Barriers to Language Acquisition

by

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This thesis will explore the acquisition of a second language by normal adults and children, and first language acquisition by children with learning disabilities, more precisely specific language impairment (SLI). It will investigate the striking similarities and the differences between these language groups. Special attention will be paid to morphological and phonological processes that are particularly problematic for both language groups. Ultimately we will delve into the implications of these findings and how they pertain to the fundamental elasticity of our language capacities. The flexibility or rigidity of the parameter settings of the structure of language, for adults and children learning a second language and children with specific language impairment, have implications for further understanding of possible limitations for language acquisition. Special emphasis will be placed on the role of developmental factors that affect the learning process of these groups. Some of the social factors that may exacerbate these language deficits will be examined. These environmental factors have serious repercussions for young language learners and may permanently affect their performance ability. Determining the social factors and developmental limitations that shape language acquisition should foster progress in proper diagnosis and therapeutic or instructive measures for these populations. In order to understand the similarities and differences between these two language groups, we must first examine the structure of language. Once we have established the normal organization of language we can more properly address those groups whose linguistic functioning deviates from the norm. Subsequently we will be able to compare and contrast both language groups and evaluate their prognosis for language improvement.
LANGUAGE ACQUISITION

DEFINING LANGUAGE

A proper understanding of language acquisition should begin with a discussion of language. Language has been defined in various, often-contradictory ways. Understanding the nature and function of language requires the identification of features intrinsic to language. The varying definitions permit or hinder the differentiation among the call of an animal, the babbling of an infant and the eloquent speech of an orator. How do we separate these different vocalizations?

“A language is a system of arbitrary vocal symbols by means of which a social group cooperates” (Bloch & Trager, 1942, p.5).

This definition emphasizes the role of language as communication for reaching a common goal. However, as an explanation it is vague and does not distinguish between human and nonhuman communication. Therefore, more specific definitions have been proposed. A different approach is a list of features that are intrinsic to language: use of the vocal-auditory channel, arbitrariness, semanticity, cultural transmission, spontaneous usage, turn taking, duality, displacement, structure-dependence, and creativity (Hockett, 1963). This list emphasizes the unique organization of language that provides guidelines for production and perception. It is clear that the presence of all these features separates our language from primate communication.

This separation of human language from other forms of communication is, most notably, the result of an internal structure to language. For example, a bee has a dance to communicate the location of honey for his fellow bees. However, this bee
dance is restricted. It does not have a hierarchical internal structure that would allow for a complete grammatical system. A bee’s instructions are limited to horizontal descriptions of space, but not vertical descriptions of honey locations. Given the complicated internal structure of our language we are able to express much more than horizontal and vertical information. We even have the ability to talk about talking.

LINGUISTIC ORGANIZATION

There are a number of competing hypotheses regarding this linguistic organization. Chomsky describes structure-independent operations. Noam Chomsky was a linguist who initiated the movement against the behaviorists in the 1950’s and originated the concept of Universal Grammar. Chomsky proposes that utterances are not random strings of words in a sequence, but that there is an inaudible internal structure that permits the speaker to be understood by a listener, an “innate schematism” of the mind (Chomsky, 1959). The sender of a message and the recipient are able to share an understanding of the transmitted message. This internal structure facilitates accurate transmission of a message.

On the other hand, behaviorism, a field of psychology that was popular during the 1950’s, had proposed that the mechanisms for language development are the same as for all other behaviors. The behaviorist camp believed that all behavior is a result of a learned or unlearned response to external stimuli (Skinner, 1957). Thus, behavior is a direct result of occurrences in the external world. Positive and negative responses from the external world affect the behavioral outcome. Therefore, the behaviorists believed that language development was a result of feedback responses from the
outside world, as opposed to a "pre-wired" inclination for language organization. Chomsky rejected the behaviorist proposal regarding linguistic organization as an over-simplification. He refuted the behaviorist argument based on his analyses regarding "the poverty of the stimulus" presented to children by the language environment. This term refers to the ungrammatical phrases of adults that are used colloquially. Children are brought up in environments where they are surrounded by ungrammatical utterances, yet despite their surroundings they develop normal language knowledge and linguistic abilities. Additionally, he found that in impoverished language environments (i.e. deaf parents, minimal exposure to human contact or abuse situations) children still develop language. Given this information, he argued that language development is not a result of learned behaviors so much as a natural inclination to generate grammatical language developmentally.

Additionally, Chomsky objected to the so-called "slot filling" theory, which proposes that language involves the simple insertion of lexical items into grammatical frames. The slot-filling formulation is clearly faulty because one sentence can often have two separate meanings. An example of parallel meanings in one sentence is: The rabbit was ready to eat. This sentence could be interpreted as: (a) the rabbit was about to eat or (b) the rabbit was about to be eaten. This ambiguity rules out the slot-filling method because if two different interpretations can be formulated for the same word order, there is clearly another principle than simple grammatical frames that generates the expression of the initial thought being expressed.

Chomsky also emphasized the importance of creativity in linguistic organization. Creativity allows the production of new phrases never uttered before as
well as the ability to say things unrelated to that which is stimulated by the external environment. The latter characteristic of creativity is what is stated in the Larousse (1994. a standard French dictionary): speech is the verbal expression of thought. Humans are able to make a commentary regarding arbitrary thoughts, emotions, and theoretical ideas.

The Petit Robert, another esteemed French dictionary, defines language as “the function of expression of thought and of communication among men, implemented by the organs of phonation (speech) or by their notation using material signs (writing)” (from de Boysson-Bardies, 1999). This definition illustrates the notion of speech as a means of expressing thought, not simply as a mode of communication. This ability to actualize concepts in speech is what so clearly separates us from animals. Chomsky says, “this creative aspect of normal language is one fundamental factor that distinguishes human language from any known system of animal communication” (Chomsky, 1972).

This is not to say that human language has no correspondence with animal communication. It is possible that our communication system evolved from the more primitive animal calls. However, our evolved organizational system of language shows clear discrepancies from the communicative behaviors of animals. The vocal tract of a very young infant does resemble that of other primates. However, after five months infants are able to use their larynx and jaw and breathing as adult humans do, thereby permitting the production and control of articulation, unlike their primate counterparts. There is clearly an evolutionary jump in the progress made by humans in language. This evolutionary difference raises the question of innateness. If
language capacities in humans are so different from other primates, are we then born with a blueprint for language?

**INBORN CAPACITIES**

Chomsky discusses the idea of linguistic inattentiveness. This term is often used to mean possessed at birth. However, Chomsky’s usage does not conform to this definition. Instead, he believes that there is an outline at birth, genetically programmed guidelines for language and its grammar. The infant does not have a specific organization for a distinct language. Rather, the fundamental understanding of grammatical structure is “pre-wired” so that the acquisition of language is a relatively easy task. These guidelines span linguistic cultures. Despite the differences in semantics and phonological sounds, all language is governed by intrinsic rules that include a grammatical system.

Karin Stromswold (1995) posits that this inherent grammatical system can serve as a factor involved in language acquisition. Her evidence is that language is “usually present in all normal individuals. Its acquisition tends to be uniform and automatic, with all normal individuals going through the same stages at the same times, without specific instruction being required”(Stromswold, 1995). Next, we will explore the normal acquisition of a first language in order to see the common organization and systematic development that appears to be pre-wired in the brain of an infant.
FIRST LANGUAGE DEVELOPMENT

The common set of principles and the concept of universal grammar proposed by Chomsky can be observed in the uniform development of language acquisition across cultures. The child's rapid learning of this system is dictated by linguistic parameters and principles intrinsic to human nature.

From birth, babies have a preference for their mother's voice (Decasper & Fifer, 1980). Starting in the first month of life there is a preference for the native language (Moon et al., 1993) and a universal ability to discriminate between phonemes (see de Boysson-Bardies, 1999). This discrimination process reflects a strong tendency towards categorization, or what is more formally called categorical perception (de Boysson-Bardies, 1999). This perceptive ability divides speech sounds into discrete contrastive categories. Thus, speech sounds are perceived discontinuously in the form of discrete units, as opposed to gradient-like perception of an acoustic continuum. Therefore, a child can categorize speech sounds despite variations in their phonetic details along the critical dimension. They also display perceptual constancy, in which certain variations are ignored and other variations are attended to, in order to organize incoming information. This categorization is particularly evident in the grouping of phonemes across all talkers: male, female and children. Phonemes are the building blocks of speech. They facilitate communication for all languages and all language speakers.

PHONOLOGY

Phonemes are the smallest linguistic units of sound. Each has distinctive
features that can signal a difference in meaning when modified. A phone is the actual speech sound produced. Thus, a child learning English (or many other languages) can distinguish between /pa/ and /ba/ sounds. Although the /ba/’s may differ acoustically across tokens, they remain categorically separate from /pa/ sounds.

One of the linguistic foci of this paper is on phonology: the rules and parameters governing the structure, distribution and sequencing of speech segments (consonants and vowels). Categorical perception of phonological segments facilitates message sending between transmitter and perceiver, because the actor does not produce a phoneme exactly the same way each time; each token phoneme differs acoustically from the next. However, categorical perception allows the receiver to organize and categorize the phonological details of the message being sent and recognize its meaning. Thus, despite differing acoustic values of a given phoneme, categorical perception provides a system by which phonemes are decoded and filed categorically in lexical entities. All /p/ phonemes coupled with differing vowels or with different formant frequencies (i.e. male versus female voices) will still be recognized as /p/ despite the acoustic discrepancies. One can never produce the identical physical sound twice, given our abilities to control our vocal tracts, thus categorical perception allows us to organize and establish a system by which we can communicate despite these surface variations (Owens, 1998).

The capacity for categorical perception in babies, as we have discussed above, starts early in life. Eimas, Siqueland and Delucia (1971) examined this phenomenon with the use of high-amplitude sucking. A baby’s attention to a stimulus was indexed by his/her increased rate of sucking on a rubber nipple, which was connected to a
computer presenting the stimuli contingent upon the sucking response. A study by Eimas and his colleagues in 1971 confirmed babies' possession of categorical speech perception much like that displayed by adults. In their study, they found that four-month-old babies could distinguish the differences between [pa] and [ba], not by simply identifying any acoustic differences, but by discriminating between phonetic categories. These phonological abilities help babies organize incoming speech sounds.

However, phonology is just one of several ways that children must come to language categories. Morphology and syllable structure are both dependent on language specific rules regarding the combination of phonemes. Morphology makes use of phonological structures by applying them to units of meaning. Syllables fall under the domain of phonology as consonant and vowel combinations that are integrated into a phonological unit. Morphology employs phonemes and syllables in its operations.

MORPHOLOGY

Morphology is the system by which a language systematically combines phonological units of meaning into words. A morpheme is the smallest unit of speech to carry meaning. Children usually start using grammatical morphemes primarily during their second year of life. Free morphemes are base words, bound morphemes are prefixes and suffixes, and in some languages, infixes. Examples of bound units might be the -s in plural nouns or the -ed in verbs that are past tense. These bound morphemes are not words by themselves but they are phonological units
that carry meaning when combined with other morphemes. We will focus specifically on these grammatical morphemes or inflectional morphemes, as opposed to derivational morphemes. The latter type do not modify the word grammatically but change its meaning (i.e. the morpheme -er, changing “farm” to “farmer”).

It is important to note that English does not have a very elaborate morphology as compared to some other languages. Many other languages have morphemes at the end of nouns indicating their role in the sentence. These markers include the accusative and dative cases that are analogous to direct object and indirect object in English constructions (Hoff, 2001).

Morphology is intertwined with phonology. Morphemes are comprised of phonological elements or sequences of syllabic organization. Syllables are the units that carry stress in a word. A stressed syllable is the prominent syllable, and the weak syllable is the less prominent syllable. These syllabic stress patterns integrate the morphological units into intonated speech. Morphological units, in so far as they are realized as syllabic units, are stressed or unstressed, depending on the prosodic structure of the words.

An experiment performed by Frauenfelder, Mehler, and Segui (1981) provides evidence that the identification of phonemes is dependent upon the way in which these phonemes are encoded into syllabic organization. Frauenfelder et al. reported a correlation between response times in the recognition of a phoneme, and the syllable organization of the utterance. The length of the syllable was negatively correlated with the speed of recognizing the target phoneme. This finding provides evidence of a cooperative relationship between these two phonological categories in word
Cutler and Mehler (1987) also investigated whether phonological recognition was affected by a complex syllabic organization. Complex is used here refer to the presence or absence of an initial consonant cluster and the presence or absence of a final consonant structure. Their experiment was conducted with French subjects who were presented with both words and non-words of differing syllabic structures, and asked to identify the target phoneme. Response times were shorter for CV syllables (consonant, vowel) than for CVC and CCV syllables. Thus response times varied in the following order: CV < CVC < CCV. This result was obtained regardless of lexical familiarity of the words, shown most clearly in a follow-up experiment with nonnative listeners. The same stimulus language was used in the second experiment to cancel out the possible bias of familiar phonemes. The same pattern was observed in this second experiment, where they used English speakers but reintroduced the same French words employed with French subjects. They found the same results: the CV type still had the fastest response times and was thus the easiest to perceive. Thus, regardless of the language of the listener the syllable components constitute a perceptual unit that aids in phonological identification. It appears that in adults, phonological information and syllabic structure are intertwined in speech segmentation. These studies show how in adulthood we integrate morphology, phonology and syllabic organization to aid perceptual speed. It is important to see how children begin to develop and struggle with this integrative process of incorporating syllabic organization in their processing of phonemes and morphemes.

There has been considerable research on syllable and morphology use with
children. Researchers found a predilection in Dutch children’s word production from 1.6 to 2.11 years of age for patterns of a strong syllable followed by a weak syllable. This sequence is the dominant sequence in Dutch. Weak syllables preceding strong syllables, whether they were within words or between words, were often omitted (Wijnen, Krikhaar, and Den Os, 1994). A study on English children ages 2.0 to 2.6 found that morphemes such as articles and pronouns (function words) were also omitted based on their phonological position in the sentence. These morphemes are unstressed syllables and thus are the weak syllable. In utterance-initial position, when it was the weak syllable preceding a strong syllable, a function word was more likely to be omitted than when it followed a strong syllable (Gerken, 1991). The function words (including determiners, pronouns, auxiliary verbs and inflection morphemes) in English, German, Dutch, Swedish and Italian are predominantly weak syllables. Thus, the hypothesized problem with the stress of weak syllables consequentially has an effect on the young child’s expression of the morphological structure of these languages. Given this interaction between syllabic structure and morphology there seems to be a correlation between function words and syllabic structure. Morphological omissions made by children are extremely informative about their stage of language acquisition.

*OptionalInfinitive Stage.* Individuals work through the morphological grammar acquisition stage in early childhood. During this time, children often omit the unstressed syllables of function words that precede stressed syllables, or substitute some other word for the difficult function words. In the following example using the third person singular the morpheme -s is omitted because it is unstressed and thus the
verb has been conjugated to fit first person or third person constructions.

