SOUND SYMBOLISM IN NATURAL LANGUAGES

By

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DEDICATION

I dedicate this work to my Dad, Donald Ciccotosto, also known as Don Tosta and to my Mom, Irene Ciccotosto, also known as Irene Tosta. I further dedicate this work to Carol Ciccotosto, my wife, and Christopher J. Costoff, her son.

These people have immeasurably enriched my life and there is no doubt I would not have accomplished this study without their support and inspiration.

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A major assumption in modern linguistics is that sounds composing words arbitrarily associate with meanings. Saussure's early 20th century arbitrary sound-meaning tenet has been neither adequately examined nor challenged. This dissertation casts doubt upon this theory by gathering evidence of sound symbolism from virtually all known language phyla. Major sound symbolism experiments are reviewed, and finally, a series of sound symbolism hypotheses is proposed for a group of basic vocabulary words. These glottochronological words, of a supposed arbitrary sound-meaning nature, are routinely utilized by linguists to trace genetic relationships among language phyla.

Dissertation data are composed of a lexical sample representing 1% of 5000 world languages. Sixteen glosses contain 50 words per meaning from 50 languages, and are taken from at least 10 of the 17 human language phyla. The set includes: NECK, TOOTH, MOUTH, NOSE, COUGH, EAT, DRINK, VOMIT, BREAST, SUCK, DOG, SWALLOW, SPIT, FOOD, WATER, and CHEW. These 800 glosses, taken from a pool of 229 languages, are tallied according to sub-phonemic distinctive articulatory and acoustic features such as nasal, stop, spirant, bilabial, and others.

For the 16 concepts, a total of 63 hypotheses are proposed. Each hypothesis argues that certain sub-phonemic features are to be found at higher or lower levels than those in the remaining sample of 750 words. Chi-square tests run on 63 hypotheses give 23 instances of association at significant levels, $p<.05$. The application of the rank-order median test of Kruskal-Wallis to the same hypotheses gives similar results. For the ordered alternative Jonckheere-Terpstra test, all predicted features based on three k-samples are highly significant.

Such synchronically extensive sound symbolism is striking. Sound symbolism, within the basic behavioral and physiological meanings of these words, shows a heirarchy of sub-phonemic features. Their evolutionary adaptive value may allow conspecifics facile entry into a communication network.

CHAPTER I
SOUND SYMBOLISM AND BIO-CULTURAL ANTHROPOLOGY: TESTING PROTO-LANGUAGE HYPOTHESES IN NATURAL LANGUAGES

Introduction

Sound symbolism, a nonarbitrary, one-to-one relation between acoustic and motor-acoustic features and meaning, is an important study for anthropologists because its accurate delineation may shed light upon an underlying nature of the human language faculty. Additionally, understanding its mechanics may render a fuller explication of the lexicon possessed by humankind in pre-*sapiens* times. This dissertation examines sound symbolism and argues that it relates to primitive cognitive levels such as those required of neonates and early and pre-*sapiens* society. The crux of this type of examination is that:

> "There will always be layers of the vocabulary, representing a more primitive stage of language in which the relation between sound and meaning is partly motivated. . . there is a need for a systematic investigation of this vocabulary in various languages, supplemented by psycholinguistic tests, in order to find out what is universal in the expressive function of these partly motivated signs." (Fischer-Jorgensen 1978:80)

In this chapter, I sketch sound symbolism and present a series of hypotheses about motivated meanings and their representations with nonarbitrary linguistic features. The language data are discussed in Chapter II and it represents 800 words taken from 229 languages. The data set includes 16 semantic categories (i.e., words and their meanings) which are hypothesized to contain sound symbolic elements. These words are part of the glottochronological list devised by Swadesh (1971) and refer to basic and proto-typical ethnoanatomical, physiological, and culturally specific semantic domains. My word sample includes: (ethnoanatomical) BREAST, TOOTH, NOSE, NECK, MOUTH; (physiological) COUGH, VOMIT, SUCK, EAT, DRINK, CHEW, SWALLOW, SPIT; (culturally specific) WATER, DOG, FOOD.

The data set exposes semantically basic words and as such, the categories may reflect universally unmarked domains. That is, unmarked domains contain words of short form, phonetically archaic in shape, which are basic in meaning, and which are learned earliest by language speakers (Battistella 1990:23-68).

This data set is admittedly minimal, though for a number of reasons. Presently, world culture exhibits at least 5,000 separate languages. Given an upward limit on the actual size of a particular language lexicon, an overestimate would be that any language contains more than 1,000,000 words. Even so, 5,000 languages with 1,000,000 words each, means that 5 billion words are spoken on earth. Clearly this demonstrates an expansion of lexicons everywhere at a distant time when phonemes, through a changing neuro-physiological morphology, became disentangled from primate call structures (Hewes 1983).

Statistically speaking, greater than two-thirds or 70% of all languages contain a phonemic inventory of between 20 and 35 phonemes. Even so, the range of phonemes actually produced in all human languages is at least 500 (Pullum and Ladusaw 1986). Phonemic inventories range in size from 11 (Hawaiian-*Austronesian Phyla*) to 141 (!Kung-*Khoisan Phyla*) (Maddieson 1984:7).

In turn, each phoneme is a mental construct of a given cultural group, composed of binary distinctive articulatory and motor-acoustic features (Sapir 1929). This suggests that languages are largely composed of arbitrary sound-meanings. The impetus for accepting the view that there is an arbitrary connection between *signifier* and *signified* comes from the work of the great structural linguist Saussure (1959). In his groundbreaking work, he held that a word is composed of sounds and reference to a concept. If the association between sound and concept were not predominantly arbitrary, languages would cease to change (Saussure 1959:67-71).

While languages are endlessly changing bio-cultural entities and completely replace their lexicon approximately every 100,000 years (1&-5% per 1,000 years) (see Gudchinsky 1964, for example), would it be unusual to find more than 1,000 sound symbolic words in any given lexicon? For the supposed maximal 1 million words per language, this would represent a negligible one tenth of 1% of a language's lexicon. Still, although any language might contain 1,000,000 items, scholars generally agree that an average speaker might command behavioral and physiological mastery of 10,000-30,000 words actively (Durbin 1969). For the neonate, child, mentally handicapped, or the emerging bilingual speaker the total can be considerable smaller. Taking the latter figure as more realistic would mean a large sound symbolic system could command more than 3% of a language's lexical system. This may have already been demonstrated for Japanese (Hamano 1986), and I argue this for English in Chapter III. However, exactly how a language's sound symbolic lexicon should be measured is still a matter of some debate (Ultan 1978; Malkiel 1990a).

The importance of these statistical assumptions is that if a number of basic glottochronological words are compiled from a geographically and genetically distanced sample of world languages, the expectation is that, not being in contact for more than 100,000 years, then only 1% of the terms should be similar. Otherwise, since contact and borrowing is ruled out, internal and cross-culturally parallel forces are at work. This more reliable intuition means that sound symbolic words should appear significantly above limits set by glottochronologists in many languages. Further, there is nothing "primitive" about a vocabulary rich in sound symbolic words versus one appearing less so. Sound symbolism may rank more as a creative force in producing "new" words, than as a label for aberrant morphological words.

At as yet uncovered levels of cognition and bio-mechanics, sound symbolic processes approach "least moves" theories, that is, they express exceedingly close association between sound and concept. Contrary to what Saussure and disciples argued, sound symbolic words are linguistically pervasive, proto-typical, and if time frames must be given, at least hundreds of thousands of years old. As LeCron Foster points out, the "arbitrary relationship between phonological representation and meaning becomes questionable once motivation is discovered for assignment of a particular meaning to a particular phonological unit" (LeCron Foster 1978:83). The subconscious levels of language use are yet to be fully explicated because the extent and importance of sound symbolism in world languages. The function of sound symbolism as a citadel of special word-meaning formations is not well studied. Much speculating and many poorly designed studies have been done, to be sure, and few scholars suggest sound symbolism can expose primordial words, for fear of reiterating some variation of the disdained "bow-wow," "sing-song," "ding-dong" language origin theories. Additionally, linguists have omitted sound symbolism as an arena of attention because of a focus upon sound changes and the etymological primacy of words (Jespersen 1921/1947:410). Among the few to propose nonarbitrary sound meanings for primordial words are Mary LeCron Foster (1978) and Gordon W. Hewes (1983).

So far, historically documented languages attest sound symbolism examples from 12 of the 17 language phyla. There is little doubt much more evidence of sound symbolism is forthcoming from the lesser studied language phyla. Just as easily, one can see a sub-field emerging to be labelled "generative phono-semantics" or "psycho-semiotics" (Markel 1991) to deal with the under studied mental structures which imbue language its affective use within socially dynamic contexts.

Psycholinguists, linguists, and anthropologists have implemented numerous types of experiments upon sound symbolism. Their investigations involve textual analysis and the psychological testing of differing linguistic groups with the creation of artifical lexicons and the use of sound symbolic words. This research has never been incorporated into anthropological theories about language origins. Below, sound symbolism is placed back into this context.

Sound Symbolism and Proto-language

The evolutionary advantages of vocal communication in primates are considerable. Calls warn others away from danger or toward food. It is no small observation that they confer "life-lengthening" advantages to select individuals capable of their efficient production and understanding (Bickerton 1990:147). This most basic tenet of communicative function, when placed in the context of human bio-social evolution, witnesses humans as paragons of communicative efficiency. Humans are the only species producing a vocal communication allowing themselves defense outside of real evolutionary time. This is to say, they can warn each other about dangers which are unknowable through the immediate senses, such as cancer and global warming (Pinker and Bloom 1990:712).

Among current speculation on language origins is the endless though necessary reiteration that language evolution has had many causes; bipedality (Washburn 1960), vocal-morphological restructuring (Lieberman 1984), increased brain size (Jerison 1976), neural-reshuffling (Falk 1990), gestural-motor enhancement (Ojemann and Mateer 1979), gender differences (Jonas and Jonas 1975), use of fire (Goudlsbom 1983), increasing face to face interaction (Tanner and Zihlman 1976), and so forth. Beyond this, however, most language origin arguments splinter into gradualist versus punctuated scenarios. Stephen Jay Gould's school argues language is an "exaptation," a combination of otherwise spurious physiological events coalescing into a remarkably sudden referential system (Pinker and Bloom 1990). The classical school of language origin antedates even Wallace's and Darwin's ideas on the subject. This school presents evidence of a gradualistic "language design" apparent in nature, even at the expense of efficiently eating, drinking, breathing, and swallowing (Hockett and Ascher 1964; Lenneberg 1967; Lieberman 1984).

Scholars like to quibble over which selective pressures resulted in early hominids leaving the forest. Our distant ancestors, Bickerton argues, used their proto-words most likely in alarm calls, animal imitations, expressive grunts, and chance associations (Bickerton 1990:156). Arising as a representational system, language was adaptable because it described nature. The only real intent of proto-words was "to get the point across," says Bickerton, and this echoes Wittgenstein's philosophy of language (C.H.Brown

1976). Wittgenstein states, "Whereof one cannot talk, one is silent." Simply put, this means that where there is no selection pressure to produce a sound, there is not one there. Chomsky claimed that humans developed a sudden and apparent "linguistic organ" through the evolving neural tissue (Chomsky 1968). The more typical Wittgenstein attitude must prevail. Instead of the "rules" of language being innate, Wittgenstein argues that the capacity to form rules of language is innate. This view more closely follows the findings of Ojeman and Mateer (1979), that syntax could have developed in concert with increasing fine motor control.

The primary function of language is to represent nature, and as intrinsically connected to animal communication as a whole, this function is crucial to the intent of all humanly produced words. The meanings which words contain are only to be found within a range of human behaviors as an animal species. More basic meanings may be inseparable from the sounds composing them because they consistently "get the point across." Whether these basic meanings are called 'flee', 'fight', 'mate', or 'feed' versus 'run', 'hate', 'love', or 'food' is a moot point. This is exactly what LeCron Foster proposed when she derived even more distant proto-words from the proto-words of reconstructed language phyla (1978). She writes:

"Early linguistic symbols (phonemes), apparently parental to all present-day languages, are reconstructed from a group of languages whose genetic relationship to one another is extremely remote. The reconstructed symbols are found to be nonarbitrary. Their motivation depends upon a gestural iconicity between manner of articulation and movement or positioning in space which the symbol represents. Thus, the hypothesis presented here implies that early language was not *naming* in the conventional sense but representation of one kind of physical activity by means of another, displaced in time but similar in spatial relationship" (LeCron Foster 1978:78).

If a handful of proto-words or sound-symbols can be manipulated so as to generate elementary propositions, a language system can emerge with conspecific vocal partners. The advantage of merely being able to indicate "THERE"+"FOOD" would be tremendous to our early hominid relatives. Evidently, this capacity to relate to (or to name) objects and delay enactment of behavioral rote is well within the range of abilities demonstrated by our closest genetically and morphologically expressed cousins *Pan* (Gardner and Gardner 1971), *Bonobo* (Boehm 1989; Mori 1983), *Pongo* (Miles 1983), and *Gorilla* (Patterson and Linden 1981).

Bickerton's presentation of proto-language assumes the lexicon of a *Homo habilis* or *Homo erectus* to be like a "miser's shoebox," each proto-word containing a meaning according to neccessity's rankings (Bickerton 1990:158). Proto-language also may have contained a proto-syntax, including negators, question words, pronouns, relative-time markers, quantifiers, modal auxiliaries, and particles indicating location (Bickerton 1990:185).

The neccessary semantic concepts identified for any human time before 100,000 years ago are, in Wittgenstein's views, synonymous with selective pressures. Without recourse to a sound symbolism element in a language origin scenario, language origin theories fail to show how any sound is ever connected to any meaning. This is an absurdity because in order to be at an overwhelming level of arbitrary sound-meaning, all the present languages had to have undergone immensely long parallel traditions.

The trouble with a cursory dismissal of sound symbolism is that in order to have arrived at fully arbitrary language now, humans would have had to have totally foregone all emotion and neccessity from their utterances. This is clearly not the case with any language.

I propose that the arbitrary sound-meaning hypothesis is an unreachable end for all languages and that sound symbolism mechanisms underlie naming processes.

The Nature of Sound Symbolism

Why should scholars of such differing ages as Socrates, Aristotle, Plato, Condillac, Swift, Darwin, Wallace, Tylor, and Freud (Jakobson and Waugh 1979) agree that some facets of words carry meaning in and of themselves? The attractiveness of a sound symbolism is that it provides a bridge between extrinsic and inner realities in hominids. Such plausibility has come into and out of vogue. Presently, it is becoming increasingly important as an arena holding vital answers about language origins.

Take the largely autonomic, primate vegetative process of coughing, as an illustration. Here, coughing is a reflex integrated neurally at the medulla and is initiated by irritation of the bronchio-alveolar, tracheal, laryngeal, or pharyngeal mucosae

(Geoffrey, Bernthal, Bertozini, and Bosma.1984). Additionally, auricular nerve stimulation can initiate the coughing reflex and it can be produced voluntarily as a discrete sign, a diagnostic event, or unconsciously with symbolic meaning (Leith 1977:547). During a cough, as the glottis closes, strong intrapulmonary pressure builds with the respiratory muscle contractions, and finally, the glottis suddenly opens to release an explosive discharge of air, mucous, water, and foreign bodies (Ganong 1983:180). The sound of a cough varies from animal to animal, being species, age, sex, and in some manners disease specific (Leith 1977). Nevertheless, the sounds of a cough in all species take place within a few frequency bands of acoustic energy, not all of them. Any animal who mimics, duplicates, or reiterates a cough would create the description of the autonomic process through the sympathetic nervous system.

There are miles of neural circuitry between the autonomic and sympathetic nervous system, but what makes sound symbolism attractive is just that it "gets the point across" as Bickerton would say. In hominid neural evolution, it points to a "least moves" pathway inexorably trained upon language development. Sound symbolism is known to provide a "least moves" route in a variety of ways, the least of which is that it provides a mnemonic assist to peripherally included vocal partners such as neonates, other *Homo erectus* individuals, or foreign language learners (Wescott 1971b, Jakobson and Waugh 1979). If language is to include a wide range of individual genotypes and intelligences, and still incorporate a list of symbolic elements, it certainly needs mnemonic assists.

In contemporary linguistics, there are arguments for "weak" sound symbolism. That is, finding one peculiar and neccessary meaning, say "size," diverse languages will all utilize one feature type to represent it (Durbin 1969). To date, evidence shows this type of a sound symbolism argument only as a general proposition.

Among the more interesting "weak" though universal sound symbolism examples include the observation that for most languages the normal declarative order is Subject-Verb-Object (e.g. English, "I Do It"). This word order represents better than any other the actual order of transitive events (Greenberg 1966:76). In regard to social relationships, terms for male/father and female/mother universally appropriate labial consonants to the female and apical consonants to the male ([mama] vs. [dada]) (Jakobson 1960).

A stronger sound symbolism argument supposes that all humans share a common pool of semantically and evolutionarily important events. In this case, the phonological, semantic, or syntactic language universals are linked through sound symbolism on a language by language basis (Durbin 1969:8). That the front vowel [i] represents "smallness" in most language is an example of a semantic-phonological sound symbolism("tiny">"teeny," Bob>Bobbie, e.g.). Depending upon how the [i] vowel is used, it might also connect with syntax. A clearer example of this syntax-phonological symbolism is a connection between [FRICATIVE] and a pluralized noun (in English [-s] or its voiced counterpart [-z]). Here, the sound symbolism expresses the concept of "more" with continued sound instead of plosive and brief sound (use of an [-s] instead of a [-p], e.g.).

Since sound symbolism is probably universal in language use, it is necessary to regard the wider scope of language universals for comparisons. Although language universal research focuses upon the regularities of syntax, phonology, and lexicon, the lexical domain was ignored until the late 1960s (Witkowski and Brown 1978). Since then, implicational universals have been found in folk color terminology (Berlin and Kay 1969), folk botanical (Berlin 1972; C.H. Brown 1977), folk zoological life-forms (C.H. Brown 1979), kinship (Witkowski 1972), ethnoanatomy (McClure 1975), and ethnobiology (Berlin, Breedlove, and Raven 1973). An implicational universal is apparent when the occurrence of an item in widespread languages implies the occurrence of another item or items, but not vice versa (Witkowski and Brown 1978:428).

As an illustration, an ethnobotanical lexical scheme is in order. First, no language exists which does not contain at least one word involving the name of a plant. Hence, naming the botanical universe is certainly part of the human evolutionary cognitive experience. But, many languages contain more than one term for plants. Some languages spoken by pre-literate hunting-gathering societies contain thousands of such terms. An implicational universal might read then that if any languages have two words for botanical items, at least one will be a term for "tree"(e.g., large plant). If any languages have three terms, the third term will be a "grerb," a small plant relative to the botanical inventory of a particular environment, whose parts are chiefly herbaceous. Given four botanical words in a language, the fourth will be either "bush" or "vine" or "grass" (Witkowski and Brown 1978:434). One always gets a term for "tree" before one for "vine", "grass", "grerb" an so on.

Biconditional universals are known as well for human language speakers. Using the semantic-differential approach, Osgood, May, and Miron (1975) found that people use the same qualifying framework in applying connotation or affective meaning to words. This biconditional universal implies that all human speakers rank their emotional response to words and their sounds according to evaluative (good/bad), potency (strong/weak), and activity (active/passive) dimensions. For a biconditional universe, the presence of one concept or term will always indicate the other.

With regard to sound symbolism, language universals expose ancient human avenues of naming behavior. Like the proto-words of Wescott and Bickerton, sound symbolic words may rank concepts according to the earliest hominid survival necessities. Hence, the more basic, primitive, or universal a word may be, the more sound symbolism may be influencing emotional evaluations about such a word. In other terms, basic words may represent the activities, dimensions, or senses of primary sensory *and* survival value to early language users with sound symbolism. Strictly speaking, early naming behavior should contain a close connection between the signifier and the event to be signified.

Sound Symbolism Hypotheses

The vocalizations of primate communication are dynamic physical events. Their many complicated muscular and acoustic productions include imploded fricatives, exploded grunts, coos, screams, cries, hoots, gobbles, songs, clicks, geckers, whines, whistles, growls, barks, pants, laughs, twitters, chirps, and "words." The varied anatomies capable of such diverse modes of producing sounds among primates point strongly that evolution selected for vocalization effects in differing environments (Waser and Brown 1984).

Among humans, physiological parameters of vocalization are no less complex. Voluntary production of sound requires coordination of seven of twelve pairs of cranial nerves, seven major paired muscles groups in the larynx alone, widely integrated brainstem, midbrain, and cortical areas, and numerous recurrent thoracic and lumbar nerves and muscles (Chusid 1970).

However, humans produce sound within acoustical physics laws as would any other primate. Namely, a rarified and condensed stream of air is modulated through modification of ventilatory resonance chambers. Human oral anatomy consists of three resonance chambers: the laryngeal, the oral, and the nasal. Sound frequency and intensity is mainly a function of the vocal folds located in the glottal region. An increased muscle elasticity or a tracheal air pressure elevation can cause a rise in pitch. Conversely, a decrease in the vocal folds elasticity or an increased tracheal air pressure elevation can cause an increase in intensity (Judson and Weaver 1942:77).

The voluntary act of phonation in humans is so extraordinary that an accomplished singer can effect over 2,100 variations of pitch by varying the length of the glottal folds 1-1.5 micrometer (Wyke 1967:5). Additionally, humans alter the post-glottal sound wave by movements of the tongue, mandible, lips, and velum with astonishing speed and articulatory proficiency. John F. Kennedy, for example, held the world record for an articulatory rate of 327 word per minute in an outburst in a December of 1961 speech (McWhirter 1978:48). One can assume the topic was emotionally loaded.

Although initiated voluntarily, the act of speaking is based mechanistically upon the precise subconscious integration of a large number of feed-back reflexes which constantly adjust the large numbers of muscles required with any type of phonation (Wyke 1967:3-4). Three phonatory reflexes derive from mucosal, articular, and myotatic mechanoreceptors. The first, presented above in the cough reflex, produces occlusive glottal effects. Articular reflexes occur very rapidly when the glottis is opened and closed. For the key of middle C, a human glottis opens 256 times per second. The articular reflexes produce what is called "phasic tuning." Finally, much slower and phylogenetically older myotatic mechanoreceptors produce stretching adjustments, tonic tuning reflexes, allowing a consistent frequency emission (Wyke 1967:13).

Considering the many vegetative requirements of humans, breathing, eating, drinking, swallowing, vomiting, coughing, chewing, sucking, biting, and so on, it is doubtful every muscle and nerve combination now existing would exist wholly because of such vegetative functions (Judson and Weaver 1942:37). Of importance here is what anatomical, neurological, and physiological differences distinguish the speech mechanism from the vegetative mechanisms. Unfortunately, this may never be possible to do considering the soft tissue nature of the vocal apparatus in primates. Instead, it can be argued that vegetative functions must have been closely connected to the earliest semantic conceptions of hominids and these conceptions are still present, though at a psycho-semiotic level, in everyday language.

Below, I present three categories of sixteen words. For each word present in Table 1.a., there are 50 instances of this particular meaning taken from at least 10 of the world's 17 language phyla. I shall propose about each semantic gloss a number of hypotheses arguing a nonarbitrary, though motivational, connection between manners of articulation or places of articulation and meaning. (The phonetical transcription of these 800 words and the languages they are from are presented in Appendix A. Their supporting references are presented in Appendix B. All phonetic characters utilized in these words are presented and defined in Appendix F for easy review.)

Table1.a.
Testing Glosses and Categories

Physiological	Ethnoanatomical	Semantically Ancient
COUGH	BREAST	WATER
VOMIT	TOOTH	FOOD
SUCK	NOSE	DOG
EAT	NECK	
DRINK	MOUTH	
CHEW		
SPIT		
SWALLOW		

The manners of articulation to be coded for in these words include: a. stops, b. fricatives, c. affricates, d. nasals, e. resonants, f. glides, and g. approximants. The places of articulation and their involvement with various muscle groups and cranial nerves include: a. bilabial, b. dental-alveolar, c. palatal, d. labio-velar, e. velar, f. glottal, g. fronted vowels, and h. backed vowels. Mechanically speaking, consistent modes of production for semantically similar concepts across distant language phyla should not be expected unless the glossary represents the proto-language constraint of sound symbolism.

Physiological

It must be assumed there was some importance to face-to-face social interaction as some species of *Australopithecines* evolved into early *Homo erectus* lineages (Tanner and Zihlman 1976:474).

Because of this, the association between highly physiologically hedonistic activities, such as chewing and swallowing, and socially expressive ones of emotional value through the face and the mouth cannot be ignored (Dellow 1976:9).

A physiological sound symbolism origin is based upon the assumption that part of the sound-producing mechanism is closely involved in the activity which is named. Wescott (1980b) goes so far as to state that a study of non-primate phonation and human speech suggests that labiality was initially prominent in language origins. The reason for the early focus upon lip sounds is the behavioral reinforcement produced by synesthetic experience:

> "[B]ecause the lips are the outermost speech-organs, they are, for a speaker, the most touchable of his own speech-organs and, for a hearer, the most visible of another's speech-organs. When the senses of touch and sight overlap the sense of hearing, they not only reinforce the latter but ease the evolutionary transition from a non-auditory to an auditory channel of preferential information-transfer." (Wescott 1980b:105)

Wescott's attitude is nothing less than a reworked version of the gesture-speech origin of language. Its most important proponents have included Darwin, Wallace, Tylor, Paget, and Johannesson (Critchley 1967:27-38). In one manner or another, each of these scholars proposed that meaningful gesture and language arose together in a mutual type of synergism (Hewes 1973). Wallace, in particular, held that a wide variety of languages utilized lip-pointing to express ideas such as coming and going, self and other, up and down, and inwards and outwards.

At the center of gesture-speech origin theories is the assumption that the shape of the physiological components constituting certain sounds (tongue placement, lip protrusion, teeth baring, extreme exhalation, etc.) may be sufficiently close in manner to provide a shorthand synonymy for other important behaviors.

The gesture-speech language origin theory is better labelled physiologically constrained sound symbolism. Two assumptions underlie the following hypotheses: First, that these words, COUGH, VOMIT, SUCK, EAT, DRINK, SPIT, SWALLOW, and CHEW, are physiological necessities for all primates; second, when they became semantic entities as words, they still represented affective arenas of behavior. Therefore, I assume that, as it became necessary for these physiological processes to become words, they became so in response to intense evolutionary selection.

Cough. A cough is one member of a larger class of respiratory maneuvers in which respired gas acts as a fluid coupling which transmits energy from the respiratory muscles to other sites in the respiratory system. This class contains three functions the energy of the respiratory muscles may be used for: 1. Ventilation, including breathing: gas exchange, panting: thermoregulation, sniffing: olfaction; 2. Sound production, including phonation and singing, whistling, snorting, and Bronx cheer; 3. Moving material outward or inward, including coughing: lower airways, larynx, forced expiration: lower airways, larynx, clearing throat: hypopharynx, spitting: mouth, sneezing: upper airways, nose-blowing: nasopharynx, paranasal sinuses, nose, sniffling: retaining secretions in the nose, snuffling: nasopharynx, nose, paranasal sinuses (Leith 1977:545-546).

Coughing appears rare when an animal possesses good health, and it is likely the appearance of coughing increasingly became a diagnostic sign to hominid groups as they improved upon other social integration behaviors. If this is true, it should not be unlikely that in most languages the distinctive features naming COUGH could also have a polysemic relation to words and concepts such as SICK, HOT, DISEASE, and so on.

While this suggestion has not yet been tested, the null hypotheses for COUGH are: H_o: stops, velars, back vowels, and glottals find chance/normal distribution in the sample. The alternate hypotheses are: H_a: stops, velars, back vowels, and glottals find higher than chance/normal distribution in the sample. The alternate hypotheses suppose that because a cough is such an invariant autonomic process, it provides reference to itself through sound symbolism.

Vomit. There are numerous mechanisms which protect an animal from ingested toxins. These include, in decreasing order of temporal effectiveness: 1. The smell or taste of potential foodstuffs which may be avoided by innate or learned behaviors, 2. The detection of toxins by the receptors in the gut followed by a central reflex triggering appropriate responses; nausea to prevent further consumption, inhibition of gastric motility to confine the toxin to the stomach, and vomiting to purge the system of ingested, though not entirely absorbed toxin (Davis, Harding, Leslie and Andrews 1986:66).

Vomiting is of great importance in human evolution considering the vagaries of diet and health in a pre-scientific era. It is a powerful reinforcer of memory and behavior for all primates. Armelagos and Farb remark that back vowels are noticed in world languages for foods which can cause nausea (Farb and Armelagos 1980) It can be suggested, therefore, that when selection pressures developed a word for VOMIT, its features closely related to other words for dangerous food items and visceral sensations, POISON, ROTTEN, RANCID, ACRID, PUNGENT, NAUSEA, QUEASY, and so on.

Emetic responses to emotionally charged events also occur and humans can speak of "sickening sights" and "nauseating fights" (Ganong 1983:180). Likewise, it can be suggested that because of the inflammatory contexts they are found within, taboo words, especially derogatory insults, contain features which are synonymous with VOMIT. Wescott reports that for English, at least, swear words about all manner of topics, include velar and labial consonants ("kike," "mick," "dyke," "nigger," "bugger," "fucker," "wop," "polack," "gook," "mex," "spic," "canuck," "redneck" e.g.) (Wescott 1971a:124). This back and front pattern relates at least superficially with what could be considered fitting sound symbolic phonetic features naming VOMIT.

Vomiting is a complex muscular event creating many points of stress and noise, so presupposing features universal to the world's examples of VOMIT is difficult. Its complexity can be noted in its sequence of motor actions: 1. the elevation of the soft palate, 2. larynx and hyoid drawn forward, 3. salivation and opening of the mouth, 4. closure of glottis, 5. relaxation of the esophagus, 6. opening of the cardia, 7. flaccid relaxation of the stomach, 8. constriction of the lower end of the stomach, 9. inhibition of normal respiration, 10. forced inspiration, 11. sharp contraction of diaphram and abdominal muscles, and 12. characteristic posture, bent at waist, clenched fists, strained face, and so on.

The null hypotheses about VOMIT are: H_o: velars, glottals, nasals, stops, and back vowels find chance/normal distribution in the sample. The alternate hypotheses are: H_a: nasal features should be found at low frequency because the velum is shut when vomiting, so as to prevent vomitus from entering the nasal passageways. Glottals, velars, and back vowels should be at high frequency in the glosses for VOMIT because they correspond to crucial areas of the process. Stops should be high frequency because they imitate the suddenness and acoustic manner of vomiting.

Spit. Though spitting is generally thought of as a voluntary activity, it is much like coughing and is present at birth in neonates. The normal person secretes about 1.5 liters of saliva per day, which contains a number of digestive enzymes, provides some measure of anti-bacterial action, and lubricates and cleans the mouth (Ganong 1983:392).

It can be assumed that early hominids possessed some degree of proficiency with spitting, and also put the secretion to important bio-medical uses. Saliva is known in early and present cultures as the means to cause fermentation of various grains for the production of alcoholic drinks. In various human cultures, the act of spitting can also be a segment of a threat display.

The bio-mechanisms of SPIT are much like COUGH. The exception is that the liquid globule is usually gathered higher in the airways. The null hypotheses assume: H_0: fricatives, stops, dental-alveolars, and affricates should have a chance/normal distribution. The alternate hypotheses are: H_a: stops, fricatives, dental-alveolars, and affricates should find higher rates in the distribution. They recapitulate the articulatory points in the act of spitting and the sounds which are made in the course of violent and abrupt exhalation.

