speakers know when to flap and if it is a goal of non-native speakers to use native-like pronunciation whenever possible, then teachers would teach postlexical rules, such as flapping. It is the claim of this paper that a knowledge of prosodic feature theory can significantly impact teaching pronunciation of items like those in (2). First, the theory of prosodic or postlexical rules of phonology will be summarized. This will be followed by an examination of the issues in second language pronunciation that pertain to teaching pronunciation, and finally, methodological predictions will be made.

Postlexical phonology

Postlexical phonology is often considered to be the component of phonology that deals with phrasal rules and constructions, in contrast to the lexical component which is often the realm of word formation rules. By way of an overview of postlexical phonology, one must know what distinguishes the postlexical rules from lexical ones. Three groups of characteristics provide the necessary differentiation: rule environment attributes, qualities of

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rule output, and the nature or application method of rules.

First, rule environment attributes of the phonology of all languages, as the theory currently stands (cf. Kiparsky, 1982; Mohanan, 1982; Selkirk, 1984; Kaisse, 1985; Halle & Mohanan, 1985; Rubach, 1985; Nespor & Vogel, 1986; Rice, 1990; Vogel, 1991), can be divided into several prosodic divisions: the syllable (σ), the foot (Σ), the phonological word (ω), the clitic group (C), the phonological phrase (ϕ), the intonational phrase (I), and the utterance (U) (3). These domain classifications can be grouped into a lexical component (domains through the phonological phrase) and a postlexical component (domains through the utterance).

(3)	
syllable	[place] _{σ}
foot	irre[placeable] _{Σ}
phonological word	[irreplaceable] _{ω}
	[outboard] _{ω} motor
clitic group	[haven't] _{C}
phonological phrase	[haven't seen] _{ϕ}
	[John's [outboard motor]] _{ϕ}
intonational phrase	[haven't seen John's outboard motor] _{I}
utterance	[[[several] _{ϕ} [potential buyers] _{ϕ}][[haven't seen][John's outboard motor] _{ϕ}]] _{U}

Rules affecting both segmentals and suprasegmentals apply with respect to the domains within both subcomponents of phonology in three ways (Selkirk, 1980; Nespor & Vogel, 1986). First, *domain span* rules apply within domains, as in (4) (=Nespor & Vogel's [10]). Secondly, *domain juncture* rules apply across domains, as in (5). Finally, *domain limit* rules apply at the edge of domains, as in (6).

- (4) Domain span:
 $A \rightarrow B / [...X_Y...]_{D_1}$
 e.g. Glottalization (optional)
 $t \rightarrow ?$
 $[bo[?]le]_{\omega} \sim [bo[t:]le]_{\omega}$
- (5) Domain juncture:
 i) $A \rightarrow B / [...[...X_Y]_{D_1} [Z...]_{D_2} ...]_{D_3}$
 ii) $A \rightarrow B / [...[...X]_{D_1} [Y_Z...]_{D_2} ...]_{D_3}$
 e.g. Flapping
 $t \rightarrow D / __ [-cons]$
 $[[a[t]]_{\omega} [ease]]_{\omega}]_{\phi} \sim [[a[D]]_{\omega} [ease]]_{\omega}]_{\phi}$
- (6) Domain limit:
 i) $A \rightarrow B / [...X_Y]_{D_1}$
 ii) $A \rightarrow B / [X_Y...]_{D_1}$
 e.g. Aspiration
 $[-voice, -cont, +cons] \rightarrow [+asp] / [__ ...]_{\omega}$
 $[[t^h]ick]_{\omega}, [p^h]ick]_{\omega}$

Because some postlexical rules appear to apply within a word, it can be difficult to

conceptualize the division between lexical and postlexical domains. The current theory claims that rules are not classified as solely lexical or postlexical, but are classified by the last domain in which they apply. Rules are available for application at the most restricted, or smallest, domain prior to any derivations. While no new rules can be added to the derivation, rules can cease to apply at any time. This aspect of rule application has been labeled the Strong Domain Hypothesis (SDH), spelled out in (7).