(a) She washes

(b) She wash (classic omission)

The morpheme -es has been omitted and substituted with the present tense first or third person plural: I/they wash. In language development children usually struggle to establish morphological categories and structure. This stage in child linguistic development is called the Optional Infinitive stage, in which children use the singular endings of verbs inconsistently in the plural context of inflectional morphemes, in circumstances where plural usage is obligatory. Sometimes the morpheme is used, but sometimes it is omitted. This stage appears in all languages that have been studied. During this stage: (a) children produce nonfinite (unconjugated) forms of main verbs, (b) at the same age, children produce finite forms (conjugated) of main verbs, (c) the children nevertheless know the grammatical (and most semantic) properties of finite and nonfinite morphemes (Wexler, 1994; 1996).
Wexler extended his theory of the Optional Infinitive stage to English despite its lack of a nonfinite morpheme that attaches to the verb stem. Thus, he refers to this as the zero inflection, because there is seemingly no additional morpheme added to the word stem, but it is still a conjugated finite word. For example the stem “go” is also “go” in the first person singular. In English it is more difficult to identify when it is the finitival form of a verb because the finite/nonfinite distinction is not always marked in the surface form. The bare stem may carry an invisible mark of tense and agreement. An example of these zero inflections is apparent in the verb walk.

(a) they walk

(b) they walked

(c) she liked to walk

(a) and (b) are both examples of finite verbs. (c) is nonfinite, and is the infinitive for walk. However, “walk” in both (a) and (c) appear the same on the surface. However, (a) has been conjugated, yet its surface mirrors that of the infinitive. Hence, it is referred to as the zero inflection. It is, as a consequence, easier to see the mistakes characteristic of this stage in other languages than English. In French, a child in the OI stage (optional omission of infinitival forms of verbs) will, like a child learning English, substitute a nonfinite verb for a finite verb. In “Voir l’auto papa” (to see the car of daddy), “voir”, the infinitive of “to see”, is used in the place of a finite verb. “Vois l’auto (de) papa” is the correct usage of the finite infinitive. With the verb “parler” (to speak) the -er is added in the nonfinite form as opposed to the finite form “Il parle” (“he speaks”). In English, the inflection, as discussed above, is invisible. Thus when a child says “he talk”, which appears to be
just a bare stem, it is actually an error in which the child has used the nonfinite/infinitive of the word. In Romance and Germanic languages the nonfinite form has a distinctive added inflection (Rice, Wexler and Cleave, 1995).

Included in English as nonfinite morphemes, and optionally omitted in the OI stage, are the third person singular -s, clauses with auxiliary and copula “be” (“she mad”, as opposed to “she is mad”) and “do” (“what I win?” as opposed to “what did I win?”)(Wexler, 1994.) This error is attributed to problems with tense because these morphological problems are rarely agreement errors. For example, a child will rarely say “I goes”. A verb morpheme rarely disagrees with the subject in this stage (Wexler, 1994; Rice et al., 1995; Wexler & Rice, 1998.)

This point is also confirmed with the use of negative markers. Children are aware of grammatical structure and finite and nonfinite verbs because they use them correctly with negations. Children know that finite verbs precede the negative marker “pas” in French: “Il n’est pas mort” (“he is not dead”) and they also recognize that nonfinite verbs follow the pas: “ ne pas manger la poupee” (“don’t eat the doll”). Thus, children intuitively know that there is a difference between the finite and nonfinite, and recognize the need for agreement (Pierce, 1992; Weissenborn, 1994).

Given Wexler’s assumptions about the role of tense and agreement, verbal behavior during this stage is best enumerated by the following criteria for English:

1. For -s and -ed markings on lexical verbs, bare stems may optionally be used where inflected forms are required.
2. For -s, in the contexts other than third person singular, there will be no overt marking; that is “they walks” is not predicted to be a productive error.
3. -ed will be restricted to past tense contexts.
4. Auxiliary and main verb copula “be” may be omitted.
5. Auxiliary “do” may be omitted.
6. When "be" and "do" forms are used in contexts where the adult grammar requires a finite form, children will give the correct agreeing form. (for example in the case of negation)

Wexler proposes the following hypothesis: “Very Early Parameter Setting: Children normally set their basic clause structure/inflection structure correctly at least from the time they begin to produce two-word utterances”. (Wexler, 1998, p.5)

As proposed by Chomsky, children are predisposed to language acquisition, therefore errors they produce during this stage will work themselves out with natural exposure. We will show later that learning impaired children have a harder time leaving this stage than normal children. We can infer, from the steady progress of normal children to adult grammatical language that without direct instruction, that normal children correct these errors to become fluent speakers of their language.

We have discussed three different linguistic factors that play a role in language development: phonology and morphology and how they interlace. Language acquisition involves learning how to understand the fundamental structure set by these linguistic categories. It is important to examine how infants and young children learn to integrate this information and establish these distinct parameters.

DEVELOPMENTAL ERRORS AND STRATEGIES

We have discussed some of the challenges that confront infants in entering our verbal world. Phonology and morphology play important roles in language development. Thus strategies are necessary to overcome possible pitfalls. We have already discussed how these two aspects of language influence the conceptual organization of words in the infant’s mental lexicon, but it is also important to
examine the way in which infants conceptualize larger language patterns in relation to these subunits.

It is clear in looking closely at early errors that children produce truncations or innovations of words based on coherent strategies. One strategy used by young language learners is the harmonic pattern strategy. This strategy is evident when a child assimilates the first consonant of the word to a later consonant. An example of this in French would be Papo for Chapeau (hat) or Tato for Gateau (cake). There is assimilation of the consonant [p] in the former case and [t] in the latter case (Vihman, 1978, Macken, 1993). Another strategy used is the melodic pattern, in which the first syllable of the word is used but not the latter half. An example of this might be [baji] for bottle or [mani] for mommy (Vihman, 1992). In the second example this truncation could be attributed to the infant's attempt to facilitate a complex construction of phonemes, simplifying it so that they can use an easier phoneme. Children have different methods for learning words and adjusting to the information provided by the language environment.

The process of learning a language is predominantly divided into two main modes: a referential/analytic style and a holistic/expressive style. The first is focused on phonetic elements, structure of syllables and the development of vocabulary (Nelson, 1973). The second is predominantly focused on intonation, word contours, the rhythmic structure of words and their phonetic structure. These different methods of analysis may explain the varying error patterns found among individual subjects. One group of children breaks their speech stream into words, and then chooses a syllabic structure that they can then build their vocabulary around. The other group
produces long sequences that resemble sentences with coherent intonation patterns, and fills in the syllables (Bates, Dale, and Thal, 1995). These strategies are important in showing the processes by which children group linguistic information. These mechanisms provide us with insight into the innate inclination of children toward language organization.

We have examined possible strategies used by young children in adapting to language, that is, how they begin to organize phonology and morphology, and how they conceptualize new information. Universal Grammar, as proposed by Chomsky, has set up the parameters for children’s grammar. There are certain intrinsic constraints on the structure of language that children recognize, and they systematically learn to fill in the divisions and categories as dictated by their language environment. Still, in order to fully understand the nature of language maturation we must also examine a population that has an already established organization, and must learn a new organization. In other words, we must also face the problem from the opposite direction. In examining second language learners, we observe a population that is learning to go from a specific language organization (L1) to a more general conception of language parameters (a framework that permits both L1 and L2 to coexist). Hence, second language acquisition is one of the central themes in this thesis.

**SECOND LANGUAGE ACQUISITION BY ADULTS**

While examining first language (L1) acquisition, we reviewed certain strategies used by young children, including categorical perception and the harmonic
and melodic patterns of word simplification. Each of these helps children to categorize phonemes. Our next objective is to examine whether these patterns occur, also, when an adult is rendered an amateur functionally -- an infant -- by a new language.

First, let us define what is meant by second language (L2) acquisition. The definition given by Rod Ellis (1994) is that it is the learning of any language other than the first. However, this definition lacks specificity. There are subtle differences not mentioned in this definition regarding the context under which one learns a L2. Such differences include the gap between foreign language acquisition in the classroom and L2 acquisition for the purpose of communicating with native speakers of the L2. The difference lies in the level of immersion. L2 learners use their L2 for an institutional and social role in the community, whereas a language acquired in a high school French class would not be considered a second L2. Thus, in these two different situations, the means by which the languages are learned is significantly different. We will be focusing primarily on L2 acquisition that more closely resembles the immersion of an infant in a natural L1 learning environment.

MODELS FOR LEARNING LANGUAGES

The study of L1 and L2 language acquisition has generated many different theories of how we construct language. Categorical perception is a model that explains how one systematizes phonemes perceptually. This kind of classification system shows the natural inclination to sort out linguistic information. However, we have not discussed how this system reacts when adults integrate cross-language
phonetic differences in L2 learning. This section will focus on theories and models of linguistic organization and how they adjust and adapt to cross-cultural language differences.

The theory of phonological transfer of L1 to L2 was discussed by Lado in 1957. He attributed difficulties in establishing the correct phonological structure of a L2 to the transfer of phonological properties from L1 to L2. In other words, the difficulties adult learners had in learning L2 was a result of imposing their vocal motor habits from L1 onto the L2. Assimilation of certain phonemes across languages is difficult because of differing articulation. Essentially, old phonological habits get in the way of new ones, and thus old habits have to be unlearned.

Lado’s transfer theory has since been challenged. The transfer theory in its initial form used the word “habit” to explain the maintenance of certain routines of one language and importing them to another. This word is fundamental to Lado’s perspective about language acquisition because it is an allusion to the prevalent theories of the time. Transfer theory was influenced by the Behaviorists. John Watson, the forefather of Behaviorism (1878-1958), was an empiricist. He believed all knowledge was obtained through experience of the external world and was not a result of cognitive processes.

Watson studied and observed stimulus-response patterns, and postulated that all human actions were a result of causal events that induced a certain response. Even thought was attributed to a cause and response reaction. Language was a result of motor habits in the larynx. Experience and repetition influenced linguistic activities and behavioral activities alike. Watson attempted to explain everything as learned
motor response behavior. B.F Skinner, a follower of Watson and behaviorism, was the creator of the concepts of classical conditioning and operant conditioning. He also believed that these concepts could be extended to language acquisition. Thus, for the behaviorists, conditioning, positive reinforcement, and general experience establish motor activities (stimulus-response patterns) that set the parameters of one's linguistic template. L1 to L2 Transfer was Lado's extension of these ideas: he considered L2 acquisition a matter of unlearning the “bad habits” of L1 transfer.

However, this theory had to be modified due to the ideas proposed by Chomsky. The linguistic learning of young children proposed by Chomsky seems to show that the action of categorization of linguistic information reflects a natural inclination to classify and organize different sounds and segments. Given his ideas regarding Universal Grammar, creativity in language, and efficient language acquisition in children under the impoverished language conditions that adult speech usually provides them, Chomsky argued that experience is not the main component of language acquisition. As a result, the behaviorist theory regarding language lost favor, because it could not account for the observations and objections of Chomsky. Thus, proponents of the transfer theory had to revise their assessments when behaviorism lost favor. The word “habit” and its association with the behaviorist model were removed.

The new Transfer model was similar to the former model in that it continued to assert that L1 categories were reconfigured in an attempt to adjust to the L2 categories. Transfer was said to be observable in the errors of L2 acquisition. However, this “error” of transferring L1 information to L2 can also have positive
effects. For example, L1 transfer was examined by Gass (1979, 1983). Gass divided a group of English L2 learners of diverse language backgrounds into two groups. The two groups were separated by whether their L1 allowed for pronoun retention (Persian, and Arabic) or did not permit pronoun retention (French and Italian). English does not permit pronoun retention. The sentence “the woman that gave a book to her is my sister”, which is not grammatically correct in English, was accepted by the first group and rejected by the second group. Thus, the transfer of L1 grammar helped to guide decisions regarding L2 grammar in the case of the second group but in the case of the first group L1 transfer created an error.

Avoidance of certain grammatical usages is another form of L1 transfer. Kellerman (1992) observed that words or phrases that are not generally used in L1 will be avoided or omitted in L2 use. However, she found that these omissions are not only reflective of the L1 transfer, but are additionally a result of possible fears about misuse or contextual ambiguities. In the same vein, one sees patterns of overgeneralization of learned L2 rules: this can sometimes be an attempt to avoid omission of other L2 structures. For example, an L2 learner may attach a regular past tense inflection to an irregular verb (i.e. cost--costed) (Leveston, 1971, 1979). In order to test the Transfer theory, various cross-language comparison studies have been conducted, in an attempt to verify the L2 learners’ errors as transfer errors rather than a result of generally poor processing. Studies have examined transfer of the grammar and phonological parameters between certain languages that show cross-language compatibility. For example, Swedish learners were ultimately more successful than Finnish learners in acquiring English because Swedish is more
comparable to English in both grammar and phonology (Sjoholm, 1976).

**SPEECH LEARNING MODEL**

Transfer theory eventually evolved into what is now labeled the Speech Learning Model (SLM) of Flege. This model proposes that non-native phonemes are classified by their similarity or resemblance to native phonemes. Both production and perception of an L2 phoneme are improved, the greater the distance they are from a native phoneme. Conversely, similarity of a non-native phoneme to some native phoneme inhibits the development of an altogether new category for this new phoneme. A merger takes place in which an L2 phoneme gets incorporated into the most similar L1 phoneme category, and a synthesis between the two is created. If an L2 sound resembles or is equated with an L1 sound, it will be blocked from establishing its own category. Therefore, L1 accommodates the new information. New categories for L2 phonemes are only established if the L2 phoneme is not very similar to any of the L1 pre-existing category (Flege, 1995). Flege found that French-English and English-French bilinguals showed a merger of L1 and L2 phonemes. Both groups were tested on their production of /t/. Results showed that both groups of bilinguals produced a French /t/ and an English /t/ with values intermediate to those observed for French and English monolinguals, respectively (Flege, 1987).

A study by Flege, Mackay, Piske, and Schirru (2001) is consistent with this prediction of the speech-learning model. They performed a study examining the production of English /b/ and the perception of short-lag English /b d g/ tokens by four groups of bilinguals who differed according to their age of arrival in Canada and
their self-reported use of their L1, Italian. The consonants /b d g/ differ in the two languages in that in Italian there is pre-voicing for all three consonants while in English they are not pre-voiced. They found that those bilinguals who had learned English as children and seldom used Italian had developed new phonetic categories for English /b d g/. The other Italian subjects’ /b d g/ tokens were still prevoiced even in their use of English /b d g/. The latter subjects maintained the pre-voicing typical of their own Italian phonological system. Those who had been living in Canada longer pre-voiced less. Additionally, the less often the bilinguals fully prevoiced English /b/, the less often they fully prevoiced the Italian /b/. These findings indicate that a merger of L1 and L2 had taken place and new categories were not devised. The voicing of the L1 phoneme prevented complete native phoneme production in the target language (Mackay, Flege, Piske, Schirru, 2001).