Eat. Although a great deal is now known about eating centers of the nervous system, this is of little aid in determining what semantic intent a proto-language word such as EAT might contain. The reason for this is that even though EAT refers to ingesting food, the steps involved are diverse and complex. Eating involves chewing, sucking, and swallowing. Each is in turn a behavior whose foundations are largely autonomic.

It would appear that EAT may have become a word when selective pressure announced a need to identify the good or bad qualities of foodstuffs whose properties were not transparent to any sensory detection. Proto-typically, EAT may mark an occasion where non-poisonous foodstuffs might be ingested.

Of all the physiological words proposed here, EAT is the most mysterious. Exactly what does it refer to? I propose these null hypotheses: H_o: fricatives, dental-alveolars, stops, and front vowels should have chance/normal distribution. Alternately, I propose: H_a: fricatives, stops, dental-alveolars, and front vowels should have a higher rate of distribution. The words for EAT may refer to getting food to the front of the mouth (front vowels), the tools of eating (dental-alveolars), sounds of chewing food (fricatives), or mechanics of glottal closure in swallowing (stops).

Drink. The behavior of drinking is closely related to swallowing. The difference between the two is that whereas a normal swallow occurs in one-thirtieth of a second, drinking can occur for durations exceeding one second (Fink 1975:109). Otherwise, when a person drinks, a liquid is introduced into the oral cavity and the larynx is elevated and glottis closes just as with swallowing.

The null hypotheses are: H_o: velars, palatals, resonants, and stops should be at chance/normal distribution. The alternate hypotheses are: H_a: velars, stops, palatals, and resonants should find higher than chance/normal distribution in the sample. Velars are elevated because the manipulation of the velum prevents liquid from entering the naso-pharynx. Palatals represent the kinesthetic sensations of a mouthful of liquid. Stops indicate the necessary glottal shutting. Resonants mime the action of the tongue while drinking.

Chew. As mentioned earlier, chewing is a hedonistic event for hominids. Evidently, the pattern of mastication is generated by a pool of motoneurones in the brainstem and is not proprioceptive in nature (Lund 1976:145). The ability to gently crack a peanut or crush a tiny blackberry seed arises from other proprioceptive facial, oro-pharyngeal, and laryngeal motoneurones.

Since chewing is a reflex present at birth, its similarities to features in the production of speech have not gone unnoticed. In fact, one scholar recently stated that in the production of vowels and consonants,

> "incorporating noncylcical gestures at specific points in an ongoing cycle of movements closely resembles the incorporation of food transport and swallowing movements into the cyclical jaw movements of chewing, suggesting that the pattern in speech is taken over from eating, with modifications specific to manipulating the shape of vocal tract resonators in place of ingesting food" (Kingston 1990:738-739).

Chewing is only one stage in a series of behavioral steps to eat food. Not only does chewing involve many cranial nerves and muscles, it appears that humans chew soft foods more slowly than hard foods (Lund 1976:146). With these bits of information on chewing, the following null hypotheses are made: H_o: features found at chance/normal rates, dental-alveolar, front vowels, velars, and fricatives. The alternate hypotheses are made: H_a: features found at above chance/normal rates, dental-alveolar, front vowels, velars, fricatives. These hypotheses are made because chewing involves articulation of the two dental arcades, in the anterior portion of the oral cavity, bordered by the velum posteriorly, and with sufficient force to cause breaking noises to be routinely heard.

Suck. There is little doubt that sucking is crucial in the early post-natal period for primates. Some studies suggest that "sucking is a functionally adaptive response that may be influenced by nutritive reinforcement contingencies in the feeding situation" (Siqueland and DeLucia 1969:1145).

A child may have tactile, muscular, and gustatory stimuli initiate sucking, at first by triggering a flow of saliva to assist in the labial seal on the nipple. The thrusting and closure of the infantile lips and gum pads upon the peri-areolar tissue is responsible for milk removal, and importantly, the true physical sucking is a minimal factor in milk secretion (Dellow 1976:14).

Surprisingly, the effective reinforcement of sucking can be achieved with a wide variety of stimuli including visual, auditory, tactile, olfactory, and kinetic (Siqueland and DeLucia 1969:1146). In other words, humming or rocking an infant may be used to reinforce feeding behavior in a neonate over and above more autonomic controls of the nervous system. It can be suggested, therefore, that sucking reinforcement in early hominids was related to direct communication with an infant with multi-modal sensory elements, the ultimate purpose being to train and exercise effective motions of the facial and oral musculature.

Sucking behaviors are also an important part of healing procedures practiced by shamans and doctors in widespread cultural areas. When SUCK was coded finally into word form, sound symbolism could have set the limits to the features appropriate to its reference. The null hypotheses are: H_o: palatals, fricatives, affricates, and nasals should find chance/normal distribution in the sample. The alternate hypotheses are: H_a: palatals, nasals, fricatives, and affricates should find a higher rate in SUCK glosses. The act of sucking creates a negative pressure inside the oral cavity, explaining the palatal features chosen. Fricatives and affricates mimic the sounds made in sucking. Nasals are hypothesized at a higher rate because an infant can breathe and suck simultaneously and the nasally produced consonants may have reinforcing and calming qualities.

Swallow. When a swallow is initiated by the voluntary action of collecting oral contents on the tongue and propelling them backwards into the pharynx, a wave of involuntary contractions of the pahrynegeal muscles push the material at a rate of about 4 cm/s into the stomach. Inhibition of breathing and glottal closure are vital parts of the swallowing reflex (Ganong 1983:393).

Swallowing is present in utero and the amount of amniotic fluid swallowed shortly before birth closely corresponds to that of mother's milk shortly after birth (Dellow 1976:7). This behavior is such a major portion of human experience that even when fasting, the normal human swallows approximately 2,400 times per day (Ganong 1983:393).

Since SWALLOW refers to a virtually autonomic process, parts of its sequence could be coded into the phonetic rendition of a word with sound symbolism. The null hypotheses are: H_o: glides, velars, and glottals should be at chance/normal distribution. The alternative hypotheses are: H_a: glides are also known as semi-vowels since the acoustic energy and articulatory form splits vowel and consonant definitions. So, because of the similarity to swallowing, glides should be found at higher than chance/normal distribution. Velars and glottals should also be found at higher rates because the act of swallowing inhibits respiration and closes the glottis. Humans must manipulate both the glottis and velum to prevent food or water from entering the nasal pharynx or the trachea.

Anatomical

The universal presence of words labelling parts of the human anatomy in all languages strongly suggests that ethnoanatomical terms are members of a proto-lexicon. Which body parts were named first in response to selection pressures is a mystery. One function of body terms might have been to represent associated behaviors with specific areas of the anatomy. Another function might have been to extend self-reflective reference upon the outer world. Widespread occurence of this type of metaphor is seen in world languages. Such extensions include "mouth of the river", "neck of the woods", "shoulder of the road", "foot of the mountain", and so on (Lehrer 1974:135). In some languages the more basic body terms extend to name even more specific bodily locations, such as "the neck of the hand" for "wrist" and "neck of the leg" for "ankle."

The basis for sound symbolic naming of anatomy rests in the physical similarity with place of articulation and part so named. This naming behavior presents a "least moves," allowing memory and activity of an area to be the same.

Breast. For neonates, the human breast is an active area of behavior. The null hypotheses about BREAST are: H_0: nasals, bilabials, front vowels, and stops should have chance/normal occurence in the sample. The alternate hypotheses are: Ha: nasals, bilabials, and front vowels should be higher than chance/normal in the sample because they are found in the same area most used in suckling. Since feeding is a continuous process, less than chance/normal distribution of stops should be seen.

Tooth. The properties of human teeth include hardness, smallness, and presence in the front of the mouth. Wescott argues that terms for TOOTH also contain dental-alveolar elements (Wescott 1971:424). With this in mind, the null hypotheses are: Ho: dental-alveolars, stops, and bilabials should find chance/normal distribution in the sample. The alternate hypotheses are: Ha: dental-alveolars and stops should be higher in rate than chance/normal distribution. Bilabials should be less than chance/normal distribution in the sample. Though covering teeth, the lips clearly are not teeth. I assume that the softness of the lips versus the teeth also made this dichotomy obvious.

Nose. The nose is an anatomical center of unceasing air turbulence. It contains the third resonance chamber necessary to create nasal sounds. Likewise, it is the prominent structure of the face for humans. The null hypotheses are: Ho: nasals, resonants, and bilabials should find chance/normal distribution in the sample. The alternate hypotheses are: Ha: nasals and resonants should find higher than chance/normal rates because the nose is also part of their place of articualtion. Bilabials should be higher in frequency than chance/normal distribution because they represent the nose visually similar to the protruding possible with the lips.

Neck. Many activities take place in the neck. It is the most obvious source of phonation, coughing, hiccuping, choking, swallowing, and drinking. The null hypotheses are: H_o: velars, stops, and back vowels should find chance/normal distribution in the sample. The alternate hypotheses are: H_a: velars, stops, and back vowels should find higher than chance/normal occurrence in the sample. These features are the most representative of the more autonomic processes in the neck. In addition, it must be assumed than since the paleolithic hunter era, humans have realized the crunching cracking sound a neck makes as it is broken.

Mouth. It is not so clear what MOUTH refers to in many languages. Though it is generally thought of as the cavity after the lips and before the neck, its meaning is variable cross-culturally like so many things. The null hypotheses are: H_o: stops, dental-alveolars, bilabials, and velars should find chance/normal distribution in the sample. The alternate hypotheses are: H_a: Stops, because they inflate the oral cavity, should be found at higher than chance/normal distribution. Dental-alveolars, velars, and bilabials circumscribe the mouth and also should be present at higher than chance/normal rates.

Semantically Ancient

Any "once upon a time" theory about human language origins must include the necessities of finding water, food, and defense against predators. If sound symbolism did play a pivotal part of the proto-language naming system in early hominids, it did so because of transforming a number of sensory data into consistent acoustic form. Semantically ancient examples of sound symbolism are based upon the connection between the most distinctive feature attribute of the object named and a referent acoustical metaphor. For example, WATER is soft and fluid, so it would not be expected that it be named with stops or dental-alveolars.

Water. A human cannot live for more than a week without water. There is little doubt than the earliest savanna dwellers became proficient in finding hidden water as a matter of survival necessity. The null hypotheses are: H_o: labio-velars, dental-alveolars, approximants, glides, front vowels, and stops should all find a chance/normal distribution in the sample of world languages. The alternative hypotheses are: H_a: dental-alveolars and stops should be less than chance/normal distribution for WATER. Both represent distinctness in oral gesturing and are incongruous with water as a fluid. The labio-velars, approximants, glides, and front vowels should be higher than chance/normal frequency since they mime drinking behaviors.

Food. It is hard to imagine what actual food, FOOD represents as a semantic universal in world languages. Does it mean something that is merely eaten, and thereby include medicinal herbs? Or does it mean something that is eaten every day and carries an appropriate set of preparative behaviors about itself? Although it could be hypothesized that the taste of a food might determine its name, it is hard to invent or even imagine any one food that might taste the same for millions of genetically variable individuals.

Nonetheless, if a very sweet food like honey were to be named, it might be named more for the front of the mouth where those taste receptors are found, rather than the back of the mouth. For example, the English "honey" and Greek "mellis" both contain front vowels and nasal consonants. If a food were bitter or used to induce vomiting, like the gourd called "kolosinth" by the English, a front and back consonantal symbolism might be produced (Norwood 1978:9).

For FOOD in general, the null hypotheses are: H_o: nasals and front vowels should find chance/normal distribution in the sample. The alternate hypotheses are: H_a: nasals and front vowels should find a higher rate than chance/normal in the sample. I argue here that humans identified FOOD in much the same way as BREAST.

Dog. It is uncertain when the wolf was domesticated by early humans. It can be assumed that since the use of fire and the production of lancelate tools, the wolf ceased to be a threat to human communities. Importantly, wolves are like humans in having spread to all continents. Human cultures almost universally contain myths concerning wolves. Dogs are important to humans because when domesticated they also eat feces and reduce levels of contamination in the immediate human environment. In various cultures they are food, servant and work horse, pet and family member, scientific subject, and god.

A DOG is most readily identified by the sounds it makes. The null hypotheses are: Ho: velars, stops, back vowels, and glottals should find chance/normal distribution in the sample of world languages for DOG. The alternative hypotheses are: Ha: velars, back vowels, glottals, and stops should find higher than chance/normal distribution in the sample. The proto-word for DOG may have synonymy with NECK, the place of the bark is near the NECK.

Below are tables 1.b., 1.c., and 1.d. which recapitulate these unwieldy hypotheses. Each table presents the 16 glosses and the types of hypotheses argued about each. There are 63 predictions away from an average feature frequency for all 16 glosses.

Table 1.b.
Glosses and Consonantal Articulation Hypotheses

Features:	Bilabial			Dental-Alveolar			Palatal			Labio-Velar			Velar			Glottal		
Predicted	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:																		
Breast	+				+			+			+			+			+	
Tooth			+	+				+			+			+			+	
Nose	+				+			+			+			+			+	
Neck		+			+			+			+		+				+	
Mouth	+			+				+			+		+				+	
Cough		+			+			+			+		+			+		
Vomit		+			+			+			+		+			+		
Suck		+			+		+				+			+			+	

Table 1.b. continued

Features:	Bilabial			Dental-Alveolar			Palatal			Labio-Velar			Velar			Glottal		
Predicted	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:																		
Eat		+		+				+			+			+			+	
Drink		+			+		+				+		+				+	
Chew		+		+				+			+		+				+	
Swallow		+			+			+			+		+			+		
Spit		+		+				+			+			+			+	
Water		+				+		+		+				+			+	
Dog		+			+			+			+		+			+		
Food		+			+			+			+			+			+	
Totals:	3	12	1	5	10	1	2	14	0	1	15	0	8	8	0	4	12	0

Table 1.c.
Glosses and Consonantal Manner Hypotheses

Features:	Affricates			Fricatives			Stops			Nasals		
Hypotheses:	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:												
Breast		+			+				+	+		
Tooth		+			+		+				+	
Nose		+			+			+		+		
Neck		+			+		+				+	
Mouth		+			+		+				+	
Cough		+			+		+				+	
Vomit		+			+		+					+

Table 1.c. continued

Features:	Affricates			Fricatives			Stops			Nasals		
Hypotheses:	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:												
Suck	+			+				+		+		
Eat		+		+			+				+	
Drink		+			+		+				+	
Chew		+		+				+			+	
Swallow		+			+			+			+	
Spit	+			+			+				+	
Water		+			+				+		+	
Dog		+			+		+				+	
Food		+			+			+		+		
Totals:	2	14	0	4	12	0	9	5	2	4	11	1

Table 1.d.
Glosses and Vowel and Semi-Vowel Hypotheses

Features:	B. Vowels			Fr. Vowels			Glides			Approx.			Reson.		
Hypotheses:	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:															
Breast		+		+				+			+			+	
Tooth		+		+				+			+			+	
Nose		+			+			+			+		+		
Neck	+				+			+			+			+	
Mouth		+			+			+			+			+	

Table 1.d. continued

Features:	B. Vowels			Fr. Vowels			Glides			Approx.			Reson.		
Hypotheses:	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Glosses:															
Cough	+				+			+			+			+	
Vomit	+				+			+			+			+	
Suck	+				+			+			+			+	
Eat		+		+				+			+			+	
Drink		+			+			+			+		+		
Chew		+		+				+			+			+	
Swallow		+			+		+				+			+	
Spit		+			+			+			+			+	
Water		+		+			+			+				+	
Dog	+				+			+			+			+	
Food		+		+				+			+			+	
Totals:	5	11	0	6	10	0	2	14	0	1	15	0	2	14	0

With the presentation of the hypotheses completed, Chapter II will provide the tally and analysis of this language data. Three types of statistical tests are made upon these 63 hypotheses. These include the standard Chi-Square test, the Kruskal-Wallis median test, and the Jonckheere-Terpstra ordered alternative test. These tables are used when Kruskal-Wallis median-rank and Jonckheere-Terpstra testing is done in Chapter II.

Following Chapter II, I discuss the incorporation of prosody as a subset of sound symbolism in Chapter III. In Chapter III, I also identify and discuss more than a dozen synonymous sound symbolism terms and introduce some order to such references found scattered in the literature. Finally, Chapter III presents natural language examples of sound symbolism for world languages. These are illustrative of the extent of sound symbolism throughout the world, types of sound symbolism, and functions of sound symbolism.

Chapter IV critically discusses the most important sound symbolism experiments carried out over the past 70 years. The diversity of these experiments is not easily compared with the results from Chapter II. Nevertheless, the concurrence they lend is impressive.

Finally, a summary and concluding remarks are given in Chapter V. Weaknesses of the dissertation design are outlined and promising areas of future research are listed.

CHAPTER II
SOUND SYMBOLISM DATA AND ANALYSIS

The Universe of the Linguistic Data

The hypotheses proposed in Chapter I regard human language as a unitary event, though as an entity expressed as over 5,000 regional languages. To test the depth of the hypotheses outlined in Chapter I, a representative sample of the 5,000 languages spoken among humans is necessary. When testing any gloss of this sample, one major assumption becomes apparent. This is that the presence of any predicted feature or pattern of sound and meaning becomes significant to a universal domain when its frequency falls above or below chance levels of occurence. In short, the arbitrary sound-meaning hypothesis holds that both words and their sounds should only find average levels of association regardless of meaning.

The data base consists of 800 monolexemes for 16 concepts. The categories include: BREAST, TOOTH, NOSE, NECK, MOUTH; COUGH, VOMIT, SUCK, EAT, DRINK, CHEW, SWALLOW, SPIT; WATER, DOG, and FOOD. Each contains 50 examples or words, and each word comes from a different language. For each category of 50 words, no more than 5 languages come from one of the 17 language phyla considered. So, for each meaning and its 50 instances of globally sampled words, at least

10 language phlya of 17 language phyla are represented. The language phyla considered include: 1. Afro-Asiatic, 2. Australian, 3. Austro-Asiatic, 4 Austronesian, 5. Eskimo-Aleut, 6. Indo-European, 7. Dravidian, 8. Indo-Pacific, 9. Niger-Khordofanian, 10. North Amerind, 11. South Amerind, 12. Uralic, 13. Nilo-Saharan, 14. Khoisan, 15. Austro-Thai, 16. Sino-Tibetan, and 17. Altaic. Language phyla such as Na-Dene, Paleo-Siberian, Georgian, Basque and others were excluded from this list because of the lack of representative sources and ambiguities surrounding their phyletic assignments.

The creation of this data base assumes that a balanced sample of geographically or historically separated languages should demonstrate languages composed of varying structural components. That is, their differences should show apt use of the "language" category because, by definition, languages are changing entities never possessing the exact phoneme usage frequencies or phonetic inventory. This should be so even though they use the same distinctive features in recognizing and creating their phonemic inventories. All told, what Saussure (1959) argues should be present; namely, there should be few strong connections between sounds and meanings, their signifiers and the concepts they signify.

The fragmentary documentation of geographically separated languages made collection of all 800 words from 50 languages impossible. This would have been ideal because a range could have been obtained for total numbers of phonemes present in the sample. Unfortunately, the data set holds words from 229 sampled languages, with no one language providing more than a total of 16 words for all 16 concepts. Thus, no single language's phonemic range and sound frequencies could influence decisions very much. By sampling from 229 languages and phonologies instead of 50, any association between sounds and the meanings would be impressive.

In point of fact, less than one percent of the words were identical in all possessed features with others. These words were from the same language phyla and it is uncertain whether they represented loans or cognates from a mother language. Clearly, there is plenty of distance between the sounds used to represent meaning in different cultures, especially when comparing across phyletic boundaries. However, when predicted patterns of sound-meaning relationships are consistently observed, the arbitrary sound-meaning hypothesis is not supported.

Coding the Linguistic Data

Each word in the sample (N=800) was coded in a variety of descriptive ways. (The entire set of words is presented in Appendix A and each specific language's supporting reference is in Appendix B.) First, all phones were tallied. A mean word length for each category was found. Interestingly, the shortest word was EAT (3.6 phones per word) and the longest was SWALLOW (5.2 phones per word). Perhaps the longer average reflects the less cultural and more autonomic behavior "swallowing". In addition, over 90% of all words contained between 4-5 phones. Below is table 2.a.:

Table 2.a.

Data Sample Descriptive Tallies

Words:	Sample	Word Length	Phones	Consonants	Vowels
Eat	50	3.6	181	98	83
Water	50	3.7	186	91	95
Drink	50	3.9	196	106	90
Dog	50	4	204	104	100
Breast	50	4.1	208	108	100
Nose	50	4.2	212	120	92
Tooth	50	4.3	219	120	99
Mouth	50	4.4	220	118	102
Suck	50	4.4	223	127	96
Neck	50	4.5	226	125	101
Cough	50	4.7	237	129	108
Vomit	50	4.7	238	127	111
Spit	50	4.8	245	144	101
Food	50	5	250	124	126
Chew	50	5.1	258	142	116
Swallow	50	5.2	263	141	122
Totals	800	4.4	3566	1924	1642

Here, it is unclear what role word length plays with regard to specific meaning. It is intriguing that EAT, WATER, and DRINK are the shortest three words and FOOD, CHEW, and SWALLOW are the longest three. It might be hypothesized that the longer words represent longer or slower phenomena, the reverse might be true for the shorter terms. It would be interesting to test such a guess by simply replicating the same size sample with new languages. If true, a length and meaning connection as a human language universal could be analogous with examples in alloprimate communication systems. These conjectures will undoubtedly be tested further because this data is not significantly different. The standard deviation of this sample is a large 1.6. So, one standard deviation from the standard mean (4.4) easily contains both the shortest word EAT (3.6) and the longest SWALLOW (5.2).

Analysis of the data set was done further for a comprehensive number of articulatory and acoustic features. Each sound, whether consonant or vowel, is identified according to its distinctive features. Tallying is a binomial decision. A language and its word either: a). Yes, contain or b). No, does not contain a feature. Hence, the maximum number of words for each category possessing any given feature is 50, or 100%. The gloss COUGH, for instance, gives 49 out of 50 languages with an obstruent in that meaning. These coding parameters for vowels included all rounded or unrounded front, central, back vowels distinguished by high, middle or low tongue height. Consonantal coding was done for the following front to back places of articulation: bilabial, labio-dental, interdental, dental-alveolar, palatal, labio-velar, velar, uvular, and glottal. Consonants were also coded for the following manners of articulation: stop, fricative, affricate, nasal, glide, trill, lateral, approximants, obstruent, and resonant. These six coding tables are given in Appendix C according to ethnoanatomical, physiological, and cultural glosses. Not all the coding parameters were used in testing hypotheses. The vowels, for instance, are tested only according to whether they are front or back. The extra coding parameters are available to demonstrate the full scope of the data and for further testing by interested scholars.

Hypotheses Testing Using Chi-Square

In Chapter I, 63 hypotheses contrasted sound symbolism and arbitrary sound-meaning relations. The arbitrary-meaning hypothesis is the null hypothesis. It argues that in the pantheon of 5,000 known languages, all phones will be randomly represented over all meanings. There should be no particular agreement among separate languages and the sounds in meanings attached to sounds. Further, when a single category of words is compared among languages, the interlanguage similarity should be as small.

My 800 word data sample is synchronic. It takes words from languages as they are known this century. No words represent the proto-forms of any phyla. The statistical tests necessary are nonparametric because the underlying population distribution of a sample is not uniform (Wynne 1982:330). The 800 word data set represents 229 languages and therefore, 229 distinct phonetic inventories. The little information available about most makes normality assumptions difficult to test.

However, the 800 word sample does represents 229 languages and the phonetic range for this sample probably reaches 90% of the possible phonetic variation known for human language in its entirety. Then, by obtaining frequency counts of categories (words) for certain qualitative variables (distinctive features), a two-by-two contingency table or Chi-square can measure significance of any relationship.

In the 63 Chi-square tests below, a test word, (e.g. COUGH), is compared to all other words (15 other glosses) according to a qualitative feature. That is, as a sample, COUGH might contain a total of 50 examples of a certain feature for its 50 languages. This number is compared to the total number of other languages and features, which might total 750 features for 750 languages. Chi-square results from the calculation of Phi shown below (Driver 1966:322-324):

$$\Phi = \frac{ad-bc}{\sqrt{(a+b)(a+c)(b+d)(c+d)}}$$

$$X^2 = \Phi^2 N$$

Since the degrees of freedom equalled 1, the Yates correction was applied for distribution skewing. There is some debate recently over whether the Yates correction for continuity is necessary. In our case, the N is so large (800), that applying this correction lowers Chi values very little. The nature of Chi-square only allows nondirectional associative findings. Although the hypothesis about COUGH predicts it will contain more STOPS than average, deviation in either direction will result in a significant Chi-square.

All 63 hypotheses discussed in Chapter 1 contain the same predictions:

Null Hypothesis;

Ho: u=U, (given a word of n=(50) and u occurence of a feature, a larger sample N (800)-n(50)=(750) and U occurence of a feature should be similar);

Alternate Hypothesis;

Ha: u is not equal to U.

The test statistic is Chi-square, and the corrected Yates value is given. The significance level sought is p<.05. At this level, the null hypothesis asks that if the true correlation between a feature and meaning is zero, what would be the probability of obtaining, by an error of sampling, a value as high or higher than that obtained from the observed sample. Since there are repeated tests being made, the results must be qualified. If 100 tests were made with Chi-square at a .05 probability level, 5 cases would be likely to be significant or insignificant by chance factors. In the tests presented below, for 63 hypotheses about 3 cases should be expected to yield results solely according to chance associations. As the results will show, this error is negligible due to the dramatic number of significant tests. Below are the 16 glosses and the Chi-square tests for each:

Table 2.b.1.
Breast

	Breast	All-Breast		p	Yates	p	p<.05
+Stop	23	506	Phi=.11				
-Stop	27	244	Chi=9.6	.001	8	.003	*****
+Bilabial	21	232	Phi=.05				
-Bilabial	29	518	Chi=2.6	.10	2.1	.14	
+Nasal	26	334	Phi=.03				
-Nasal	24	416	Chi=1.0	.3	.77	.37	
+F. Vow	24	337	Phi=.01				
-F. Vow	26	413	Chi=.17	.67	.07	.78	

For BREAST, distribution of the stop is significantly predicted by the alternate hypothesis. Of 50 languages contributing to the BREAST sample, only 46% contain one or more stops while 67% use one or more stops for the 15 other concepts.

Table 2.b.2.
Tooth

	Tooth	All-Tooth		p	Yates	p	p<.05
+Dental	42	507	Phi=.08				
-Dental	8	243	Chi=5.8	.01	5.1	.02	****
+Stop	30	499	Phi=.03				
-Stop	20	251	Chi=.89	.34	.65	.42	
+Bilabial	32	329	Phi=.14				
-Bilabial	18	421	Chi=16.1	.0001	14.9	.0001	****
+F.Vowel	32	329	Phi=.09				
-F.Vowel	18	421	Chi=7.6	.005	6.8	.008	****

These results demonstrate that world languages use dental-alveolars and front vowels, not bilabials to name TOOTH. A linguist should find the teeth named with sounds like, ne, si, se, zi, chi, and so on, but not mo, ma, ka, ta, duh, pu, po, ba, bo, and so on.

Table 2.b.3.
Nose

	Nose	All-Nose		p	Yates	p	p<.05
+Nasal	40	320	Phi=.18				
-Nasal	10	430	Chi=26.3	.0001	24.9	.0001	****
+Resonant	42	496	Phi=.09				
-Resonant	8	254	Chi=6.7	.009	6.0	.01	****
+Bilabial	27	226	Phi=.12				
-Bilabial	23	524	Chi=12.3	.0004	11.2	.0008	****

For NOSE, nasals, resonants (which include nasals and approximants), and bilabials are favored features, presumably because of iconic or gestural similarity. The NOSE sample shows 80% of its languages choosing nasal, versus 43% for the other 15 concepts. For resonants, NOSE carries 84% to 57%, and for bilabial 54% to 30%.

Table 2.b.4.
Neck

	Neck	All-Neck		p	Yates	p	p<.05
+Velar	35	286	Phi=.15				
-Velar	15	464	Chi=19.8	.0001	18.5	.0001	****

+Stop	42	487	Phi=.09				
-Stop	8	263	Chi=7.6	.005	6.7	.009	****

+B.Vowel	30	402	Phi=.03				
-B.Vowel	20	348	Chi=.7	.37	.5	.46	

Highly significant associations for velars and stops are seen for NECK. The velar feature may be used in NECK with iconic or kinesthetic origin. The velar articulation is at the level of the neck in proximity. The significance may also be because so many vegetative processes occur in the neck involving the same processes of phonatory stopping. Some evidence is seen for this below for COUGH and VOMIT. Both contain significant levels of stops like NECK.

Table 2.b.5.
Vomit

	Vomit	All-Vomit		p	Yates	p	p<.05
+Nasal	1 5	3 4 5	Phi=.07				
-Nasal	3 5	4 0 5	Chi=4.8	.02	4.2	.03	****
+Stop	4 0	4 8 9	Phi=.07				
-Stop	1 0	2 6 1	Chi=4.5	.03	3.9	.05	****
+Glottal	1 3	1 1 3	Phi=.07				
-Glottal	3 7	6 3 7	Chi=4.2	.03	3.4	.06	
+Velar	2 3	2 9 8	Phi=.03				
-Velar	2 7	4 5 2	Chi=.7	.38	.52	.46	
+B.Vowel	2 6	4 0 6	Phi=.01				
-B.Vowel	2 4	3 4 4	Chi=.08	.76	.02	.88	

For VOMIT, significance is found with nasal and stop features. Presumably, nasals are not favored because the velum is usually closed during vomiting. Stop features describe convulsive mechanics of vomiting. The glottal features approach significance with p=.06. Surprisingly, back vowels and velar consonants find an average distribution. The most common VOMIT vowels are /a,ɑ/.

Table 2.b.6.
Cough

	Cough	All-Cough		p	Yates	p	p<.05
+Stop	41	488	Phi=.08				
-Stop	9	262	Chi=6	.01	5.2	.02	****

+Velar	28	265	Phi=.1				
-Velar	22	485	Chi=8.6	.003	7.7	.005	****

+Glottal	13	113	Phi=.07				
-Glottal	37	637	Chi=4.2	.03	3.4	.06	

+B.Vowel	31	401	Phi=.04				
-B.Vowel	19	349	Chi=1.3	.24	1	.3	

Like the word NECK, the gloss COUGH contains significant numbers of stops and velars. The glottal feature is suggestive at p=.06. COUGH does carry features commonly known for most coughs, namely velar stops. Back vowels are just as likely to be found as front vowels in names for cough. Of all vowels, the most common for COUGH is Back Mid Round /o/, at 36%.

Table 2.b.7.
Mouth

	Mouth	All-Mouth		p	Yates	p	p<.05
+Bilabial	19	234	Phi=.03				
-Bilabial	31	516	Chi=1	.31	.7	.39	
+Dental	35	514	Phi=.007				
-Dental	15	236	Chi=.04	.82	.003	.95	
+Stop	32	497	Phi=.01				
-Stop	18	253	Chi=.1	.74	.03	.86	
+Velar	22	299	Phi=.02				
-Velar	28	451	Chi=.3	.56	.18	.66	

None of the hypotheses for MOUTH is significant. Apparently there is no commonality among what feature used to name MOUTH. When the frequencies of all the features are ranked, as is done below in the next analysis section, MOUTH is average for all features except one. It is tied for last place, out of 16 rankings, for the use of fricatives. Why MOUTH stands out among anatomical terms may have something to do with the semantic vagueness of MOUTH itself. What is the MOUTH? Where does it begin and end? Its vagueness may aid in its arbitrary sound-meaning form.