- (7) *Strong Domain Hypothesis (SDH)*: The grammar may stipulate merely where a rule ceases to apply. All rules are potentially applicable at the first level of the lexicon, and apply there provided only that the principles of the grammar permit it; at lower levels of the lexicon and in the postlexical phonology rules may be *turned off* but no new ones may be added (Kiparsky, 1984; Rice, 1991).

The advantage of the SDH is that rules such as voicing assimilation (8) which apply in both the lexical and postlexical components can be accounted for. The rule commences at the outset of the derivation process (9a) and continues into the postlexical component (9b). Flapping, in (1) and (2), may appear to violate the SDH in that the rule only occurs postlexically; however, a word such as *lattice* (la[D]ice) shows that flapping applies lexically as well as postlexically.

- (8) *Voicing Assimilation*
[-son] → [αvoice] / [... [αvoice] ____ ...]_b

- (9) a. cat[s] b. Matt'[s] here.
 mall[z] Bill'[z] here.
 nos[ɪz] Rose'[ɪz] here.

Second, postlexical rules can be distinguished from lexical rules by their output. The resultant form that a word or phrase takes is distinctive as to whether or not the output is a lexical exception, and whether or not its structure was maintained. Postlexical rules prohibit lexical exceptions. For example, the English aspiration rule in (6) will always yield the same phonetic result, application after application. Structure preservation is a claim that only phonological forms included in the initial inventory of sounds will be used in the lexicon. However, it is possible for a novel form to be created in the postlexical stage. For example, flapping in (5) is a postlexical rule in English, since a flap [D] is not a part of the initial phonetic feature set.

Third, phonological rules of the lexicon are separated from the postlexical rules in the nature or application method of the rules. In both the lexicon and postlexicon, phonologists have observed distinct levels on which rules apply. Ordering is typically the method by which rules are discussed with respect to levels (Halle & Mohanan, 1985), probably due to the ease with which some rules block other rules (bleeding) or set up an environment for another rule to occur (feeding) (Kiparsky & Menn, 1987). Although it is not within the scope of this paper to deal with lexical processes, it is important to note that the lexical levels have been shown to correspond to morphological activity. This lexical relationship between morphology and phonology can be characterized by two kinds of cycles: those within a stratum and those between stratum. Looping within stratum, or intrinsic cyclicity, accounts for the occurrence of multiple lexical rules within one layer (e.g. $\Phi \rightarrow M \rightarrow \Phi \rightarrow M \rightarrow \text{etc.}$, Kaisse & Shaw, 1985:20), contributing to the Strict Cycle Condition, as formulated in (10) (=Kiparsky's, 1985 [47]).

- (10) *Strict Cycle Condition (SCC)*:
a: Cyclic rules apply only to derived representations.
b: Def.: A representation ϕ is *derived* with respect to rule R in cycle j iff ϕ meets the structural analysis of R by virtue of a combination of morphemes introduced in cycle j or the application of a phonological rule in cycle j.

This rudimentary method of dividing the rule domains between the lexical and postlexical components by considering that only the domains from the phonological word down to the syllable can be impacted by morphological affixes, and thus, by the SCC, leads to the assertion that postlexical rules apply in a non-cyclic manner. Where phonology responds to morphology in the lexicon, syntax influences the postlexical stratum, although the domains are not necessarily isomorphic with the phrasal syntax. Even though postlexical rules are noncyclic, after the rules apply the phrase formation process proceeds to the following stratum, erasing any residual brackets of previous morphological applications.

Prior to proceeding, one additional comment needs to be made regarding the different types of postlexical rules. The primary distinction between phonological rules in the postlexical subcomponent is that some rules are non-obligatory. For instance, pausing can separate domains and prevent domain juncture rules from applying. This rule attribute divides the corpus of postlexical rules into a group that applies obligatorily (e.g., English Aspiration in (6)) and those rules that are non-obligatory (e.g., English Glottalization in (4)).