Another experiment was performed on Italian immigrants to Canada (Flege, Meador and Mackay, 2000) ranging in age from 7 to 19 years. This study examined the relationship of cross-language phonetic differences in consonants and vowels and their effect on L2 acquisition. It is important to note that Italian has seven distinctive vowels while English has fifteen. There is more aspiration in some English consonants and more voicing in others, as compared to their Italian counterparts. Therefore, production and perception of certain phonemes of English by Italian L2 learners are different from native English speakers. The study found that the Italian subjects, as a result of their inaccuracy in perceiving English consonants and vowels, had poor word recognition abilities.

This was the first experiment to directly link the cross-linguistic perception of
phonetic segments in L2 to the recognition of L2 words, regardless of age of arrival or L1 use. Higher word recognition scores were found among the subjects with the earliest date of arrival (seven years of age). Even more significant is the higher score of a sub-group of early arrivals who reported using less Italian than the remainder of the early arrival group.

These results show that the continued use of an Italian phonetic system inhibited the representations of phonetic segments for the English L2. The authors attributed the effects of L1 on L2 to the influence of the L1 phonetic system struggling to incorporate L2 phonetic segments. However, L1 has already established a tight framework, which may have trouble incorporating L2 phonemes if they are very different. If the L2 speech sound is equated with an L1 sound it is blocked from forming a new category. The Italian phonetic system influenced the representations developed by Italians for English vowels and consonants. This limited representation affected their word recognition abilities. The L1 phoneme carries associations to certain words that influence the ability to predict or recognize the word. When the phoneme is from a different language, native phoneme associations affect one’s ability to recognize or predict the target word with the non-native phoneme. These findings with the low-Italian early arrivals were further confirmed by the higher performance in word recognition, and perception and recognition of English vowels and consonants, as compared to both later arrivals and early arrivals who continued to use their L1 on a regular basis. The latter group’s maintenance of L1 infringed upon their ability to establish new L2 categories (Flege, Meador, and Mackay, 2000).

Another investigation that addresses the merger of L1 and L2 phonemes is
that of Sancier and Fowler (1997), who conducted a case study of a native Brazilian Portuguese speaker who acquired English before moving to the United States. They examined the effect of a six-month period in either the subject's native country or the U.S., on her production of English and Portuguese sentences. Specific emphasis was put on observing the differences between Portuguese /p/ and English /p/ phonemes. The /p/ sound differs in English from Portuguese, in its extended, voiceless period, which is longer in English. After six months in the United States the subject's productions of both Portuguese /p/ and English /p/ became acoustically more like the English /p/ sound. Brazilian listeners perceived the American phonemes (stop consonants) in the recording of the subject's Brazilian Portuguese, after her stay in the United States. However, English listeners were less aware of her change in stop consonants after her stay in Brazil. This discrepancy could be attributed to the English listeners' inability to hear different degrees of an accent. This example shows that it is not only the L2 that is compromised in bilingual speakers but L1 is also changed. Her /p/ sound still had a longer voice onset time than most Portuguese /p/s and remained shorter than most English /p/ phonemes. The phonetic compromising that takes place shows that L1 representations of phonetic systems do have an effect on L2 phoneme representations.

NATIVE LANGUAGE MAGNET MODEL

Another theory regarding acquisition of phonemes is the Native Language Magnet model (Kuhl & Iverson, 2000). This model proposes the development of phoneme prototypes or “ideal” exemplars of the phoneme, which warp phonetic space
around the prototype. Prototypic phoneme representations are established early in infancy. The baby creates a phonetic space in which it is difficult to distinguish between the phones of the category that are acoustically similar to the prototype, from the prototype itself. In other words, it becomes more difficult to distinguish variations around a prototypical exemplar than around a non-prototypical exemplar of the same category. This prototype is established by native language experience. Thus, a child of 12 weeks will have a less circumscribed prototype than a 12-month old infant who, after more experience, can establish a more clearly defined example of the ideal vowel. In her 1991 paper, Kuhl shows that there is greater clustering for vowel tokens around the native prototype than around a foreign language prototype. In other words, there is more perceptual generalization in favor of the native representation than there is for a non-native prototype. Kuhl’s formulation of the prototypes and phonetic space is called the Native Language Magnet theory because it posits that the target prototype pulls in the perception of the similar tokens; they are considered part of the phonetic domain of that ideal phoneme. Thus, a token of the category that is not the prototype will be easier to discriminate from another non-prototypic token, than the discrimination of either of those tokens from the prototype.

Kuhl extends the magnet concept cross-culturally. There is a kind of cross-language difference in “categorical perception.” The magnet effect of the target phoneme prevents the listener from distinguishing variations around native prototypes. However, in the case of a non-native language, lack of exposure prevents the establishment of a specific prototype for the unfamiliar phoneme category. Thus the magnet effect does not work as well in the presence of unfamiliar phonemes. As a
result, discrimination between tokens of a given phoneme should be better than in a foreign language (Kuhl & Meltzoff, 1996). Kuhl’s model deals predominantly with within category perception, as opposed to between category perception. As a result, her model is limited in its application to studies of L2 acquisition. Indeed, both SLM and NLM are problematic in that they both focus on individual phonemes and devote less attention to non-native phoneme contrasts, making their predictions for cross-cultural research dubious.

PERCEPTUAL ASSIMILATION MODEL

A third key theory is the Perceptual Assimilation model (PAM). This model fills in some of the gaps in NLM and SLM, which fail to accurately identify the variations in discrimination of diverse non-native phoneme contrasts. This theory is rooted in an ecological approach to perception, which assumes that a perceiver has direct contact with distal stimuli. That is, perception is not an indirect process of mental constructions, nor is it dependent on inborn knowledge. Rather, the ecological position derives from the philosophical view held by Direct Realists. Extending this view to speech perception, direct realists believe that speech perception involves the detection of articulatory information. Speech results from articulatory patterns or gestures. The direct perception of these gestures is the basis of speech recognition and perception. These gestures may vary in manner of production, place of constriction, degree of voicing produced by the articulators in the supralaryneal vocal tract, and in the articulators used. Discrimination and identification of phonemes and word segments are a result of our ability to perceive speech gestures (Browman &
Goldstein, 1991). Based on the commonalities of articulatory gestures in native and nonnative phonemes, PAM posits that listeners may associate or assimilate certain L2 phonemes to L1 phonemes.

Given the flexibility and diversity of our articulatory gestural capacities, the Perceptual assimilation model (PAM) examines how phonemes get assimilated by virtue of their similar articulation patterns. PAM proposes three main ways in which a non-native phone can be assimilated into the L1 phonological organization: (1) as an uncategoryed consonant or vowel that falls between categories in the native language, and might be similar to two or more different phonemes; (2) as categorized exemplar of a native phoneme, in which the non-native phoneme resembles the native phoneme, ranging from very well to very poorly; (3) as a non-assimilable non-speech sound that doesn’t resemble any speech sound in the native phonology.

Discrimination of non-native contrasts is dependent on how each of the contrasting non-native phonemes is assimilated. There are at least five possibilities for assimilation of non-native contrasts. Two Category assimilation occurs when contrasting non-native phones are assimilated to two different phones in the native language. However, in Single Category assimilation two separate non-native phonemes are assimilated to the same native phoneme. A Category Goodness difference occurs when there are two non-native phonemes that are assimilated to the same native phone, but one is perceived as a better “fit” to the native phone than the other is.

Conversely, it is possible that one of the phones may fall in the gaps between the phonemes of the native language, and hence be Uncategorized, while the other
phone may be assimilated and thus categorized. Such cases form an Uncategorized-Categorized assimilation pattern. In the case where both phones are uncategorized in the native phonology, it is an Uncategorized-Uncategorized assimilation. However, if both phonemes' verbalization gestures are highly discrepant from any native articulatory gestures, then both may be perceived as Non-Assimilable non-speech sounds.

Discrimination ability, as predicted by PAM, should display the following pattern: Two Category assimilation > Category Goodness difference assimilation > Single Category assimilation. Discrimination is best in Two Category discrimination because the two different phones are assimilated as a contrast in the native language. In the case of Single Category assimilation, the phones are assimilated as equally good exemplars of the same native phone, and thus native categorical perception hinders discrimination.

Non-Assimilable non-speech contrasts have relatively good discrimination, because they are unaffected by the native phonology. However, in the case of Uncategorized-Uncategorized pair the distinctions is made more difficult because both non-native phones are midway between native language phonemes. They can’t be assigned to native phonemes, because they aren’t similar enough to any native phone, yet they are heard as ambiguous speech sounds. Uncategorized-Categorized pairs are discriminated similarly to Two Category assimilation because the two members cross some phonological boundary in the native language (Best, McRoberts, Goodell, 2001).

A study performed by Best, McRoberts, LaFleur, and Silver-Isenstadt (1995)
examined the accuracy of PAM in predicting discrimination abilities in infants. Their experiment examined non-native discrimination with 6-8 month old babies and 10-12 month old babies in a visual fixation habituation task. The babies were to discriminate Zulu click consonants and Nthlakampx ejective consonants. For English speaking adult listeners, Zulu clicks are non-assimilable consonant non-speech sounds, whereas the ejectives are perceived as voiceless stop consonants and are examples of Single Category assimilation. The results showed that the younger infants discriminated all three contrasts but, the older infants discriminated not only an English control contrast but also Zulu clicks, yet they were significantly worse at discriminating the ejectives. This finding is consistent with the PAM model’s description of Non-assimilable phones. The Zulu clicks were perceived by English speakers as non speech sounds, thus discrimination between clicks was good as predicted.

One advantage to the PAM is that its predictions emphasize the importance of individual differences. A phone’s probability of assimilation is affected by the perception abilities of the perceiver. The perceiver’s culture, socio-economic class, and personal traits may affect his/her perception of a phone and thus the assimilation pattern for a given nonnative contrast. Possible theories have been proposed to explain the limitations of our phonetic organization in its ability to influence perception of different contrasting phones. There are many proposals for why there is a rather unbendable phonological organization. This phonological framework seems to influence phoneme acquisition. A natural inclination is to see this phonological inflexibility in L2 learners as a result not just of transfer from L1 to L2, but
additionally of a limited ability to retain so much new information, given the information that is already present in memory. We will explore this offered explanation to see if it in fact it has merit and thus can provide an appropriate explanation for the phonological difficulties we have encountered.

Memory storage in L2. Difficulty in assimilating two or multiple different phones may be attributable to a difficulty in memory processing. Just and Carpenter (1992) theorized that language has limited working memory to draw from. When that memory capacity has been exceeded, the language ability declines, because of the incapacity of the memory system to compensate. The smaller the working memory of the person, the more likely is a decline in performance. L2 learners therefore may be working with a heavier load, because they already have the knowledge of a prior language stored in their memory capacity.

We have observed that L1 similarity to L2 does have an effect on the performance in L2. Difficulties in establishing new L2 phoneme categories are consistent with limited working memory capacity. The presence of strong L1 categories appears to hinder the establishing of L2 categories is due to the limited working memory capacity. The limited working memory capacity also explains individual discrepancies in success, given the varying working memory capacities of individuals.

Morphology in L2. We have focused, thus far, on L2 phoneme usage. Let’s return to a previously discussed linguistic level, morphology. Krashen (1980)
proposed that for all second language learners, regardless of language or age, there is a “natural order” of morphology acquisition. He asserted that if the language learner focused on the meaning of the word and not as much on the linguistic form (i.e. morphology, syllable structure or phonology) the following pattern of morphological acquisition holds cross-culturally. The model is in descending order of acquisition:

1. present progressive, plural copula
2. auxiliary, articles
3. irregular past tense
4. regular past tense, 3rd person singular, possessives

Pica (1983) performed an experiment that confirms the order proposed by Krashen. Pica found this same “natural order” in second language learners of all ages as well. However, she labeled it the “accuracy order” since she measured when morphemes were accurately produced, which could have been significantly after that stage of morphological development was occurring. Once the morpheme has been accurately produced, inferences about the time line of the development of the morphological stage are possible. However, these extrapolated calculations can be significantly inaccurate. In order to avoid these kinds of inaccuracies Pica only recorded “accuracy order” as opposed to the order of the stage of development. She used three groups of L2 learners: a control group of “natural language” immersion, an instructed group, and a mixed group. She found that in all these groups the error patterns remained the same, and mirrored the predictions of Krashen’s “natural order”.

Both longitudinal and cross-sectional experiments have been performed to test
this “natural order” model. However, the research has provided mixed evidence. Rosansky (1976) observed the acquisition of morpheme order in a Spanish learner of English. Their research extended over a ten-month period and they found that it did not match with the “natural order” reported. A cross-sectional analysis by Schmidt (1983) found that a Japanese man living in Hawaii had a very different order of morphological acquisition. Krashen is skeptical about these studies because they used very few sessions and thus he believed their samples were skewed. However, these data do provide some controversial evidence against Krashen’s model of morphological acquisition, which did not afford sufficient evidence regarding natural ordering.

When we examine learner errors with morphemes, we can see more clearly how the order develops in adult L2 learners. Felix and Hahn (1985) found a pattern in L2 adults’ pronoun errors. They observed that the first step in establishing pronouns is the distinction of person. This process basically establishes I versus me. They found an overgeneralization of “I” or “me” in the vocabulary of adult L2 learners. “He” or “you” is used for all other people following the first person stage. After pronoun number is integrated, L2 learners begin to use third person pronouns. However, gender distinctions are not acquired until the last stage. It appears that there is a morphological rite of passage, or progression, where in moving to the next level one must fully complete the tasks of the prior stage. One must establish certain fundamental categories before being able to comprehend the more subtle aspects that appear in the next stage. We will now examine more closely some of these stages and the order of acquisition that facilitates the progression toward fluency.
A case study was performed with a French subject learning English. Butterworth and Hatch (1978) found similar results to those of Felix and Hahn. Their subject used both “I” and “me” interchangeably for the subject pronoun, and failed to differentiate between personal and possessive pronouns. Additionally, he used “he” and “she” in the place of “we”, “it” and “they”. This is compatible with the pronoun use found in Felix and Hahn’s study.

Gundel and Tarone (1983) performed a cross-cultural analysis of L2 pronoun acquisition. Their study had three Spanish speakers and two Chinese speakers learning English, as well as English speakers learning French in an immersion program in Canada. These groups were tested by orthogonal methods: tape-recorded conversations, a recorded picture description task, and two grammatical construction exercises. All three groups had significant difficulties with object pronouns. An example of the kind of omissions is: “She didn’t take” with an omission of the object pronoun “it”. This could be explained for the Chinese learners as an example of transfer, given that Chinese has many fewer usages of the object pronoun. In Chinese, it is optional, not obligatory, to add the object pronoun. However, given that the other groups also displayed the same omissions, direct transfer seems to be an insufficient explanation. Tarone and Gundel proposed that there is a cognitive process that unfolds for all L2 learners. Each L2 learner assumes that the object pronoun will play the same role as in the L1. When this assumption has been disproven, by the L2 data, the L2 learner then assumes that there is no object pronoun. Therefore, they begin to omit necessary grammatical units. Finally, the L2 learner realizes the existence of the L2 object pronoun and thus readjusts accordingly (Tarone & Gundel, 1983).
A Dutch study performed by Broeder, Extra and Van Hout (1989) found that
the L1 had no effect on morpheme development in Dutch as an L2. The most
influential factor in acquisition was the rules and parameters of the L2. The subjects
were all immigrants to Europe and were untutored in the target language but were
learning language by immersing themselves in the Dutch culture. The experimenters
found the same order of acquisition for all immigrants:

1. Subject pronouns
2. Objective forms
3. Possessives

Also, singular pronouns acquired before plural forms. This occurs during all
the above stages.