Table 2.b.8.
Suck

	Suck	All-Suck		p	Yates	p	p<.05
+Palatal	17	115	Phi=.12				
-Palatal	33	635	Chi=11.8	.0006	10.5	.001	****
+Affricate	5	37	Phi=.05				
-Affricate	45	713	Chi=2.4	.11	1.5	.21	
+B.Vowel	39	393	Phi=.12				
-B.Vowel	11	357	Chi=12.3	.0004	11.3	.0008	****
+Fricative	21	280	Phi=.02				
-Fricative	29	470	Chi=.4	.50	.25	.61	
+Nasal	25	335	Phi=.02				
-Nasal	25	415	Chi=.5	.46	.3	.55	

For the gloss SUCK, palatals and back vowels are significant. This duplicates the mechanics of suction whereby the tongue is depressed due to negative ingressive pressures. Other features as nasal, fricative, and affricate are insignificant. Apparently, there is little acoustic mimicry found in words for SUCK.

Table 2.b.9.
Eat

	Eat	All-Eat		p	Yates	p	p<.05
+Fricative	12	289	Phi=.07				
-Fricative	38	461	Chi=4.2	.04	3.6	.057	
+Dental	30	519	Phi=.04				
-Dental	20	231	Chi=1.8	.17	1.4	.23	
+Stop	27	502	Phi=.06				
-Stop	23	248	Chi=3.5	.06	2.9	.08	
+F.Vowel	16	345	Phi=.06				
-F.Vowel	34	405	Chi=3.7	.05	3.1	.07	

The gloss EAT is an enigma. No feature appears at levels above average. Surprisingly, the rotory action of chewing and its intra-oral noise must not contribute to the choice of this feature for CHEW words. Fricative frequency is 24% versus 38% for all other glosses. Possibly the reason for this is that EAT, like MOUTH, is a culturally more malleable word because of its semantic vagueness. Like MOUTH, what does EAT refer to? Is it chewing, swallowing, consumption, sipping, gulping, or slurping? Each culture approaches EAT differently and this is paramount in its form.

Table2.b.10.
Drink

	Drink	All-Drink		p	Yates	p	p<.05
+Velar	12	309	Phi=.08				
-Velar	38	441	Chi=5.7	.01	5	.02	****
+Palatal	11	121	Phi=.03				
-Palatal	39	629	Chi=1.1	.27	.7	.37	
+Resonant	34	504	Phi=.0004				
-Resonant	16	246	Chi=.01	.90	.001	.96	
+Stop	31	498	Phi=.02				
-Stop	19	252	Chi=.4	.52	.2	.62	

Only velar features are significant for DRINK. Since drinking mechanics conspire to keep fluid from the nasal sinuses, velars are less than the mean frequency for the other words. It may be that physiological words tend to reject the very features that would indicate a poor enactment of the named event. When velars are in a word, movement of the velum draws attention to the border area between the mouth and nose at the soft palate. Choking on a drink or morsel of food involves the velum and the glottis and accurate drinking behavior may be named to contrast with this.

Table 2.b.11.
Chew

	Chew	All-Chew		p	Yates	p	p<.05
+Velar	22	299	Phi=.02				
-Velar	28	451	Chi=.3	.56	.1	.66	
+Fricative	24	277	Phi=.05				
-Fricative	26	473	Chi=2.4	.11	1.9	.15	
+F.Vowel	36	341	Phi=.02				
-F.Vowel	14	409	Chi=.5	.45	.3	.54	
+Dental	36	513	Phi=.01				
-Dental	14	137	Chi=.2	.59	.1	.7	

Like the words EAT and MOUTH, CHEW is semantically inscrutible because none of the tested features are significant. CHEW may not be comparable in its failure to MOUTH and EAT and may involve other senses. For nasals, CHEW ranks second among 16 for frequency of such phonemes. Chewing may be tied to the stimulation of the cranio-facial musculature and enhancement of olfactory detections. Or, the act of chewing reduces food mass and may reflect this in a front, small to back, large vowel apophony in each word for CHEW. For CHEW, 30 of 50 languages show a vowel apophony.

Table 2.b.12.
Swallow

	Swallow	All-Swallow		p	Yates	p	p<.05
+Glide	15	109	Phi=.1				
-Glide	35	641	Chi=8.5	.003	7.4	.006	****
+Velar	23	298	Phi=.03				
-Velar	27	452	Chi=.7	.38	.5	.46	
+Glottal	9	117	Phi=.01				
-Glottal	41	633	Chi=.2	.6	.06	.8	

SWALLOW contains glides at significant levels. Glides mime the motion of the tongue as it propells a bolus of food toward the esophagus. This result was predicted. Glottal and velars are random and perhaps for reasons similar to why DRINK lacks velar features at significant levels. Ideally, swallowing is a continuous and autonomic process and glottal and velar articulation features stand in the way of this. When swallowing goes awry it becomes choking, and it is possible CHOKE would use features which are only random in SWALLOW, much like DRINK.

Table 2.b.13.
Spit

	Spit	All-Spit		p	Yates	p	p<.05
+Fricative	32	269	Phi=.14				
-Fricative	18	481	Chi=15.8	.0001	14.6	.0001	****

+Stop	41	488	Phi=.08				
-Stop	9	262	Chi=6	.01	5.2	.02	****

+Dental	39	510	Phi=.05				
-Dental	11	240	Chi=2.1	.14	1.7	.18	

+Affricate	9	33	Chi=1.4				
-Affricate	41	717	Chi=17.4	.0001	14.8	.0001	****

SPIT contains significant levels of affricates, fricatives, and stops. All these features are present in the mechanics and acoustics of spitting. This is, again, predicted. The dental-alveolar frequency of SPIT ranks third of 16 words. Even so, such a frequency is only average. As for the vowel a SPIT word tends to contain, though no predictions were made, the SPIT sample contains the highest number of High Back Round vowels of the data set. The vowel is /u/ and in 23 of 50 languages SPIT contains this vowel. It would be interesting to see whether the finding holds up in a larger sample.

Table 2.b.14.
Food

	Food	All-Food		p	Yates	p	p<.05
+Nasal	27	333	Phi=.04				
-Nasal	23	417	Chi=1.7	.18	1.3	.24	
+F.Vowel	24	337	Phi=.01				
-F.Vowel	26	413	Chi=.1	.6	.07	.78	

FOOD is not labelled with any predicted feature at significant levels. This may be due to poor feature choice or the semantic variability of FOOD across cultures. One culture's food is another's waste. However, FOOD leads the category of central, unround vowels, showing 39 of 50 languages with the vowel /a/. The significance of this is unclear, but next most common for this vowel is CHEW (36) and then EAT (33). Interestingly, these three terms had the fewest successfully predicted features. Also pertinent is the observation that FOOD contains the most dental-alveolars features of any gloss. It tops even the TOOTH gloss. This suggests FOOD may have polysemic overlap with TOOTH as the start of the eating process.

Table 2.b.15.
Dog

	Dog	All-Dog		p	Yates	p	p<.05
+Velar	22	299	Phi=.02				
-Velar	28	451	Chi=.3	.55	.19	.66	

+B.Vowel	25	407	Phi=.02				
-B.Vowel	25	343	Chi=.3	.56	.18	.66	

+Stop	39	490	Phi=.06				
-Stop	11	260	Chi=3.3	.06	2.8	.09	

+Glottal	7	119	Phi=.01				
-Glottal	43	631	Chi=.12	.72	.02	.88	

The gloss DOG is insignificant for all tested features. Contrary to popular belief, the word for DOG is not similar across widely disparate linguistic areas for stops, velars, glottals, and back vowels. Other features may be similar but have not been measured. For instance, DOG ranks third for labio-velars, front vowels, and approximants. It may also display vowel apophony.

Table 2. b.16
Water

	Water	All-Water		p	Yates	p	p<.05
+Labio-Velar	8	46	Phi=.09				
-Labio-Velar	42	704	Chi=7.2	.007	5.7	.01	****
+Approximant	16	238	Phi=.001				
-Approximant	34	512	Chi=.001	.96	.01	.9	
+Stop	18	511	Phi=.16				
-Stop	32	239	Chi=21.6	.0001	20.1	.0001	****
+F.Vowel	22	339	Phi=.005				
-F.Vowel	28	411	Chi=.02	.86	.003	.98	
+Glides	13	111	Phi=.07				
-Glides	37	639	Chi=4.4	.03	3.6	.05	****
+Dental	27	522	Phi=.004				
-Dental	23	428	Chi=.01	.89	.002	.98	

Like SWALLOW, the gloss WATER contains significant association with glides. This was predicted. Labio-velars are also significant in the words collected for WATER. This is interesting because this type of phoneme is produced at both ends of the oral cavity and perhaps duplicates the wide oral area which water contacts. Finally, WATER does not tend to use stops as naming features. In this way, it is much like BREAST.

It would be interesting to compare terms for water from cultures which are aware of ice and those which have had little knowledge of ice. If there is a reference to water because of its liquidity, would the cultures with knowledge of ice include more stop features than average for their water term? (English contains a stop in its water term, /t/, but also a labio-velar /w/).

Hypothesis Testing Using Rank Ordering

Since an 800 word sample is large and bulky, more than one type of statistical analysis is useful to bring out significance. A large number of ranking nonparametric tests are available to test the null hypothesis for social scientists. One of the most widely used is the Kruskal-Wallis one-way analysis of variance by ranks. This test is useful when there are more than two categories comparing more than two populations or samples. When only two categories and two populations are given, the Kruskal-Wallis test is equivalent to the Mann-Whitney test and equates the Chi-square distribution tables (Daniel 1990:226).

Another nonparametric test useful to the types of data considered here is known in the literature as the Jonckheere-Terpstra test for ordered alternatives (Terpstra 1953) (Jonckheere 1954). In the Kruskal-Wallis test, as in the Chi-square, the deviation in a particular direction from the null hypothesis cannot be measured (Holander and Wolfe 1973:122). With the Jonckheere-Terpstra test, the alternative hypotheses are ordered and at least three samples drawn. Since this test is used with three or more samples of observations, the distinction between one-sided and two-sided tests is not maintained (Daniel 1990:235). It is, therefore, a very powerful alternative nonparametric test which creates simplified results available to any researcher with a rudimentary understanding of z-score and normal distribution statistics (Odeh 1972:471).

In Chi-square analysis, each of the 16 word categories has a number of hypotheses. Presumably, each word as a category (n=50) has a mean average different from the mean average of a larger number of words (N-n=750) drawn from the same universe of words (U=800). In nonparametric ranking analysis, each word category is ranked against each other according to each of the 15 tested features; bilabial, dental-alveolar, palatal, labio-velar, glottal, affricate, fricative, stop, nasal, back vowels, front vowels, glides, approximants, and resonants. The initial ranking needed for both tests in given in Appendix D. The actual rankings are given in Appendix E. Actual rankings average the ties between categories and are not merely 1 through 16 rankings found in the initial rankings.

Kruskal-Wallis Testing. The Kruskal-Wallis test is a median-rank test. Any null hypothesis formed with it assumes that the k sums of ranks (that is, the sums of the ranks in each sample) to be about equal when adjusted for unequal sample sizes (Daniel

1990:227). According to the 63 hypotheses outlined in Chapter 1 and tested according to Chi-square in this chapter, we can only say that each Chi-square test shows or fails to show significant association between word and feature frequency. In the case to follow, the testing feature (e.g. bilabial, velar, et cetera), not individual hypotheses about words is considered. In testing median, not mean, the Kruskal-Wallis test can tell whether the hypotheses, as grouped by feature, are significant or not.

In order to test using the Kruskal-Wallis design, the hypotheses outlined at the end of Chapter I must be used. This time, as the tables 1.a., 1.b., and 1.c. show, each feature is predicted to be High, Mid, or Low in frequency in each of the 16 glosses. The 63 hypotheses now become 240 hypotheses, with the 177 unstated Middle or average values considered hypotheses. Further, in using this test, some of the features have only Mid and High values predicted, while four, bilabials, dental-alveolars, stops, and nasals have three values predicted. Below are the predictions made for 16 glosses and 15 features on two and three values (k=2, k=3 e.g.).

The Kruskal-Wallis test statistic is given below. In summary, it is a measurement that is a weighted sum of the squares of deviations of the sums of ranks from the expected sum of ranks, using reciprocals of sample sizes as weights (Daniel 1990:227).

$$H=\frac{12}{N(N+1)}\sum_{i=1}^{k}\frac{R_i^2}{n_i}-3(N+1)$$

The use of this test statistic involves making the null hypotheses that given n1, n2, or n3 population comparisons (Hi, Mid, or Lo samples, i.e.), their medians will be identical. The alternate hypotheses argue the medians are different from one another in the predicted manners. There are 63 High or Low frequency medians predicted for my data set. The remaining 177 are Mid predictions. When k=3, the degree of freedom is 2, for k=2, the d.f. score is 1. The significance tables are the same as those used for Chi-square. The table below gives the computed Kruskal-Wallis test statistics:

Table 2.c.
Kruskal-Wallis Results and Significance

	k sample	Test-Stat (H)	p<.05
Features Tested:			
Bilabial	3	6.5	****
Dental-Alveolar	3	1.7	
Palatal	2	3.4	
Labio-Velar	2	2.1	
Velar	2	8.4	****
Glottal	2	-.6	
Affricate	2	4.7	****
Fricative	2	.5	
Stop	3	5.9	****
Nasal	3	5.1	
Back Vowel	2	1.2	
Front Vowel	2	.09	

Table 2.c. continued

	k sample	Test-Stat (H)	p<.05
Features Tested:			
Glide	2	4.1	****
Approximant	2	-.12	
Resonant	2	.8	

In these results, the predictions for bilabials, velars, stops, affricates, and glides are significant. This represents one-third of the feature categories tested. In comparison, about one-third of the Chi-square scores of the 63 individual hypotheses were significant at the same levels of probability. The concurrence speaks well of the overall success of the hypotheses and the internal data reliability.

Given usual pronouncements of the arbitrary sound-meaning hypothesis, a sample, such as has been created here with this data set, should contain about 5% shared cognate set per 100,000 years contact. The levels of associations for features and meanings are entirely too high, almost 6 times more than expected. This exposes either a serious flaw in linguistic reconstructionist arguments or evidence that sound symbolism is present within many languages, regardless of phyletic grouping.

Alternately, it might be argued the significance is due to a sub-set of languages within the sample concurring. This seems unlikely given that 229 languages provide the 800 words in the data set. If there is actually an agreement among a subset of languages, it would have to be remarkably obvious to create such a strong showing.

Jonckheere-Terpstra Testing. While the Chi-square and Kruskal-Wallis test statistics measure differences between selected samples of words or features, neither indicates whether the difference is in the predicted direction Though there are many ranking tests, one useful test is the little known Jonckheere-Terpstra test for ordered alternatives. With this test, at least three populations are required. In it, the null hypothesis predicts all populations equal, but the alternate hypothesis predicts an inequality in a particular direction. For the alternate hypothesis, n1 is lesser or equal to n2 which is lesser or equal to n3. In short, the Jonckheere-Terpstra test is a one-sided Mann-Whitney or Wilcoxon test. The advantage of this test is that it takes into account the partial prior information in a postulated previous ordering.

In the tables listing the hypotheses in Chapter 1, it can be seen that only bilabial, dental-alveolar, stop, and nasal features contain a k=3 and qualify for this type of testing. Additionally, all the hypotheses of the dissertation can be summed and a grand score of hypothesis efficacy can be figured. This type of test creates a J-score, which given probability tables, elicits a significance level. Entering such a table, the p-level desired is matched with the k-score, and the k-score's three or more sample sizes. For instance, the k-score for bilabial is 3, their sizes are 3, 12, and 1. The probability level can be less than .05.

The formula for obtaining the Jonckheere-Terpstra test is given below. It tallies all pairwise comparisons from each population, giving a score of 1 when one population element is greater than that in another, and one-half point in the case of a tie. It measures whether at least one of the population means is less than at least one of the other population means (Daniel 1990:234).

$$J=\sum_{i<j} U_{ij}$$

The k-scores for each of the five tests are non-symmetrical and unusual. As a result, tables do not exist which can translate the J-score into a probablity statement. This is unfortunate, but not devastating. When sample size is large enough, the J-score can be converted quite readily into the standard z-score, which carries a normal distribution. In the z-score, the mean is always 0 and the variance 1. The formula to convert using the obtained J-score is given below.

$$z=\frac{J-\left[\left(N^2-\Sigma_{i=1}^{k} n_i^2\right)/4\right]}{\sqrt{\left[N^2(2N+3)-\Sigma_{i=1}^{k} n_i^2(2n_i+3)\right]/72}}$$

This test is useful because it relates the ability of the hypotheses to predict order in a data set, which according to arbitrary sound-meaning tenets, should not have order.

The scores are given below in Table 2.d. with their significance levels.

Table 2.d.
Jonckheere-Terpstra Results for Feature Hypotheses (k=3)

	J-Score	Z-Score	p	p<.05
Feature(s) Tested:				
Bilabial	47	3.5	.0002	****
Dental-Alveolar	47	9.5	.0001	****
Stop	56.5	9.7	.0001	****
Nasal	51	8.9	.0001	****
All Hypotheses (63); (58)Hi<(177)Mid<(5)Lo	8751	6.3	.0001	****

These strikingly significant results indicate that when enough information warranted three predictions as to the direction of the means of three populations about certain features, the hypotheses were all significant. Further, the results show that as a whole, the 63 hypotheses proposed initially, when modified into 240 hypotheses by including populations which are merely considered average, are highly significant. Succinctly, this indicates order can be predicted for sound-meaning associations for a geographical and genetical distant sample of world languages utilizing classical ideas about sound symbolism. To date, such a simple design has never been done by scholars researching the limits of the sound symbolism phenomena.

The following chapter places these results into the context of widespread sound symbolism examples from world languages. Given such comparison, the unusually marked results of this chapter appear so only due to lack of structured research into sound symbolism phenomena.

CHAPTER III
SOUND SYMBOLISM AND PROSODY, SOUND SYMBOLISM TERMINOLOGIES AND SOUND SYMBOLIC EVIDENCE IN NATURAL LANGUAGES

Introduction

Within this chapter, three related areas are examined. They are important to consider because they shed light upon the difficulties which arise when scholars choose to specialize research domains and forget the overall unity of linguistic phenomena. First, evidence suggesting *sound symbolism* encompasses prosody is viewed. As a long labelled "supra-segmental" feature of linguistic pattern, prosody is essential to all languages. Philosophers from Plato to Freud and linguists from Ben Johnson to Roman Jakobson have held that prosodic functions are intrinsic to the lineal nature of sound use in communication purposes. Prosody not only occupies a pivotal role in the language play during language acquisition for children, it is basic in allowing meaning transfer between speakers. Yet, until recently, prosody has received little serious attention by language scholars.

Many works have scratched out schemes which place prosody within a sound symbolic domain or sound symbolism within prosodic one. Each paradigm reaches vastly different conclusions. Among the more notable include: Fonagy (1979), La Métaphore en Phonétique, Genette (1976), Mimologiques: Voyage en Cratylie, Ertel (1969) Psychophonetik, Jakobson and Waugh (1978) The Sound Shape of Language, Wescott (1980c) Sound and Sense: Linguistic Essays on Phonosemic Subjects, and Thass-Thienemann (1967) The Subconscious Language.

Second, prosody is vast and its literature has not been adequately reviewed anywhere. Neither has its body of knowledge ever been trully compared with sound symbolism studies. So, even though this cannot be done here, I will list and define a plethora of *sound symbolism* terms, currently used without much agreement among scholars. In recognizing this immense arena claimed by the numerous sound symbolism researchers, I propose that prosody is a sub-set of a much tighter grouping of sound symbolism rules. I predict that when the elements of a universal prosody are identified and codified, they will be indistiguishable from sound symbolic ones.

Lastly, evidence of *sound symbolism* from 12 of the 17 major language phyla is presented. I claim research will expose sound symbolism in all known language phyla. Its absence is due to lack of published research data, though certainly it appears present in scans of relevant dictionaries.

Sound Symbolism and Prosody

The bio-acoustic universe is composed of environmental sounds, animal calls, and human speech. Sounds have always carried emotive meanings for humans. Any survey of the cultural metaphors ascribed and debated about sounds in particular languages demonstrates this pervasiveness. Each one of these domains is described in all cultures with varying numbers of semantically polar adjectives. A far from exhaustive list includes the following contrasting beliefs about bio-accoustically perceived sound: A sound may be described and thereby taught to be understood as small or large, dry or wet, light or dark, lightweight or heavy, fast or slow, hard or soft, smooth or rough, weak or strong, sharp or dull, female or male, quiet or loud, angular or round, clear or abstruse, near or far, empty or full, gay or sad, pure or mixed, short or long, few or many, sweet or sour, even or odd, squat or tall, high or low, thin or wide, major or flat, tonal or atonal, nervy or calm, and so on (Fonagy 1979). Even so, evidence remains anecdotal that any sounds innately evoke emotions.

Though the acoustic features lending themselves to such binary description are not well understood, there is general acceptance among scholars that prosody plays a major part in this and it carries "sound suggestiveness" and "intrinsic value" (Jakobson and Waugh 1978:198). In most definitions, prosody refers to a suprasegmental manipulation of the forms of utterance. So defined as suprasegmental, the prosodic process takes place on a level which overlies a basic structure, usually the phoneme. Any number of suprasegmentals can be created and labelled prosodic. However, the most commonly cited ones function such that the pitch, loudness, tempo, duration, and rhythm are linked, either innately or voluntarily, to connotative meaning (Barry 1981:321).

Prosody has at least four functions. First, the "globally rhythmic" and tonal pattern direct a hearer's attention and act as semantic guides (Barry 1981:337). Prosodic tonality and tempo modulation aid in dividing acoustically inseparable "connected speech" into semantic units. "Connected speech" is common to all languages and involves the ordinary blending of one word into another. This phenomenon is witnessed in the difficulty of aurally learning a foreign language, when it is more easily learned literally.

A second prosodic function is known as speaker attitude signalling. For this function, a person hears and discerns whether a speaker is agitated, angry, calm, seductive, happy, sad, or despondent, by voice quality. Though the prosodic elements processed to achieve this aim can include pitch, tempo, and loudness, an accurate discernment of speaker attitude by conspecifics has been shown to interact within social context. That is, even though emotional states are broadly comparable for all humans, the traits used to identify each are highly malleable to change according to particular instance. Nevertheless, keeping a social situation qualifier in mind, for English speakers, it has been shown that mild anger produces an increased tempo of speaking, whereas depression produces a decrease (Markel, Bein, and Phillis 1973). When listeners rate emotions of speakers according to "softness" or "harshness", it has been evident that soft, empathetic emotions such as grief and love are expressed through peak-pitch profiles. The harsh, hostile emotions, such as anger and contempt, are expressed through peak-loudness profiles (Costanzo, Markel, and Costanzo 1969:269). Additionally, length of utterance seems connected to an expression of friendship (Markel 1988). Consequent to these studies, no one now doubts social context and prosodic elements synergistically interact to convey speaker attitude.

Third, perceptual focussing is a function of prosody. Localization in the tonal accent, determined by pitch movement, forces a centralization upon the type of information being conveyed (Barry 1981:330). With this prosodic function, for example, most languages utilize high and/or rising intonations to mark questions and the converse to indicate statements (Bolinger 1964). Otherwise, a speaker such as an irritated parent might indicate the imperative in a command to a child such as "Get in this house NOW!" Focussing acts as a double function in that it determines the communicatively most important elements within the sense unit and at the same time links the unit to its context (Barry 1981:337).

Finally, experiments show that when subjects are presented with syntactically ruptured binaural sentences, the listener's attention follows the prosody, while the syntacto-semantic switch merely caused hesitations and omissions (Darwin 1975)(Barry 1981). This "guide" function of prosody is suspect in the emergence of proto-syntax. This is to say, in the earliest language scenario, prosody may have been the syntax. Consequently, conspecific sound meant emotion and meaning emplacement within a social context. Certainly, vocal pauses marked an upward physiological constraint of vocal length utterance and must have played a part in semantic "guidance."

Cross-cultural similarity in the use of the fundamental frequency to convey affect, intention, or emotion is well known in anecdotal and experimental evidence (Ohala 1984:2). Neonates prefer their own mother's voice over others (DeCasper and Fifer 1980). "Baby-talk" or "motherese" consistently occupies higher and harmonic regions of frequency and amplitude (Ferguson 1964)(Fernald and Kuhl 1987). Perhaps one of the oldest perceptions in any hominid proto-language may be that MOTHER is FEMALE and SMALLER and TONALLY HIGHER in acoustical production. If this conjecture is extended, the earliest human culture and language began with mother-infant interaction communicating affective intent.

It is little secret all mammalian orders communicate emotional activity with tonality and other prosodic features. Within humanly conceived sound symbolic words, high tone tends to be associated with words connoting or denoting small, diminutive, familiar, near, familiar, near, or narrow, and the reverse meanings for low tone (Ohala 1984:4). In phonemic terms, for vowels, this means the front vowels represent the higher frequency versus the back vowels. For consonants, this means the voiceless ones represent the higher versus the voiced ones. As shown further, this is an important focus of testing in sound symbolism experiments.

In humans, vowels are most easily recognized and are always intonated. Intonation of utterance is universal, if only because Nature creates animals of differing shapes and capacities and possibly intonation is the most common denominator (Bolinger 1964). For example, an evolutionary pattern producing, accepting, and perceiving a high front unrounded /i/ vowel by a female or male, child or adult, of differing size and health is too widespread to be explained by borrowing, descent from a common linguistic source, or chance (Ohala 1984:2). Indeed, Liebermann pointed out that this group of articulatory parameters forming this intonation be called the "supervowel" because it is identified with unerring accuracy among a pantheon of cultural groups and actors (Lieberman 1984:158-161).

Intonation is thusly deemed partly an innate and evolutionarily selected behavior. It is so because evidence shows it is crucial to the socialization processes in alloprimates by allowing the inherent variability of the individual a place in communicative adaptiveness. Over-specialization gets a genera wiped out and no species can perfectly create high frequency vowels invariably. A process entailing the use of sound for communication of affective intents must include a multitude of constraining factors. Some of these include the health of the animal, a social context, an age of the animal, a sex for the animal, and an emotional state of the animal. Any one of these can alter the formation of a vowel intonation. Too often, language or communication schemes assume "once upon a time" that animals created a sonal frequency, and that this became an auditory frequency. All this, the assumption goes, without the slightest variability.

Prosody is not yet a subset of any sound symbolic scheme. Partly, this is due to lack of cross-cultural data on prosody and the lack of a unifying framework with which to study sound symbolism. Even so, all vowels are intonated. Any two phrase utterance occurs within a temporal and commonly iconic scheme. Plus, the use of prosody is linked with intent within a social context, and the use of sound symbolism is connected with clarifying intent within a social context containing shared perceptual routines. In any case, it seems absurd to argue that when small front vowels indicate semantic "smallness" in a particular culture, this be labelled "sound symbolism," while claiming the use of a high frequency register, including the same vowels, and evincing affective connotations, belongs for study within prosodic subfield. The troublesome blur between sound symbolism mechanics and prosodic ones belongs in part to faulty logic. Use of sound symbolic phonetic devices implies a shared cognitive tradition. This tradition owns functions identical to those of prosody. Often, sound symbolism is treated as if it must only occur within a vacum, something a categorical definition of prosody could never sustain.

Sound Symbolic Terminologies

Sound symbolism is labelled with a swath of terms including: "iconic symbolism" (Wescott 1971b), "psycho-morphism" (Markel 1966), "phonosymbolism" (Malkiel 1990a), "phonetic symbolism" (Sapir 1929) (Newman 1933), "synaesthesia" (Karkowski, Odbert, and Osgood 1942), "sound-meaning correlation" (Heise 1966), "onomatopaeition" (Kahlo 1960), "vocal-gestural symbolism" (Paget 1930), "phememism" (Foster 1978), "animal talk" (Langdon 1978), "ideophone symbolism" (Samarin 1970), "magical imitation" (Fisher 1983), "mimicry" (Bladon 1977), "expressiveness"

(Henry 1936; Fudge 1970), and "holestheme-phonestheme symbolism" (Wescott 1987).

Such colorful nomenclature regards types of sound and meaning within language mechanics as sometimes partially and entirely motivated. These terms can refer to types of sound symbolism: lexical, syntactic, morphic, psychological, and phonological. Otherwise, they can appear as combinations of two or more types. I delimit most below. A simple organization on a expressive scale ranging from minimally to maximally arbitrary is difficult to construct cross-culturally, though it has been done for a single language elsewhere (Bladon 1977). Even in the case of the least arbitrary, mimicry, the given defintions are paradoxical. Nevertheless, in comparison, each possesses semi-inclusive functions enabling communicative intent to be interpreted among conspecifics in a manner more certain than in purely arbritary sound-meaning units.

Mimicry. Mimicry is the least arbitrary form of language use and generally the best possible imitation of a particular sound source by a conspecific (Bladon 1977). Individuals always vary in their capacity to mimic with vocal dexterity fluctuating widely among a speaking groups. An important difference exists, however, between imitating a cat using a high-toned rasping falsetto voice and reporting a name for what a cat says. The former can use vocal pitch, amplitude, delivery speed, staccattoed presentation, reduplication, and so on (in English, [miauw], [hesss] i.e.]. The latter are described below as onomatopes and represent an abbreviated recall of an obvious auditory feature of the thing described (in English, [kaet], [pus] i.e.).

Mimicry is not easily transcribed orthographically.for linguists, poets, and speech therapists. Consequently, it is not well studied scientifically. Still, it is extensive in the collective psyche and oral history of a culture's forms of dramatic recitation. The great art to mimicry, whether of human voice, activity, or emotion, is well known among primates.

Evidence abounds that humans possess extraordinary mimicry capabilities and talents. Widespread communities astound the public yearly by hosting pig-calling, eagle-calling, alligator-calling, duck-calling, or turkey-calling festivals. The only requisite for a person to become a rich and famous performer in Western soicety is an uncanny ability to duplicate other people's voices and say something which is semantically inappropriate to that persona's voice.

One of the few studies done on this topic reports on a speaker's ability to create onomotopoetic words so to describe auditory phenomenon. Wissemann (1954) asked subjects to describe various sounds which included rattling chains, snapping wood, sploshing water, shattering glass, clanging bells, and the like. Interestingly enough, the longer sound did not necessarily elicit the longer name. Instead, the number of syllables corresponded to the number of divisions heard in the noise. Syllables created expressed the sound's differentiation and stress highlighted important sonal dimensions (Brown 1958:116). Abrupt onset of sound, such as in snapping, breaking, pounding, and the like, usually was named with a voiceless stop consonant (e.g., [p], [t], [k]) Gradual onset noises became labelled with fricative consonants (e.g., [s], [z], [h],) (Brown 1958:117). Further, Wissemann's subjects agreed upon a common scheme for vowel utilization in labelling colors and sizes. Vowels produced frontally were used to refer to bright small noises, low back vowels the reverse (Brown 1958:118).