In sum, postlexical rules of the phonological component can be distinguished from those rules of the lexicon in a number of ways. Postlexical rules are phonological rules which apply in domains up through the utterance, do not permit lexical exceptions, do not have to preserve segmental or suprasegmental structure, and may be non-obligatory.

Language acquisition

In order for second language learners to successfully acquire postlexical rules, an effective means of examining the effect that postlexical rules have on second language acquisition, and the other way around, is by looking at a speaker's performance and competence. Intuition and research support the claim that performance and competence are not identical in both first and second language learners (Brown, 1987; Goodluck, 1991).

Performance is everything. To some speakers, native-like pronunciation improves their self image as they successfully communicate with others, while to other speakers who prefer not to generate native-like speech, production is a key to distinguishing their identity (Tarone, 1987). To listeners, improved production increases understanding and communication (Hinofotis & Bailey, 1980).

While good speech production has a positive effect on the language learner, the implications of the Critical Period Hypothesis (CPH) seems to discourage the teaching of pronunciation. The CPH claims that after puberty native-like pronunciation is impossible (Scovel, 1969; Seliger, 1978). Although some researchers have attempted to debunk the theory (Flege, 1987; Neufeld, 1980), the CPH is widely accepted. Above all, in spite of the CPH and a host of other factors, the learner's success is primarily dependent upon him/herself.

The CPH, though, should not daunt one's efforts to teach pronunciation. Although native-like speech may be impossible, it is not unapproachable. Several studies show, and teaching materials reinforce, that pronunciation should hold a prominent place in a teacher's repertoire (cf. Leahy, 1980; Neufeld, 1980; Dickerson, 1983; Pica, 1985; Stevick, 1988; Celce-Murcia & Goodwin, 1991; Leather & James, 1991). Near-native-like production is attainable due primarily to the learner's competence.

All other things being equal, a second language learner's competence is characterized by his/her learning strategies and the speech production process. Dickerson (1983) claims

that most adult learners of English can, and are used to using, some form of linguistic metalanguage.¹ Consciousness of the rules of language is indicative of adult language abilities rather than of child language. As Brown (1987) points out, adult learners use whatever tools are made available to them. Some available tools are developed while learning a first language. For example, Bailey, Madden and Krashen (1974) claim that second language morpheme acquisition mirrors first language morpheme acquisition (Brown, 1973; de Villiers & de Villiers, 1973; Dulay & Burt, 1974).

First language cognitive strategies assist second language learners (Crookes, 1991). Fromkin (1971) established that a language learner undergoes a process or progression leading to phonological realization from the utterance to intonation to derived lexical items to morphology, as in (11). This claim is supported by the observation that children can use correct intonation while exhibiting problems with segments (Goodluck, 1991).

- (11) *Utterance generator* (from Fromkin, 1971:50)
- Stage 1: Meaning is conveyed.
 - Stage 2: Meaning is syntactically structured.
 - Stage 3: Intonational contour is applied.
 - Stage 4: Lexical units are assigned.
 - Stage 5: Morphology is added.
 - Stage 6: Articulation.

Implications

Postlexical phonology is impacted by a second language learner's competence and performance. Specifically related to the second language acquisition of postlexical rules, first language phonology rules have been shown to interfere with second language phonology rules. Rubach (1984) found that first language obligatory rules which do not permit exceptions (i.e., rules found in one subsection of the postlexical phonology) may cause interference with similar rules in the second language. For instance, Polish speakers learning English pronounced *tours* as [tuwers] as a result of applying the late postcyclic rule in Polish of Glide Insertion to their second language (1984:46). Fortunately enough, this interference has been found to predominate at the beginning of the second language learning process but begins to decrease later on (Major, 1987). In addition, there have been several studies regarding speech rate and intonation, both postlexically governed attributes.