All groups had virtually the same results. Thus, the influence of L1 did not
play a significant role. More likely, variation in acquisition is a result of the L2 target
language. The target language’s grammatical and phonological idiosyncrasies may
be more or less difficult, depending on the complexity of the linguistic structure, and
rules of grammar in the L2.

In this section we have discussed the phonological and morphological
challenges faced by L2 learners. We have also addressed three main models for how
L2 phonological information is dealt with by L2 learners. In both the Speech
Learning model (the evolution of the transfer model) and the Native Language
Magnet Model, the emphasis is primarily on the relationship between a non-native
phoneme and the closest native phoneme prototype. However, in dealing with L2
acquisition, a model is needed that explains how an L2 learner deciphers non-native
phoneme contrasts. An ideal model is one that addresses phoneme differentiation by a L2 learner for the phones in their language as compared to other languages, as well as their ability to distinguish between two non-native phones of another language, if they can distinguish them at all. The Perceptual Assimilation Model addresses this issue, discussing the importance of articulatory perception for a beginning L2 learner, as well as discussing the inability to distinguish non-native phonemes from each other by comparison to the native phoneme. All approaches focus on the importance of L1 phonological salience to the L2 learner.

There is some contentious evidence regarding the natural acquisition of morphology in L2 learning. Some theorists propose a natural order of acquisition, while others have found inconsistent evidence. These morphological patterns relate to an issue addressed earlier regarding maturational processes. We have noted that in children's acquisition of their first language there are clearly biological processes that affect the stages of language development. Given the morphological patterns in childhood, we must explore whether or not the same processes of morphological maturation are present in adulthood, in L2. In trying to attack this issue of maturational language development, we will examine more closely the maturational progression of children through the OI stage. The trajectory for the Optional Infinitive stage will provide evidence for the possibilities of maturation processes in adult L2 development. Here we will briefly compare the morphological development of children and adults as a means to examine possible maturational processes that might alter their different acquisition stages.
As previously noted, the OI stage in normal L1 children influences the order of morpheme acquisition. Several studies have confirmed that verb-subject agreement also develops before the use of tense-marking in the acquisition of L2 French and English (Paradis, Le Corre, & Genesee, 1998). These experimenters believed that under-specification or optionality in tense-marking (i.e. varying between omitting and including the verb "do" when the verb was needed) was an intrinsic stage to L2 development in adults. Prevost and White (2000) and Grondin and White (1996) found a different pattern among children learning French as a second language. They found that (a) finite and infinite clauses alternated despite obligatory contexts. (b) contingency between verb placement and negations and between finite verb and subject verb were accurately maintained even if the verb was infinite in a finite context. (c) Subject verb agreement was accurate. This finding agrees with the results for normal children with the development of their L1 (Wexler, 1994). However, Prevost and White found that this stage does not appear to be present in adult L2 learners. They observed that in adult L2 learners of French, the presence or absence of finite inflections was not related to the contingencies between subject and verb or negation. Often, child learners produced nonfinite verbs that preceded a negative marker. This finding is counter to rules of contingency in French. An example of good French would be:

(a) Elle ne roule pas (It doesn’t roll)
(b) Ne pas rouler en velo (don’t roll on the bike)

Both of these sentences work with the contingencies of French. As shown in (a) the finite verb always is to the left of the negative marker "pas". With a nonfinite
verb, the verb follows the negation, as in (b). Unlike child L2 learners, the adult learners did not observe rules of contingency and varied in their production of finite and infinite verb usage. Thus, up to this date it appears that OI is only present in child L2 learners and not in adult L2 learners, who show a different pattern of errors in L2 morphology. This suggests support for a maturational hypothesis regarding the OI stage.

To summarize, the OI stage has conclusively been found in children learning a second language. In the case of adults conflicting evidence has been offered. Several studies we have reviewed show that adult second learners lack a conception of verb-subject contingency, which is one of the requirements for the OI stage. Therefore, more research will have to be done to confirm or disprove the existence of the OI stage in adult L2 learners. If there is no OI stage in adults, this stage may be regarded as a maturational stage. However, there does seem to be consistent evidence for L2 adult trouble with object pronouns, possessives and plural forms of morphemes, as is the case in the OI stage.

The errors listed above are consistent problems that have been observed in adults and children, including the OI stage, might appear to suggest that a simple explanation for L2 morphological acquisition is possible. Hence, it would appear that the transfer theory explanation is inadequate. The consistency across L1 languages in acquisition of L2 morphology implies that it results from the way the learner deals with the target language, more than from the effect of the L1. This result seems to be most closely related to the PAM model's assessment of phonology and the relationship between the learner's perception of the differences between the target
language and their own language.

Given that their are significant struggles in both morphological development and phonological integration with L2 learning, we will return to the working memory hypothesis to explore these morphological difficulties. It was proposed earlier that working memory capacity is limited by the addition of a second language and thus the L2 learner must reduce their phoneme categories. If we attempt to apply this limited memory explanation to the use of mophemes the proposal fails. Children have similar morphological problems in L1 acquisition as those experienced by the adult and children L2 learners. It seems unlikely that compromised working memory capacity provides an adequate explanation for these difficulties. In the next section, we will examine another group that struggles with the challenges in morphological and phonological acquisition, the learning impaired. This comparison could shed light on the nature of the underlying problem, if it is not a memory problem.

**SPECIFIC LANGUAGE IMPAIRMENT**

We have discussed the difficulties encountered by L2 learners as one means to examine strategies used in acquiring a language. Developmental language learning impairment represents another population that can illuminate strategies of language acquisition.

"'Language impaired' is defined as a heterogeneous group of developmental and/or acquired disorders and/or delays, principally characterized by deficits and/or immaturities in the use of spoken or written language for comprehension and/or production purposes that may involve form, content and/or function of language in
any combination" (Owens, 1999, p.4). This definition includes an extremely broad
group of disabilities with numerous subtypes. To keep this thesis within manageable
limits I will examine one specific population, those with Specific Learning
Impairment (SLI). I have chosen this particular group because, unlike most learning
impaired populations, there has been little conclusive evidence to localize any
anatomical problems to explain the deficits experienced by this group. The lack of
anatomical evidence for impairment makes SLI subjects more analogous than other
learning impaired groups, to other language-learning populations that struggle with
language development. Hence, language learners with SLI are relevant to our study of
language groups that lack physiological evidence for language deficits. Yet all
discussed language groups struggle with phonological and morphological proficiency.

Those who suffer from SLI have severe deficits in production and/or
comprehension of language that cannot be explained by hearing loss, mental
retardation, motor deficits, neurological or psychiatric disorders, or lack of exposure
to language. SLI is usually diagnosed when there is a distinct discrepancy between
their IQ and language ability (Casby, 1992). This group remains extremely
heterogeneous, which makes diagnosis of SLI difficult. More specific problems
include impairment in auditory sequencing and processing, as well as inability to
extract linguistic features and impairment in representational or symbolic reasoning
(Stromswold, 1995). The brains of children with SLI have been compared to those
with dyslexia as well as aphasia. However, similarities in abnormal brain dysfunction
among these groups have not been found reliably. What has been shown is that SLI
brains lack the anatomical and functional asymmetries typically associated with
language. Language is a lateraled function, normally dominated by the left hemisphere. Broca's area, or Wernicke's area in the left hemisphere, are the areas that handle speech and comprehension functions of language, respectively. In the case of disability it is in these two areas that we see malfunction or lesions. However, in SLI subjects this functional asymmetry is less than normal subjects, displaying slightly less left hemisphere dominance. Nonetheless, there appears to be no outright malfunction in these regions in SLI, just a more even distribution of power between the hemispheres. The lack of significant anatomical explanations for the deficits in SLI makes a comparison between L2 learners and SLI first language learners more analogous. To examine the possible biological sources of SLI one must explore whether it is a heritable impairment.

GENETIC TRANSMISSION

Twin studies show that both SLI and more general language disorders do have a genetic component. Defries et al. (1987) recorded the reading abilities of 64 pairs of monozygotic(MZ) and 55 pairs dizygotic(DZ) twins with at least one twin suffering from SLI language impairment. This study showed a higher concordance rate among the MZ (identical genetic make-up) as compared with the DZ (not identical genetic make-up) twins. Only 3% to 14% of non-language impaired children have a family history of language impairment (Fundudis, Kolvin, and Garside, 1979), again suggesting SLI is genetically based. One might propose that the impairment in children, with increased impairment in their family histories results from poverty of the stimulus. In other words, perhaps a poor language environment created or aided
the development of the impairment. However, both general developmental research and research on SLI show that normal children can compensate for impoverished speaking environments, so there should be no long lasting effect if the child is exposed to other language environments (Gopnik & Crago, 1991). Taken together, these studies afford some evidence for a genetic component to SLI. To explore further the possibility of a genetic component Pinker examines the possibility of the contribution of a distinct SLI gene. According to Pinker, impairment is either present or absent among family members of an index case. He argues that this pattern is more consistent with the operation of a single gene rather than multiple genes since the latter would likely result in degrees of disability. However, research has shown that there is a lack of variation in severity in SLI (Pinker, 1994). In an attempt to understand possible biological constraints on language acquisition in SLI we will focus on the problem areas of those with SLI for evidence of an organic limitation.

AUDITORY DEFICITS, MEMORY CAPACITY AND PROCESSING IN SLI

In examining more closely the deficits found in those who suffer from SLI, there seem to be three main components: poor auditory processing, reduced working memory capacity and generalized deficits in processing capacity (i.e. computational abilities). Each of these components is discussed in more detail below.

Auditory deficits. A large amount of research examining auditory deficits in SLI was performed by Tallal. During the early 70’s and 80’s when Tallal was conducting most of his experiments on auditory deficits, a neurological label for those with SLI had yet to be established. This subgroup of children with developmental
language disorders was usually diagnosed with childhood aphasia or verbal auditory agnosia (all hearing related deficits). However, in the last two decades this subgroup has received more attention and research continues to subdivide and characterize this group. The reappearance of auditory processing proposals to explain SLI result from the years of research performed by Tallal.

In an experiment performed by Tallal and Piercy (1975) SLI children had more difficulty discriminating consonants than vowels, except when vowels had been artificially shortened or consonants artificially lengthened. SLI children in comparison to normal children needed more intra-stimulus time and inter-stimulus time intervals in order to accurately discriminate between consonant-vowel pairs (/ba/ vs /da/). Their weaknesses in auditory processing necessitate extended time intervals for discrimination.

Nittrouer (1999) studied children with poor phonological processing skills in an attempt to replicate the temporal processing abilities examined by Tallal and Piercy. Her results seemed to diverge from these aforesaid researchers. As previously reviewed processing problems were thought by Tallal and colleagues to slow all processing, as shown in the previous study with consonant-vowel pairs. However, Nittrouer found that those with poor phonological processing depended on brief and transitional signals for speech perception. That is, just like their normal age matched counterparts, they based their phonetic judgments on formant transitions. Nevertheless, they relied on this information more than normal subjects, and failed to use the steady noise information in fricatives. She concluded that the subjects with poor phonological processing abilities performed with only subtle temporal
processing deficits. These deficits were not related to the processing of rapidly presented signals. Nittroeur argued that these deficits are not a result of a failure to process formant transitions, as was concluded in the Tallal and Piercy study. The children were not disproportionately affected in their ability to process rapidly presented auditory information. Nittroeur claims, instead, that deficits are linguistic and are related to poor verbal working memory capacity, not auditory deficits. If we review this new conclusion in light of the study with Tallal and Piercy it appears that the slow processing of vowel-consonant pairs was not related to a problem with auditory information so much as a linguistic deficit related to phonological memory retention and the ability to maintain linguistic information.

Memory capacity in SLI. Several theories have been proposed regarding memory deficits, which assert that there is an inability of SLI subjects to take written or spoken linguistic information and convert that data into accurate phonological representations, as a result of limited memory capacities. Weismer, Evans and Hesketh (1999) examined the effects of variations in the rate of speaking on linguistic input provided during a novel word-learning task. They hypothesized that limited working memory would make retention of linguistic input (novel words) more difficult if the rate of speaking was very fast, and thus there would be less time for memory processing. Speaking rate variations influenced the acquisition of novel vocabulary by the children with SLI. As compared to normals, SLI subjects had trouble repeating words that had been presented at fast rates during training. These discoveries provide further evidence for the claim that both phonological memory and
temporal processing constraints may influence difficulty with word learning for those with SLI. Gathercoles and Baddeley (1990) also found that children with SLI showed significantly poorer phonological working memory than normal controls.

Despite the evidence offered by Gathercole and Baddeley (1990) supporting the theory that short term memory deficits can account for the multiple problems found in those with SLI, Howard and Van der Lely (1995) provide a different interpretation. The studies by both Gathercole and Baddeley, and Howard and Van der Lely had very similar methods for their data. However, differences in results were seen in a few of the recall list analyses. Gathercole and Baddeley found that the SLI children had a significantly harder time recalling single non-words when the non-word was more than one syllable, while Howard and Van der Lely did not find a statistically significant impairment with two or more syllable non-words. In the experiments performed by the latter two researchers, emphasis was placed on short-term memory abilities, rather than focus on phonological production of non-words in the recall test. They chose this focus so as to look more closely at phonological production. Gathercole and Baddeley integrated phonological assembly and non-word production into their short-term memory task, to focus on general memory retention.

Multiple other factors may contribute to the discrepancy between the two different results of these researchers. Conclusive results on the retention of multi-syllable words and single syllable words are not evident. Despite the inconsistency in results Howard and Van der Lely maintain that the phonological errors made in their study are attributable to a difficulty with production of polysyllabic non-words and phonological storage. Further research should be performed. The short-term memory
theory regarding phonological storage has not been conclusively confirmed and the
data initially supporting this theory may be more accurately explained by other
linguistic deficits (i.e. trouble with perceiving and producing articulatory gestures) (Browman & Goldstein, 1991).

Phonological memory deficits are reminiscent of the model proposed earlier
by Just and Carpenter (1992) regarding limited memory capacity. This model
proposes that it is not the comprehension of the sentences that interferes with
performance, but the limitations of retention of incoming information that increases
the difficulty of the task. Comprehension is possible. However, the input may not be
properly retained so that it can be properly analyzed for completion of a certain test
task. It is unclear whether the problem with retention is a result of difficulty with
processing in short term memory, or some specifically linguistic processing deficit.
Possible linguistic processing deficits will now be explored.