This study raises the possibly that mimicry or a process similar to echoism underlies naming principles for sensory experiences. Roger Brown inquired: "Is it possible that primal man created his first words in accordance with these same imitative rules and that these rules, being "natural" to all men, made translation of the first words easy?" Such an earliest language scenario presents mimicry as only part of a creative manipulative naming system in a dynamic communicative order, loaded with changing social needs, for numerous primate genera. For example, higher rank in early hominid vocalizations, in comparison with other alloprimate observations, might have been signalled by greater than normal use of vocalizations given and received from conspecifics (Gouzoules, Gouzoules and Marler 1986).

Onomatopes. Onomatopes are "words" and not mere acoustical imitations. As qualified "words," they seldom possess unchanging spelling forms and show considerable difference in dictionary definitions. They represent a sound source and are phonemically characterized speech sounds. For example, sonogram comparisons could show that the English voiced alveolar-palatal fricative /z/ resembles the sound of a bee buzzing. The /z/ and the sounds of the word "buzz" are phonemes in English. In Yucatecan Mayan, there is no /z/ phoneme to use in an onomatope for the sound a bee makes and their /b/ is imploded, the feature reversal of the English /b/. If Mayan children make a word for what a bee says, it will not contain a /z/ if it is an onomatope. The codification of phonemes into those "words" for a speaking group varies cross-culturally. Onomatopic production is distinct from mimicry, though, and languages contain rules for compressing an imitation of what an animal/process actually emits into a shared word. This acoustical compression phenomenon of languages is little studied and few statements can be made regarding it.

"Morpho-phono-symbolics" or similarly, "phono-semantics" are empty jargon. No one knows how speakers go from imitating the bark of a dog, for example, to creating a word for its bark. To give some examples from the Indo-European family, English speakers' dogs can say [wʊf], Germans' [vaʊ], Frenchs' [wa], Icelandics' [gelta], Rumanians' [lătrá], Croatians' [lajati], Lithuanians' [loti], and Palis' [bhussati]. In the Altaic language family, a Turkish dog says [haʊ], and a Japanese [wãŋ]. For the Niger-Khordofanic language Mbukushu a dog says [kudha]. Tahitian, an Austronesic language, allows dogs to say [aoa]. North Amerind languages differ as well for dog barking. In Hopi it is [waha], Crow [bahúk], Ojibwa [miki], and Micmac ['psaĝàgw]. Finally, for Mon, an Austro-Asiatic language, a dog's bark is [kiʔ] (Bladon 1977:162; for others see dictionaries in Appendix B). The common sense adage that dogs bark the same world round is untrue. Even among packs of the same sub-species barks may differ. Which types of dogs and what area of the geographic world do the dogs bark in are two variables influencing onomatopic construction of "bark." All this quickly dismisses a tidy summary of a mechanical dog bark. In short, simply naming the vocalization of an animal is a complex event.

Other onomatopes relate to sounds that a culture recognizes as emotionally significant. In English these include "tee-hee," "boo-hoo," "ugh," "tut-tut," "no-no" and so on. Certain onomatopes also have echoic reference to speech styles, such as "blah-blah," "la-dee-dah," "hem and haw," "yammer," "stammer," "babble," "stutter," "mutter," "sputter," and so on. Of particular importance to this dissertation is a group of onomatopes regarding vegetative process such as hiccuping, sneezing, coughing, laughing, and so on. Cross-cultural onomatopic similarities expose the operation of sound and gestural symbolism. In the experiments following, this "semantic" compression of sound value is further examined. It should be noted that even with the most automatic event, say coughing, the cross-cultural expressions are non-identical in some ways, but identical in other, predictable, ways.

Synaesthesia. Synaesthesia labels a subject's connotative regard for sounds as they associate with unusual senses. In early Greece, Homer equated colors, emotions, and sounds (Pecjak 1970:625). More modern subjects, in response to music, report major chords "wet" and minor "dry" (Karkowski, Odbert and Osgood 1942). Similarly, Naval submarine radiomen during World War 2, in response to the need to share information about sonar recordings, developed a specialized lexicon. In this creative vocabulary sounds were called "bright" "shiny" and "dark". Large objects, explosions, or processes were given low frequency phonemes. When events approached the ship, they were called small, bright, and high (Solomon 1958,1959).

Sapir (1929), discussed at length in Chapter IV, using nonsense CVC words (i.e. words created of consonant+ vowel+ consonant), demonstrated that the more anteriorly produced the vowel, the smaller in relative perceived size (1929). Other tests have associated high tones with sharp objects, and low tones with round objects (Davis 1961). Bilabial phonemes (e.g. /b/,/p/,/m/,/β/,/ɓ/) associate with rounded shapes and velar stops (e.g. /k/,/g/,/g̃/) with angular shapes in English (Firth 1935).

Synaesthesia experiments are described in detail in the next chapter. Compared with sound symbolism, synaesthetic definitions are fuzzy because they were formulated upon archaic conceptions of sense perceptions and sound dynamics. Just as any neurologist would say there are more than five sense receptors, any audiologist would says sound perception includes transduction of mechanical energy through air, water, bone, chemical, and electrical mediums. Sound lends itself synaesthetically with light, touch, space, and the like presumably because of somatosensory overlapping modes of sensory processing in the brain.

Phonaesthetics. Phonaesthetics label an emotional nature to sounds. Good or bad, hot or cold, fast or slow, dangerous or safe are varied affective connotations which types of sounds can acquire in orderly fashion within a culture. Examples include: a.) [-æš] found in words (such as dash, gash, clash, lash, flash, etc.) associates with violence, b.) low mid back unrounded sound ,/ʌ/, (in mud, dud, cud, e.g.) associated with an unspecified heaviness and dullness, c.) [sm-] cluster carries a pejorative connotation for English speakers (Markel 1966). Ideophones operate in Niger-Khordofanian languages to label "big" or "harmonically ideal", and "thin" or "discordant" speaking styles (Wescott 1980a; Samarin 1967; Sapir 1975).

Phonaesthetic devices vary considerably between cultures. Nonetheless, no comparative studies have been done upon universal world poetry, song, or recitation trope. The crucial value of an idea of linguistic "beauty" in any language is underestimated. Language speakers are critically directed to vary their speaking registers from earliest utterances. That each of these registers carries its own rules of appropriateness is well known. The ability to interact successfully within a social milieu is tied with knowing the rules of the "pleasant" speech game (Farb 1974). Perhaps because the rules are so fluid or perhaps because they are so subjective, scholars have failed to develop a scheme appropriate for the study of phonaesthetics. Still, phonaesthetic devices are little different from sound symbolic ones. Sounds which are made during pleasant activites become synonymous with pleasantness. Many of these include sucking, making love, smacking, and so on, and are described in the following section upon sound symbolism in natural languages.

Linguistic icons. Linguistic iconism denotes the use of sounds as icons, nonarbitrary intentional signs acting as designations bearing an intrinsic resemblance to the thing it designates (Wescott 1971b:416). Instances highlighting linguistic iconism in the world's languages include: a.) quickness--in English, stop consonants convey the iconic impression of brevity and discontinuity as in the contrast between "chirp," "yelp" versus "chirr," "yell". The rapidity with which they are made, iconically recapitulates their rank as "quick". In terms of meters per second, they are the fastest produced sounds humans can make.; b.) quietness--voiceless consonants imply inaudibility or a vocal incapacity and are most effective when coupled with high front vowels to imply smallness. Such English exemplars include "tick," "hiss," "sizzle," "whistle," "whisper," and "shush". Again, diminished volume with speech terms parallels diminished activity of a referent process; c.) temporality--later events are reflected later in the naming event. This is evident in the commonality of suffixing for past tense morphemes (Greenberg 1964); d.) commonality--frequently used terms are shorter than average when referent importance rises. These short basic terms are also learned earliest by children (Brown and Witkowski 1982:73).

Such a list of linguistic icons is hardly complete. An exhaustive study of their pervasiveness has not been done. As a whole, they demonstrate that vocal behavior parallels non-vocal behavior as far as some semantic intents are concerned. Iconism is abbreviated behavior display. As such, it is very similar to sound symbolism devices. Like behaviors and meanings get like expressions, albeit in greatly reduced forms.

Vocal icons. Vocal iconism is not strictly linguistic iconism. Instead, it refers to the use of gestural specificity of vocality. For example, dentality can be a vocal icon. Since this consonantal feature involves articulation with the teeth, it connotes steady projection of something from a base. Many world languages contain names of various projections from the earth or the body utilizing dental consonants. Instances include Proto-Indo-European *ed- "to bite" and *dent- "tooth;" Effik -ot "head," eto- "tee;" Mixtec tu- "tail," thuk "horn," t'e "woods," and duti- "mountain" (Wescott 1971b:422).

Following this conjecture about vocal icons and the teeth, Hockett proposed that the rise of the labiodental phonemes [f, v] were caused by the advent of agriculture (Hockett 1985:284). He remarked that these phonemes diffused from nascent agriculture centers and represented the shift to the chewing configuration required of grinding cereals instead of the scissor-bite required for cutting meat. Such a shift became iconic and presumably, the terms for grains of all types should overlap significantly with those of teeth, at least as far as sharing phonemes.

In some languages, minimal articulatory shifts indicate minimal semantic shifts. For English, instances include "this-that," or "six-seven," or "four-five". In proto-Semitic (*θinay) and (θala:θu) "three-four" and (šidθu) and (šab'u) "six-seven" (Wescott 1971b:421)

Names for body parts often include just those parts so named. I have compiled evidence that hundreds of languages name "tooth" with dental consonants made with the teeth. Similarly, "lip" is named with labial consonants. Vocal icons are necessarily redundant. For example, the word for tongue in all languages will include movement of the tongue. What would be of interest is to test through electro-mylography whether muscles of named anatomical parts invariably respond when so named. If so, vocal iconism may be considered an adjunct to other identified synergistic body languages (Argyle 1973).

Psycho-morphs. A Psycho-morph is "a non-morphemic unit of one or more phonemes for which a connotative meaning can be established, but, this connotative meaning may not accompany all occurrences of the unit" (Markel 1966:2). Non-morphemic units for English can include the phoneme clusters /sm-/ and /gl-/, for example. The speaker associates, with cognitive mechanisms not well understood, the identified psycho-morph with a select attitude. For instance, English speakers negatively regard the /sm-/ cluster (Markel and Hamp 1960).

The mechanisms for Markel's psycho-morphs are not inherited, appearing culturally and language specific. However, like so many speech behaviors, the active processes of the psycho-morph occur below the normal level of speaker awareness. Unconscious attitudes toward psycho-morphs influence speaker selection of appropriate word choice when given competing alternatives (Markel 1966).

Psycho-morphs impute linguistic units, other that at the level of the word, actively disturbing a level of word retreival in a speaker's cognitive mind. Within a culture, psycho-morphs demonstrate a culture's self-reflexive processes, injected into actual language use. Attitude is use and use is iteration of attitude. For Markel, the psycho-morph is only one of a number of processes expressing the inner psychic world of a speaker. Even the selection of large groups of vocabulary, expressive words, of negative and positive connotation, link up in frequency of use in hypertense speakers (Markel 1990). Feelings reiterate use, use reiterates feelings. In itself, these findings recapitulate views of virtually every "mentalist" ethologist. Animals, including humans, overlay their inner worlds upon extrinsic reality.

Ideophones. Ideophones are linguistically marginal units, their exact definition being a matter of some debate. Africanist Clement Doke first described a group of grammatically deviant expressive forms common to Bantu languages and conveying sensory impressions as ideophones (Doke 1935:118-119). He argued ideophones were a separate part of speech much as an adjective or adverb. Since then, their special lexical status has been largely dismissed (Wescott 1980a).

Other linguists have added to the growing corpus of the ideophone. Samarin reports that at least twenty-five terms synonymous with ideophony (Samarin 1971). Westermann labels it *Lautbild*,"a word that depicts a reaction to sensory impressions and expresses a feeling in a suitable acoustic form"(Smithers 1954:73). Linguist Gerard Diffloth characterizes ideophones as grammatical units which can function by themselves as complete sentences. Their morphemic constituents are phonic features (Diffloth 1972).

Ideophones contain unusual sounds, form exceptions to the rules of length, tone, and stress applying to other elements, and are commonly reduplicated (Smithers 1954:83). Two examples are illustrative: a.) intensity--English ideophones can involve consonantal doubling [mm, tt, dd, gg, pp, ss, ll, etc.] to indicate intensity such as in "puff," "yell," "guffaw," "chatter," "sluggish," and "quarrel". Verbs with voiced consonantal doubling are rare in Old English and as well as Old Norse. There are six known in each language. But when their usage increases in Middle English, they are used in words expressing actions, gestures, or movements of a sluggish, inert, or vacillating kind, or those that are repeated (Smithers 1954:85); b.) sound duplication--another event of ideophony is palimphony or sound-repetition. Types abound in English including "pop," "crack," "plop," "boob," "dud," and so on. Disyllable examples are also well represented in "hot-head," "tid-bit," "kick-kack," "sad-sack," "sing-song," "rag-tag," and "hobo". Echo-compound words can be seen as well in "hodge-podge," "hurly-burly," "pell-mell," and "tootsy-wootsy"(e.g. bilabial series); "rag-tag," "super-duper," "willy-nilly," and "ding-a-ling," "chit-chat"(e.g. apical series); and "hootchy-kootchy" and "hurdy-gurdy"(e.g. velar series) (Wescott 1980a:200-202).

Discussions of ideophony present an interesting dilemma for scholars. In order to define ideophony, an assumed learned and homorganically (i.e. same place of articulation for same meaning) ascribed form of sound symbolism must be present. This has never been seriously investigated. Linguists debate sound symbolism as a learned or inherited universal, but its mechanisms can exploit verbs, suffixes, infixes, prefixes, and other distinctive phonological features as linguistic tools for the speaker. These tools are identical in scope with ideophonic types. Ideophones might best be subsumed as sound symbolic systems, instead of distinctly different types of sound symbolism.

Vocal-gesture. With vocal-gesture,human communication is shorthand for complex of bodily gestures. Proponents argue the vocal apparatus became pre-adapted as an ancillary body language syntax (Hewes 1973). The result was that sounds representing events in the real world would be formed in sonally produced gestures representing those events. For one scholar, vowels are called *posture* sounds because they indicate the emotional state of the speaker. Consonants are *sounds of movement* (Johannesson 1952:10). A process such as choking would mimic the sound and muscular event of choking itself. Indeed, the velar sound made by /k/, /g/, /q/, and so on is attached to the primitive meaning 'to eat', 'to catch', 'to hold in mouth', and 'to close' (Johannesson 1952:18).

The term *articulatory gesture* is discussed by Schuchardt (1897), Grammonts (1901), and Jespersen (1918). An elaborate examination of this form of sound symbolism is found in Paget (1930). His studies of Polynesian, Semitic and Sinitic languages produced many intriguing examples. The word [gar] was considered appropriate to the verb *to devour* because it contained a swallowing motion. For the English word *roll,* the sounds fit because they *rolled* .

Sound-gesture paradigms are tautological. Words are posited to be gestures because gestures must have preceded complex vocality. Even so, the theory might predict velarization of sounds describing a physiological act such as vomiting, where the velum must be closed during the actual process. It could predict labial sounds for processes involved with sucking, eating, drinking. Much like the hypotheses argued in this dissertation, the sound gesture hypothesis argues that certain behavioral routines find analogy in other behavioral expressions.

Johannesson continued Paget's work, but arbitrary reasoning emerged in his articulatory premises when one tracks a large list of root morphemes for six distantly related languages compiled as evidence. For example, he first argues *velar+vowel*+/l/ or /r/ described a rolling or curved motion for primitive hominids. Then, in the same paragraph insists, however, "it was therefore very natural that *Homo sapiens* in his attempts to describe the surrounding nature also made use of the lips or teeth as starting point instead of the throat or the palate" (Johannesson 1952:15).

There is no doubt that gestural value found in some speech registers presages sound symbolism. It is argued that at least five or more "languages" exist simultaneously alongside vocal language (Argyle 1973). *Wild speech* is certainly wildly articulated and *prosaic oratory* can be likened to the "ballet of the tongue." Nevertheless, a theory as intuitively sensible as vocal-gesture leaves no room for understanding because there is little left to understand. By explaining everything, nothing is explained. Gordon Hewes remarks on this point, "mouth-gesture theory and sound symbolism research still leave most of the postulated transformation from a gestural to a vocal language unexplained" (Hewes 1973:10).

Sound-meaning correlation. Correlations occur with the statistical comparison of one event, incident, or behavior to another. They are not proof of causality. Evidence of interaction that correlations present are valid only so far as certain measuring constraints are constant. For linguistics, statistical measurement can be a dubious affair.

One type of measurement scheme designed explicitly to examine the "meaning of meaning" is known as the "semantic differential." Published in the book The Measurement of Meaning (Osgood, Suci, Tannenbaum 1957), the semantic differential has been used as the basis of hundreds of social science experiments.

Briefly, the semantic differential offers the subject of an experiment the choice to describe a word with 20 scaled antonymic adjectives. For example, asked to describe *father* a subject could choose the conceptual side of the scale indicating "happy" instead of "sad", "hard" instead of "soft", and so on. In order to investigate every possible pairing of n scales it is necessary to generate a test consisting of $n(n\text{-}1)/2$ items. The measurement of relationship is simply the percentage of agreement in direction of alignment.

The interaction among these 20 concepts ("good-bad," "weak-strong," and others.) creates clustering by factor analysis. Eight dimensions of meaning analysis are identified and described. These are called evaluative, potency, oriented activity, stability, tautness, novelty, receptivity, and aggressiveness dimensions. "The three prime factors--evaluation, potency, and activity--are also identified in studies where the "concepts" are not words or anything linguistic, but rather such things as underwater sonar signals and representational pictures in an art gallery" (Carroll 1959:67).

The authors of the semantic differential argue evaluation, activity, and potency are pervasive in adjectival characterization because they correspond to fundamental attributes people hold and to the organization of basic perceptual and conceptual processes. Evaluation concerns an individual's approach or avoidance of a stimulus to the extent it is negative or painful and positive or pleasant. Activity refers to the necessity or nonnecessity of making movement in regard to the stimulus. Finally, potency suggests the amount of adjustment needed to deal with the concept in question (Carroll 1959:74-75).

A number of sound symbolism studies have used adjectival scaling so subjects rank sounds in words with the use of the semantic differential. These studies lend insight into the prelinguistic basis for a certain classes of linguistic behavior, presumably because such behaviors are founded upon perceptions of reward value, of demands for certain kinds of adjustment to stimuli and of the transmission of information about such perceptions (Carroll 1959:75). One study involved 342 males in the U.S. Navy rating the 1,000 most commonly used English words on 8 semantic differential scales. Ratings were averaged for each visually presented word. Factor scores of the three dimensions of evaluation, activity, and potency were found with regression equations (Heise 1966:16). The study did find that words in which certain phonemes occur tended to have attitudinal meanings and that the attitudinal meanings predicted from their phonemic content correlate significantly with the actual attitudinal meanings (Heise 1966:14). However, the results did not match those of other tests which involved "artificial" words constructed of separate phonemes. This study is discussed in more detail in the next chapter.

In the case of this test, the use of the semantic differential is only as good as the experimental design. Drawing the test list from a single frequency stratum presented results not generalizable beyond frequently used words. Since word length is inversely related to frequency, the results may also be specific to relatively short English words. It is also likely that a phoneme may have more that one attitudinal meaning depending upon the influence of other linguistic events. For example, the stressed /i/ phoneme is seen in more "active" words than the unstressed schwa /ə/ (Heise 1966:26).

Sound meaning correlations are powerful as evidence of semantic intentions for words, sounds, phonemes, and features. They are as strong as the experimental designs which produce them. They also imply that sound symbolism events are causal. Most tests do not follow up such unstated implications. For this reason, sound symbolics are considered specific types of sound and meaning associations.

Animal talk. Most languages include a special set of words for use with animals playing important cultural roles. In Cocopa, a Yuman language spoken in Arizona and Mexico, animal talk is the kind of speech humans attribute to animals, and which in turn is used by humans to address animals (Langdon 1978:10). American English and Yucatec Mayan follow similar themes about animal talk: (1) it does not normally function as a means of communication between two or more adult members of the speech community except perhaps in narrative exchanges between actors playing the roles of mythic animals (Burns 1983), and (2) it includes unique linguistic features which do not occur in the normal language (Chandola 1963:203).

Animal commands often imitate the vocal repertoire of a directed animal. The involvement of mimicry, reduplication of phonemic segments, unusual phonological vocalizations, and imperative or denotive intonations lead some scholars to propose that animal talk marks an important stage in preconditions for the development of complex language. Such preconditions include: a) the tendency for early hominids to vocalize more than the great apes, b) human ability and desire to imitate environmental sounds, c) a hominid tendency to magical behavior and to act under frustration to create the illusion that a difficult goal is nearly or already achieved. Thus, the imitation of the sounds of a desired phenomena could be one form of magic, d) the tendency of many animals to approach on hearings human imitations of their sounds, of the sounds of their own, or other unusual, non-threatening sounds, and e) the conscious production of such sounds by hunters to attract prey (Fischer 1983:313).

Superficially, animal talk sounds have meaning in the speaker's phonological inventory as functional tools for extra-species communication. Nonetheless, the logic underlying animal talk represents an ancient interplay between environment and culture, cause and effect. An example is the imploded lateral affricate (e.g.,"chick-chick-chick") which is made to cause a horse to turn and trot in a higher order behavior sequence, but initially merely causes it to move. Hooves make sharp sounds when striking against rocks buried in the soil. Sharp sounds cause most animals to reflexively move. Another example is a staccatoed and sharply intonated whistle to cause a dog to return. Again, the animal talk imitates the canine "whine" call it uses to establish contact with conspecifics.

Involving mechanisms of sound symbolism, the words of animal talk also create a psychological distance between the animal world and the human world by defining both according to roles and expectations. Sounds purposely used to move animals to action are different from combinations that move humans. Animal talk is expressive, not heavily referential. A dog can learn to fetch the newspaper with a command but not balance a bank statement. Everyday speech, as part of social parody, uses animal talk on an expressive level. No one says "giddy-yap" to a person, but a staggering fool might be called "giddy", someone who seems to have four legs. The "wolf's whistle" associates sex on a physical and not romantic level in miming another species' contact call. Military orders are growled out with commands of animal talk under dramatized physical settings. Male fighting identity, closely modeled after the animal world, makes men "grunts", "squids", or "sea-bees." Physical sports like wrestling, football, and boxing create staged animal talk names (Raging Bull La Matta, King Kong Bundy, Boom-Boom Mancini, Bronco Nagurski, et cetera), commands (Kill 'em, Get 'em, Hut-Hut, e.g.), and the mythic identity with animal totems (Rams, Bears, Eagles, and so on).

Identity with the human facets of animal origins across a swatch of mass society occurs utilizing this manner of sound symbolism. Say the sound and an actor becomes as if the animal. Qualities of sound and behavior are marketed and modeled for children as the source of inspiration for competition. Is this so different from the manner in which complex language began? While animal talk is useful to control animals, it also serves in a larger metaphor defining a conceptual and cultural boundary for humans. As a specific type of sound symbolism, it may or may not be the origin for all sound symbolism.

Phememism. At present, numerous scholars are engaged in lively debate about the earliest historical forms of proto-languages. The earliest linguistic symbols are still considered phonemes, and are posited as parental to modern languages, whose genetic relationship to one another is extremely remote. Still, reconstructed symbols tend to be nonarbitrary and their motivation depends upon a gestural iconicity between manner of articulation and a movement or a positioning in space, which the symbol represents. Here, some scholars propose that early language was not naming in the conventional sense but representation of one kind of physical activity by means of another, displaced in time but similar in spatial relationship.

Based upon LeCron Foster's work with primordial language, the phememe is defined as a minimal unit combining distinctive features of sound and meaning (LeCron Foster 1978:78). A phememe is taxonomically organized according to features of a sounds articulation. For example, sounds involving lip movements carry meanings including *peripherality*, while sounds articulated with tongue and teeth interaction between the alveolar ridge bring forth *internality* with their meanings (LeCron Foster 1978:111). This concurs with results of Chapter II and the association between NOSE, BREAST and bilabiality. Compared with phonemes, phememes carry nonarbitrary connotations. Phonemes are structurally much larger than phememes as a result. A phoneme might contain 10 or more structural units necessary for its perception, a phememe only a few.

Importantly, phememes are the deduced result of LeCron Foster's comparative skills with linguistics, not the result of more intuited hypotheses proposed by Paget (1930). Her reconstruction of proto-language claims 103 ancient forms of primordial language (i.e. PL) and these words, morphs, or reflexes plausibly existed 50,000 years ago. The phememic argument says that just as a phonemic transition is an articulatory feature shift rather than substitution of a completely distinct articulatory configuration,(Teutonic /d/ into /t/ in Old English e.g.), so semantic transitions eliminate or replace particluar features rather than whole meaning configurations. New meanings, then, like new phonemes, are both similar and different from those which they replace (LeCron Foster 1978:86). With an expanded and changed language arising somewhere after the Mid-Pleistocene, 50 to 75,000 years ago, primordial language's semantic and syntactic base increased enormously in sophistication and intricacy. The phonological base changed, as it is forever doing, but it no longer expanded because the separation of meaning from sound meant phonological expansion was unnecessary (LeCron Foster 1978:86).

Sound symbolism, under the phememic hypothesis, is based upon gestural cues. Sound carries meaning insofar as it references motor sequences within the hearer's mind, iconically representative of expressed behavior and activity. Conceivably, there is a substratum of this cognitive process present today in all languages. In addition, language learning could be activated with the aid of the partly innate and acquired knowledge of the pheme.

Phonesthemes. A phonestheme is defined as a phoneme or sound cluster shared by a group of words which also have in common some element of meaning or function. Generally, phonesthemes are not found within words which are etymologically linked (Householder 1946:83). Etymologic provenance is limited when words are traced to proto-forms through hundreds of feature shifts and reflexes. So, a phonestheme must be regarded more as a form of a psycho-morph than as a distinct entity. This term is rarely used.

Summary of sound symbolic terms. In brief, the elements in this set of terms each refer in some way to intrinsic "hard wired" connections between sound and meaning through unspecified neural pathways. Some are merely structural suggestions of the avenues language travelled in order to have expanded its lexicon. Others indicate culturally prescribed modes of connecting sound with meaning. Still, others identify facile or minimal units containing meaning and sound.

All societies contain language arts, revered and traditionally transmitted, as part of humankind's distant evolutionary past. Poetry is ubiquitous in human cultures. It is difficult to imagine language not containing rhymes, tempoed insights, and verbal games. The ultimate sonal, acoustic, or phonetic "quanta" of meaning, according to Jakobson, has never been identified by any scholar. Sound symbolism describes an innate propensity to express meaning and sound together in nonarbitrary manners. Though certainly elaborated upon in every culture, this propensity is misunderstood. The scholars presented above have attempted to describe the transition from a mandatory, genetically evolved connection of sound and intentional content to arbitrary language as human culture expanded geometrically over the last one million years.

Below, I consider the factual evidence for sound symbolism in present languages. In all fairness, sound symbolism requires considerably more research and a unifying framework as a mechanism of proto-language, which still acts as structural support for the human super-communication known as language.

Evidence of Sound Symbolism in Natural Languages

Of the 17 major language phyla, published evidence of sound symbolism for at least 12 exists. Unfortunately, like the discussions of sound symbolism terminologies presented above, this evidence is neither exhaustive nor systematically comparable from study to study. I present studies of each of these language phyla and discuss the types of sound symbolism pointed out by their researchers. Future research should document sound symbolism in all language phyla. However, since my audience in English speaking, the largest discussion of sound symbolism evidence will involve English. In this regard, I attempt to show that English, like Japanese, contains a vast sound symbolic system. This system is yet to be analyzed sufficiently.

There are a variety of reasons for presenting this evidence of sound symbolism here. First, in describing the diverse kinds of sound symbolic words and concepts used throughout the world, a clearer picture of the affective intent of language is seen. Second, the widespread existence of sound symbolism negates the adage that it is spurious. Third, the many cultural differences and similarities of languages and their relations to the physical world are exposed in presenting their sound symbolic examples. Language is a selective process. Sound symbolic words often involve sensory events that are both universal and sometimes specific to culture. By focussing upon how a certain language partitions its sensory environment into word units, important facets of human perception are highlighted.

Afro-Asiatic. As a language phylum, the Afro-Asiatic languages number about 250. They are spoken by about 175 million people across Northern Africa, the Middle East, and the Northwest corner of Central Africa. Important sub-divisions include Egyptian, Semitic, Chadic, Berber, Omotic and Cushitic.

Hausa, like many African languages, contains ideophones and utilizes a tonal system. These linguistic events interact with a variety of reduplication types to create sound symbolic meanings (Newman 1989:248). For example, the Hausa verb 'to become dim' is [dúšèe]; the Hausa adverb 'nearly blind' is [dúší-dúší]. Other adverbial ideophones have a light-heavy rhythmic pattern and low-low tone: 'movement with big gown': [bùyàa-bùyàa]; 'bustling about': [hàyàa-hàyàa]; 'noise of two objects rubbing together': [kàyàa-kàyàa], and so on (Newman 1989:251-252).

Austro-Asiatic. This language phylum is comprised of numerous language groups spoken in Southeast Asia. The largest of the group is Mon-Khmer, containing Vietnamese. Other familiar languages include Cambodian, Laotian, Malay, and Mon.

Expressives are known from a variety of Southeast Asian and Malaysian languages. These are described in some detail by Diffloth (1979). For the language of White Hmong, expressives are created by reduplicating the verb, adding a sentence final intensive particle, or adding a post-verbal morpheme (Pederson 1986:472). White Hmong expressives are used in image-rich and flowery language. While used in normal conversation, they are more frequently utilized in literature (Pederson 1986:479).

The meaning of a particular expressive is dependent upon the specific verb with which it is combined, though, the total meaning of the V+PVE is seldom decomposable (Pederson 1986:481). For example, the cluster [pl-] is used in the following White Hmong expressives: [plig plawg]; 'a bird rising from its nest on the ground', [plig plog]; 'someone jumping into the water', [plib pleb]; 'wood crackling', [plij plej]; 'a little popcorn popping in a big pan', [plij ploj]; 'bullet impact, bamboo bursting', and [plij plooj]; 'heavy raindrops' (Pederson 1986:481).

It is clear that the White Hmong [pl-] cluster represents suddeness, but also, that the use of expressives entails a syntactic extension of meaning with the use of sound symbolism This is an event long considered essential to the formation of proto-syntax in proto-language.

Another Austro-Asiatic language showing a type of sound symbolism is Gtaʔ or Ḍiḍeyi, of the South Munda grouping. In this language, echo-words are used, chiefly among the speech of women (Mahapatra 1976:815). Echo-words are formed usually by duplicating a stem and inserting an alternate vowel. This lexical class broadly designates thing, manner, quality, or action of a general nature in relation to the specific idea of the base word (Mahapatra 1976:823). From a semantic point of view, echo-forms derivable from a single base form can be classed into four types: 1.) [a-] forms, indicating gross variety, 2.) [i-] forms, indicating diminutive or tender forms, 3.) [u/a-] forms, indicating variety different from a related category, and 4.) [a-] or [i-] forms, indicating an inferior quality compared to original form (Mahapatra 1976:823-824).