First, speech rate impacts second language acquisition in that the slower the speech (as a result of attention to formality) the less interference becomes a factor (Major, 1987). Intuitively, at least, lenitions (i.e., segment deletions for the purpose of ease of articulation) would be more likely to occur at a faster rate than at a slower rate of speech. Research by Griffiths (1990) supports intuition, showing that a moderately fast rate of speech impedes comprehension. One example of conflicting research, probably due to faulty implications,

¹This point is not to be taken lightly. Hammerly discounts the effectiveness of generative phonological theory on a second language student because, as he claims, "the second language student who wants to acquire good pronunciation needs ... not to speculate about the mental processes involved in the production of sounds" (1973:488) and that "exercises in derivation are useless for the second language learner, who need not concern himself with underlying or base phonological forms ..." (1973:489). While it is possible to acquire a great deal of language without the assistance of rules, bringing rules to students' attention is not counter-productive. Sherri Purnell (personal communication) informs me that her four- and five-year old kindergartners use diacritics (a form of linguistic metalanguage) in learning to distinguish between short and long vowels. It would seem not only conceivable but appropriate, then, to teach adult second language learners pronunciation using linguistic metalanguage.

has claimed that speech rate is not a factor in second language acquisition. Blau (1990) makes the claim that varied speech rates, either mechanically or naturally controlled, do not affect acquisition. While the findings of this particular study only support mechanized rate fluctuations, there is some evidence, as Weinberger (1992) point out, that a faster speech rate may actually assist second language acquisition.

Second, intonation, which is suprasegmentally layered over syntactic and semantic structures, has been found to influence second language learning in a critical fashion (Lepetit, 1989). Both, Backmann (1977; cited in Tarone, 1987), and Leather and James (1991) claim that intonation goes beyond first language interference and into the interlanguage of a learner's postlexical phonology that does not belong to either the first or second languages.

Since postlexical phonology is impacted by a second language learner's competence and performance, postlexical phonology also impacts second language teaching methodology. First of all, if teaching rules is useful (Dickerson, 1983), and if teachers should begin with suprasegmentals to set the stage for segments (Morley, 1987; cited in Murphy, 1991), then a teacher instructing students on rules of prosodic domains would, it is surmised, begin to be more effective in pronunciation drills.

The progression for teaching pronunciation rules, then, should follow Fromkin's progression in (11), beginning with utterance level rules, then intonational rules, phrasal rules, and so on to the morphology, as in (12).

(12) *Order for teaching pronunciation rules.*

- Stage 1: UTTERANCE LEVEL: Meaning is conveyed.
- Stage 2: INTONATIONAL LEVEL: Meaning is syntactically structured and intonational contour is applied.
- Stage 3: PHONOLOGICAL PHRASE LEVEL: Lexical units are assigned.
- Stage 4: WORD-INTERNAL LEXICAL LEVELS: Morphology is added.
- Stage 5: SEGMENT LEVEL: Articulation.

This model would follow a progression from the largest domain to the smallest domain, thereby prioritizing postlexical rules over lexical ones. Consequently, flapping would be taught prior to rules which deal with the addition of morphology. The model, though, is wholly untested, and one would need to assume that some lexical rules would be included in the postlexical rules since they apply until they are turned off, that some segmental instruction may be necessary, such as minimal pair drills.

Since interference occurs between first and second postlexical phonological rules, teachers are at a methodological advantage if they are aware of the rules in their students' first and second languages. As Celce-Murcia and Goodwin (1991) point out, possessing knowledge of the students' first language(s) and performing a simple contrastive analysis between the first and second languages can assist in matching the most effective teaching method with the students' level of second language development. An added benefit of being aware of what is happening in both first and second languages can, as Vogel (1991) observes, is that second language phonology can provide information into first language phonology.

This paper has suggested that possessing a knowledge of linguistic theory can make language teaching methods more effective. Although the model in (12) appears to be bent in the right direction, it needs to be thoroughly tested. As Leather and James (1991) point out, most research has been done with regard to morphophonemics. Hopefully, this paper has demonstrated that research should be conducted on second language and interlanguage postlexical phonology.

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