For example, Leonard, McGregor, and Allen (1992) investigated the
relationship between morpho-phonological memory and processing. These
researchers proposed that children with SLI are able to perceive word final
consonants and weak, non-lengthened syllables; but the limited processing ability
characteristic of these children is strained when such forms play a morphological role.
Leonard et al (1997) investigated samples of spontaneous language responses on
probe tests that required the use of grammatical morphemes in both real and nonsense
words (i.e. “I walk”, “she walks”, “I grek”, “she greks”). SLI children could use
morphological markers successfully, but at a significantly lower rate than normal
controls. Additionally, the tense-related morphemes (i.e. -ed) caused more significant
performance errors in SLI subjects than non-tense-related morphemes (i.e.-es). If the tense related morphemes were more problematic for SLI subjects this number is more likely to be due to a processing problem with parts of speech (i.e. a linguistic deficit) than simply a memory related deficit. Memory deficits would imply equanimity of an ability to retain the different morpho-phonological information. However, given the fact that some morphemes are more problematic than others implies that the reason for the inability to produce or retain these morphemes is related to the way in which they are processed within one’s linguistic framework.

**Processing Deficits.** Swiftness of a task response is viewed as a classic indicator of processing capacity and speed. In a study performed by Stark and Montegomery (1995), 6-10 year olds with SLI were found to respond more slowly to target words in a sentence than did matched controls. A similar study, requiring true or false responses to standard adult-child questions, found that SLI children were much slower in responding than their peers (Reynolds & Fucci, 1998). Additionally, children with SLI had trouble in using sentence context to facilitate target word recognition, as compared to slightly younger controls (Montegomery, Scudder & Moore, 1990). The slower processing times of those who suffer from SLI may be interpreted as an indicator of their global limitations in processing capacity and speed, which seemingly affected many aspects of their cognitive and linguistic abilities.

Other research regarding delayed processing or problematic processing in SLI was performed by Orsolini, Sechi, Maronato, Bonvino and Corcelli (2001). Their study compared the responses of a group of children with SLI to a group of normal children on a mispronunciation detection task, evaluating the groups’ errors in both
complex and simple syllabic structures. Subjects with SLI struggled with complex syllabic structures. These subjects tended to make unstable substitutions of target phonemes as a result of articulation difficulties for a particular sequence of words. Thus, there appeared to be both an articulation difficulty and a processing difficulty. The errors were specifically an omission of the consonant that was highest in sonority (i.e. either /r/ or /l/). In examining more closely one of the subjects in their experiment, difficulties in articulation became more apparent. One of the subjects was able to perceive certain consonants under certain syllabic situations and not others. In the case of two syllable target words, the subject was able to use the labial-dental fricatives /I/ and /v/, but with three or four syllables contexts, she used other constrictions to replace the labial-dental fricatives. The vibrant liquid /r/, and affricatives, are the most common phonemes that contribute to errors. They are so difficult to produce that they constrain word sequences and create classic errors with certain words.

Browman and Goldstein proposed that these types of errors are a result of temporal errors in articulatory planning (Browman and Goldstein, 1991):

"The development of a number of phonological alterations and sound changes can be seen as resulting from variability normally occurring during the act of talking - reductions in magnitude of the gestures and increase in the overlap of gestures... as similarity and dissimilarity can be analyzed as reassignment of gestural attributes in cases where two gestures overlap. Such reassignment is a failure on the listener's normal ability to correctly identify which of the overlapping gestures is the source of some aspect of the acoustic signal (Browman & Goldstein, p.313)."

Browman and Goldstein propose a dynamic system of articulation movements, gestures that are dependent on a specific phase relationship. Thus, the
consonant errors could be a result of a temporal error in coordinating different articulator movements and ultimately resulting in an imprecise approximation of a desired sound that depends two independent action phases. Therefore, it seems only reasonable that the phonemes that are the last to be acquired (liquids and affricatives) would not be coupled with phonemes of similar articulatory gestures, because the transition from one phoneme to another would necessitate quick shifts of precision.

The Orsolini et al experiment confirms this hypothesis. The SLI children’s limited repertoire of vocal actions in simple syllabic structures is what caused the omission errors or the substitution of certain target phonemes. Children with SLI would often switch a sentence with a complex syllabic structure to a simple syllabic structure to avoid errors. Thus, the slow articulatory development of SLI children manifests itself as a limited repertoire of vocal movements, and therefore affects phonological sequencing, the connection between auditory-phonetic content and articulation patterns. Additionally, this study also found that SLI children had difficulty in comparing phonological auditory inputs with phonetic memories of words in the lexicon. The article by Orsolini et al. claims that the phonological difficulty in SLI children is related to a delay in articulation development.

Thus far, we may note both similarities and differences between normal adult L2 learners and L1 learners with SLI. Errors experienced by both groups appear to be reduced working memory capacity. In the first case, past linguistic experience with L1 strains the working memory, while in the second case limited linguistic capacities constrain the performance ability. While the problem in both cases can be attributed to a similar fundamental concept, the differences between these two language learner
groups are noteworthy. With L2 learners this limited working memory capacity, as discussed previously, is most notable in the case of phonological discrimination, but there is no conclusive evidence with regard to morphological working memory. With regard to SLI children affected by these memory and performance deficits we find more evidence of working memory deficits in retention of morphemes, and most phonological memory retention problems seem to result from general processing difficulties. Thus, although the two populations fundamentally share a deficit in short-term memory, this deficit manifests itself differently and has a different cause in the two cases.

Similarly, phonological errors are experienced by both groups and are attributed to trouble with perceiving or producing articulatory gestures. In the case of L2 learners, this is attributable to associations with the native L1 phonemes. However, in SLI this limitation may be a result of either temporal processing problems or more general processing problems. In order to fully understand the differences and similarities between these two groups we must look more closely at the different errors produced by them.

MORPHOLOGY AND PROCESSING

Morphological difficulty is characteristic of the problems suffered by children with SLI. These morphological problems may be explainable as a result of a processing problem related to handling tense. In a study performed by Jakubowicz and Nash (2001) on French children with SLI, the children avoided and/or mispronounced the passé compose (the past tense). The subjects were given a
sentence completion task. Picture-matching was also performed to confirm comprehension. The present, past and future were all examined. This finding seems to imply a delay in fundamental functional categories. The obligatory fundamental functional categories are tense morphemes. These morphemes are affected by the person (pronominal) or by tense alone (temporal) (i.e. in Romance languages and German, respectively). The SLI children struggled with the organization of the past tense. The computational complexity model was used in this study. This model examines different forms of tense conjugation and their syntactic density. The passé composé requires a past participle that is syntactically necessary and is presented as a separate “word” or morpheme. The construction of this morpheme is distinct from a lexical verb and is syntactically necessary. The Passé simple has less of a syntactic role at the inflection level. In the computational complexity model the passé composé is the more problematic tense than both the passé simple and the present tense because of the additional “word” or morpheme that is syntactically required for its construction. In the passé simple the temporal specification is marked on the verb.

Present- Il *parle* (he talks)

Passé Simple: Il *parla* (He talked)

Passé composé: Il *a parlé* (He talked)

Passé compose = (Auxillary of avoir +conjugated infinitive of “parler”)

The Passé compose is also of special interest because of its focus on the syntactic role of inflection morphemes, which is important given our interest in the optional infinitive stage. Children with SLI had trouble using the past tense auxiliary “avoir”. They replaced it with the aspectual light verb “finir” (to finish), which makes
the meaning inherently encoded in the past tense, or with a lexical verb, which is ambiguous between a participle and present tense (i.e. "He is finishing his drawing"). In an example where the child is supposed to use the past tense "Il a écrit son dessin" (he has drawn his picture), the child avoided the passé compose and said "Il fini (approximation of finit) son dessin (he is finishing /finishes his picture). The child uses this ambiguous verb to avoid the passé composé. Occasionally children also left out the (de) complementizer in introducing a subordinate clause. "il a fini écrire maman" (he finished write mom), as opposed to "il a fini (d’) écrire maman" (he finished writing his mom). However, these errors were not seen universally among the group of SLI children. Because the present tense emerges earlier in development than the passé compose, these omissions could be a result of a developmental delay in SLI children. Consistent with this observation, in general, it was the younger SLI subjects who suffered the most dramatically from these morphological omissions or substitutions, and they were affected in both production and comprehension. Implicit in this age difference in error rates is that SLI children might be able to compensate and eventually reach the same level as their normal counterparts, as they continue to acquire language.

A study by Laurence, Miller, Grela, Gerber and Petucci (2000) also addresses the morphological processing deficit issues in SLI, specifically by examining the role of tense morphemes in processing. The investigators measured the frequency with which a child used the appropriate morpheme when it was preceded by a prime with the appropriate syntactic frame and prosodic structure for the target. For example if "the boys are washing the car" is the prime for the target sentence "the horse is
kicking the cow,” the auxiliary verb pair is “are”. The /are/ should prime the /is/, making “is” more accessible because it has been primed by the preceding verb and the identical sentence structure. Additionally tested were past tense auxiliaries, e.g., “The pig fell down” was paired with “the mouse is eating the cheese.” These same types of sentence pairs were also generated with /-ed/ endings. Thirty-six prime-target pairs were created with drawings that depicted the meanings of the sentences. Both for normal slightly younger children and for SLI children the priming had a significant effect. The use of the auxiliary in the target sentence was greatly increased when it was primed. Some SLI children omitted the auxiliary but on the whole their data resembled that of their younger normal counterparts. This finding implies that the limitations in SLI are a production-processing problem. Given that these children were significantly aided by the use of a prime sentence, it is clear that their error lies in processing. Their inability to properly integrate the “clues” given to them implies a failure to grasp the nature of the task. Laurence et al. proposed that the only mechanism that can fully explain this deficit in properly integrating priming information is the complicated processing of SLI children. This atypical processing influences production and comprehension of important task related information.

Given these two studies, Jakubowicz and Nash, and Laurence et al., it is likely that SLI involves a deficit in morphological development. Several experiments have been performed to examine this deficit and its more specific causes. A study by Bortonlini and Leonard (1996) examined this morpheme deficit in both Italian and English children with SLI, and found omission of function words in both languages. The first part of the experiment examined two pairs of English speaking children.
Each pair contained one child who was more proficient (the control child) with function words (articles, uncontractible copulas). These function words were the focus of the experiment because they are examples of grammatical morphology. The normal and SLI children were matched respectively with a member of the other pair on their abilities for grammatical inflections (i.e: -s, -ed). The study was performed with spontaneous speech samples made possible by picture probes, which created an obligatory context for certain morphemes. All data was obtained in the same room filled with toys and other objects. The child initiated all speech interactions. The investigators conclusively found that the children with better function word ability were more likely to produce weak syllables that preceded strong syllables as compared with the other group. They found a correlation in their recorded speech samples between the use of function words and the ability to deal with weak syllables that precede strong syllables. Weak syllables that follow strong syllables have a longer duration than when they precede strong syllables. Thus, they may be less salient when they are in the first position.

The second study involved observing the Italian children. They were compared to English children because Italian inflections are weak syllables that follow strong syllables, whereas in English it is the reverse. The English children were much worse on their morphological inflections than the Italian children. The only inflection morpheme that diverges from the normal strong weak pattern in Italian is the third person plural, which is strong-weak-weak. Italian SLI children experience difficulty with this construction and often substitute the third person singular form. Thus, the SLI difficulty even in Italian once again seems to reside in the use of a
weak syllable that fails to follow a strong syllable.

In trying to explain this difficulty with weak syllables, studies have attempted to identify the possible perceptual causes. Weak-strong patterns shorten the duration of the weak syllable, thus the minimal duration makes them less salient. In a strong-weak pattern the weak syllable is usually lengthened by virtue of its position (Echols, 1993). Leonard (1989) proposed a processing hypothesis that the non-final weak syllable of the weak-strong pattern poses a difficulty because it must be held in phonological memory during the longer strong syllable, while its grammatical function is inferred.

Thus, the SLI children’s errors appear to a combination of several deficits: articulatory problems with syllables, morphological deficits as a result of poor syllable pronunciation and phonological abilities, and general processing problems regarding tense. The role of syllables in morphological errors in SLI remains questionable. Thus, although syllabic organization is interconnected with morphology, suggesting that errors in one field will naturally affect the other, the fundamental question regarding the basis of these morphological errors remains to be determined. The morphological processing problem in SLI nevertheless leads us to our next hypothesis: that maturational development of language is slowed or drawn out in SLI children.

**EXTENDED OPTIONAL INFINITIVE**

Another hypothesis regarding impaired morphological development in SLI is based on Wexler’s Extended Optional Infinitive (EOI) stage. Wexler proposes that
the OI stage encountered by normal young children is similar for those suffering with SLI. However, SLI children have a harder time accomplishing this stage and thus it lasts considerably longer. Available data do not yet confirm when children with SLI actual emerge from this stage. All that is known is that it is a gradual and delayed emergence. There is clear evidence of omission of finiteness marking and correct use of verbal agreement in young and older children with SLI (Van de Lely, 1997). Wexler believes that SLI children do not recognize that main verbs must be finite. He hypothesized that tense is therefore optionally omitted. When tense is omitted, an OI sentence is produced; when tense is not omitted, a normal sentence is produced. The diagnosis for this stage in young children is characterized by erratic use of tense. It is as though grammatical tense has not been marked obligatory in this stage. This theory can explain the Jakubowicz and Nash, Laurence et al., and Bortonlini and Leonard morphology studies with SLI described previously. The two first examples in this section describe SLI children’s omission of the auxiliary verb. This error can be explained by an extended optional infinitive, EOI, stage. Wexler believes these errors are a part of a biological maturation process (Wexler, 1994, 1996, 1998). The evidence that led Wexler to this maturational explanation of SLI is the presence of the OI phenomenon in children with SLI cross-culturally (Wexler, 1994). If this stage is present cross-culturally, then late emergence from the stage must be a result of a maturation process and not a result of certain language-specific parameters. It is not the external environment that triggers the difficulty, so much as general language development.

Other observations of children with SLI provide converging evidence for this
hypothesis. Children suffering from SLI, like younger control subjects, omit tense-marking morphology in obligatory contexts. Additionally, despite this variability in use of tense markers, in both groups, the subject-verb agreement and the contingency associated with verb order are accurately maintained (Bedore and Leonard, 1998, Oetting, and Rice, 1993). This finding shows that the dysfunction is related to tense use, and is not a general processing problem. The similar performance of French children with SLI as compared to younger normal French children supports the notion that the OI stage is seemingly extended for the SLI children. Rice, Wexler and Hershberger (1998) confirm that this stage does exist in both SLI and normal groups, but is evident at a later age in SLI children and is prolonged.