Some unsurprising examples of echo-words in Gtaʔ include: [kitiŋ], 'a small and weak ghost' versus [kitoŋ], 'a larger and stronger ghost'; [kisi], 'a small piece of cloth' versus [kesa], 'a large thick piece of cloth'; [bala], 'a main dish' versus [bili], 'a snack' (Mahapatra 1976:424). In other uses, echo-words are formed to indicate a sense of vagueness and uncertainty: [coŋ], 'to eat' and [coŋ-caŋ-e], 'he will eat and the like'; [ko], 'to sit' and [ko-ka ce], 'after sitting, etc.' (Mahapatra 1976:827). These examples are identical to what Sapir found in his 1929 studies.

Austronesian. Members of this language phylum stretch half-way around the world, from islands in the Indian ocean to the far reaches of the Eastern Pacific. At least 20% of the world's languages are Austronesian. Such diversity is due to the geographical isolation imposed by island culture.

Javanese has the largest number of speakers, (over 60 million), the longest literary tradition (+1200 years), and is one of the major literatures of Asia. It also contains a large number of unusual morphic structures for words involving expressives, nick-names, hortatives, plants, animals, and *krama* -courtesy words (Uhlenbeck 1950:265).

Malagasy is spoken upon the isle of Madagascar and as a language it contains an extensive sound symbolic system. Bernard-Thierry outlines four major categories of sound symbolic words: 1.) cries of animals, their names, and verbs describing their actions; 2.) noises made from natural forces and noises made from physical properties inherent in common objects; 3.) patterns of peculiar speech registers including stuttering, muttering, sobbing, blabbing, crying, yelling, and so on; and 4.) physically and emotionally loaded words such as shivering, shaking, anger, excitement, gaiety, sadness, and so on (Bernard-Thierry 1960:241-242).

Single syllable sound symbolic words are a rarity in Malagasy (Bernard-Thierry 1960:243). Most often, words of this sort are suffixed, infixed, prefixed, or reduplicated. Examples of interest include: 'dog bark' [vovó]; 'crying of hounds' [kinaonáona]; 'tiger roaring' [kaonkáona]; 'housecat mewing' [méo]; 'death cry of cattle in a slaughterhouse' [réhoka]; 'light rain' [dadadáda]; 'heavy rain' [dradradrádra]; 'stomach growling' [goraráika]; 'howling winds' [popopópo]; 'baby cries' [jája]; 'laughing' [hehihéhy]; 'giggling' [kikikíky]; 'babbling' [bedidédy]; 'fury' [afonáfona]; 'heart pounding fright' [tepotépo] (Bernard-Thierry 1960).

Dravidian. Dravidian languages are centered in South India and claim 175 million speakers. As a whole, this language phylum is not well studied. Among the more important languages include Tamil, Malayalam, Kota, Telegu, and Tulu. Dravidian languages show an extensive system of sound symbolism. Their forms involve reduplicative morphs including identical repetition, vowel alternation, consonant apophany, tonal contrast, and interfixal replacement in various cases (Emeneau 1978:204-205).The extent of sound symbolism is such that it is a diagnostic trait defining the whole of the Indian continent. There is increasing evidence that many sound symbolic forms spread from Dravidian to neighboring Indo-Aryan languages (Emeneau 1969:274).

For Kota, the sound symbolic forms are a basic CVC shape with only a few derivative suffixes. In other ways the roots may be modified non-systematically with vowel nasalization, added phoneme length, or a CV instead of CVC pattern (Emeneau 1969:275). Some of the more interesting examples of sound symbolism in Kota include: 'noise of lamenting' [dododo]; 'lullaby' [jo·jo·]; 'suddenly' [kavakn]; 'to become limp with fatigue' [daṇak in-]; 'death rattle' [kor kor]; 'noises of bumping in sexual intercourse' [dop dap]; 'heart beating furiously' [tiṭk tiṭk]; 'smack lips while eating' [mak mak]; 'twitter' [civk civk]; 'to laugh' [gilgil]; 'to talk secretly, in a whisper' [gucgucn]; 'to pour water' [bodbodn]; 'dog bite' [labakn] (Emeneau 1969).

<u>Niger-Khordofanian.</u> Languages of the Niger-Khordofanian phylum are found in sub-Saharan Africa. Over 100 million speakers share at least 500 hundred languages spread from Senegal to South Africa. Well known languages in this phylum are Yoruba, Zulu, Xhosa, Kikuyu, Fula, Dyola, Mande, Dogon, Igbo, Igala, Ewe, and Tiv.

A large number of Niger-Khordofanian languages are tonal in nature and utilize vowel contrast in sound symbolism. Consonants are used in sound symbolism as well, and when both are joined, ideophones result. Ideophones were discussed previously and are noted in a large number of languages. Among these include Bini, Diola-Fogny, Zulu, Akan, Gbeya, Ijo, Igbo, and others (Doke 1935; Samarin 1967; Samarin 1970;

Samarin 1971;Wescott 1980a; Wescott 1980d). Unfortunately, each ideophone may be defined differently according to each language.

Though scholars disagree about ideophonic structure and have created at least 25 types to describe this sound symbolic event there are notable similarities. Ideophone words display an amazing tendency to play with the phonological inventory of the language they are within. They display reduplication, they contain a special phonological inventory, and they reflect specific meanings of a dazzling variety (Samarin 1970:160).

Ideophones are found in large measure with the narrative register of social discourse (Shanks and Velanti 1990:10). Phonologically, they seem to provide a mirror image in the minds of the speakers of the sound of that word in Nature. Again, as a mnemonic bridge, the use of ideophonic words brings sensations into juxtaposition with meanings in iconic fashion.

Ideophones are not confined to the Niger-Khordofanian phylum. The other African language phyla Afro-Asiatic and Nilo-Saharan contain ideophones, but it may be that they are lacking in the Khoisan languages (Samarin 1970:159). "Africanized" creoles based upon European languages also show ideophonic structures. These include: Sierra Leone Krio, West African Pidgin, Gullah, Jamaican, Saramacan, Ndjuká, and Sranan based upon English; Crioulo based upon Portuguese;

and Haitian based upon French (Samarin 1970; Shanks and Velanti 1990).

Some examples of ideophones include: (Ndjuká) 'shaking tail' [ɾíɾíɾí]; 'relatively fast movement with respect to a slow moving creature' [hĩll(l..)]; 'action of grabbing tightly' [gwáà(à..)]; 'hyperactive' [ɾaɾa]; 'quick pinch or twist' [kúwów]; 'limping walk' [kàtà kàtà] (Shanks and Velanti 1990); (Bini) 'blabbermouth' [ɔ̀gbɛ̀ɛβɛ̀ɛ̃nò]; 'bush ghost' [ɛ̀z`izà]; 'way up high' [gólótó]; 'cowering' [kpùkpùkpù]; 'pipe' [ɛ́pípá]; 'jingle-jangle' [jɔ̀jɔ̀jɔ̀]; 'to follow' [lele]; 'so begins the tale' [s`iɛ̃s`iɛ̃s`iɛ̃]; sounding like the wind in the trees' [tĩtĩtĩtĩ] (Wescott 1980a)

<u>North Amerind.</u> Paleo-indians first entered the North American continent anywhere from 35,000 years to 125,000 years ago depending upon which of numerous disputed archeological sites one recognizes. Among these include Sandia Cave, Calico and its alluvial fan, and Del Mar. Regardless, the peoples which became the North American Indian created hundreds of languages, including Iroquois, Lakota, Navaho, Hopi, Salish, Kwaikiutl, Winnebago, Menomini, Cree, Cherokee, Tzeltal, Yucatec, Pomo, Algonquian, and Blackfoot.

Sound symbolism is linguistically expressed in a variety of ways in many languages in the North Amerind phylum. Some include consonantal symbolism, reduplication, feature-specific symbolism, and vowel contrast symbolism or vocalic ablaut. In the Coeur D'Alene language vowel symbolism is highly developed. When a word stem contains the vowels /i a or ɔ/, the subject has been made or caused to act, or to assume a condition by an outside agent. In the case that the stem contains /a u ụ or a/, the thing has a quality or is in a given condition automatically or without an outside force or agent (Reichard 1945:49).

These examples in Coeur D'Alene are suggestive of the same in other languages. Also, the work of Osgood, Suci, and Tannebaum (1957) and their "potency" and "activity" dimensions of connotative evaluation of words comes to light in view of this. Some examples are: 'milk' [pȧy] versus 'squeeze, press' [piẏ]; 'cough up' [teał] versus 'be nauseated' [tcił']; 'scare' [x̣at] versus 'fear' [x̣it]; 'rub' [mań] versus 'smear grease' [mińl]; 'jerk' [łátk^ω'] versus 'cause to jerk' [łítk^ω']
(Reichard 1945).

In addition to using vowel contrasts to indicate semantic value, Coeur D'Alene uses a series of consonant shifts to create the diminutive. These are: /tc/›/ts/; /tċ/›/tṡ/; /gw/›/ẇ/; and /c/›/s/. Examples include: 'be low, below' [gwüant] versus 'just below level' [ẇant]; 'be long' [tsic] versus 'be slender' [tsis]; 'wait' [catċ] versus 'be firm, solid' [catṡ] (Reichard 1945).

A Siouan language, Dakota, expresses an interesting correspondence between back points of articulation and increasing intensity in activity (Boas and Deloria 1941:17).

Reduplication is found in Coeur D'Alene, Tzeltal, Cocopa, Yucatec, Mohawk, Oneida, Seneca, Cayuga, and Algonquian languages. For all of these, reduplication functions to indicate augmentation, intensification, and and continuation (Berlin 1963:211; Crawford 1978:20-220; Durbin 1969; Cowan 1972). Reduplication probably will be recognized in other North Amerind languages, but to date it has been poorly studied.

With consonantal symbolism, the substitution of one or several specific consonants with others causes a change in connotative meaning (Haas 1970:86). For Wiyot, 'two small roundish objects' [dícack] › 'two large roundish objects' [díčačk]; 'he sings' [lóliswiɬ] › 'he hums' [róriswociɬ]; and so on (Haas 1970:88). Yurok uses suffixes much like the English suffix /-iš/, which means 'in a general manner akin to' (as in "seven-ish" to describe time of arrival, or "moppish" to describe a hairdo). More streamlined consonantal symbolism is found in Yurok where /t/ › /č/ in 'ashes' [pontet] › 'dust' [pənčəč]; 'heart of salmon' [tekʷsaʔr] › 'heart of human' [čekʷs], where /l/ › /r/ in 'hair' [ʔlep] › 'eyebrow' [ʔrep]. If both sets of the changeable consonants occur in the same word, both will be replaced: 'to scrape off mud' [seʔlet] › 'to whittle wood' [seʔreč] (Haas 1970:89).

Consonantal symbolism is seen in many North Amerind languages including Yuman, Iroquois, Yucatec, Hupa, Yurok, Karok, Wiyot, Yokuts, Nez Perce, Miwok, Lower Chinnok, Salish, Wishram, and others (Nichols 1971; Mithun 1982; Gamble 1975; Haas 1970; Sapir 1911).

Expressives, as defined by Fudge (1970), are also present in many North Amerind languages. For Mohawk, Oneida, Cayuga and Seneca: 'buzz' [tsi:]; 'hello' [kwe:]; 'oh dear!' [akė]; 'crow call' [ká:kaʔ]. More interestingly, /r/ does not occur in Seneca except in expressives and taboo words. For instance, 'croak of a frog' [krõkrõk]. The same is true for /l/ in Cayuga, Seneca, and Mohawk; 'fat legs slapping together' [blæts] (Seneca); 'croak' [mbláõ] (Cayuga); 'glug glug' [klukklukluk] (Cayuga). Labials occur in expressives as well: 'pow' [boʔks] (Mohawk); 'plop' [phloʔts] (Seneca) (Mithun 1982:50-53).

A far-reaching study of sound symbolism in North Amerind is Marshal Durbin's "Sound symbolism in the Mayan language family" (1969). He demonstrates Yucatecan Maya a richly sound symbolic language, and one suspects other Mayan languages may be as well. For Yucatec, palatal features signify a plasticity of physical properties, alveolars signify breaks in direction, glottals refer to completion of events, labials indicate long, narrow, and round things, high tones incorporate states and qualities, and low tones are used for nick-names (Durbin 1969:19).

Durbin also compares dozens of roots from the amply documented Yucatecan Mayan language to their semantic counterparts or cognates in Proto-Indo-European. The results are striking because they question rife assumptions of arbitrary sound-meaning connections, usually found as disclaimers at the beginning of most introductory linguistic textbooks. Durbin states that these...

"examples illustrate the fact that in many cases where the English lexicon derives from the same PIE root we can also expect the semantic counterparts in Yucatecan Maya to be phonological similar to each other. This indicates that the same historical processes found in Indo-European languages resemble those in Yucatec Maya, a not very surprising fact. But it also indicates that the cognitive processes (i.e. the selection and placement of semantic features for a given object or event) are comparable for the two languages. For example, there is no linguistic reason why [drying] should be associated with [flat open place] in both languages" (Durbin 1969:46).

English and Yucatec could not have been in contact at any time earlier than at least 100,000 years ago. With such a span of time separating these languages, any semantic similarities should be mystifying, but are instead instructive if one wishes to examine sound symbolism as a normal mechanism through which human senses become coded into sound values.

Some of the more interesting examples include: 'cold' (English) vs. 'shiver with cold' (Yucatec) [kuy]; 'to fill, abundance' (PIE) [*pel] vs. 'fat' (Yucatec) [pol]; 'to throw' (PIE) [*bheld-] vs. 'to throw' (Yucatec) [pul]; 'to wind, twist' (PIE) [*sner], 'to snare' (English) vs. 'to stretch a rope' (Yucatec) [sin-]; 'sand' (English) vs. 'sand' (Yucatec) [sa'am]; 'to cook' (Yucatec) [č'aak-] vs. 'to cook, char' (English); 'crooked' (Yucatec) [koy] vs. 'crooked' (PIE) [*ger]; 'to toast' (Yucatec) [póok] vs. 'to dry' (PIE) [*ters], 'toast' (English); 'put something to the lips' (Yucatec) [noš] vs. 'nibble' (English); 'to slip' slide' (Yucatec) [nil] vs. 'slimy' (PIE) [*lei]; 'to press out liquids'

(Yucatec) [pič] vs. 'to mash' (English); 'to place, put' (Yucatec) [peh] vs. 'position, place' (English), 'off, away' (PIE) [*apo]; 'dog' (Yucatec) [pèek'] vs. 'dog' (PIE) [*kwon]; 'dust resulting from sawing' (Yucatec) [ma'ay] vs. 'saw' (English).

These comparisons cannot be used to reconstruct genetic or phonological origins, but they are important in building a semantic base for the reconstruction of human proto-language. In both Indo-European and North Amerind phyla, proto-words are extended in similar manners. For example, in Yucatec the word 'root' also is associated with [base, shrink, closing up, folding, curling] and in English is associated with [abstract, essence, contracting, drawing, dragging, moving](Durbin 1969:47).

South Amerind. The phyla encompassing the South American continent has not been well studied. Hundreds of languages exist south of Meso-America and few have been described in any detail. Better known languages of this phyla are Quechua, Aymara, Tupi, Guarani, Lenca, Huitoto, Amahuaca, Jivaro, Arawak, Mayoruna, and Siriono.

Sound symbolism has been identified in Santiago de Estero Quechua. Reduplication is seen in many words and this feature refers to actions done intensely or excessively (DeReuse 1989:61). This language exhibits meaning inside the phonological feature for various semantic domains and this contradicts transformations identified as it emerged from proto-Quechua. The palatal feature in Santiago del Estero

Quechua [š], refers to the diminutive in a variety of suffixes (DeReuse 1989:58). Whenever a word stem appears with [-sapa] or [-lu], the [-sapa] has the more augmentative meaning (DeReuse 1989:59). Finally, consonantal contrasts of /s/ > /š/ › /x/ correspond to increasing degrees of stench (DeReuse 1989:62). De Reuse suggests that this contrast parallels other North Amerind languages in which back point of articulation corresponds to intensity of phenomenon. Nevertheless, it is one instance of negative visceral precursors to vomiting, and hence negative connotations, taking value in sounds produced in the back of the oral cavity.

Apalai is an Amazonian language that contains ideophones. These particles of meaning and sound act as a finite verb form. They can be used as a direct object, a separate sentence, an infinite verb substitute, and can be reduplicated up to 10 times (Koehn and Koehn 1986:124).

Finno-Ugric. This language phylum is located in Northwestern and Northern Asia. Its best known languages are Hungarian, Finnish, and Estonian. These three languages are spoken by about 22 million people. A number of Samoyedic languages are included in this group, the best known of which are Lapp, Saam, Yurak, Ostyak-Samoyed, and Nenets.

Few of the Finno-Ugric languages have been studied with any thoroughness by any but Finnish linguists. However, in the second largest language, Finnish, sound symbolism appears in for a large verb class involved with affective and phonesthetic concepts (Austerlitz 1967:26). The presence of sound symbolism as a mechanism, per se, violates the normal Finnish rules of morpheme distribution.

Affective vocabulary was examined in Finnish by Antilla (1975). He found a variety of phonological instances where the semantic properties of nouns were amplified. A double stop could be found in proper names of people. The suffix /-ari/ and infix /-sku-/ appear in an increasing frequency in a variety of affective terms, including verbs. Vowel shortening is also noted. Antilla remarks that these phonological regularities of affective nouns act as phonaesthemes, growing from minor coincidental identifications between a few words to larger patterns (Antilla 1975:18). He notes as well that other Urgic languages show similar unifying phenomena.

Austro-Tai. The Austro-Tai languages are located in South East Asia and the more well studied languages include Tai, Black Tai, White Tai, Siamese, Lao, Lue, Phuthai, and Phuan. Approximately 37 million people speak dialects of Tai.

Thai uses an extensive variety of reduplications to express words and meanings sound symbolically. Three major forms of Tai reduplication include reduplication of the base, ablauting reduplication, and reduplication with a change of tone (Hudak 1990:767)

In the first, reduplication of a base serves to soften a quality, 'good' [dii] vs. 'rather good' [diidii]; intensify meaning, 'to be true' [ciŋ] vs. 'really true' [ciŋciŋ]; and indicate plurality, 'child' [dèk] vs. 'children' [dèkdèk]

For the second, 'vowel/consonant oppositional pairing,' reduplication can form a qualitative or quantitative meaning. Examples include: a.) the pairing of a back rounded vowel with its corresponding front unrounded, /u ˜ i/, in 'mutteringly' [mùbm`ib]; 'sleepy' [ŋuaŋia]; 'wrinkled, mussed' [jû·ʔjî·ʔ]; 'in tatters, in shreds' [kràʔrûŋʔkràʔrîŋʔ]; /o˜ e/ in 'leaning to one side or the other' [jó·ʔjî·ʔ]; 'scanty' (as in foliage) [rŏ·ŋrĕ·ŋ]; 'limpingly' [p'lò·gp'lè·g]; /ɔ ˜ ɛ/ in 'tottering, wobbly' [tɔ̀ʔtɛʔ]; 'not firm, unsteady' [ŋɔ̂nʔŋɛ̂nʔ]; 'stammeringly' [ʔɔ̂·ʔʔɛ̂·ʔ]; b.) the pairing of any vowel with /a/, /i ˜ a/ in 'very far away' [líbláb]; 'stridently' [w`i·dwà·d]; /e ˜ a/ in 'radiant, glowing with health' [plèŋplàŋ]; 'gangling' [kê·ŋʔkâ·ŋʔ]; /ɛ ˜ a/ in 'doubtingly' [nɛ̆·ŋnă·ŋ]; /i ˜ a/ in 'mumblingly' [p'ip'am]; /ə ˜ a/ in 'clumsily' [t'əʔt'àʔ]; /u ˜ a/ in 'roaringly' [sû·ʔsâ·ʔ]; /o ˜ a/ in 'scatteringly' [pro·ypra·y]; and finally /ɔ ˜ a/ in 'sadly, lamentingly' [mɔ̆·ŋmă·ŋ] (Haas 1942: 2).

The final type of sound symbolic reduplication found in Tai involving reduplication with a tonal change is used often for emphasis. In addition, it is used more in woman's speech than man's speech. Generally, such words carry the changed tone in the first syllable and this tone is higher in pitch and longer than the normal tone (Hudak 1990:767). Examples include 'good' [dii] vs. 'really good' [dĩ idii]; 'forward, bold' (of a woman) [kràʔdὲʔkràʔdε̆·]; 'whisperingly' [kràsĭ bkràʔsâ·b]; and 'flickering' [wábwâ·b] (Haas 1942:3).

Thai has numerous other, though rarer, examples of sound symbolic reduplication. These are important to notice because in largesse they are semantically identical with English meanings for the same activities, nouns, or qualities. Some of them include: 'beating of a drum' [tumtum] (Tai) vs.'rum-pa-pum' (English); 'trivially' [yĭmyĭm](Tai) vs. 'so-so' (English); 'aimlessly' [k'wé·ŋʔk'wá·ŋʔ](Tai) vs. 'willy-nilly' (English); 'jokingly' [p'lŭmp'lăm]; 'awkwardly' [ŋûmʔŋâ·mʔ]; 'hearty laughter' [he·ha·]; 'bright and smiling' [yέmʔyímʔ]; 'much' [yə́ʔyέʔ]; and 'rippingly' [c'`i·gc'ὲ·g] (Haas 1942:2).

In comparison to Tai, Haas remarks that English is very similar, but uses both consonantal and vowel ablaut. Examples include: hodge-podge, mamby-pamby, shilly-shally, pitter-patter, ding-dong, wishy-washy, tick-tock, chit-chat, dilly-dally, slipslop, sing-song, criss-cross, mish-mash, riff-raff, zigzag, fuzzy-wuzzy, bigwig, hubbub, helter-skelter, honky-tonk, razzle-dazzle, humdrum, hobnob, hurly-burly, hocus-pocus, humpty-dumpty, fuddy-duddy, and others (Haas 1942:5).

Sino-Tibetan. More than 1 billion people speak Sino-Tibetan languages. Its major languages include Mandarin, Lahu, Cantonese, Burmese, Classical Newari, Hakka, Fu-Chow, Tibetan, Miao-Yao, Kachin, Bodo, Min, Wu, and Garo. Despite the numbers of people speaking these languages, little work has been done on sound symbolism, again, oustide works by Chinese linguists.

One paper describes a comparison between various Sino-Tibetan languages and Uto-Aztecan languages (Shafer 1964). Surprisingly, a number of basic vocabulary items were virtually identical between various languages of each phylum. This should not happen unless for chance or borrowing reasons. Still, the correspondences are for basic vocabulary items, and were chance mechanism at work, any vocabulary should have the same likelihood of being similar. For these reasons an underlying parallel sound symbolic system for each can be suggested

Though Shafer explains the similarities as archaic and stationary words of a macro-phylum (Sino-Aztecoid), I think a more reasonable explanation would be to propose that these words represent semantically vital concepts for proto-language. Sound symbolism is suspected for each. The words are worth a closer look: 'cloud' [nā̆mu] (Yaqui) vs. 'cloud' [nam] (Old Bodish); 'rain' [yúu] (Papago) vs. 'rain' [yu] (Kukish); 'wind' [hwe-li] (Papago) vs. 'wind' [*li-] (Karenic); 'father' ['á'-pə] (Shoshone) vs. 'father' [a-p'a] (Garo); 'mouth' [kamatl] (Nahuatl) vs. 'mouth' [-kam] (Rai); 'breast' [pipi] (Cahita) vs. 'nipple' [pipil] (Newari); 'elbow' [tsiku] (Huichol) vs. 'joint' [ts(')ik] (Burmish); 'buttock' [kú·p-tca] vs. 'backside' [kup] (Dandézongka); 'belly' [wo·'k] (Papago) vs. 'belly' [vok] (Banpara); 'stomach' [pó-no] (Hopi) vs. 'stomach' [po] (Kukish);

'belly, breast' [to-ma] (Cahita) vs. 'belly' [lto-ba] (Old Bodish); 'urine' [sisi] (Cahita) vs. [si-] (Yano); 'hear' [na-ka-] (Comanche) vs. 'ear' [*krna] (Sino-Tibetan), 'deaf' [naká-p] (Heve); 'bear' [tyó-tum] (Papago) vs. 'bear' [tă-hum] (Taying); 'mouse' [puwe-tsi] (South Fork) vs. 'bamboo rat' [*bwi] (Burmish); 'to spit' [tuhi-] (North Fork) vs. 'spittle' [t'u] (Karenic); 'call' [ko] (Papago) vs. 'to call' [k'o] (Middle Burmese); 'sing' [ka'a] (Ute) vs. 'sing, song' [ka] (Mandarin); 'see, know' [mati] (Nahuatl) vs. 'think, consider' [hmat] (Middle Burmese) (Shafer 1964:104-105).

Sino-Tibetan and Uto-Aztecan languages separated more than 100,000 years ago. The arbitrary sound-meaning hypothesis seems absurd here. Chance and borrowing hypotheses must also be ruled out. To make this point even more forcefully, Sapir and Jespersen initially pointed out an encoding of 'near-far' meaning which was expressed with vowel ablaut in widespread languages. This is discussed more at length in Chapter IV, but briefly, it holds that 'near' or 'here' or 'this' concepts be represented with small front vowels and the vice versa. For 'this', Uto-Aztecan languages show: ['íi-] (Papago), ['í'i] (Hopi), ['í i] (Yaqui), [ivi] (Cahuilla); and Sino-Tibetan languages show: [i] (West Himalayish), ['i] (West Bodish), ['i-] (Mandarin), [ĭ] (Sgaw) (Shafer 1964:105).

Altaic. The Altaic languages stretch from Western Turkey to Outer Mongolian and Japan. Well known Altaic languages include Japanese, Turkish, Mongolian, Azerbaijani, Kurdish, Korean, Manchu, Ainu, Yakuts and Sibo. As a whole, the Altaic languages may take sound symbolism as a diagnostic trait. Recent work on Japanese shows an extensive spread of sound symbolic markers which will be discussed further below (Hamano 1986). Korean is reported to have thousands of sound symbolic roots (Martin 1962). Finally, I have noticed, at the very least, hundreds of sound symbolic words in both Kurdish and Manchu dictionaries in the course of acquiring test words.

Hamano's study (1986) of Japanese exposes a wealth of sound symbolic phontactic, syntactic, and idiomatic markers. For a native speaker, the language of 'giongo' or 'mimetic' words and 'gitaigo' or 'modal' words is apparent from childhood. However, until Hamano's dissertation, most scholars did not even remotely suspect the extensiveness of Japanese sound symbolism.

It is entirely possible that sound symbolic words and roots make up more than 3% of the average Japanese speaker's vocabulary. The 'giongo' dictionary of Asano (1978) lists more than 1,450 words (Hamano 1986:3). This is striking for two reasons. First, it shows a major language can contain a massive sound symbolic system that can be overlooked for decades by scholars. Second, it demonstrates that sound symbolism can act as a powerful generator of meanings within a given language rather than serving as an "archaic" and quasi-stationary or static linguistic remnant.

Japanese contains two main sound symbolic structures. The first is a class of 'mimetic adverbs,' and is concerned with actions and sounds. The second is a class of 'mimetic nominal adjectives' and deals with qualities more often than actions (Hamano 1986:32) It seems that more 'synaesthetic' meanings are present in the second class. These structures have at least five types of sound symbolic expressions. These include: 'p-forms,' which are sound symbolic words beginning with the consonant /p-/; consonantal doubling; CVC groups; CVCV-CVCV groups; and finally, irregular forms of sound symbolism (Hamano 1986:13-31). Additionally, vowels express sound symbolism.

Some interesting examples are: 'crisp' [pari-pari]; 'crunchy' [pori-pori] 'surprised' [bikkuri (to suru)]; 'startled' [gikuu (to suru)]; 'enraged' [kaa (to suru)] (Here, [to suru] is the verb 'to do' which the mimetic adverb modifies.); 'splendid' [riipa (da/desu)]; 'shaky' [gata-gata (da/desu)]; 'tight' [gyuu-gyuu (da/desu)]; 'spirally' [kuru-kuru (da/desu)] (The nominal adjectives here are CVCV-CVCV. The copulas [da/desu] are added and act as the verb 'it is' or 'the way it is' or 'just so'.)

Other types include monosyllabic, CVC, with a small or absent verb marker: 'wailing' [ween to]; 'drunken sighs of contentment' [wii to]; 'small bell or insect sound' [riin riin to]; 'very excitedly' [ru'n-run]; also 'hi' [yoo]; 'a call' [yaa]; bisyllabic, 'meagerly, exacting' [kookiri]; 'exactly' [kaakiri];

'vividly' [kuukiri]; 'tasting rich' [kookuri]; and others, 'sound of wooden clogs' [ka'ra-koro]; 'small object knocking about in a box' [ka'ta-koto]; 'sound of dry leaves' [ka'sa-koso]; 'sound of trains' [ga'ta-goto]; 'being sullen' [mu'sya-kusya]; 'with bumps' [de'ko-boko]; 'being flustered' [do'gi-magi]; 'noisily' [zya'ka-suka]; 'toiling' [e'etira, o'otira] (Hamano 1986:28-32).

Japanese also exhibits a system of consonantal symbolism, which is paralleled in diverse language phyla noted earlier (Indo-European, North Amerind, and Dravidian, e.g.). Some of the nonarbitrary sound-meaning connections in Japanese involve: 'explosion, breaking, decisiveness' /p,b/; 'hitting of a surface, coming into close contact, complete agreement' /t/; 'opening, breaking up, swelling, expanding, puffing out, emission from inside, surfacing=inward/outward movement' /k/; 'softness, haziness, faintness' /w/; 'soft contact, friction' /s/; 'sounds from many sources, childishness, haziness' /y/; and 'rolling, fluid movement' /r/ (Hamano 1986:226).

It can be readily assumed that such an impressive sound symbolic vocabulary as possessed by Japanese, also must contain some words with which to test my numerous hypotheses This is the case: 'dog' [wa'n-wan]; 'fox or the act of coughing' [ko'n-kon]('physiological and culturally specific homonymity' e.g.); 'tummy, or the sound made rapping the stomach' [po'n-pon] ('ethnoanatomical' e.g.); 'A-bomb blast, describing its sounds and flashes' [pi'ka-don]('culturally specific' e.g.); 'breast' [boi'n][mune] ('ethnoanatomical' e.g.); 'baby rattle' [gara-gara]('baby-talk' e.g.); 'small dots' [putu-putu]; 'dry, rough place on the skin' [kasa-kasa] ('ethnoanatomical' e.g.) (Hamano 1986:49)

Indo-European. The Indo-European languages are probably the most well described and analyzed of all language phyla. Most of these languages need no introduction: English, French, Latin, Pali, Persian, German, Polish, Spanish, Portuguese, Hindi, Bengali, Greek, Sanskrit, Italian, Rumanian, Bulgarian, Croatian, Russian, and so on. Many Indo-European languages show diverse types of sound symbolism. Not surprisingly, a number of these include consonantal symbolism, vowel ablaut or alternation, phono-morph clusters, and reduplication.

Shields provides an interesting theory for the origin of reduplication in Indo-European languages (1976). At some stage, Proto-Indo-European carried words which were CV- with either an amplified or augmented ending. Ultimately, this conjecture follows the ubiquitous start of language in a human child. First a child begins with vegetative process and those physiologically constrained sounds. Vowels and their prosodic manipulation are mastered next. Then, CV sounds are made in a 'babbling' stage. Finally, because of the Bernoulli effect and other constraints upon length of vocalization, a child learns its CV- utterances can 'go out like a lion' or 'go out like a lamb'. This is precisely what Wescott (1980b), and Swadesh (1971) proposed as a feature in Proto-Unified-Language: (Biologically contrained vocals)>(V+)>(CV)>(CV+)>(CV+(SOFT-UNMODULATED) or (HARD-MODULATED)>(C1VC1), (C1VC2) et cetera.