Another study, conducted by Rice, Wexler and Cleave, (1995) examined a group of English speaking children with SLI as compared to a group of age matched normally developing English-speaking children and a group of unimpaired children several years their junior. The groups were tested on their ability to perform with finiteness marking of -s and -ed and BE and DO forms of a verb. This study confirmed all six predictions proposed by Wexler in the OI stage. The first prediction of the optional use of -s and -ed forms was found in both the younger normal subjects (2 years of age) and the SLI subjects (5 years of age). The correct percentage of finite verbs in obligatory contexts was slightly lower for the SLI subjects. The subjects in both groups often used the bare stem form of the verb. Additionally, the third prediction was confirmed: the SLI children rarely used “you walks” with the *he walks* affix, nor did they incorrectly use the “he walks” where *he walked* was the appropriate response. Thus, there were no errors regarding agreement, the past tense
suffix was not used in the present tense, and errors of agreement with the -s, other than the third person singular, were lacking. There were some errors of an overgeneralization of -ed in irregular stems, “he goed”. However, this error is not counter to the predictions. On the contrary, it is an example of the SLI subjects' awareness that a past tense morpheme should be used in a past tense context. Thus, predictions two and three, regarding subject-verb agreement and contingencies, are confirmed in the SLI population. BE/DO verbs were also often omitted, confirming predictions four and five. Consistent with prediction six, the SLI subjects did not use infinitive forms of DO/BE in finite contexts nor did they make agreement errors with these two verbs. In all cases the SLI group did slightly worse than the normal younger subjects and significantly worse than normal age matched subjects.

In summary, the conditions of the OI stage are met in children with SLI. However, children with SLI appear to emerge from this stage at a significantly older age. In fact, emergence from this stage may first occur in adulthood or it may carry into adulthood (Gopnik, 1994). Therefore, this stage in those that suffer from SLI is labeled the Extended Optional Infinitive stage (EOI).

All prior theories regarding syllable processing seem to be insufficient to explain the deficits in SLI. It has been proposed, instead, that the problems in SLI are a result of difficulties in morpheme processing. Those morphemes that are less stressed and thus less salient tend to be omitted or overlooked. However, the Rice, Wexler, and Rice study shows that SLI subjects rarely make agreement errors, and BE and DO were never mis-used in their suppletive forms such as: “I is” or “she am”.

In other words, the SLI children are clearly able to process and use the proper forms
of the verbs. Thus, a general processing deficit is inadequate in explaining the morphological problems. The specific errors of SLI subjects suggest a particular struggle with tense as opposed to a general processing deficit.

The discovery of EOI may help establish better ways of diagnosing children with SLI and providing therapeutic measures. The EOI stage proposed in this last section can explain the errors discussed in the previous studies. The variable omission of the passé compose, and the wide ranging use of is/are and -ed in the study by Jakubowicz and Nash (2001), and the finding by Bortonlini and Leonard (1996) that weak syllable use is correlated with tense errors, all can be explained by an EOI stage in SLI. This confirmation of OI in SLI creates an interesting situation since we have noted that OI exists for normally developing children, as well as child second language learners. While adult second language learners may or may not show evidence of full-blown OI, they do show numerous morphological deficits that are found in the normal developmental OI stage.

**SLI, L2, LI CONVERGENCE**

The presence of this OI stage in normal developing children, in SLI children and in children learning a second language poses a difficult problem, the problem of differential diagnosis. A child learning a second language with SLI may not be recognized as suffering from SLI because his errors may be misinterpreted as second language learner errors. A child learning a second language, who doesn’t have SLI may be mistakenly classified as a SLI child. Thereby, he/she may receive aid which is unhelpful because it is directed at helping general processing and not at second
language development. The prevalence of OI across these three groups (and possibly L2 adults) makes diagnosis difficult in children of these three cases. We must then look more closely to find more specific markers of impairment or variance in order to accurately find a way to distinguish these groups. Research is beginning to suggest some potential differentiation signs. For example, Swedish children suffering from SLI, and L2 child learners of Swedish, had more errors and more similar errors than normal children in the OI stage (Hakansson & Nettlebladt, 1993,1996).

A study by Paradis and Crago (2000) tried to address the relationship between the OI and EOI and to hypothesize a new way of examining this stage of morphological errors. They found that both SLI and L2 children have similar morphosyntax (they both had significant tense marking difficulties with past and future tenses), although specific differences do exist (SLI children produced more nonfinite verbs, especially non-themed verbs like auxiliaries, than present tense verbs, and the L2 children had the opposite results, more present tense verbs than nonfinite verbs). Paradis and Crago provide evidence for the optional infinitive phenomenon in both groups.

Their experiment examined three populations: French speaking children with SLI, English children learning French and French-speaking normal controls. All groups were approximately seven years old. All data were obtained through spontaneous speech samples gathered in response to questions of recent past or future events. With the L2 learners, there was less spontaneous speech in the L2, not surprisingly, given the natural tendency toward using their native language. Children were tested on tense morphemes, temporal adverbials (i.e. yesterday, tomorrow),
agreement morphology and distributional contingencies associated with finiteness. Temporal adverbials were used as a measure, to clarify whether or not the omission of tense as proposed by Wexler (1994) was a grammatical error rather than a conceptual one. If SLI children use temporal adverbials successfully earlier in development, then their impairment is not conceptual.

The researchers found that all three groups were correct in their use of temporal adverbials. Subject-verb agreements were also correct in all three groups, as were their scores on contingency with finiteness. All negative markers were also accurately placed in their correct position in all three groups. The errors in these groups were only found in relation to tense. Both the SLI and the L2 child learners struggled significantly more with the future and past tense than their normal counterparts. Both SLI and L2 children replaced the appropriate tense with either the present tense or a nonfinite form of the verb. The differences between their errors were subtle. The L2 group made more present tense substitutions and used fewer cases of the nonfinite form of the verb than the SLI group. On the contrary, the SLI group had fewer cases of the present tense usage in either a recent past or future question, and frequently used nonfinite verbs. This error pattern in the SLI subjects is hypothesized by the authors to be related to SLI children's problem with non-thematic verbs like auxiliaries. This speculation is confirmed, in other data, regarding the omission of auxiliaries and function words by children with SLI. More evidence concerning their strain with non-thematic verbs is that when dealing with the past tense, SLI children struggled with the past participle, and yet with the future tense, their trouble was with the infinitive.
Difficulties with the past tense:


SLI child: Non, je dessiner un jeu de pupitre. (“No, I draw a desk game.”)

The child has inappropriately used the infinitive of “dessiner” instead of using the past participle.

Difficulties with the future tense:

Interviewer: “Est-ce que tu sais déjà qu’est-ce que tu vas faire à ta fête?” (“Do you know what you are going to do for your birthday?”)

SLI child: “Ma mère achète le patin à roulettes.” (“My mother buys me roller-blades.”)

The child has inappropriately used the present tense instead of the future.

Both the auxiliary “avoir”, and the future stem of “aller” are used to construct these two tenses:

Past Tense: J’ai lu (I read)

Future tense: Je vais lire (I am going to read)

Thus it is the less thematic word that the SLI children have difficulty with. It appears that both SLI children and children learning L2 pass through the OI stage. The discovery of the presence of this stage in L2 learners is important, given their age. Their ages are past the alleged critical period window of neurological change for normal acquisition of tense-marking grammar (Lardiere, 1998; Prevost & White, 2000). Therefore, it appears that the mechanisms that are working during this stage are not specific to first language acquisition (impaired or unimpaired), and may not be extended to the classical critical period, but can also be extended to the early stages of
L2 young learners. It seems that the maturational model will have to be extended to incorporate this L2 group. If evidence is found conclusively that adult L2 learners clearly display O1, this stage may have to be defined as a process that extends across the lifespan, in which case the critical period notion would have to be rejected. Thus, for clinical purposes, these groups must be more carefully examined.

We have explored various populations that must put great effort into their language development. In attempting to address the linguistic problems experienced by these communities we must examine other factors that may exacerbate, crystalize or otherwise influence their linguistic difficulties. A large contributor in language development is the social environment. Language is learned in a social context, not a vacuum. Therefore, we will turn to the question of how context effects the acquisition of language.

**Socio-linguistics**

The social world is filled with cognitive social labels that both reflect and influence one’s social identity and personal sense of self. Those people who are labeled, thus, become linked to stereotyped beliefs. These beliefs are the means by which groups and their recognized members are stigmatized. This stigmatization causes stereotype biasing and can inhibit self-growth. In turn it can prevent the stereotyped individuals direct access to important parts of society. When examining those acquiring an L2, and those acquiring L1 with disabilities, we must ultimately examine the social environments in which these groups learn language. Both groups stand at a disadvantage relative to those who surround them and are stigmatized as a
result. The prognosis for needy language learners is inescapably affected by this stigmatization. The following section will address the socio-emotional factors that influence these “different” or stigmatized language learners.

**STIGMATIZATION**

Stigmatize, as defined by the Oxford English Dictionary is (1971): “To mark with a sign of disgrace or infamy; to call by a disgraceful or reproachful name; to characterize by a term implying severe censure or condemnation.” Erving Goffman’s (1963) book, *Stigma: Notes on the Management of Spoiled Identity*, defined stigma as an “attribute that is deeply discrediting” and that degrades the bearer “from a whole and usual person to a tainted, discounted one” (Goffman, 1963, p.3). Crocker and colleagues (1998) assert that “stigmatized individuals possess (or are believed to posses) some attribute or characteristic that conveys a social identity that is devalued in a particular social context” (p.505).

These definitions express two major elements of stigma: 1) negative stereotyping, and 2) discriminating against those who receive the stigmatization. This labeling permits prejudicial treatment. Discrimination of stigmatized groups is prevalent in all domains: social, economic and institutional. The most disconcerting part of stigma is that it not only helps the society devalue those who are stigmatized, but also has the negative effect that those who receive the negative branding believe in their own inferiority.

Thus far, we have discussed the biological factors that contribute to language acquisition. However, stigmatization presents us with an important psychological
element that should equally factor into our assessment of language performance. Language acquisition does not happen in a vacuum. All language learners who deviate from the norm of their particular social context may be negatively stereotyped and thus face the consequences of exclusion from the normative group memberships. This labeling serves to distinguish an “us” from a “them” (Morone, 1997). The rationale behind this labeling is that those who are negatively labeled can be separated from what we would like to see as the “us.”

The stereotyped behavior is sometimes sustained by the stigmatized individuals themselves as a self-fulfilling prophecy. In an experiment performed by Steele & Aronson (1995) two sets of SAT scores were given to white and black students. In one condition the students were led to believe that the test reflected intellectual ability. In the second condition the same test was given but the students were not told that the test was diagnostic of ability. In the first test the black students did significantly worse than the white students. However, in the second condition, the black students did equally well as the white students. Thus, self-perception actually affected the test results. The black students who internalized the stigmatization in condition one ended up substantiating the prejudices against them. The group in the second condition, unselfconscious of prejudice, performed significantly better. The second group did not feel stigmatized on what they considered to be a non-evaluative task, and so they performed at their appropriate level of ability.

In a related study, Spencer and Steele (1997) gave a difficult test of mathematics to men and women of the same mathematical ability. In one condition, participants were told before taking the test that men and women have equal math
abilities, in general. In the second condition, the participants were told that women usually under-perform men in math abilities. In the condition where female mathematical ability was devalued, the women confirmed the negative stereotype of them. In both these studies of racial and gender stereotyping, a group that was stereotyped and discriminated against acted in such a way as to substantiate the negative stereotype. The negative stereotype became a self-fulfilling prophecy.

This point has special relevance for the present subject matter. Children who are labeled as disabled or foreign may face undue obstacles to improving their proficiency in a language. Teacher, parent and peer feedback can help or inhibit language growth. However, the preceding studies indicate that the way a child is received in the social environment may exert a very strong influence on his/her performance. It is important, then, to assess how these language groups react in diverse social environments and how their linguistic abilities, socio-emotional abilities and behavioral abilities interact to inhibit or enhance linguistic progress. A number of researchers in recent years have turned their attention to this question. Their work forms the subject of the next section of this thesis.

**Socio-emotional Implications of SLI**

There is an association in the literature between having language impairment and being perceived as socially deviant. The term social deviance is vague term. In the context of SLI, it will be considered as deviant emotional behavior that is symptomatic of emotional disorders. A correlation exists more specifically between emotional disorders and language impairment, as opposed to behavioral disorders and
language impairment. However, emotional disorders can manifest themselves in negative behavior. Hence, certain negative behavior is seen as an expression of emotional problems rather than as an indicator of a behavioral disorder. Emotional disorders can be characterized by passivity, low self-esteem, or withdrawal. Behavioral disorders are often also characterized by aggressive behavior toward others, unpredictable outbursts in social situations, or oppositional and defiant behavior (American Psychiatric Association, 1987).

The evidence seems to show that children with SLI do exhibit emotional disorder types of behavior in social situations: (a) fewer conversation initiations than their peers; (b) their initiations are usually directly at adults and not peers (c) they are usually less socially accepted by their peers, which leads to peer rejection; (d) they rate their social relationships more negatively than their normal peers; and (e) they exhibit more withdrawn behavior than their peers (Hadley, Rice and Sell, 1991, Fujiki, Brinton and Todd, 1996). All of these behaviors are manifestations of emotional problems related to low self-esteem and social withdrawal.

Several hypotheses have been advanced to explain the correlation between emotional disorders and low academic performance generally. The first hypothesis proposes that this co-occurrence is explicable as a result of underlying emotional problems that manifest themselves both as linguistic and as emotional behavioral problems. Attention deficit disorder hyperactivity disorder (ADHD) may serve to illustrate this point even more clearly. As a result of a child’s poor attentional skills, he or she may ignore certain auditory input. The child becomes more withdrawn as a result of his/her inability to focus. Inability to focus causes withdrawal that
perpetuates possible social problems. General performance will be affected by social problems, because emotional responses to teachers, parents and students influence receptivity to incoming information. Because he is not attending to certain information, the child’s language ability suffers. Thus, the emotional disorder contributes in a causal way to the language impairment, rather than vice versa (Prizant et al., 1990).

Another hypothesis is that deficient language abilities lead to deviant emotional behavior as a way of coping with the social environment. This hypothesis is best represented by the Social Adaption Model (SAM) (Rice, 1993). This model posits the notion that SLI children and their normal peers have the same psychosocial make-up initially. However, the language deficits in the former group make socializing strenuous linguistically, and emotional disturbances are a response to these social strains. Emotional disturbance as a reaction to social strains represents a maladaptive response to these stressors. The Social Adaption Model asserts that children with primary language limitations will struggle in social situations in which their language abilities are put to the test. The prediction of SAM is that teachers and parents will rate these children differently on scales of emotional or behavioral disturbances. The social stressors in a classroom may make a child more reactive than when he is at home where he is more at ease and in a less anxiety-producing environment. This rater difference is attributed to the strenuous language situations in schools that spur behavioral problems.

An experiment by Redmond and Rice (1998) compared teacher ratings of children in their kindergarten and first grade classes with parental ratings of the same
children. They found a discrepancy between the ratings of emotional behavioral
deviance in children by the teachers and parents. Redmond and Rice explain these
differences as being a result of SAM. The teachers rated the children with SLI as
having more emotional/behavioral problems than their normal children. The parents
of the SLI children saw their children as exhibiting normal behaviors and generally
without emotional problems. This study supports the SAM hypothesis, that the social
situation exacerbates the language deficit and the child adapts to the situation by
exhibiting different behavioral or emotional reactions. Implicit in this assessment is
that language and emotional deficits are not intrinsically connected in all social
settings in which the child operates. However, it is clear that there is a correlation
between emotional problems (withdrawal and socially limited behavior) and SLI.
This brings us to our third hypothesis.