For Proto-Indo-European at least, Shields says that the widespread CV forms became affected by numerous dipthong shifts (or prosodic breakage of a single vowel). Then the entire pool of CVC classes split into two groups. One prefered dental-alveolar nasal /-n/ as the second consonant, the other the dental fricative /-s/ (Shields 1976:37). This theory argues /-n/ and /-s/ as marked forms and when they appear, the meanings they serve appear to mime other reduplicative functions. For example: CV-N; 'average, norm' [báli] (Sanskrit) vs. 'strong' [balin]; 'name' [nama] (Sanskrit) vs. 'THE name' [naman] (Sanskrit); 'carry' [épher] (Attic-Ionic Greek) vs. 'he was carrying' [épheren] (Attic-Ionic Greek); 'be' [ésti] (Attic-Ionic Greek) vs. 'he is' [éstin] (Attic-Ionic Greek); CV-S; 'sneeze' [nava] (Sanskrit), [niesen], and [sniz] (English) (Shields 1976:37).

Though it is unclear how true Shield's hypothesis be, he may have uncovered a transformation taking place more distantly than Proto-Indo-European. Assuming the /-s/ and /-n/ phones make 'sneeze' doubly sound-symbolic, it would be interesting to see what other language phyla label the process.

Although the following examples are not balanced by phyletic numbers of languages sampled, they suggest frequencies of /-s/ and /-n/ in 'sneeze' and greater use of fricative and nasal than an arbitrary sound-meaning theory could explain as normal variation. They include: Afro-Asiatic; Arabic ['aṭsah], Hausa [atišawa], Burji [hat'iš], Amharic [anaṭṭasa], Somali [hinḍísayya], Austronesian; Hawaiian [eki'he], Tonga [mafatua], Pascuense [téhi], Maori [matihe], Tahitian [tihe], Eskimo-Aleut; Aleut [asukuqiŋ], Eskimo [tagiortorpok], Indo-European; Croatian [kihanje], Danish [nysen], Gaelic [sraiarteč], Hindustani [čhí ṇk], Icelandic [hnerva], Lithuanian [čiaudéti], Pali [khipita], Portuguese [espiro], Rumanian [strănut], Italian [starnuto], Niger-Khordofanian; Mbukushu [yáθimiθa], Swahili [čafya], Shona [-hotsira], Xhosa [-θimla], Zulu [θimula], Ndebele [θimula], North Amerind; Blackfoot [wa'sI:yI], Crow [a·pí· əxi], Hopi [aasi], Micmac [ejgwit], South Amerind; Cashibo [?atišanki], Cavine~na [hači], Chama [ati], Marinahua [átiši], Mayoruna [atiṣun], Shipibo-Conibo [hatišain], Uralic; Finnish [aivastaa], Nilo-Saharan; Miza [ɔ-si], Ojila [tsɛ̆], Logo [syà], Lugbara [tsɔ̀], Lokai [tso], Sino-Tibetan; Cantonese [dá·hāk·či], Tibetan [həpṭikəp], and Altaic; Japanese [kušami], Turkish [aksirma], Korean [čaejae], Kurdish [pijme].(/s/=$^{19}/_{50}$ /n/=$^{11}/_{50}$ /fricative/=$^{48}/_{50}$ /nasal/=$^{23}/_{50}$).

Languages arising later than Proto-Indo-European show consonantal symbolism. The dental/alveolar voiceless stop /t/ apparently has a long history as the carrier of the meaning 'stubborn resistance' among Slavic, Russian, Old High German, Latin, Old French, Old Spanish, Greek, Castilian, Old Portuguese, Czech, and others (Malkiel 1990c:69-80). Malkiel argues that it would be usual NOT to label the most easily observable deliberate obstruction or occlusion of the breath passage--"namely the one effected by pressure of the tip of the tongue against the teeth, the gums, or the hard palate"--with meanings about 'resistance', 'strength', 'firmness', 'toughness', and 'stiffness'(Malkiel 1990c:71).

Although Latin is a generally commended scholarly language, it reveals a wealth of sound symbolism. Evidently, its people highly prized birds for some 315 terms are known. Not counting the more ancient Greek loans, Latin names at least 107 species with 232 terms. More than 20% of these names are sound symbolic (André 1966:146). Latin people did not only name a bird for its call because it was noisy animal that could not be labelled on sight very easily. The same species of bird might have a differing song according to breeding group. Many Romance languages emanating from Latin labelled many of the same birds by picking out differing parts of its tonal vocabulary. In French, a plover was named [vano], the Sanskrit word for 'sneeze'. Meanwhile the French description of the plover's song, 'li huit', somehow became the English name 'litweet' (André 1966:148).

Echo-words are found in Bhojpuri, an Indo-Ayran language. The basic type of this word form is similar to conjectures of Shields, Swadesh, and Wescott. In it, (CV + any

C) is added a duplicated initial (C + either /o/ or /u/) (Tiwary 1968:32).

For Gujerati and Marathi, the most commonly reported echo-word begins with /b/. The most favored in Hindi is /w/ (Tiwary 1968:38). In Bhojpuri examples, the echo-words can also act as verbs or nouns. However, since the root really implies the echo, and not the reverse, echo-words are far from being a unified sound symbolic system with specific and precise functions (Tiwary 1968:35).

Echo words and their reduplication can serve as a sarcastic speaking register and point out status distinctions according to role and capital accumulation. Like 'emotional' or 'affective' words, echo-words load semantic meaning into words. Tiwary comments that this sociolinguistic function for reduplication is highly developed as part of the behavioral manipulation of young-old social strategy(Tiwary 1968:36).

Sound symbolism is best thought of as a process of negotiating relations between the world's sensory potentials (hardness, softness, et cetera) and mental and acoustic reality. It is not merely a single group of un-regenerate words which echo loud phenonmena. If so, affective connotations and sound symbolism may be intrinsically linked within a species selecting complex acoustical exchange of information.
Recently, it has been suggested that substantial proportions of the 'emotional' vocabulary of ordinary speech contains sound symbolic markers as well as intricate prosodic schemes.

(Markel 1990). Wescott regarded this as the reason for an anger-context connection to labio-velarity and derogation in English (Wescott 1971a). Presumably, the quickening pace of the physiology in social conflict would produce short biting sounds with articulatory sweeps of sound.

English is well studied, though generally it has been refered to as an 'un-sound-symbolic' language. Below a word list is created to show that English contains a substantial number of sound symbolic words. These words either contain an etymological primary form of sound symbolism, or show associated cluster because of semantic cohesion (Malkiel 1963).

This list was compiled using the data reported by Marchand (1959) Wentworth and Flexner (1960), Malkiel (1963), Smithers (1954), Wescott (1980c). Over 1,000 suspected or attested sound symbolic words are given. The list presented in table 3..a. is unanalyzed and, though far from being comprehensive, it is presented as a synchronic picture of American English. It suggests that the "un-sound symbolic" language of English may be as sound symbolic as other languages and that English is well equipped to provide its everyday speaker, (i.e. with an average 24,000 word vocabulary), a vocabulary consisting of 3% sound symbolic words. This extraordinary amount should warn against cursory dismissal of sound symbolism in English.

Table 3.a.
English sound symbolic words

VC suffix forms	Words:
1. -ab	stab, jab, blab, fab, dab
2. -ack	crack, brack, snack, smack, thwack, quack, whack, flack
3. -addle	paddle, straddle, addle, waddle
4. -am	lam, clam, slam, jam, flam, ram, wham, bam
5. -amp	stamp, tramp, champ
6. -amble	famble, wamble, scramble, scamble, amble, bramble, shamble
7. -ang	pang, bang, twang, tang, clang, spang, sprang, whang
8. -ank	clank, spank, crank
9. -ap	clap, tap, chap, rap, snap, swap, slap, yap, plap
10. -arl	snarl, gnarl, marl
11. -ash	dash, lash, flash, pash, crash, slash, gnash, clash, swash, squash, gash, bash, splash, smash
12. -at	bat, pat, chat, rat-tat, spat, splat
13. -atter	clatter, chatter, batter, patter, hatter, smatter, splatter, yatter
14. -attle	rattle, tattle, prattle, twattle
15. -awl	sprawl, scrawl, spawl, drawl, yawl, brawl, bawl
16. -eep	cheep, peep
17. -eer	sneer, jeer, cheer
18. -eeze	sneeze, wheeze, sleaze
19. -ick	pick, prick, tick, flick, nick, click, snick, crick, lick, stick, kick, dick, brick, chick, hick, mick, sick, slick, wick, yick,
20. -iddle	fiddle, piddle, tiddle, twiddle, quiddle, diddle
21. -iff	sniff, whiff, tiff, miff, biff,

Table 3.a. continued

22. -iggle	wiggle, squiggle, wriggle, jiggle, sniggle, scriggle
23. -ing (excluding the grammatical suffix forms)	ring, sing, ding, whing, swing, sling, fling, ping, zing, wing
24. -ingle	jingle, tingle, dingle
25. -ink	tink, clink, chink
26. -ip	clip, whip, hip, skip, nip, tip, gnip, flip, snip, zip
27. -irl	whirl, chirl
28. -irr	whirr, skirr, chirr, squirr
29. -irt	squirt, flirt, spirt
30. -isk	whisk, frisk, flisk
31. -iss	hiss, siss, kiss, piss, miss,
32. -it	spit, slit, flit, hit, skit, jit, dit, fit, bit, quit, chit,
33. -itch	twitch, hitch, pitch, stitch, scritch
34. -iver	quiver, shiver, flivver
35. -izz	whizz, fizz, sizz, frizz, blizzard, grizzled,
36. -oan	groan, moan,
37. -ob	sob, throb
38. -od	plod, prod, dod, pod, clod, trod,
39. -odge	hodge-podge, stodge
40. -oll	stoll, toll, knoll, stroll, loll, roll, joll
41. -omp	stomp, romp,
42. -onk	honk, cronk, conk,
43. -oom	boom, zoom, doom,
44. -oop	whoop, roop, cloop, droop, scroop
45. -op	pop, whop, flop, plop
46. -ore	blore, gore, snore
47. -ouch	couch, crouch, slouch, grouch
48. -ough	cough, rough, tough
49. -ounce	bounce, trounce, jounce, pounce
50. -udder	shudder, dudder
51. -uddle	cuddle, fuddle, muddle, nuddle, huddle

Table 3.a. continued

52. -udge	grudge, drudge, trudge, smudge, sludge, fudge, pudge, nudge
53. -uff	huff, puff, buff, bluff, snuff, fluff, guff, chuff, cuff
54. -uffle	ruffle, shuffle, scuffle, muffle, snuffle
55. -ug	tug, shrug, lug, rug, hug, chug, glug
56. -um	hum, bum, thrum, strum, tum
57. -umble	mumble, rumble, humble, grumble, stumble, bumble, drumble
58. -ump	hump, bump, stump, lump, dump, thump, slump, wump, clump, plump, jump, crump
59. -unch	crunch, bunch, hunch, lunch, munch, punch,
60. -unk	funk, punk, spunk, flunk, stunk, bunk, dunk, hunk,
61. -urry	hurry, scurry, curry, flurry
62. -urt	spurt, blurt, hurt
63. -ush	flush, lush, rush, blush, tush, push
64. -ustle	rustle, bustle, hustle
65. -utter	utter, stutter, flutter, clutter, mutter
66. -uzz	fuzz, buzz,
Consonantal suffixes	Words:
67. -l	warble, yell, trill, yodle, purl, chirl, wail, roll, rile, brawl, bawl, call,
68. -z	buzz, whiz, wheeze, sneeze, frizz, sizz
69. -sh	mash, dash, flash, flush, gush, crush, splash, splosh, smash, squish, squash, quash, whoosh, rush, lash, bash, hash, stash, slash, swish, wash, gosh
Initial consonants and clusters	Words:
70. b-	bark, bellow, belch, bell, bumble, boom, buzz, boo, bang, bump, burble, bob, bib, bab, besmirch, babble

Table 3.a. continued

71. p-	puff, poof, poom, pud, puddle,
72. g-	guzzle, gush, gargle, gag, gut, gust, gasp, gaggle, gurgle, gullet, guff, grunt, gruff, growl, gong, gob, gab, giggle, gaggle, gobble, gulp, gunk, goop, glop, gulch, guffaw
73. t-	tip, titter, toddle, totter, tush, trash, tot, tiff, tipple, teeter-totter, tinkle, tick, tittle, toot, tuck, tickle, tum-ti-tum, ta-da,
74. k-	cock, kiss, cackle, coo, cuff, cow, kick, quick, cut,
75. s-	sizzle, sap, sip, seep, sop, sup,
76. st-	stand, stumble, step, stamp, stomp, stuff, stash, stop, stodge straddle, stride, strode, stroll, struggle, strike,
77. sk-	skip, skit, shirt, scud, scuttle, scrawl, skedaddle, scamper, scoot, scope, scour, scurry, scuffle, squeak, skiff, skid, skarf, scatter, scat,
78. skr-	scratch, scream, screech, scritch, scrape, screw, scrunch,
79. pr-	prate, prattle, prig, prim, prayer, prow, priss,
80. tr-	tramp, trod, troll, trudge, trap, trot, trip, tread, trim
81. dr-	dribble, drop, drive, droop, dregs, draught, draw, drain, draggle, drabble, drown, drink, drum, drawl, drool,
82. kr-	crow, crick, creak, crush, crash, crinkle, crank, crumb, crimp, cramp, crisp, crack, crackle, crouch,
83. gr-	gripe, grimace, grumble, grope, grasp, grapple, growl, grouse, grit
84. gl-	glimpse, glance, glare, gleam, glimmer, glitter, glint, glisten, glow, gloss, glib, glut, glug, glum

Table 3.a. continued

85. kl-	clink-clank, clang, clutter, clump, clamor, clomp, clack, clamor, cluck
86. fl-	flop, flap, flab, flash, flit, flee, flow, fly, fleet, fling, fledge, flag, flak, flare, flat, flick, fleck, flinch, flog, floss, fluff, flute, fluster, flout, fluctuate
87. pl-	plop, plump, plunge, plash, plaster, plea, plod, plosive, plush, plunder, plow, pluck,
88. bl-	blam, blur, blunt, blot, blip, bleep, blast, blaze, bleat, blend, bleed, blight, blink, blister, blob, blow, bluster, blush, bluff, blurb, blunder, blubber, bloat, blather, blare, blatter
89. Reduplication	pop, dad, mom, sis, pup, pip, tit, tot, tat, babble, bobo, puppet, peep, pap, dodo, dum-dum, boo-hoo, tee-hee, hurly-burly, hustle-bustle, go-go, boo-boo, lu-lu, gobbledy-gook, mumbo-jumbo, fiddle-faddle, huff-puff, chug-a-lug, hubbuh-hubbuh, zig-zag, yum-yum, yuk-yuk, yo-yo, woof-woof, tum-tum, tweet-tweet, ta-ta, pooh-pooh, rah-rah, pee-pee, boogie-woogie, bow-wow, ducky-wucky, fuddy-duddy, hanky-panky, heebie-jeebies, hoddy-toddy, hokey-pokey, honky-tonk, hotsie-totsie, humpty-dumpty, itsy-bitsy, jeepers-creepers, okey-dokey, razzle-dazzle, super-duper, wham-bam, teeny-weeny, fancy-schmancy, chit-chat,
90. high tone	hiss, swish, click, clip, clink, tick, ting, titter
91. low tone	blob, knock, plop, flop, plod, roar, snore, caw, moan, groan, hoot, toot, boom, coo, whoop, croon,

Since English is an important world language, violation of the arbitrary sound meaning hypothesis is a major event. That a language can contain such a bevy of sound symbolic terms is important because it demonstrates sound symbolism is crucial to certain registers of semantic intent. The above words are notoriously evident in poetry, children's books, works of fiction, and any communicative activity in which emotional activity is at a premium. One need only listen to the vocabulary of a sports broadcaster, a preacher, a politician, or a salesman to hear large numbers of these words. Much work is neccessary to disentangle a disregard for sound symbolic words from their function as affective vocabulary markers. The next chapter examines dozens of sound symbolism experiments. In unique ways, these experiments were designed from perplexing questions posed by sound symbolism events every speaker is aware of from birth.

CHAPTER IV
OTHER SOUND SYMBOLISM EXPERIMENTS

Types of Experiments and their Limitations

This chapter investigates the findings of various sound symbolism experiments. These fall broadly into three types of classes. First, psychological tests can utilize a linguistic medium called an *artificial lexicon.* With this technique, linguists construct entirely meaningless words from a phonological range. Linguistic researchers can thereby present foreign and native phonemes in nonsense words for evaluation by subjects.

By presenting 'nonsense' phono-morphs or 'unrealized words' to speakers, scalar connotative evaluation of specific phonemic, phonetic, acoustic, or prosodic qualities may be viewed. Otherwise, the language's own phonemic distribution, in its own word frequency, would bias association between sound and meaning. Put simpler, the *a priori* assumption for the *artificial lexicon* is that "nonsense" or "neutral" words can be constructed. In the most evident language evolution scenario, non-affective vocalizations were unlikely to be the first of these communicative vocal behaviors to emerge.

Other sound symbolic inquiries use a *natural lexicon.* In these experiments, words of specific languages are presented to speakers. Again, various measurements can be made concerning a speaker's connotative evaluations of groups of antonymic, synonymic, homonymic words. Lists are also made which purport to contain "unrelated" words or words argued to contain meanings arbitrarily.connected with phonemes.

There are major drawbacks to both these types of experiments. As every linguist knows, numerous perceptual parameters exist on which speakers could rate and rank words connotatively. Deciding which boundaries connect which meaning is a complex problem posed to neurolinguists, physiologists, and cultural anthropologists. Some perceptual borders are shared widely among mammals, such as the categorical distinction of VOT (voice-onset-timing, i.e.). In contrast, many physiological routines are not so widely shared, such as the ability to make imploded grunts.

Simply deciding which perceptual categories a species has a potential for or describing that species' physiological production range does not easily lead to awareness of which motor routines a species connects with which meanings. This is a widely realized difficulty for ethological studies of alloprimates as well as language acquistion studies of children. A similar bent is true for human languages. If languages can be compared at all, it is because there is general acceptance that semantic categories are more overlapped than phonological ones. Even when two languages contain a word which carries the meaning "up," their ultimate semantic boundaries for "up" could be culturally dissimilar.

Certainly, the meanings offered to a speaker by his language can never divorce themselves from those sounds they use to convey information. Longer words are learned later in life than shorter words. In longer words more sounds and motor routines are involved. To functionally use words, a speaker ascends through many layers of neuro-motor practicing. Nevertheless, the speaker enters into the functional use of words on a basic sound-meaning level.

Language is, by definition, a shared associational phonology system. The paradox in sound symbolism experiments is that they cannot control the amount of regularity and associative input a language bestows upon its speakers and this is what they presume to measure. The results they garner are to a considerable extent influenced by age, intelligence, gender, and dialect group of their subjects. So, for any language experiment the greater number of perceptual events provided for subjects by their language might easily influence the smaller number of features to be studied. For example, any speaker might note longer words are rarer in speech than shorter words. Even words of a specific semantic type, such as expressives, interjections, or exclamations, might easily be recognized by a speaker as carrying unusual phonological structures and elements.

As a final type of sound symbolism research, there are experiments proposing sound symbolism hypotheses about natural languages modeled upon types of analysis which sometimes exclude speaking subjects. This type of analysis is crucial in order to synthesize differently written and sporadically published research. My dissertation is an example of this genre of sound symbolism research.

Of all three types, only for the last can sound symbolism's identified sound-meaning morphs enable reconstruction of the distant historical contacts between world languages or expose their internal sound shift stages (Malkiel 1963; Hamano 1986; Malkiel 1990). It also can allow investigation into the treatment of sound symbolism as a language universal. Finally, with steadily improving language samples worldwide, it can elucidate the vocabulary use by human culture in a pre-sapiens era.

Sound symbolic experiments typically produce a list of the linguistic features associated with semantic meanings reported by speaking subjects. Viewed with inferential and nonparametric statistics, as associations, their occurences violate boundaries of normal distributions of all other sounds and meanings within and between languages. Often, these experiments use non-equivalent or biased language samples. One experimenter could choose two Altaic and one Sino-Tibetan languages to compare with English, an Indo-European language. Another might choose to study three Indo-European languages with a Finno-Urgic tossed in.

In addition, functional or operational definitions of sound symbolism are hazy (witness the preponderance of terms and overlapping meanings discussed in Chapter III). Experimental methodoligies often do not investigate equivalent linguistic and cognitive structures. Some measure associations between entire phonemes and meanings, features and meanings, words and meanings, and other more involved variants. The data results issuing from such mixed definitions and testing elements make fully comparable sound symbolic experiments rare.

Needless to say, the conclusions of most sound symbolism experiments are not easy to compare with one another. Beyond this, however, sound symbolism studies have yet to be comprehensively reviewed. While Fonagy's work is a an admirable melange of documented sound symbolism ideas and conjectures, it eventually presents a neo-Freudian explanation for sound symbolism (Fonagy 1979). Freudian theory when applied to bio-cultural anthropology and linguistics is hardly without objection.

More recent and systematic effort is forcing sound symbolism again into serious linguistic study (see especially Malkiel (1990) and Hamano (1986)). Below I review some highlights of the last 70 years of experiments into sound symbolism. They rate a close look because they demonstrate the difficulties for postulating meanings for human words at any date 100,000 B.P. without recourse to nonarbitrary sound-meaning processes. Sound symbolic words are one of the plausible bridges connecting present language to proto-language. The experiments also corroborate numerous individual findings presented in Chapter II and bear witness that this dissertation stands upon solid theoretical ground.

"Size" Sound Symbolism Experiments

Otto Jespersen and Edward Sapir are responsible for early 20th century interest in the search for a linguistic gesture representing a size concept. To justify their search, they theorized on the structure of sound symbolism. Of such, Jespersen says sound symbolism is a natural correspondence between sound and sense (Jespersen 1921/1947:396). There is no logic to an extreme denial of sound symbolism in any language (Jespersen 1921/1947:397). Since there are words a majority of speakers would argue are instinctvely adequate to meanings, Jespersen says, it should be important to study what ideas lend themselves to sound symbolism (Jespersen 1921/1947:378).

In further study, Jespersen outlines an early "front-back" hypothesis centralized about the value of the vowel /I/. He collects numerous detailed examples from Indo-European languages including those for 'little', child', 'young animal', 'small thing', and 'diminutive endings'. For all these categories, the /I/ vowel, a lax high, front unround phoneme, would be regarded in names of small, slight, insignificant, and weak meanings (Jespersen 1922/1949:557).

For Indo-European, Jespersen argues that sound symbolism makes some words more fit to survive and gives them strength in their struggle for existence. This manner of sound symbolism is not necessarily one present in distant language origins and there might be progressive tendencies towards fuller and more adequate expressions (Jespersen 1922/1949:559).

Sapir tested the conjecture of Jespersen in his classic series of experiments (Sapir 1929). His experimental orientation launched the challenge: "can it be shown, that symbolisms tend to work themselves out in vocalic and consonantal contrasts and scales in spite of the arbitrary allocations of these same vowels and consonants in the strictly socialized field of reference?" (Sapir 1929:226).

In measuring sound symbolism, Sapir suggests that languages contain "expressive" and "referential" classes of vocabulary (Sapir 1929:226). Preferential tendencies for "expressive" vocabularies might include greater use of phonological contrast.than "referential" ones. It is presumed the referential vocabularies would be less bounded by innate trends than the expressive ones.

Since whatever innate tendencies exist for sound symbolism might be expressed in sound contrasts rather than merely one phoneme, Sapir devised a number of artifical lexicons to represent the range of high-low and front-back vowels for English. In one list, 60 pairs of nonsense words were constructed using all English vowels in a lineal inventory. For the first 30, this meant the vowels /a, æ, ɛ, e, i/ were used. In the second half, non-English vowels were also used. Each pair was presented aside an arbitrarily chosen meaning, for example, [mil] versus [mal] 'table'. The subject was asked to indicate the term for the larger 'table' or if both words were equal to omit a mark (Sapir 1929:227).

Another list had 100 pairs and were tested on 500 subjects of ages varying from 11-21, and including English and a smaller number of Chinese speakers (Sapir 1929:229). In these two runs and for two other experimental variations, Sapir found that "symbolic discriminations run encouragingly parallel to the objective ones based on phonetic considerations" (Sapir 1929:238). Put more simply, the subjects weighted their responses on a continuum of size in response to scalar frequency levels from the lowest vowel /a/ to the highest vowel /i/. When vowel contrast included vowels in the middle levels, the objective responses to size differences were minimal (Sapir 1929:230). Additionally, the Chinese subjects' evidence was in the same direction as that of the English speaking ones (Sapir 1929:231).

In these few experiments, Sapir sought to measure connotative evaluations, as socially constructed and bordered by age and speaking group, and to distinguish from that innate tendencies to symbolism of a presumed and increased use of sound contrasts. Many other works build upon this theme. Sapir's student, Stanley Newman restudied the size-sound symbolism problem (Newman 1933). He asked 606 students of varying ages to rank nonsense words according to size value. Youngest subjects produced the most widely varying rankings, then the older, and the oldest showed the most consistent rankings (Newman 1933:59).

Even though age affect choices, all age groups consistently rank front to back vowels on a scale of small to large. He argues acoustic, kinesthetic, and visual signals influence the associations. A repeated experimental series tested small-large and dark-bright with other phonemes. Dark consonants appeared to be /br/, /gr/, and /m/, large consonants /br/, /gr/, /gl/, and /r/, small consonants /p/, /n/, /d/, and /s/, and bright consonants /s/, /k/, and /l/ (Newman 1933:63).

Newman also did a word search in English for evidence indicating size-sound symbolism and had each word rated by a series of judges according to fitness. His evidence was inconclusive. While Newman's results were not surprising, his statistical reasonings were abstruse and unclear. Additionally, he fails to separate among causal explanations. Which causes an idea of "small", small oral size or high frequency or tongue height or kinesthetic constriction upon the tongue?

As soon as Newman's study was published, another restudy was made. Bentley and Varon (1933) found that high pitch was associated with "small", low pitch with "large". Front vowels tended to be thought small and back vowels large (Bentley and Varon 1933:86).

Since their test words were pronounced behind a cloth screen, they effectively deduced that the connotative rankings, largely duplicating Newman (1933) and Sapir (1929), were not neccessarily based upon visual stimuli from mouth configuration (Bentley and Varon 1933:85). Later researchers tested further upon this note in the manner described below for Brown, Black, and Horowitz (1955). Siegel, Silverman, and Markel (1967) found the results found for auditory presentations significantly increased with a combined visual and auditory presentation.

Thorndike and Orr measured languages for antiphony and front-back vowels in certain semantic fields also sought by Sapir and Jespersen (Orr 1944; Thorndike 1945). Orr gathered examples showing opposition of vowels relating to "roughly" the same semantic field (tip-top, slit-slot, strap-strop e.g.) Thorndike, meanwhile, conducted an impressive collection of 1,970 English words and ranked them according to smallness/largeness ratios.

Thorndike's results are worth a closer look simply because they corroborate Sapir, Jespersen, and Orr. The systematic collection of data entailed collecting as many words as possible for each of the following 17 categories of English vowel sounds: [I] as in 'bit', [i] as in 'machine', [I] or [i], [ɛ] as in 'bet', [eI] as in 'bait', [ɛ] or [eI], [æ] as in 'bat', [ɔ] as in 'box', [oʊ] as in 'bone', [ɔ] or [oʊ], [ʊ] as in 'bush', [u:] as in 'fool', [ʊ] or [u:], [ʌ] as in 'but', [aI] as in 'bite', [yu] as in 'beauty', [ʊ], [u:] or [yu:] (Thorndike 1945:11).

Each sound was then coded for number of words suggesting smallness, probable smallness, largeness, and probable largeness. The final smallness/largeness ratio was twelve times larger for [I] and [i] as it was for [ɔ] and [o]. He states succinctly, "the theoretical chance that the difference of +0.046 between the percentage of 'small' words in [I] or [i] and the percentage of 'small' words in [ɔ] and [o] could occur by chance is about 1 in 1700 (.0005 i.e.) and the corresponding chance for the difference of -0.051 in the percentage of 'large' words is about 1 in 16,000 (.00006 i.e.) The chance for joint occurence is less than 1 in 250,000,000" (Thorndike 1945:10).

Thorndike also notes that at least for English, German, Russian, Greek, Finnish, and Hungarian certain phoneme clusters are found more frequently in words connotating pleasantness than in ones for unpleasantness (Thorndike 1945:12). In tallying similar size-phoneme word lists from Greek, Hungarian, and Finnish, Thorndike showed there is some association between front-back vowels and small-large meanings. The evidences were much weaker than for English, however, and it is possible that the size-sound symbolism utilizing [i] or [I] is a special case for English.(Thorndike 1945:13).

Maxime Chastaing expounded upon these speculations of Thorndike and others. In a review of the signification of the vowel /i/, she remarks that when considering a sound's motivation, it is not only determined by circumstance, text, context, but also its phonetic uniqueness and what it is actually used to name (Chastaing 1958:413).

In considering the vowel /i/, she notes it is used in at least a dozen Indo-European languages to represent smallness, clarity, height, quieter forms of talking, birds, stages of breathing, sharpness, narrowness, quickness, lightness, and rapidity. It obtains its meaning largely from its use, but importantly, its meaning is a function of its relation to other sounds. The /i/ vowel has value also as a structural or gestural event in the articulatory musculature.

Her interest in the qualities of meaning assigned to the vowel /i/ led to seven experiments (1962). The first had 30 French speaking students list a vowel series in order of lightest vowel to darkest vowel. The more frontal and higher the vowel, the brighter it was reported. Next, 20 students rated 4 words, Kig, Kag, Kog, and Kug, according to whether they were bright, neutral, or dark. The nonsense word Kig was brightest, Kag was neutral, and Kug was darkest (Chastaing 1962:2).

Chastaing asked 168 elementary students to replace the vowel in the word, Pab, with one befitting the dawn, the day, dusk, and twilight. Most common for dawn was /e/, for day /i/, for dusk /o/ and twilight /u/ (Chastaing 1962:3). Thirty-five students were asked to replace the vowel in the word, Grum, to best indicate clarity. 66% replaced the /u/ with /i/. Another experiment asked 41 students to modify words so as to darken or lighten their meanings. The vowels /i/ and /e/ lightened, vowels /o/ and /u/ darkened. Word pairs were presented next to students and they were asked to choose the light or dark pair. The vowel /i/ was lightest as compared with /u/ for 91% of the subjects. Finally, elementary students were shown pictures of night and day, and large objects and small objects. Over 75% connected /i/ with day and /u/ with night. The same percentages held true for small and large (Chastaing 1962:5).

The results of these experiments upon French speaking subjects are far from surprising. What they do not show, however, is whether sound symbolism is innate, learned, or a combination of both. Chastaing remarks on this and suggests certain sounds carry more non-arbitrary meaning than others because they are created during essential behaviors. Her list contains some of the words discussed and examined in this dissertation: vomit, suck, cough, and drink

Most linguists believed sound symbolism experiments lacking in hard cross-cultural results. One attempt to answer the /i/ vowel-size controversy was Ultan (1978). His study gathered data from 137 languages. It coded for the existence of various phonemic and morphic structures carrying meanings involving size, distance, quantity, force, intensity, pejorativeness, time, age, gender, sweet-good, sensation, and so on.