The third hypothesis posits the presence of a third factor that may be causing
this correlation between language impairment and emotional problems in children
with SLI. Several mechanisms have been advanced as third factors. The social
deviance model (SDM), which could also be used to express the ideas of the first
hypothesis discussed (SAM), puts forward that there is a common fundamental socio-
emotional trait structure that guides emotional development in children. This model
compares SLI children to those suffering from psychiatric disorders, and finds them
to be similar in socio-emotional traits (anxious, and inhibited behavior) and language
deficits. Thus, SDM proposes that both groups have these traits as a result of a shared
socio-emotional construct. These traits are a part of the child’s socio-emotional
development, and can be intensified during development, causing the rise of socio-
emotional problems. However, it is important to remember that correlation does not mean causation. Despite the facts that psychiatric patients and SLI patients do have similar behavioral emotional problems (withdrawal, passivity etc.), and that some psychiatric patients do show language impairment problems, the co-occurrence of those characteristics does not mean that these two groups share a fundamental trait. The SDM doesn’t explain, for example, the discrepancy in rater differences between teachers and parents. The observed variability of performance in different environments cannot be accounted for by Social Deviance Model. Additionally, studies have not found evidence that severity of impairment is positively correlated to severity of socio-emotional problems. The SDM proposes an underlying socio-emotional construct that affects linguistic and emotional problems. However, the presence of an underlying factor that influences these two variables would imply that the severity of one of the variables would increase severity in the other, resulting from a poor socio-emotional construct. Yet no conclusive evidence has been found that supports a positive correlation in severity between these two variables. Hence, other factors must be operating to contribute the originally correlation between emotional and linguistic problems.

Other third factors that have been proposed to explain the language-emotional problem correlation, include socio-economic status. This factor did not have a significant effect on mental status of the learning impaired (Beitchman, 1985). Other third factors such as low IQ, significant hearing loss, and brain damage were compared between those suffering with SLI and psychiatric patients. Yet the correlation for these factors was also weak. Thus, no specific third factor underlying
the correlation has been identified yet. However, there are multiple variables that seem to co-occur between emotional difficulties and language impairment.

The fourth hypothesis to be discussed is the Transactional model (Samernoff, 1987). This model focuses on the exchange between the child and the environment. A child’s social contacts and family situations are constant environmental influences that respond to the child and change his/her behavior. There is a constant interchange between social environment and child, which makes child development research a dynamic study. Examples of this interchange between child and environment are present in the relationships between children and their conversational partners. The contrast between parent-child dialogues with normal children and parent-child dialogues with SLI children show that the environment within which the child lives both affects, and is affected by, the child’s development. A study performed by Conti-Ramsden, Hutcheson and Grove (1995) found that children with SLI had different dialogues with their parents than did their younger siblings, or control subjects, and their parents. The measures used in the experiment were audio recordings of interactions between mother and child or father and child. There was special focus on the use of recasts by parents. A recast is a sentence produced by a parent in which the sentence structure uses words provided by the child. The parental sentence incorporates words that are already part of the child’s repertoire. By so doing, the parent provides a means by which the child can juxtapose the sentence structure he has produced with that produced by his parent. The child is therefore more likely to identify rules and parameters of the target language. As a result a child can start to learn more complex sentence structures. An example of a simple recast is the
following:

Child: “crayons on knee.”

Father: “put the crayons on your knee, yes.”

This simple recast is an example of an interactive utterance. What the researchers found is that with most children with SLI, these recast sentences occur less frequently than with normal control children.

Interaction of a mother and a control child, a simple recast:

Mother: “What are you making?”

Child: “ship.”

Mother: “a big ship”

The kinds of responses exhibited in the second example are important because they can expand the child’s understanding of sentence structure. The child’s attention becomes more focused on the sentence structure and makes certain aspects of the sentence more salient. In verb recasts such as “that Emily cookie” recasted as “that is Emily’s cookie”, the parent supplies the copula for the child or the verb agreement (dance - you’re dancing). In noun-phrase recasts the parent supplies the modifiers (dog - good dog), number (doll - dolls), nouns (yellow - yellow bus). The results in the Conti-Ramsden and colleagues experiment indicate that normal controls received new verb-phrase recasts from parents twice as often as children with SLI. In general, SLI children received fewer simple recasts than either the controls or their own siblings. In past experiments, the SLI children were also less likely to produce interactive utterances (i.e. to initiate the conversation) and so most of the parents’ recasts of SLI children’s statements were responsive utterances (Conti-Ramsden et
Another important recast is the recast loop. A recast loop is when a recast is followed by another recast. This type of recast encourages a longer discourse with the child through repetition and positive reinforcement.

A normal control recast loop:

Child: peeping
Mother: he is peeping
Child: he is peeping
Mother: Yeah, look! He is peeping
Child: Alex look
Mother: Alex, look he is peeping. Yeah, look, he is peeping

These results are consistent with the socio-emotional research discussed earlier. SLI children initiate conversation less and are usually more withdrawn. Their passivity in conversation may make parental opportunities for recasts more difficult. However, in the Conti-Ramsden et al. study no significant differences were found between the SLI and normal controls in the production of responsive or interactive utterances. This could have been due to the fact that it included a very small sample size, making generalizability open to question. The small sample size did, nonetheless, yield some statistically significant results: conversational differences were observed between SLI children and normal control children. In families of control children, recast loops occurred more frequently, as compared with families of children with SLI, where these recast loops were rare. The lower frequency of recast
loops in families with SLI children could be a result of the passivity of SLI children. These children are less likely to initiate conversations like the child in the example above, due to their more withdrawn behavior. Alternatively, there may be aspects of the parental interaction that are less conducive to an interactive dialogue, and that may make the child less responsive to the parent. Additionally, given the data discussed earlier regarding genetic transmission of language deficits it is possible that the parents of SLI children may also suffer from language deficiencies. We have examined in depth the problems that children with SLI have with tense and thus verb constructions. These difficulties may lead to the infrequency of verb-phrase recasts because the parents feel they are receiving negative feedback from the child with SLI. However, this negative feedback creates a cycle. With less opportunity to be presented with appropriate verbs the children are less exposed to proper sentence structure and improvement is slowed. It is virtually impossible in this situation to determine whether the input from the parents is exacerbating the verb difficulties or whether it is the child’s intrinsic difficulties that cause a lack of communication between parent and child. Seemingly, these two processes may reinforce each other and increase the ultimate problem.

The data regarding the younger siblings of children with SLI increase the complexity of these effects. Even the siblings of children with SLI received fewer loop recasts and recast expansions than normal control children of the same language age. Parental expectations may have started to affect the dialogues they have with their other children. Furthermore, there may be genetic factors that also affect the younger siblings of SLI children and their parents. It is clear that there are other
factors involved that should be studied in greater detail, including the child’s relationship with their parents, their birth order, and their general intelligence. Above all, it is important to keep in mind the theory of the self-fulfilling prophecy. The output of the SLI child is being affected by their expectations, which are in turn influenced by the expectations of their surrounding environment.

An experiment by Nettelbladt, Hansson, and Nilholm (2001) discovered that discourse style affected the complexity of the grammatical contributions of SLI children. Children with SLI produced more grammatically complex utterances if either their parent or a clinician provided a non-soliciting initiation, rather than soliciting questions or giving directives. Grammatical complexity was defined as a complex verb form (auxiliary + a past participle or a modal + an infinitive), an expansion (when subjects, objects and adverbials consist of more than one word owing to the use of, for example, determiners or subordination), and topicalization (when an element other than the subject is placed initially in the sentence). Who the conversation partner was (parent or clinician) had no effect on the grammatical utterances of the child, but question style did have an effect.

It should be noted that multiple studies have found, despite to the preceeding finding, that children with SLI do have a much easier time interacting with adults than their peers (Fujiki, Brinton, Morgan, and Hart, 1999, Fujiki, Brinton and Todd, 1995). In a study by Rice, Sell and Hadley, children with SLI, children with speech impairment, children learning English as a second language (ESL), and normal control children were observed in a naturalistic setting. These four groups were observed so as to identify and describe their different conversation styles.
The observations were coded for initiations in conversations, responsiveness, and addressee. Initiations were coded as a way of measuring the child's assertiveness. Responses were measured to see if the child would produce multi-word responses, one-word responses or nonverbal cues. The two latter kinds of responses were labeled limited response strategies. The level of responsiveness is an indicator of a child's ability to maintain an interaction.

The results showed that children who were struggling with communication suffer socially. They are less frequently addressed by classmates, prefer conversing with adults as opposed to their peers, and are less social in general.

The authors of this experiment believed that both assertiveness and responsiveness were signs of social competence. The four groups were different in their language profiles. The speech impaired group differed significantly from the SLI group in that their speech errors often made their language unintelligible, as opposed to SLI children, who had developmentally appropriate speech errors. The ESL group was composed of children from very different ethnic backgrounds: Chinese, Japanese, Korean, Spanish and Urdu. They had no previous exposure to English. All four ESL groups were placed in the same preschool class, which included teachers, learning specialists, and "special friends" for the ESL students. All children were encouraged to interact with any of the adults in the classroom.

Observations of the class proved that SLI and normal students initiated more conversations than the ESL group. All four groups chose the normal children as the preferred addressees for conversations. The other three groups addressed most interactions to adults than to peers. The normal language group was more likely to
use multi-word responses than the SLI group. On the other hand the SLI children and the normal language children were more likely than either of the two other groups to use multi-word responses. In general the two other groups used a limited response strategy. The group least likely to initiate interactions and be the addressee of an interaction was the ESL children.

There could be several explanations for these results. ESL children may be aware of their linguistic shortcomings in the L2 environment and thus try to compensate by using a limited response strategy, or by having an adult audience that may find them more intelligible. Alternatively, communication ability might be an indicator of social popularity. Thus communication ability might be a sign of social status. In a study by Black and Hazen (1990) groups of liked and disliked preschoolers were put in a setting with children they didn’t know. Children who were generally disliked were less responsive to peers and made more irrelevant comments than liked children. The self-image of these children may have caused a self-fulfilling prophecy. It is also important to recognize the huge cultural differences that may exist for the ESL children and affect their social behaviors. It is difficult to know what causes their socially isolating behavior, but one possibility is that because of their limited communication skills, these children adopt a negative social affect as a way of avoiding unpleasant interactions. It is also plausible that negative feedback from a peer may cause a downward spiral in both social and linguistic competence. More importantly, the communication problems shared by the ESL children, SI and SLI children support the theory that these social difficulties are not a result of unidentified personal factors but a result of limited communication skills. Because of the divergent
linguistic problems across these groups, it is possible to see these social problems as a byproduct of language deficits (impairment or the transfer of L1 into L2) and to see some of the language problems as an exacerbation of linguistic obstacles created by the social environment. Thus, there is not necessarily an innate emotional and linguistic deficit in children who struggle with language, as proposed in a prior hypothesis (SDM).

**Socio-emotional Effects of L2 Acquisition**

Many researchers criticize the work done in laboratories on child L2 acquisition studies. They consider it crucial to take into account the social environment in which the child learns the second language, the community in which the child is brought up, and the social views the child has toward the culture and themselves. In laboratory experiments these elements are often absent. Some researchers see the social context of the learner as a strong influence in affecting negative feelings about language acquisition. In this section we will focus on the importance of the social context on learning. More specifically, we will examine the social immersion of the learner and the level of motivation and anxiety experienced due to social context.

We can state with certainty that motivation and anxiety have a significant effect on performance, based on the varied data found when L2 learners are put in different learning contexts. In Tarone and Liu’s (1995) a study of “Bob”, a young Chinese boy, they found that his language abilities varied entirely based on his partner. He initiated conversations least with his teachers and used the least complex
sentences. On the contrary, he initiated most with a friend of his parents that lived with them. In the latter situation, he also used many more complex sentences. Sentence improvement and learning started with the child’s adult friend at home and eventually was integrated into his peer relationships. Lastly, progress was evident in his interactions with his teacher. Given what has been previously discussed regarding stigmatization a teacher’s perception of a “needy” child may set the child on a negative downward spiral.

A striking finding in that experiment was that “Bob” acquired English questions in a different way than most children. His sentences had many more complex constructions. This difference was attributed to the influence of his adult friend, implying that social environment can be so strong that it can alter the stages of acquisition.

If the social environment can alter language acquisition significantly, social variants must be carefully observed in language experiments. Hence, a child’s language competence should be regarded not only as a result of proficient language processes but also as a function of numerous social factors. It is important to note that this study was a case study and hence it is difficult to generalize “Bob’s” data to the general L2 population. Many linguists share the socio-emotional view of language acquisition, that the social context of language input is extremely important in L2 acquisition.

Salience has been discussed previously in relation to SLI learning and general language acquisition. It is also important with regard to a psychosocial context of language acquisition. The receptiveness of the learner to the interlocutor strongly
affects performance. A study performed by Karniol (1989) studied the affects of an L2 day care center on the development of a child’s L2 speech. The findings support the claim by Tarone and Lui (1985) that the social environment of children affects their L2 acquisition. The experiment involved the observation of the acquisition of Hebrew by an English-speaking child in Hebrew daycare from ages 1-3. Her acquisition was recorded by her mother’s use of L2 in their home. Her parents spoke both Hebrew and English. Originally they only spoke English to the child, and they spoke Hebrew to each other. The other children in the daycare program were all Hebrew speaking, which made communication between the Hebrew speaking children and the child acquiring Hebrew problematic.

Acquisition of L2 was difficult for this child for several reasons: 1) the other children struggled in understanding the L2 child and 2) the control children served as the models for learning constructions in the Hebrew language, thus reducing the child’s likelihood of observing correct grammatical constructions. As a result, the L2 learner relied on the input of the teachers or adults in the daycare environment. Given this input source, this L2 learner is only exposed to a particular kind of linguistic contact. The child, in imitating adults, had a disproportionate number of imperatives and declaratives in her speech and very few declarative sentences. These results show that the child’s social environment has affected her stage and type of acquisition.

We have proposed several possible factors that may affect the social environment of language acquisition, but before exploring ways in which these social factors increase or decrease motivation and anxiety, first we must establish that there is a mechanism by which these emotional states can affect linguistic performance. In
Pulvermuller and Schumann (1994), as well as Schumann (1995), an integrative model of emotional and cognitive processing is put forth, that a learner’s emotional response serves as a “stimulus appraisal.” This term is used to mean that a learner’s emotional assessment of the social environment affects his conceptualization of certain ideas and influences his processing of information. This processing is not simply a logical analysis but integrates social dynamics and world-view. Neurobiologists and socio-linguists agree that the degree of convergence in vocabulary style, accent, and proficiency between interlocutor and speaker are a result of shared social relationships and environments (Giles & Powesland, 1975, Labov, 1974).