Ultan finds size symbolism represented by a number of sonal forms in 27% of his languages. This result is obtained with reservation though. Of 137 languages sampled, over 40 are from North Amerind. For the other16 language phyla, only the following have an N=5 for their sample: Austronesian (9), Indo-European (15), Afro-Asiatic (5), Altaic (13), Niger-Khordofan (14), South Amerind (9), and Dravidian (11). This sample exemplifies the difficulties of obtaining data on language phyla distant to Indo-European.

He reports 33% of the 137 languages contain distance symbolism. The overwhelming favorite feature representing nearness is front or high vowels (Ultan 1978:546). This corroborates many earlier sound symbolism experiments. It also suggests that distance symbolism is a proto-language conceptual fragment because it exists both between disparate languages and within the mental frameworks of the language speakers.

Another sound symbolic tendency was the presence of a short-long, one-many, part-whole conceptual overlap. Short sounds represented shorter events or singular instances, or few instances. Long sounds represented many or more than one instance, longer, whole events (Ultan 1978:547).

In regard to Sapir's "affective" words, Ultan finds many languages set the emotions of a verbal praising or hyporcoristic and pejorative nature into words with the use of ablauting devices (Ultan 1978:547). In "emotional" speech, this means speakers can change distinctive features, vowels, articulations, and consonants within a word or phrase to enhance connotative intent. For example, in hypocoristic speech, I can call my friend *Bobby-Lee*,or in the pejorative I can trivialize an event by saying "it can do a *flip-flop* over the *mish-mash* about the *hub-bub*". In each italicized phrase a front-back ablaut is present.

Ultan remarks that it is not odd to find that the pejorative, hypocoristic, and affective speech registers share the same formal features (Ultan 1978:547). Extending this thought, it appears that sound symbolism is a mechanical system possessed by speakers which transcends various speaking styles. If the numerous sound symbolism definitions of Chapter III are labelling entirely separate events, this could not be true. But it might be easier for speakers to recognize a brief list of sound symbolic axioms to apply to varied conceptual styles of speech than to construct similar linguistic rules when changing speaking registers. As a fact, the least we do know is that speakers do recognize a series of sound symbolism axioms and apply them appropriately when within settings where connotative intent is to be amplified.

Artificial Lexicons in Sound Symbolism Experiments

Artifical lexicons were designed to find connotative value for individual sounds. Interesting variants of Sapir's nonsense words sometimes included the use of the semantic differential test (Osgood, Suci, and Tannebaum 1957). Oyama and Haga (1963) ran three tests which provided a semantic profile of nonsense words and visual figures. Their students rated 14 line drawings and 16 phonetic items of 35 semantic scales.

Not surprisingly, they found certain sounds, /t/, /k/, and /z/ were likely to be named sharp and angular. Others as /m/, /u/, /r/, /o/, /l/, /b/, and /n/ were pinned to round figures (Oyama and Haga 1963:141). Their results duplicated Miron (1961) and Newman (1933) in that /u/ and /o/ vowels were felt to be deeper, farther, fuller, softer, heavier, hotter, wetter, more smooth, stable, and unreal than /i/ and /e/ (Oyama and Haga 1963:138). The front high vowel /i/ was considered brighter than /o/, and on a scale of /i,a,e,u,o/ vowels varied according to size. Finally, consonants /k/ and /r/ were felt happier than /t/ or /m/, and consonant /k/ was stronger than /m/, and vowels /u/ and /a/ were more sober yet happier than /i/ and /o/ (Oyama and Haga 1963:139).

Lack of information upon how subjects rank nonsense words compelled Weiss (1964) to measure stimulus meaningfulness and its efficacy to sound. Here, 88 female undergraduates ranked contrasted "high" and "low" meaning nonsense words on scales of magnitude, brightness, and angularity. Weiss argued that a variety of schemes are used to "decide" connotative regard of nonsense words. Some subjects reportedly would think of Latin, others related to their understanding of "baby language" to make a choice (Weiss 1964:261). He believed early negative experimental results with nonsense words and figures is due to the fact that a direction of evaluation must be introduced for the subjects before they will achieve significant agreement as a group.

His results showed the brightness dimension increased in response to requesting this particular judgement (Weiss 1964:262). He comments that Brown's learning theory appeared closer to the truth than the Gestalt theory of physiognomic perception. In other words, speaker agreement increased with age for sounds and meanings merely because the linguistic associations in a particular language have had more time to become known to a speaker.

Important data fueling a disconfirmation for universal sound symbolism is seen in Taylor and Taylor (1962). Their method was to present 144 nonsense CVC words to speakers from four unrelated languages. These words were composed of all consonants and vowels common to the English, Japanese, Korean, and Tamil languages. Speakers rated the nonsense syllables according to warmth, size, movement, and pleasantness. They found the "meanings associated with any particular sound were different from language to language and there was essentially zero correlation between the symbolism scores found in any pair of languages" (Taylor and Taylor 1962:356).

They also note that Korean and Japanese responses were the most similar due to being the most similar cultures (Taylor and Taylor 1962:356). This is not surprising considering both have sound symbolism systems and are from the Altaic language phylum (Martin 1962)(Hamano 1986). The major problem with Taylor and Taylors' study is that it fails to account for the possibility of prosodic-meaning or feature-meaning sound symbolism. A phoneme is a large mental event and is constructed by the speaking group which uses it. Further, the phoneme and many prosodic markers do not exist in a non-mentalist reality. This is to say, when a sonogram is utilized to distinguish the structures contained in a phoneme for a speaking group, the features often physically do not exist (Snowdon 1986:496). Their experimental design may have entirely missed common or universal regard for sound and meaning. Voicing, vowel length, or front consonants might each be regarded on a similar semantic pole, but with the experiments, the phoneme is the least divisble unit of sound. Further, merely because test phonemes are chosen because they intersect all four languages is no guarrantee they represent the features used in sound symbolism.

In a critical review of then recent sound symbolism experiments, Taylor (1963) entirely dismisses its case as universal. Some experiments may have been biased by researchers choosing foreign equivalents which mimed English words. At least it is clear linguists also use the adage that "something is lost in the translation" as well as common people. Other experiments did not control for consonantal effects. As such, it is argued, Sapir's "mil-mal" nonsense pair may have returned different results if it were "vig-vag" instead. Similarly the mode of the stimulus presentation, kinds of verbal subjects, and subject tasks may have been incorrectly controlled (Taylor 1963:205).

Insup Kim Taylor remarks that sound symbolism is probably entirely learned, and that "if we obtain phonetic symbolism patterns in English, German, Russian, and one non-Indo-European language, there should be a heirarchy in the degree of relatedness among those languages as reflected in phonetic symbolism" (Taylor 1963:209). She restates a tenet of Saussure; "a new hypothesis must be found that accounts not only for the fact that people associate certain sounds with certain meanings, but also the fact that people speaking different languages associate the same sounds with different meanings" (Taylor 1963:206).

Contrarily, researchers continued to find data disputing a more relative language specific sound symbolism. In 1961, Davis found British children tended to place the word TAKETE with angular pictures and ULOOMU with rounded ones. They did this much like African children who had never been exposed to English.

Johnson, Suzuki, and Olds (1964) tested deaf and hearing high school and college students. In rating 14 pairs of artificial words with polar adjectives, the two hearing groups established significant correlation. The deaf group matched neither hearing group nor matched each other within their group (Johnson, Suzuki, and Olds 1964:236).

Mixed results were found in a test of 60 Navaho speakers (Atzet and Gerard 1965). Using the list of antonyms known from Brown, Black, and Horowitz (1955), subjects were to guess the meanings of Hindi and Chinese pairs. For twenty antonym pairs, only Chinese many-one, smooth-rough, thin-fat, and Hindi many-one, hard-soft examples were significant.

From these results, the authors state "the amount of overlap between a given pair of non-cognate languages of such images called forth by similar-sounding words is probably minimal and if it does occur it will often be coincidental" (Atzet and Gerard 1965:528). The numbers of these words must be very small, they aver, and are localized to imitative words such as "cricket" and "sizzle" (Atzet and Gerard 1965:527).

Their comments pay homage to the arbitrary principle, again, without much comparative language data. How, for example, would they explain the fact that in the 50 language sample for COUGH seen in Chapter II, obstruents are present in 98% of the examples? Or that a presumably quiet noun like NECK should show 70% velar features? Worse, for a much quieter noun like FOOD, why should over 80% of a balanced language sample show it carrying a nasal feature? For both Taylor (1963) and Atzet and Gerard (1965), the denial of feature-meaning association between distant languages is argued with little supporting research.

Antonyms were eliminated in a retest by Weiss (1966). 318 subjects were presented with 28 word sets, with two English words and one Japanese equivalent to one of the two words. The mean percent agreement was 60.8, significant beyond the .001 level (Weiss 1966:99). The correct English choices were; frosty, twitch, stun, gnaw, cut, sting, ache, grope, rub, lick, kiss, wince, bleed, whip, itch, tickle, sweat, scald, moist, thud, vibrating, tick, whisper, harmonious, howling, hoarse, wheezy, splendid (Weiss 1966:100-101). This list is given to demsonstrate that most of the words chosen are of a sensory nature and most do not carry easily accepted antonyms. The semantic difficulty is easily seen. What is the antonym of "tickle" for example? Is it "torture" or "pain" in the imperative second person case?

While Weiss provides evidence that high agreement may be obtained in guessing choices, the results are not easy to analyze. Many of his translations of English words into Japanese directly evoked the Japanese vast sound symbolism system. "Wheezy", for example, is translated into Japanese as "Zei-zei (Suru)" (Weiss 1966:101). As Hamano noted (1986), the lack of reference to the existence of such a Japanese sound symbolic system at all, undermines the results.

Taylor did not appreciate the Weiss word list either (1967). She noted many of the words were sound symbolic in Japanese and that this consideration along with the factor of word length influenced choice more than sound (Taylor 1967:237). Again, she denies universal phonetic symbolism (then known as UPS) (Taylor 1967:238).

Taylor's criticism brought more experiments, but her counterpoint mostly failed on one point. It merely substituted "imitative" words as causal to "better than chance" guessing and added in word length as a paralinguistic bonus. It failed to explain how each culture manufactures words, which even when all agree are onomatopoetic, are still less than duplicates of one another. One only need to read the list of COUGH terms in the Appendix A to see the truth of this statement. It seems clear that "onomatopoeia" or "imitative" labels have been used as a garbage bin for words linguists have refused to analyze.

A creative investigation into the antonym problem was carried out by Gebels (1969). Fifty Australian students were asked to rate 22 pairs of antonyms according to semantic poles ranging from -12 to +12. They were given runs consisting of an antonym set translated into 5 languages: Old Hebrew, South Malaita, Kiwai, Tongan, and Finnish. Subjects were not told that any of the words were antonyms nor what were their meanings when asked to sort a given sequence of 10 words of 5 languages.

He found that matching occured beyond the .05 chance level and argued that a positive relation existed between the structure of the language and cognitive processes. The only requirement for the antonym class was that it carried words of a sensory nature because, as predicted, "sense-expressing antonyms would arrange themselves around opposite semantic poles on a phonetic scale" (Gebels 1969:311).

Gebels also notes that each sound symbolism experiment is incomplete in itself because the data it purports to explain has not been fully described. He says, "only with a large number of cross-linguistic cultures which are supposed to perceive the world differently (Whorf), can the hypothesis of the existence of phonetic symbolism across two or more contrasting linguistc communities be supported." (Gebels 1969:312).

One such study was done by Crockett (1970). Two hundred Russian subjects were asked to rank phonotactically Russian nonsense forms to semantic scales involving brightness, size, and mood. Diffuse vowels were associated above chance with smallness, compact vowels with voluminosity. Acute vowels carried bright and gay meanings, grave vowels possessed dark and unhappy connotations. Finally, the voiced velar stop phoneme /g/ was considered universally to be large and dark (Crockett 1970:112).

Crockett remarks that it would be better to regard imitative words as primary sound symbolism and the values deriving from word associations within a specific language as secondary sound symbolism. In some cases, the value of the sounds from the first domain mute those from the second. Crockett also argues that these secondary associations may become linguistically diffused (Crockett 1970:113).

Where the secondary sound symbolism might lie within the pool of features perceived by speakers is unclear. An interesting experiment touched upon this and retested college students with 23 pair of Brown, Black, and Horowitzs' (1955) antonym list (Kunhira 1971). Japanese antonyms were presented visually, in a monotone voice, and with an expressive voice. Correct pairing was significant in all cases, but also significantly greater for the expressive voice mode of presentation. Interestingly enough, for the expressive voice the happy-sad, up-down, and good-bad antonyms were guessed above 79%. For the monotone, above 79% was fast-slow, and this was true for the printed form as well (Kunhira 1971:428).

This study indicated that prosodic elements play a parallel role to structural phoneme elements in directing cognition toward sound-meaning associations. While suggesting such, the experiment again uses a word list full of sound symbolic words from Japanese. The English words are never considered for their sound symbolic value, as I suggest should be done for English as a whole, by sheer word volume in Chapter III. Further, it does not compare a false set of antonyms with contrasting phonemes as a control for the results it does obtain. Again, the results are difficult to further analyze.

Contrasting antonym word list experiments are seen in other studies examining specific contrasting antonymic concepts to sounds. Tarte and Barritt (1971) ran three forced choice experiments consisting of a number of CVC English trigrams and elliptical or angular drawings. They found that the vowel /i/ was most often preferred for triangles, /a/ next most preferred, and /u/ least preferred. The vowel /u/ was also most preferred for round figures. Not surprisingly, the vowel /i/ was preferred for smaller items and the vowel /a/ for larger ones. Consonants were not consistently tagged to either type of figure.

They remark that there seems to be "some, as yet, undetermined, factor which permits monolingual adult native American speakers of English to agree on the assignment of vowel sounds to figures of different size" (Tarte and Barritt 1971:168). Tarte and Barritt chose the continua of vowels from /a/ to /u/ to /i/ to represent large-to-small oral cavity size, low back-to-high front in terms of tongue position, and compact/grave to diffuse/acute in terms of distinctive features theory for their experiment (Tarte and Barritt 1971:168). Their results suggest that with this method, the vowel continua was shown associated with the size dimension. Therefore, they argue, the phonetic continuum /a-u-i/ are also related for native speakers of English They astutely remark, "what is not clear is whether any or all of these factors are causative in producing these results" (Tarte and Barritt 1971:168).

A follow up study was undertaken by Tarte (1974). Monolingual English and Czech speakers were asked to rate 252 trials of CVC nonense words and geometrical figures. In this case, both English and Czech subjects chose the vowel /a/ for large figures, /i/ with small, /u/ with ellipses, and /i/ with triangles

(Tarte 1974:92). In a quick retest, Tarte replaced one phoneme within his 9 word nonsense trigram. By replacing /s/ with /g/, the same results were obtained except that the size dimension was muted and the shape dimensions amplified (Tarte 1974:94). His experiments suggest it should not be unusual to obtain agreements of these sorts from related languages. Both English and Czech are Indo-European.

Natural Lexicons in Sound Symbolism Experiments

The works of Sapir and Jespersen sparked a flurry of experiments in the early 1930's. Few included natural lexicons as phonemic stimuli. In Tsuru and Fries study (1933), 25 pairs of English words were paired with their corresponding words in Japanese. Only a few of these words were antonyms, however, and the entire list included: 1. bird-worm, 2. red-green, 3. peace-war, 4. sweet-bitter, 5. fast-slow, 6. white-black, 7. square-circle, 8. good-evil, 9. praise-deprecate, 10. far-near, 11. soft-hard, 12. smart-dull, 13. high-low, 14. kite-boat, 15. old-young, 16. hot-cold, 17. are-are not, 18. blue-yellow, 19. thick-thin, 20. big-small, 21. clear-muddy, 22. enemy-friend, 23. crooked-straight, 24. right-wrong, 25. sharp-dull (Tsuru and Fries 1933:283).

In their presentation of 2 English and 2 Japanese words to their subjects, Tsuru and Fries found that up to 75% of the meanings could be correctly translated. Of itself, this result caused a tremor in the arbitrary hypothesis for linguists of the day. Later criticism showed that "marked" terms in the vocabulary of Japanese and English corresponded and that perhaps subjects were only guessing according to overall word length. In binomial choice tests, merely using word length could easily allow guessing at rates higher than 50% or chance levels.

Probably the most cited sound symbolism study using natural lexicons was done in 1955 by Brown, Black, and Horowitz. In their study, 21 pairs of words were matched with corresponding words from Hindi, Chinese, and Czech languages. The list was formed under two conditions: the words had to be of a sensory nature, and two, their frequency had to be at least 100 in one million words used (Brown, Black, and Horowitz 1955:389).

Eighty-six subjects correctly guessed meanings of three foreign language groups of antonyms twice as often as they were wrong. The highest rate was for English-Hindi, followed by English-Chinese and English-Czech. In further analysis, it was shown no significant difference existed between male and female responses.

However, introducing expressive quality of voice when pronouncing test items did make a difference. Somehow, pronouncers could iconically introduce haste into the "fast" word, or sharpness into the "sharp" word (Brown, Black, and Horowitz 1955:391). For the monotone condition, choices correct above a chance level of guessing at .01 include: Eng-Czech, Eng-Hindi (blunt-sharp), Eng-Chinese, Eng-Hindi (bright-dark), Eng-Hindi (down-up), Eng-Chinese, Eng-Czech (fast-slow), Eng-Chinese, Eng-Czech (hard-soft), Eng-Chinese (light-heavy), Eng-Hindi (one-many), Eng-Czech (thunder-lightning), and Eng-Chinese (wide-narrow) (Brown, Black, and Horowitz 1955:391).

These experiments raised more questions than they answered. For one, the idea that sound symbolism effects should be apparent in antonyms is supposed, but is not proven. Word length, while apparent earlier to Tsuru and Fries (1933), cannot be controlled when using a natural lexicon data set. Exactly what makes various categories more liable to correct guessing is unclear, though expressive voice in a vocal presentation does enact augmenting influence. Finally, their list is considered non-auditory and non-onomatopoeic, but many of the pairs are indicated in types of sound symbolism outlined in Chapter III. Regardless, the authors argue that sound symbolism is an important sub-segment of all languages. They argue it can either be decreasing or actually increasing in its scope in present languages.

Another similar series of experiments were run by Maltzman, Morrisett, and Brooks (1956). Their scheme was to test the correct guessing of 25 English-Croatian, English-Japanese, and Japanese-Croatian words. The list was the same noted above in Tsuru and Fries (1933). In the English-Japanese and English-Croatian trials, significant choices above chance were obtained at .001 probability. The results "clearly indicated the English equivalents of Croatian words can be selected with a frequency significantly beyond chance expectancy, and quite as effectively as the selection of English and Japanese equivalents" (Maltzman, Morrisett, and Brooks 1956:250). However, Croatian-Japanese and Japanese-

Croatian presented pairs were far below any statistical significance level.

Their results called them to doubt the "gestalt organization of trace systems, and the physiognomic language" (Maltzman, Morrisett, and Brooks 1956:251). Once again, the experimental method is flawed because the word list chosen does not clearly reflect the subject of study. Are the concurrence due to gestural or auditory or synaesthetic or kinesthetic associations? With the Tsuru and Fries' list, extrapolation is impossible.

Retests of experiments by Brown, Black, and Horowitz (1955) and Maltzman, Morrisett, and Brooks (1956), were done by researchers Brackbill and Little (1957). Essentially duplicating earlier experimental designs, they asked subjects to guess the meanings of word pairs of English-Japanese, English-Chinese, English-Hebrew, Chinese-Japanese, Chinese-Hebrew, and Japanese-Hebrew items.

The subjects were able to guess at better than chance rates of .01 for English-Hebrew (53%), Japanese-Chinese (54.8%), and Japanese-Hebrew (52.3%) (Brackbill and Little 1957:318). Unlike the other studies, subjects guessed chance rates for English-Japanese (50.3%), English-Chinese (49.9%), and below chance rates for Chinese-Hebrew (48.1%). Visual presentation of word pairs aided English-Foreign guessing, the same for Foreign-Foreign word pairs made no difference.

Though their study used auditory, visual, and audio-visual modes of data presentation, and this is commendable, the experiments return weak inference for strong data. Exactly what allows better than chance guessing on word pair testing is unclear. They note that word lengths, vowel and consonantal types, spacing of compound words, and connotation markedly influenced the agreement of subjects as to the sameness of meaning of word pairs (Brackbill and Little 1957:318). This remark implicates prosody, consonantal and vowel distinctive features, and even graphically iconic factors as causal to the results of their guessing behaviors.

Other researchers did not view these results with equal disfavor. Brown and Nuttal (1959) regarded the Maltzman, Morrisett, and Brooks 1956 word list with suspicion. It included non-antonym items, such as "when", "first", "this" and others. Consequently, a 36 item antonymic list was created for English, Chinese, and Hindi. Their subjects matched correctly at levels significantly above chance for all groups. They also achieved extreme significance when the native language English was paired with foreign words versus foreign-foreign pairs (Brown and Nuttal 1959:445).

A different nonparametric approach was used by Wertheimer (1958) to get at word-meaning fitness. Ten words were presented: 1. break, 2. clean, 3. cool, 4. cut, 5. rush, 6. belong, 7. knee, 8. sun, 9. teach, and 10. write. Each was ranked on two scales: a semantic differential scale according to whether it contained sounds which fit its carried meaning and on a bipolar scale as to whether its connotative meaning was angular-rounded, weak-strong, rough-smooth, active-passive, small-large, cold-hot, good-bad, tense-relaxed, wet-dry, fresh-stale (Wertheimer 1958:413).

Not surprisingly, "on each of the ten scales, the fitting words were rated more extremely. Whether measured by the *t*-test, U-test, or binomial expansion, the difference is significant beyond the .01 level. Apparently fitting words have more clear-cut emergent qualities than non-fitting words" (Wertheimer 1958:413). Subjects were also asked to indicate when a particular word lost its meaning after being continuously shown on a screen. The fitting words all took longer for their implicit cultural meaning to disappear in a condition of saturation (Wertheimer 1958:414).

This study suffers in that it fails to measure precisely what allows a word to be rated more fitting to a group of assigned sounds than another. Sensory words apparently carry more information than other kinds of words, but all sorts of qualities and meanings might be assigned objects and concepts according to the activities or contexts in which they are found. For example, would the word "key" be considered "fitting" because as a metal object it often causes a clicking sound when used, and therefore should contain a stop? Or should the sounds be fitting because a "key" is a small object and, following regard in other sound symbolism studies, it should carry a small front vowel /i/?

Even so, the delay of loss of meaning evaluation of a word stimulus is interesting. It should be possible, if it is so, to measure with PET scans whether different or more long term memory areas of the brain are utilized for various sound symbolic vocabularies.

Further, such PET scans may enable researchers to note whether the brain channels the memory of "affective" and "referential" vocabularies to different areas.

Another interesting experiment, similar to Wertheimer (1958), is Miron (1961). Here, 76 American monolinguals and 41 Japanese speaking bilinguals were asked to rank nonsense CVC words created from a consonant and vowel matrix on 16 semantic differential 7 point scales. A great many of these CVC combinations are actual words, and for this reason, I consider this experiment involving a natural lexicon for both groups.

Using rank order correlations to determine similarity of groups, he found that Japanese and English speakers agreed most heavily for the evaluative dimension (.89), the potency dimension (.74), and the activity dimension (.64). All correlations are significant at the .01 level. Miron remarks that this reliable means the "two language groups use similar semantic dimensions"(Miron 1961:626).

To note Miron's findings: A.) the highest ranked evaluative vowel and consonant were; English, /a/ and /p/; Japanese /i/ and /p/: the least highly ranked evaluative vowel and consonant were; English /u/ and /g/; Japanese /e/ and /g/; B.) the highest ranked potency vowel and consonant were; English /ɑ/ and /g/; Japanese /ɑ/ and /g/: the least highly ranked potency vowel and consonant were; English /i/ and /p/; Japanese /e/ and /š/ and; C.) the highest ranked activity vowel and consonant were; English /u/ and /n/; Japanese /a/ and /n/: the least highly ranked activity vowel and consonant were; English /i/ and /č/; Japanese /a/ and /p/ (Miron 1961:628-629).

Miron's study can be criticized for the choices it made in selecting constituents for its consonant and vowel matrix. He chose the vowels [i, e, a, o, u], which is fine because Japanese only contains 5 vowels, but the consonant choices are problematic. He includes two affricates [č and š], two stops [p and g], and one dental nasal [n]. What exactly makes any of the phonemes significantly evaluated is unclear through this design.

More clearly, both Japanese and English subjects rank the voiced velar stop /g/ as "bad" or "undesirable". What makes it "uglier" than both their highest picks, the voiceless bilabial stop /p/? Is it the voicing distinction? Or is it the position in the oral cavity, the /g/ being back and the /p/ being front? Miron's study suffers due to an assumption that the phoneme is the significant unit of sound symbolism mechanics. This is problematic because the phonemes are not systematically chosen. Affricates are the rarest consonantal phonemes universally, and here, he includes two in his ten phoneme list. This is probably 5 times larger a frequency than occurence in real world languages. The means the results cannot be easily viewed through a universal perspective in the face of vast numbers of affricateless tongues.

Nevertheless, he states the front vowels and consonants seem to refer to "pleasant" and "weak" things, the back vowels and consonants to "unpleasant" and "strong" things for Japanese and English speakers (Miron 1961:630). In itself, these remarks concur with trends seen in a large number other languages. His remarks lead toward a hypothesis that a vocabulary of purgatives and emetics compiled from any language in any culture should contain back features with "unpleasant" and "strong" sound-meaning connotations.

In an ingenious experiment, 48 English speaking Hawaiian four-year olds were tested for sound symbolism (Roper, Dixon, Ahern, and Gibson 1978). Researchers compiled words for loud, soft, large, and small categories from Hawaiian, French, Spanish, and English. These words were pronounced to each subject and he or she was allowed to take a small black, large black, small white, or large white token to represent what was heard.

Their results indicate a relationship between token choice and word category. All subjects associated a large token with loudness denoting words. Interestingly, males preferred black as soft and large where the reverse was true for females. Although white tokens were associated with small and soft words, the results were opposite for Hawaiian words (Roper, Dixon, Ahern, and Gibson 1978:95).

This study is significant in that it demonstrates gender differences of sound and color/size associations for specified word categories. It is weakest in not having created a series of nonsense CVC words to measure token choice against. As it stands, the word is the unit of perception and it is unclear which linguistic features boys and girls choose in labelling a certain color or size or loudness.

"Goodness-of-Fit Sound" Symbolism Experiments

Subjects in sound symbolism experiments often made choices between a diverse array of phonetic and semantic examples. Even when their choices indicated selective meaning-sound associations must be taking place, their reasons for success were unclear. Many experiments were designed with this problem in mind. They wished to explicate those cognitive arenas encasing the linguistic selection procedures of sound symbolism.

An early study into the perceptual processes underlying choice was labelled "The fitness of signs to words" (Hall 1952). Thirty-four males and female subjects were to rank sets of 5 signs to 50 words. The words included examples such as: fear, madness, art, energy, help, tradition, visionary, and so on. Each set of 5 signs was composed of two or three conventional signs with meanings associated with the test word and two or three which were purposely vague. For example, the test word, energy, had one sign choice that was a line drawing of the sun.

Results showed that while there was great agreement upon a particular sign for a word, there was "no absolute and consistent grounds for popularity" (Hall 1952:23). He remarked that "almost any figure that is not purely arbitrarily connected with a word may, by some subjects, be likened to some associated object, but it was considered, from the evidence, that it was not always the capacity of the figure to suggest an object that was primary in influencing choice" (Hall 1952:23).

Hall's study is important with respect to sound symbolism, but not because it connects any sounds to any clear-cut types of concepts. Instead, the results lead to a suggestion that subjects use a variety of schemes in fitting qualities for concepts, signs, and words. There appears also to be quicker responses from subjects where less apprehension is present about choices. He states that "for several words, the agreement in choice of a sign as the most appropriate is high, but the type of fittingness varies. While some signs of obvious conventional significance are chosen, it seems probable that those signs which combine the formal qualities of simplicity and regularity of design with a familiar structural appropriateness to the verbal setting are both the quickest choices and the "best symbols" (Hall 1952:31).

Sound symbolic words may be the "best symbols" par excellence. If this is true, quicker retrieval times for sound symbolic words would be predicted. Unfortunately, this has not yet been done and Hall's study reaches only general conclusions. The sign drawings are not applicable to any other sound symbolic visual figure-sound experiments.

In a slightly more streamlined retest of Hall, McMurray (1958) tested 37 college students on a sign-word test using the semantic differential. A ten word list was created; rhythm, wrong, justice, serene, storm, philosophy, visionary, crisis, peace, and enthusiasm. Each of these words was paired with two sign drawing modified after Hall (1952). Subjects were then asked to pick one or the other signs to best represent the word.

The 10 words and the 20 drawings were then rated with 15 polar adjectives on 7 point intervals to obtain the semantic differential scores. Subjects described a word or sign as angular-rounded, weak-strong, rough-smooth, active-passive, high-low, cold-hot, good-bad, tense-relaxed, heavy-light, kind-cruel, fast-slow, hard-soft, ugly-beautiful, green-red, or sick-healthy. McMurray concluded "the mean ratings of the chosen signs were found to be closer to the mean ratings of the word than were those of the non-chosen signs" (McMurray 1958:312).

This brief experiment demonstrated that connotative meanings for words and signs can overlap when there is similarity. The kinds of similarity cannot be deduced from this experiment. Part of the reason is the choice of signs and the other part is choice of words. It would be no surprise to find worldwide consensus in representing a basic term with a distinct sign and parallel semantic connotations. For instance, given the test word, snake, I believe a high probability exists that most subjects would not choose a circle over an S to represent it. Further, I predict that in using the semantic differential adjective scales, no one would be surprised if snakes assumed connotations including ugly, cruel, cold, green, angular, fast, active, and sick.

Another test use of the semantic differential had 15 men and 15 women rank 360 words upon 20 bipolar adjectival scales (Jenkins, Russell, and Suci 1958). The same test was regiven to 540 subjects later as a measure of coding reliability. These tests were largely designed to test the use of the semantic differential for solving word association problems. As such, its importance to sound symbolism is unstated. Results indicate that all words do not have equal connotative value and that meanings and sound cluster on occasion. The manner of these occasions awaits further investigation.

For example, one of the bipolar adjectival pairs of the semantic differential was cruel-kind. When over 500 subjects ranked 360 words on a scale where 1=cruel to 7=kind, interesting evaluative similarity was seen for certain words but not others. The following words had mean rankings below 2, (or a "very cruel" connotative judgement): abortion (1.6), anger (1.8), bad (1.6), cold (1.8), criminal (1.6), deformed (1.9), devil (1.3), discomfort (1.9), fraud (1.8), grief (1.9), hate (1.2), heartless (1.2), hurt (1.4), mad (1.8), nasty (1.6), pain (1.7), putrid (1.9), rage (1.9), scalding (1.5), severe (1.8), sin (1.9), starving (1.4), sword (1.7), thief (1.8), tornado (1.3), trouble (1.9), war (1.2) (Jenkins, Russell, and Suci 1958:695-699).