Labov proposes the idea of the power of a “speech community”, which is defined as a group or community that interacts frequently and shares common norms and linguistic points of reference. An example of such a “speech community” includes groups that use Ebonics, or in which adolescents or adults may incorporate the phrase 24/7 as a common abbreviation for “all the time” (twenty four hours, seven days a week). These speech communities may inhibit or enhance certain language usages. Thus, it is important when examining the performance of a certain group of speakers to observe the context and speech community of which they believe themselves to be a part, as well as their relationship to the community they reside in. All these factors should be incorporated into experimental or observation study design. Given the power of social situations to affect learning performance, we must carefully review the most prominent emotional correlates of language acquisition. In doing so, we are faced with several obstacles with regard to the analysis of children.
Getting self-reports from children is extremely difficult and problematic, given both the limited language and conceptual abilities of children, as well as their level of self-awareness and self-analysis. As a result, studies regarding child L2 learning are often based on retrospective self-reports. In order to understand the contributing social factors of language learning for the language learner, we must understand his/her perception of specific language communities. A language learner’s perception of a language environment is affected by his/her ideas about that target culture as it relates to his/her own sense of linguistic identity. Thus, the next section will focus on linguistic identity and how social identities influence language performance.

LINGUISTIC IDENTITY

Second language learners’ performance is related to the setting in which they learn the target language, by their values about their cultural identity and how those values affect their assessment of the target culture. The attitudes of their native culture pervade their ideas about learning, their ideas about language, and their ideas about learning in the target culture. Thus L2 acquisition is affected by how the learner integrates his/her opinion about the native culture and the target culture. Here, we are primarily interested in the effect of differing views on performance. The following studies focus on adults, because as mentioned previously, children’s values are much more difficult to assess, given their limited self-awareness about their own cultural identity and hence, their awareness of their feelings toward other cultural groups. Therefore, we will focus on adult L2 learners. Adult learners are aware of their role in society, both in their own culture and the target culture. These attitudes about self-
perceived identity influence opinions about target cultures. All of these opinions about the learner's relationship with the L2 may affect proficiency.

A study by Svanes (1988) shows that a subject's perception of the target culture affects performance in L2. This study found in adults, a correlation between attitudes about the target people (balanced or critical opinions of the L2 community), and performance. The study was performed with 170 students in Norway, at the University of Bergen, of varying ethnicities and L1 backgrounds. The total sample was divided into three groups depending on the amount of "cultural distance" between the target culture and the L2 learner. This term is used to assess the target culture's familiarity to the learner. The researchers observed linguistic similarities and differences between the target language and the official language/second language (e.g., Mali's official language is French.)

The Northern European groups were defined as "near countries." Their mother tongues were all SVO (subject verb object word order for sentences) languages as was the target second language of Norwegian. All groups in this category were part of Western European culture although each has its own cultural differences depending on their region of northern Europe. Middle Eastern and African students were considered the "intermediate" group, because they had been significantly exposed to Western culture, but were not raised in it. In the case of Africa, colonization by the English and French made western languages their official languages. In the case of the Middle East there has been more exposure to western culture there, than in other Eastern countries. Linguistically these groups were also intermediate. Languages like Arabic, Hebrew and Twi are verb before object (VO)
languages whereas Turkish, and Telugu are object before verb (OV) languages. This in-between group differed in language and background from the Norwegians. However, their familiarity and exposure to western traditions enhanced their relatability. The third group was comprised of Asian students from Bangladesh, India, Pakistan, Sri Lanka, and Vietnam. With the exception of Vietnamese, their languages were all OV languages. Generally, these cultures are less exposed to Western culture. Although some of the groups were familiar with English, their own languages were the official languages in their home country, unlike with the Africans, so their use of English was limited and unnecessary.

The students were given three questionnaires with twenty-four adjectives in each. The adjectives were divided into those that pertained to intelligence or kindness/warmth. The subjects were asked to decide on a 1-5 scale (not at all-very much) how the adjective characterized their fellow countrymen, Norwegians, and the ideal person. This task aids an assessment of cultural identity and cultural attitudes toward other cultures. One to two weeks later these students were given an exam to test their language proficiency in Norwegian. The test included essay writing, reading comprehension, a cloze test, and oral proficiency. The results were very interesting. The Asian students, the group with the greatest cultural difference, had the most positive attitudes toward Norwegians. They considered them more “intelligent” and “kinder” than did the Western students. Additionally, Asians rated their fellow countrymen higher on these two scales than did the western students. No group rated their own people or Norwegians as comparable to their ideal conception of kindness. The Asian group performed significantly worse than the other groups on their
language performance. The performance of the Western students surpassed the other groups, followed by Middle-eastern and African students and lastly the Asian students. Thus on the one hand, the greater the culture difference between the target culture and the learner's culture the worse the performance and on the other hand the more distance the more positive the attitude toward the target culture. This study asserts that cultural distance does increase negative linguistic performance. However, it is difficult to know if performance varies as a result of L1 properties or as a result of degrees of cultural distance. This finding supports earlier studies performed by Svanes (1987) that also found a correlation between the closeness of the L1 and L2 cultures and the learners' proficiency in the new language. In other words, L2 acquisition is increased if the learner has a more balanced view of the culture. Ideally, the language learner should be able to see both the positives and negatives of the target culture. The language learner is familiar enough with the culture to be able to critique it and recognize its fine points. Idealization, in the case of a more "distanced" culture, may cause the language learner to feel inferior and thus perpetuate his poor language skills (Svanes, 1987, Oller & Perkins, 1977).

These views are controversial. Some researchers claim that there is a positive correlation between positive attitudes toward the target culture and proficiency in that language, rather than the critical and balanced view proposed above (Gardner and Lambert, 1972). These attitudes become important because they contribute to the motivations of the language learner and consequently influence language performance.
Anxiety and Self-perception. In the same way that motivation in L2 can affect performance, anxiety about L2 acquisition can sway proficiency. The literature supports a theory of self-perception/anxiety relationships. It supports the claim that anxieties about self-perception contribute to lowered language achievement scores. A study by Bailey, Onwuegbuzie and Daley (2000) found that the foreign language learners with the highest levels of anxiety appear to be older, have lower expectations of global self-worth, low perceived scholaristic ability, low perceived intellectual competence and low perceived job competence. These correlations are further supported by Krashen’s (1980) finding that low expectations of language learners about their linguistic performance led to decreased receptivity to L2 and poor linguistic performance.

Gardner and Lysynchuk (1990) also argued that worry and emotionality about L2 acquisition lead to anxiety and poor performance. Relatedly, a study observing French students at Anglophone university examined the claims that beliefs and negative experiences with the target culture were good predictors of both anxiety level and of students’ final marks. These measures were recorded based on the Classroom Anxiety scale as well as on self-reports (Coulombe, 2001). Negative attitudes, and or negative experiences in the target culture, as well as high anxiety levels contribute to low performance on L2 measures. It is evident that the social experience of the learner, his cultural identity and his level of anxiety had an effect on his performance in L2.

The opening of this section focused on the effects of stigmatization on achievement. The perception of the social learning environment by either the SLI or
the L2 language learner affects learning progress and efficiency. The different morphological, phonological, and syllabic problems experienced by these groups can be exacerbated and perpetuated by their surrounding environment. Each of these groups is stigmatized, in the former case by disability and in the latter case by estrangement from the target culture. Their divergence from the norm and thus societal stigmatization lowers self-esteem and increases self-scrutiny. It is important to identify societal factors so that appropriate learning strategies can be used to aid language instruction. Restorative measures should include both social and linguistic foci, so as to minimize negative influences.

**THERAPEUTIC MEASURES**

We have examined both the linguistic and psychosocial factors that play a role in language acquisition. It is important to keep these factors in mind because they influence proficiency. The literature presented aids in identifying possible factors that may thwart proficient language acquisition. As a result of our close examination of both morpho-phonological problems experienced by all three language groups and our discussion of possible social factors, we can now propose therapeutic measures that will best address these linguistic and environmental problems and increase performance success.

Children with SLI should receive phonological training as well as being provided with appropriate learning environments that deter social factors from negatively affecting performance. A study by Gillon (2000) showed that children who received phonological awareness intervention had a higher rate of phonological
improvement over those receiving the more general and traditional speech-language intervention programs. The latter program focused on perfecting articulation and language skills. The former program teaches a variety of different skills, including development of skills on a phonetic level, letter-sound knowledge, phoneme segmentation skills, and reflection about the nature of phonetic tasks. An example of the first skill that focuses on phonological awareness is picture rhyme bingo, in which the child tries to recognize similar phonemes in spoken word pairs. The second skill is also incorporated into games. An example is a game in which the child associates sounds with objects. A building block is associated with a letter and a word is built. The child is forced to physically construct the word, with verbal articulation and with the manual manipulation of blocks. Additionally, children are instructed to use picture drawings to help them identify the initial and final phonemes in words. For example, there might be a variety of pictures with animals on them and the clinician might ask the child “do cat and cow start with the same sound (consonant)?” This activity focuses the child’s attention, helping them to notice linguistic elements that they may find problematic. These procedures are varied depending on the linguistic weaknesses of the child in the session.

The traditional method is less varied in its activities and thus less apt to accommodate certain individuals need. The traditional approach focuses on the child’s ability to articulate phoneme targets in isolation and within syllables, words, phrases and sentences. This method is less game oriented and focuses primarily on articulation gestures. The object is to teach the child how to coordinate articulation into sequences. The phonological awareness intervention, on the other hand, not only
improved the phonological awareness, production, and articulation skills of SLI children, but it also improved their reading ability.

SLI children, after having the phonological awareness intervention therapy, had a phonological performance rate similar to their peers with normal language development, because this mode of therapy emphasizes the sound structure of spoken language. The diverse techniques of this form of intervention were more effective. In order to minimize the social stressors that may exacerbate these phonological problems, intervention should start at an early age. Rice, Seli and Hadley (1991) emphasize the importance of viewing SLI children in environments with normal developing peers. In these mixed environments, clinicians can observe natural speech interactions and make assessments of the child’s deficits. Additionally, a normal learning environment can maximize the potential for correct development. Segregating these children into slowed down learning environments will only encourage their deficit, and decrease normal language exposure. The earlier these disabilities are recognized, the easier it will be to avoid the social contributors and address phonological difficulties.

Second language learners, to increase their proficiency and avoid the negative social responses that accompany language inferiority, should also be educated about language intervention programs. Involvement and aid differ between adult L2 learners and child L2 learners. Krashen believes that the ideal way for adults to learn L2s is through an emphasis on communication and not on formal classroom learning. Given the “natural” order of acquisition of morphemes it seems that acquisition occurs in the same order irrespective of the target language. Hence, classroom
learning forces an "unnatural" language development. Thus, Krashen proposes that language learning should be focused on communication and not on formal language ability. Complimentary to this claim is the argument that L2 adults learn primarily from input rather than from production. Krashen explains that comprehension is the most important element of language learning and the output is secondary.

This emphasis on input reiterates the importance of having a positive or receptive attitude toward the target culture. An adult L2 learner should be aware of his or her own prejudices about the target culture, as well as be placed in an optimal language environment so they are more receptive to the language culture.

Krashen's work is controversial. Nonetheless, his models regarding sociolinguistic and phonological problems seem applicable. The difference between child and adult second language learning is that in child learning, the spontaneous covert attention of the child is the base for their linguistic knowledge, while in adults, it is overt awareness, attention, and a focus on specific language forms for communication that establish fluency. Children receiving phonological training should have games that help focus their attention on the details of the task, with repetition, hands-on activities, facial expressions, and sensory aids. All of these activities should be embedded in context so that the children can easily adapt what they have learned to normal social environments.

Adults do not need as many hands on activities, as a result of their superior abstraction, and conceptual abilities. Adult learners have an advantage in that they can easily recognize patterns and structures in languages, yet they are at a disadvantage because they have "baggage" from their L1 that may block
establishment of new language configurations. For adults and children alike, there are certain phonologically focused activities that increase performance. Relevant techniques include listening and imitation activities, tongue twisters for improving articulation, systematic pair exercises ("don’t slip/sleep on the floor"), development approximation drills (/w/-/r/= wed-red), drilling of vowel shifts (/ai/-/I/: bible-biblical), stress shifts (photograph-photography). All these exercises should be in a contextual environment (i.e. dialogues) so that the task becomes natural.

Additional activities for L2 learning include memory chain drills. For example, in English L2 learners, the morpheme -s can be tested by having students repeat the following sentence with their classmates "my/his/her name’s __ and I/he/she like(s) to__". Repetition is a key part of language learning, thus recitation activities are also encouraged. Exercises that include chanting or word diagrams (two (draw a /w/) apples, three (draw a /y/) elephants) that show the way words are segmented are also useful. Having adults and children set up classification systems will help them to establish an L2 framework. For example: /Ed/-added /d/-moved /t/-baked. The sound preceding the word shows the different possible phones for an "ed" ending. These word models help to set up phonological principles for the L2 (Celce-Murcia, 1991).

CONCLUSIONS AND IMPLICATIONS FOR LANGUAGE COMMUNITIES

It is important to address the social environments of L2 learners. For L2 children, as well as SLI children, it is important to educate these children in normal language environments. This increases their exposure to the target language, as well
as providing clinicians with appropriate environments for observing linguistic interaction performance. In general, L2 learners should be encouraged to focus on communication, discourse norms, and strategies for intelligibility (Brown, 1994). The ideal L2 scenario is when a L2 learner is motivated to learn, feels positively about the target culture, learns the language before the end of the critical period/ sensitive period, and when their L1 is not phonologically unlike the target language.

All three language groups (SLI children, L2 adults and L2 children) struggle with the acquisition of language. All these groups have biological constraints that affect their capacity to acquire language. In the case of L2 learners the critical period places limitations on the rate and level of language acquisition. A child’s natural inclination for acquiring language makes him/her establish certain parameters for L1 and thus circumscribes their linguistic domain of focus. The parameters that help children to formulate the first language also constrict their flexibility to acquire a new language. The boundaries of phonological systems (categorical perception) help infants to understand the way words are constructed. Yet, by establishing categories and systems, the child creates settings for integrating linguistic information, which limits linguistic arrangement. Thus, the organization becomes more rigid and less attuned to refinement. This is the case with adult L2 learners. Their parameters for language processing have been well-established, so that the acquisition of a new language is more difficult and necessitates a restructuring or adjustment period. This adjustment period, although not causally the same, is also experienced by SLI and L2 children. In the case of SLI children, default parameters have been set innately, and the child seems unable to change them as needed. The SLI child is unaware of certain
patterns in the language environment, and limits in the target language. Just as the L2 adult must reset the switches on their linguistic parameters so must SLI children. Both are biologically confined, the former by the critical period (hypothesized period, prior to age five, in which language learning must occur) and the latter by an impairment. Both groups are socially at a disadvantage because they face the consequences of stigmatization, which may exacerbate any linguistic problems they may have. L2 adults struggle with phonology and the interface between phonology and morphology, as do SLI and L2 children. Chomsky sees language segmentation and organization as innate human capacities. Organizing a phonological system is an inherent stage in linguistic development. However, this natural inclination for language development, like a double-edged sword, inhibits the elasticity in the parameters that have been set. Thus, L2 learners and SLI children are limited by biological constraints that establish the boundaries of language. The modification of these boundaries is only possible if therapeutic measures are implemented early and appropriately, to reduce any socially exacerbating factors and improve acquisition of the phonological lexicon.
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