By itself, the list only leads one to note that subjects use words according to the meanings they perceive them to contain. But if "cruel" words are analyzed, do they carry certain features that their opposites the "kind" words do not?

The opposite pole words ranked above 6, (or very kind) on the cruel-kind scale include: baby (6.3), beautiful (6.1), calm (6.3), clean (6.1), comfort (6.3), doctor (6.3), faith (6.3), farm (6.0), flower (6.3), god (6.1), happy (6.6), heal (6.1), holy (6.5), home (6.3), joy (6.2), lenient (6.2), loveable (6.7), mild (6.0), minister (6.1), mother

(6.5), music (6.2), nice (6.5), nurse (6.4), peace (6.7), puppies (6.4), relaxed (6.0), sister (6.0), sky (6.2), sleep (6.1), sunlight (6.3), sweet (6.1), and trees (6.2) (Jenkins, Russell, and Suci 1958:695-699).

A very simple hypothesis about these two groups is immediately desirable in the fashion of this dissertation. It can be suggested the "cruel" words should contain more back consonants and stops than the "kind" words. Other experiments have found this tendency, so the hypothesis is conservative. Conversely, it can be supposed front consonants should be found more in "kind" words than "cruel" ones.

A tally of the 26 "cruel" words find that 6/26 (23%) words contain back consonantal velars and 3/26 (11%) contain glottals, 22/26 (85%) contain stops, and finally 8/26 (31%) contained frontal bilabial consonants and 25/26 (96%) contained dentals. Contrarily, of the 32 "kind" words; 7/32 (22%) words contain velars, 4/32 (13%) contain glottals, 21/32 (66%) contain stops, 15/32 (47%) contain bilabials, and 26/32 (81%) contain dentals. For this cursory further analysis of Jenkins, Russell, and Suci data, the emergent "cruel" word category carries twice as many stops as the "kind" words. Also, "kind" words contain more frontally produced bilabials than "cruel" words. Back consonant appear in an even frequency for "cruel" and "kind" word lists.

This type of quick analysis of semantic differential testing results is flawed because the phoneme groups composing the words are not mutually exclusive. A follow-up test to correct this was performed on 342 male enlistees in the U.S. Navy by Heise (1966). Subjects ranked 1000 English words on a number of bipolar scales. The test items included frequently used and short words of English. Each word contained one of the 45 phonemes of English. Each was opposed in comparison with a list of words which did not contain that one phoneme. As a result, ratings according to connotative potency, evaluation, and activity were derived for every phoneme in English.

Unlike previous experiments done by Miron (1961), Heise found /g/ was considered both "good" and "soft" (Heise 1966:23). Nevertheless, much of the data corroborated earlier sound symbolism studies. The following phonemes were agreed upon as being potent: [ə,a, k, r, š]. The "un-potent" ones were: ['ə, 'ər, g, i, y]. Highly active phonemes were [v, r, ə]. "Un-active" phonemes were: [l,o]. The phonemes connotatively responded to as "good" were: [g,p,v]. Phonemes most indicated as "bad" were: [au, d] (Heise 1966:18-19).

This study fails to identify which distinctive sound features associate with which meaning evaluations. Since the unit of testing is the printed word, word length and rhyming effects cannot be controlled. For example, because /g/ is considered "soft" and /k/ "hard", is the deciding factor the voicing feature? Using natural words makes it impossible to answer this question. It could just as easily be a connotation created by the angles found in the orthographic /k/ and lacking in the /g/.

Finally, Heise's subjects were a select group. They were all male and their situation as inductees may have influenced their decisions on which sounds were to be most important in their impending indoctrination into the U.S. Naval Corps. As such, this study can be used as illustrative of a speaking group's connotative assignments of meaning to sound. It is not clear how phonemes act in real language examples versus artificial language examples, though they differ in the results they produce.

Synaesthetic Studies into Sound Symbolism

Scholars since antiquity have noted sound is easily associable with various sensory perceptions. Synaesthesia is a type of sound symbolism in which words, phonemes, and their structural elements attach to identities involving colors, smells, shapes, tastes, and even temporal perceptions. Like other sound symbolism experiments, a debate rages over whether the capacities to consistently categorize sounds according to widely disparate senses is universal or culturally and language specific. There is evidence pointing in both directions.

An early study was done by Odbert, Karwoski, and Eckerson (1942). For this study, 243 students listened to 10 selections of various classical works including Stravinsky's *Sacre du Printemps*, Wagner's *Fafnir*, Sibelius' *Second Symphony*, and so on. The students were to rate each piece according to 10 sets of adjectives. These categories included, for example, category A; spiritual, lofty, awe-inspiring, dignifies, sacred, solemn, sober, serious or category F; merry, joyous, gay, happy, cheerful, bright.

Once subjects had rated these 10 selections they were asked to imagine that each selection was a color. Responses were divided according to whether the subjects reported seeing colors, thinking colors, feeling colors, or forced their color-sound choice (Odbert, Karwoski, and Eckerson 1942:157).

Color was rated on three continua. Subjects could report spectral characteristics, such as red, orange, yellow, green, blue, or purple. They could also indicate intensity of brightness through white, gray, gray and black, and black. Finally, hue saturation could be described with light mixture, medium mixture, or dark mixture responses.

Their most striking result was that the peaks on all three measures of vision that were reported varied systematically with the mood of the selection (Odbert, Karwoski, and Eckerson 1942:161-163). The classical music selections matched sound-color as follows: tender-blue, leisurely-green, gay-yellow, exciting-orange, vigorous and exciting-red, solemn and sad-purple (Odbert, Karwoski, and Eckerson 1942:163).

They indicate their study was limited because of the small musical selection number. One selection of "sad" music did not cover the range of somber tone, nor did a couple of lively pieces cover all "happy" musical possibilities. Also, it seems unclear what tonal features lead toward which color association. What makes a certain piece of music "leisurely"? Why can people not only agree upon the mood of the piece, but also its color?

Even so, their data corroborate Berlin and Kay's system of color term universals (Berlin and Kay 1969). In Odbert, Karwoski, and Eckerson's study, subjects use basic color terms at higher levels than color terms which are peripheral to languages worldwide. For example, red, blue, and yellow use as descriptors were much commoner than purple, orange, and pink. In the schemes outlined by Berlin and Kay and modified by Witkowski and Brown (1977), the pink, brown, purple, and orange color terms are the last words for basic colors added to a language's lexicon.

Another synaesthetic study measured this sensory-sound association differently. Since it was evident to researchers from the start that some subjects were vivid "photistic" visualizers, one experiment exploited this phenomenon. Karowski, Odbert, and Osgood (1942) collected drawings from subjects who were good visualizers during the presentation of music and from a control group.

The first group was given colored pencils and the control group merely one gray pencil. Essentially, both groups drew the same types of figures (Karwoski, Odbert, and Osgood 1942:212). This strikingly apparent event led them to test further upon the notion that culture contains and transmits common analogies relating both to sight and sound.

Their testing created a Group Polarity Test which compared musical moods with visual adjectives. The music moods of bad, depressing, heavy, happy, bass, alive, relaxed, loud, fast, and harmony were rated on semantic differential scales for large, down, thick, angular, blurred, dark, far, crooked, background, and moving adjectives. They remark, "in almost every case the majority of subjects related the words in the same way that photisitc visualizers had related the qualities" (Karwoski, Odbert, and Osgood 1942:213).

In their discussion, these researchers point out that from the standpoint of this particular experimental design, synaesthetic causality remains unclear. Individuals may acquire mood-music-color associations from their cultural experiences, as a result of natural associations (bass tones from large animals, treble from small, and so on), or from some sort of "unity of the senses" neural network (Karwoski, Odbert, and Osgood 1942:213).

What they do present is a set of 5 principles helpful in describing the synaesthetic phenomenon. These are instructive because many later tests reinspect their claims. First, there is the *Principle of Polarity.* They state that "in color-hearing every quality of sound or sight implies its opposite" (Karwoski, Odbert, and Osgood 1942:216). The "Janus-like" words so noted by linguists, "those that look at once in both directions", are part of color and hearing perceptions. When color or auditory adjectives are used in any language, the existence of one implies the other. In order to know light, dark must be understood.

Next, the *Principle of Gradients* argues that "in color-hearing a pair of opposites may come to represent extremes of a continuum, in which intermediate steps are represented" (Karwoski, Odbert, and Osgood 1942:217). This is especially true, they note, when fuzzy polar adjectives, such as those describing mood or inner imagery, are used.

Third, the *Principle of Parallel Polarities and Gradients* states "in color-hearing a linkage of an auditory pole with a visual pole implies a linkage of their opposites. Gradations along an auditory continuum may be paralleled by gradations along a visual continuum" (Karwoski, Odbert, and Osgood 1942:217). Music which starts off in high pitch may be represented as bright, but as it slows down, the photism becomes darker. Effects such as this can be confounded by overlapping polar associations. For example, a connection between thick and heavy might be linked with one involving thick-heavy, heavy-deep, and deep-dark (Karwoski, Odbert, and Osgood 1942:218). In comparison, English shows homonymic polysemy for some of these synaesthetic events. The word light means happy, lightweight, and bright depending upon its context.

Fourth, the *Principle of Alternate Auditory Polarities and Gradients* states that "in color-hearing not all aspects of the music need be represented in the visual response" (Karwoski, Odbert, and Osgood 1942:219). Some subjects, they note, respond to the entire selection of music where others refer only to individual items within it.

Finally, the *Principle of Alternate Visual Polarities and Gradients* avers that in color-hearing, any of a number of visual polarities may be paralled with a given auditory polarity" (Karwoski, Odbert, and Osgood 1942:219). A soft-loud gradient can be referred to as thin-thick, bright-dark, or fast-slow. When reporting about a soft-loud gradient, subjects can also refer to loud as near, soft and far.

These five principles have been listed because they demonstrate the complexity of disentangling cross-modality events within human psychology from real cultural backgrounds. Further experiments on synaesthesia attempted further analysis along these lines. In a series of interviews with German, Czech, Serbian informants, and data from Russian and Dakota speakers, Reichard, Jakobson, and Werth (1949) showed that color-audition was very uneven between cultures. Jakobson noted that the sound-color equation might be expected to be particularly vivid and regular in languages with a high degree of sound symbolism (Reichard, Jakobson, and Werth 1949:230). To date, no study of this has been done. This did nothing to stop speculation. Masson suggested that there exists in the brain a map of color contours part of which is similar topographically to a map of acoustic frequencies there (Masson 1952:41). To date, there is little evidence for this.

A review and retest of cross-cultural visual-verbal synaesthetic tendencies was carried out by Osgood (1960). Testing took place upon 40 Navaho, 10 Mexican-American, 27 English, and 20 Japanese speakers. Subjects were presented a word such as "heavy" and asked to choose whether the term meant up-down, vertical-horizontal, and so on.

Results were an interesting mix. English speakers felt "heavy" was down, colorless, thick, dark, concentrated, and near; Spanish speakers saw "heavy" as down, horizontal, hetereogeneous, thick, dark, crooked, hazy, and large; Navaho speakers saw "heavy" as thick, dark, crooked, blunt, and near; Japanese speakers saw "heavy" as down, colorless, thick, dark, crooked, hazy, concentrated, large, near, and blunt (Osgood 1960:149).

Such an example does not display what Osgood actually discovered. For the data, "when 28 verbal concepts are judged against all 13 different visual alternatives in all possible combinations (364 items), approximately half of the items yield evidence for consistent intra-cultural synesthesia" (Osgood 1960:152). His cross-cultural significance reached .05 for all language pairings. Anglo vs. Navaho speakers agreed 65%, Anglo vs. Spanish 72%, Anglo vs. Japanese 78%, Navaho vs. Spanish 61%, and Navaho vs. Japanese 69% (Osgood 1960:152).

These data are striking because they highlight both cultural differences and similarities. For example, all three speaking groups agreed "calm" was bright, but differed as to whether it was large (English) or small (Navaho). All agreed 'heavy" was down, thick, dark, and near, but differed as to whether it was crooked (English) or straight (Navaho and Japanese) (Osgood 1960:153).

Osgood's conclusions are merely the form of more hypotheses about synaesthesia. He argues that there is a common connotative framework for humans, and this is buried under the weight of the denotative, structural requirements of symbolic language as we know it. One type of synaesthesia may be innate, the common reference to the red spectrum and warm and the blue spectrum as cold, for example. Another may be learned, such as the loud dimension with large, which is simply a characteristic of the physical world that as any noise-producing object approaches or is approached, its increases in visual angle are correlated with increases in loudness (Osgood 1960:168).

The semantic differential was used to test Osgood's remarks by Pecjak (1970). Subjects included Americans, Hungarians, Turks, Italians, Belgians, Dutch, Germans, and Japanese. He tested ratings for gray, red, yellow, blue, green, and white with emotions and days of the week. He found results which led him to conclude that some general variables extend beyond specific culture influence to verbal synaesthesiae. These can be of two kinds: a). the common environment determines the nature of the world, e.g. night is dark, cold or blood is warm, red, and b). cultural conventions crossing large ethno-graphic ranges (Pecjak 1970:625). Evidence for the second is noted in that for Belgians, Dutch, Germans, and Italians the day Sunday also meant white. This was not the case for Americans, Japanese, Turks, and Yugoslavs (Pecjak 1970:625).

Pecjak's study hardly disentangled innate from learned synaesthesia. He even remarked that the denotative meaning of words may influence synaesthetic effects more than had been thought because the different methods of measuring meaning (semantic differential, similarity judgements, and association techniques i.e.) do not correlate very highly (Pecjak 1970:626).

Still, his study showed that an astonishing amount of association between sound and other senses regularly occurs without much conscious decision among speakers.

Further research by Marks (1975) has led researchers to believe that only 10% of the population has vivid color-sound perceptions. His retests led him to argue that the natural world does bend cognition along parallel metaphoric paths among differeing subjects and senses. Loudness in amplitude and higher pitch are categorized as brighter than their polar contrasts (Marks 1982). He argues that this emanates from phenomenological similarity in the make-up of sensory experiences of different modalities (Marks 1982:177).

Williams took a different approach to synaesthesia. In undertaking an analytic study of English over the past 1200 years, he uncovered semantic laws which regulated sensory modal shifts (Williams 1976). He argued that English, as well as other languages, regularly moves metaphors from one domain of sensing to another. For example, what was once touch (warmth) can become taste (hot/spicy) later on. To date, his impressive work has received scant attention or corroboration.

Summary of Sound Symbolic Experiments

Sound symbolism experiments are never strictly about sound symbolism. Each is an attempt to view the cognitive nature of language use. As a whole, they have presented a loose behavioral and social scheme to explain results which strain the well-worn arbitrary sound-meaning hypothesis. This "arbitrary" sound-meaning assumption cloaked the beliefs about insufficiently studied languages for decades.

A real synthesis has not been done for the maze of sound symbolism experiments or hypotheses known this century. Nevertheless, their intent was clear. These experiments, whether studying speakers of foreign or native languages and their responses to real or imaginary words, were designed to show "structural similarity in historically unrelated words of the same meaning" (Weiss 1964:456). The reason for this is that "the theory of phonetic symbolism does not specify that a single meaning becomes associated with a single sound, but rather that many meanings may become heirarchically associated with a sound, and vise versa, the heirarchies established by different cultural groups may differ" (Weiss 1964:456).

Such testing intents led sound symbolism experiments this century to come to these conclusions: a.) "the basic and inescapable principle of the arbitrariness of language symbols is neither absolute nor inviolable" (Ultan 1978:551), b.) semantic concepts of a basic sensing (light-dark, small-large sweet-sour, windy-calm, and so on) and orientating nature (up-down, fast-slow, in-out, near-far, and so on) are regularly identified with phonetic contrasts universally, c.) some amount of sound symbolism is learned in early childhood universally, at least as part of "motherese" and its affective bonding regime, d.) the degree to which sound symbolism expresses innate or genetically inherited perceptions is unknown, e.) its presence is expressed as large numbers of words in some languages, f.) the scope of sound symbolism events is large and is pervasive in many languages. These observations disallow independent invention or diffusion explanations to account for its presence globally and, g.) finally, no one disputes sound symbolism is a meta-language process, and cross-culturally and bio-culturally it allows various phono-semantic decisions to be reached, allowing a speaker to find a best mental "fit" for sounds and communicative intents.

CHAPTER V
CONCLUDING REMARKS

Summary

This dissertation began by raising questions about the Saussurean arbitrary sound-meaning hypothesis. Its general acceptance has been based upon anecdotal rather than rigorous, systematically produced evidence. Sound symbolism, it was argued, should be examined carefully because of its importance to an understanding of proto-languages and language origins. It violated the bounds of Saussure's linguistics because it holds that a human communication system should find adaptive value in a close association of meaning with signs. The more signifiers that can be placed in a referent symbol, such as a word, the more easily any member is able to recognize that which is signified.

This simple argument has been revived recently in the works of Hewes (1983), LeCron Foster (1978), Wescott (1980c), and Malkiel (1990a). Sound symbolism, they argue, is the logical bridge between what must have been a rudimentary and highly gestural language of Homo erectus and a more arbitrary sound-meaning language of Homo sapiens. For these reasons, a conservative set of 63 hypotheses about sound symbolism was proposed in this dissertation. They were tested upon a geographically and genetically distanced sample of languages in Chapter II and measured with three nonparametric statistical tests.

These tests were supplemented by a search for examples of sound symbolism in world languages, this detailed in Chapter III. Sound symbolism was present in virtually all language phyla. Its absence in some phyla was due to lack of research data and also imprecise sound symbolism definitions. Sound symbolism tests were scrutinized next in Chapter IV. Their findings were found more supportive of sound symbolism as a cognitive universal than they were negative. As a whole, sound symbolism experiments have not been incorporated into a unified sound symbolic scheme. The inclusion of sound symbolism as part of the cognitive adaptation in human evolutionary history is incomplete because these experiments use a disparate methodology.

In contrast, my sound symbolism experiment held that the sub-phonemic unit carried meaning, not the utterance as with prosody nor the word or phoneme as with most other sound symbolism experiments. Using the Chi-square test, 23 of the 63 hypotheses about 16 glosses were significant at $p<.05$. The results broken into gloss category showed ethnoanatomical words, BREAST, TOOTH, NOSE, NECK, and MOUTH, the easiest to predict a significant association between feature and meaning. There were 18 predictions made for this group of words and 9 or 50% were significant. The physiological words were next easiest to predict. They included: COUGH, VOMIT, SPIT, SUCK, EAT, SWALLOW, CHEW, and DRINK. Thirty-three hypotheses were made for this group and

11 or 33% were significant. The final group, semantically ancient, were the most dificult to predict. For the words WATER, FOOD, and DOG, 12 hypotheses were made and 3 or 25% were significant.

These results cause reflection upon the use of ethnoanatomical words when reconstructing distant language families. A large number of the glottochronological words commonly used in comparative linguistics are words for body parts. The high degree of association between feature and meaning found here for ethnoanatomical terms should be a warning to linguists that more than one feature and one gloss is necessary to indicate a relationship between two languages, especially when that word involves the ethnoanatomy.

In regarding features, each feature tested was significant at least one time. The easiest to predict feature-meaning association was stop, followed by velar. The incidence significance for features tested with Chi-square goes: (6) stop, (3) velar, (2) glide, (2) nasal, (2) bilabial, (1) palatal, (1) back vowel, (1) fricative, (1) affricate, (1) labio-velar, (1) resonant, (1) front vowel, and (1) dental-alveolar. These results indicate sound symbolic effects are not limited to one or few features as some researchers have suggested, although some features are more liable to use as sound symbolic features. This tally also speaks well of the testing design because it shows that the hypotheses offered sound symbolism as a broad phenomenon, not one restricted to a few sub-phonemic features.

These 63 hypotheses were also combined into 240 hypotheses so to run the Kruskal-Wallis and Jonckheere-Terpstra tests. For the

Kruskal-Wallis test, bilabial, velar, affricate, stop, and glide features were predicted at significant levels. These results were important in suggesting the features primary in the reconstruction of a unified proto-language spoken by Homo erectus. Two of the significant features are place of articulation, bilabial and velar. It is logical that, owing to the largely binary nature of human language, proto-language was binary as well. Sounds most easily contrast in front, bilabial articulations with back, velar articulations. Further, as manners of articulation, stops, glides, and affricates were predicted at significant levels. All three are recognized features in countless mammalian vocal repertoires. However, if they are indeed at the basis of the elaborate mental and phonemic distinctions made in present languages and emanating from proto-language, more research is necessary to show this. Affricates, for instance, are the rarest type of consonantal phoneme. They might be better known as "complex phonemes" because they contain a stop feature joined with a fricative feature. Affricates could either be arising or diminishing in regard to a proto-language era according to this data, but their rarity remains unexplained.

Finally, the use of the Jonckheere-Terpstra test showed that my 63 hypotheses predicted an astonishing amount of order upon a data set that should have only shown random sound-meaning associations.

Two strengths are evident about the dissertation. The first is that the design is simple, though it has never been done before by other scholars. Second, the design is easily replicable. Skeptics only need to put up their hypotheses, find the dictionaries, and tally the features they predict.

Theoretical Weaknesses

Research designs are limited because they explore the unknown to a degree corresponding to existing knowledge. Until this century, few languages were known adequately, least of all to enable a study of this type to be done. One fault in this research is that the data sample is small. The universe of human languages is vast and at least 5,000 languages have been described. Besides, the extent and intricacy of individual languages virtually defies complete description.

In the past thirty years linguistics has demonstrated the scope of language and communication is no less small. Splintering specialties have arisen including child language, language development, language origins, psycholinguistics, paralinguistics, sociolinguistics, ethnolinguistics, semiotics, and zoosemiotics. The range of information transfer among individual speakers of specific languages is unknown, though as vast. Likewise, the range of phonetic variation in individually described languages is incompletely known. This study draws from a pool of 229 languages, only 10 of the 17-24 debated language phyla, and 16 semantically basic, though culturally intended nonidentical words. The extrapolation of results to the 5,000 present languages and to proto-language phenomena is a manner of statistical faith.

The periods of human development are large. Presumptory conclusions about what was of importance at anytime in distant eco-zones and within differing neurological templates are easy to reach. Nevertheless, this study contradicts a cherished belief of modern linguistics. That is, a major Saussurean tenet is that the word is an amotivational construct and is largely unconnected in its connotation and denotation. The assumption that sounds and meanings are entirely disconnected is doubtful. The extent that sounds or features of sounds carry meaning in themselves is now an open discourse. Larger samples than the one presented here should corroborate the conclusions I reach.

Another weakness of the dissertation is the lack of a unified sound symbolic scheme upon which to rank languages, or individual instances of sound symbolism. As I pointed out in the discussion of hypotheses in Chapter I, sometimes a sound-meaning metaphor is formed because of visual similarity (NOSE and bilabiality, i.e.), gestural iconism (TOOTH and dentality, i.e.), acoustic mimicry (COUGH and stopping, i.e.), or kinesthetic metaphor (WATER and labio-velarity, i.e.). Which metaphor is used by which cultural group probably varies as does which events become labelled in such fashion. The similarities exposed in my conclusions point to complex naming schemes in each individual language. Yet, no researcher has compiled a complete listing of sound symbolic words, events, or guidelines for their recognition. Indeed, the norm in most dictionaries is that the editor identifies such words according to principles known only to his own design.

Future Research

Children enter human society probably sensitive to a variety of human specific vocalization. There is evidence that as they acquire mastery of their language, they use a number of sound symbolic words, features, and techniques to enhance the connection of meaning and sound inside their memory. Though it is not entirely clear why children reach about the same levels of language competence at the same ages worldwide, part of the reason must be that they are exposed to language in structurally similar ways in all societies.

It may be, as Bickerton (1990) suggests, that a type of proto-language mechanism exists within all humans and this is more obvious in children than in adults because of the incomplete neural development. If so, sound symbolism is part of the birthright of all children and they recapitulate their phylogeny through verbal play with sounds and meanings in order to achieve mastery within a much larger predominantly arbitrary sound-meaning language.

It might also be that humans contain a tacit level of language awareness which enables choices to be made on a less than conscious level. Such a level, indicated in numerous language experiments, suggests the cognitive use of language engages an inner Gestalt to achieve parsimony.

Sound symbolic use and a sound symbolism vocabulary deserve increased focus by scholars because they signal a doorway into an understanding of rudimentary language, language development, and human cognition. Given this impetus, it would be interesting to determine a sound symbolic vocabulary, along lines similar to this dissertation, and apply it to a setting in which a number of mentally handicapped individuals need to develop a working vocabulary. A sound symbolic vocabulary is one in which the sounds are rich in cues about the semantic intent of the words. Such a vocabulary might be more successful in providing access to language for such handicapped individuals than other traditional methods.

There is the possibility that the brain is organized in such a way to provide different retrieval times for different vocabulary items. Research with positron emission tomography (PET) might elicit evidence that sound symbolic words cluster in various specialized regions of the brain, or that they are a bilateral phenomenon. Again, research in this area may also be usefully applied to the mentally handicapped in order to develop a working vocabulary.

There is increased interest in alloprimate communication systems. It would not be surprising to find sound symbolism elements in any of these systems. It is already known that contact calls often involve high frontally produced sounds and threat or danger warnings the reverse, back harshly produced sounds. Given an more unified scope of the vast alloprimate communication systems, sound symbolism may be seen vindicated as a form intermediate between call and phoneme structures.

Finally, as stated previously, studies into sound symbolism can unlock proto-language and indicate semantically important concepts of early humans. Until modern instrumentation, early humans used their sensory abilities as "scientific" probes. Sound symbolism relates closely to the "doctrine of signatures", where the traits of an object imbued that object with its powers. In identifying vital concepts in the distant past for humans, and identifying them with the help of sound symbolic vocabularies, a better recognition of their ability to cognitively parse events can emerge. This may provide insight into the nature of mental evolution which has taken place among our ancestors.

APPENDIX A
WORD LIST FOR 16 CONCEPTS

1 Language gloss "breast" of female, n.

1.Afro-Asiatic

1Amharic [ṭut]

1Arabic [θ̣adi]

1Burji [unúna]

1Hausa [mama]

1Somali [náaske:du]

4.Austronesian

4Maori [rei]

4Palauan [tut]

4Tahitian [u]

4Tolai [au]

4Tonga [fatafata]

7.Dravidian

7Gondi [bomi]

7Kolami [pom:e]

7Manda [may]

7Pengo [may]

7Tamil [mey]

8.Indo-Pacific

8Hiri Motu [rata]

8Siane [ami]

8Fore [nono]

8Gadsup [naami]

8Tairora [maama]

9.Niger-Khordofanian

9Bini [ewúẹ̄rẹ]

9Bini [ewúẹ̄rẹ]

9Ife [ọ́mu]

9Igbo [ára]

9Mbukushu [dyere]

9Yula [ńyī le]

10.North Amerind

10Apache [ipé·]

10Blackfoot [mon:IkIs]

10Cakchiquel [¢'um]

10Micmac [pêsgun]

10Hopi [pi:hu]

11.South Amerind

11Quechua [čočo]

11Amahuaca [xoči]

11Cashibo [ṣ̌oma]

11Chama [ṣ̌oma]

11Chaninahua [paˀoti]

13.Nilo-Saharan

13Kanuri [tégam]

13Kaure [yírẹ]

13Erenga [juud]

13Mararit [sūd]

13Tama [òjut]

16.Sino-Tibetan

16Cantonese [nīn]

16Lahu [cúnɛ̂ˀ]

16Mandarin [rǔfáŋ]

16Tibetan [nūmə]

16Newari [dudu]

17.Altaic

17Japanese [mune]

17Korean [čǔt]

17Mongolian [œbœr]

17Turkish [goğus]

17Manchu [hunhun]

2 Language gloss "chew" v.t.a., v.t.

1.Afro-Asiatic

1Amharic [aňňakä]

1Arabic [yamḍag'u]

1Burji [lek'ans]

1Hausa [tauna]

1Somali ['alalinaya]

4.Austronesian

4Hawaiian [mama]

4Palauan [meríŋet]

4Tahitian [mama]

4Tanga [uŋ]

4Tonga [lamu]

6.Indo-European

6Croatian [žvakati]

6Icelandic [tygyu]

6Pali [cabati]

6Rumanian [rumega]

6Spanish [maskar]

7.Dravidian

7Kannada [avuḍu]

7Kui [muht]

7Kuwi [hōk-]

7Pengo [muh-]

7Telegu [nemarueu]

8.Indo-Pacific

8Hiri Motu [ania]

9.Niger-Khordofanian

9Mbukushu [tahuna]

9Nyanga [kutafuna]
9Shilluk [nyam]
9Swahili [tafuna]
9Xhosa [hlafuna]

10.North Amerind

10Chontal [di¢ij'ma]
10Micmac [alisĝopg]
10Navaho ['aš]
10Ojibwa [ša:ša:kom]
10Zoque [wyajsu]

11.South Amerind

11Aymara [turula]
11Cavinena [nako]
11Chaman [naka]
11Jaqaru [čakča]
11Tacanan [hobo]

12.Uralic

12Finnish [pureskela]

15.Austro-Tai

15Khmer [d̦lâr]
15Pearic [ke:t]
15Thai [k'io]

16.Sino-Tibetan

16Cantonese [jiuh]
16Gurung [ŋeba]
16Lahu [bε̂]
16Mandarin [jiáo]
16Newari [tap]

17.Altaic

17Japanese [sošaku]
17Korean [s:˘ipda]
17Manchu [nIyaŋ]
17Mongolian [zaʒlah]

17Turkish [ciğne]

3 Language gloss "cough" v.t.,v.i.

1.Afro-Asiatic

1Amharic [sal]

1Arabic [su'aal]

1Burji [k'ufay]

1Hausa [tari]

1Somali [qufá'aya]

4.Austronesian

4Fijiian [vu]

4Indonesian [batuk]

4Nukuoro [kobe]

4Tahitian [mare]

4Tikopia [tare]

6.Indo-European

6Czech [kălati]

6Hindustani [khánsí]

6Norwegian [hoste]

6Polish [kaszlek]

6Portuguese [tose]

7.Dravidian

7Pengo [kroki]

7Malto [inqe]

7Kurukh [iũkhnā]

7Manda [kruk-]

7Konda [kok-]

8.Indo-Pacific

8Bagupi [doro-]

8Bikol [abó]

8Garus [daluʔ-]

8Hiri Motu [huahua]

8Kare [dagʌl-]

9.Niger-Khordofanian

9Fula [d'oya]

9Igbo [í kwá]

9Mbukushu [dikohwēra]

9Shona [kosora]

9Swahili [kohoa]

10.North Amerind

10Blackfoot [saIs:kIna:]

10Choctaw [hotilhko]

10Hopi [öho]

10Micmac [nòĝêĝ]

10Navaho [dikos]

11.South Amerind

11Aymara [k'ajaña]

11Cashibo [ʔoko]

11Chacobo [ʔoko]

11Chama [oho]

11Guarani [hu'ú]

16.Sino-Tibetan

16Cantonese [kāt]

16Lahu [cɨ]

16Lisu [tšəcʉ]

16Mandarin [késòu]

16Tibetan [lókə̣p]

17.Altaic

17Japanese [seki]

17Korean [kič'im]

17Mongolian [xanad]

17Turkish [oksuruk]

17Kurdish [qoz]

4 Language gloss "dog, "jaguar", "fox", "animal", "deer"

1.Afro-Asiatic

1Arabic [kalb]

1Burji [woccóo]

1Hausa [kare]

1Hebrew [kalab‘]

1Somali [éI]

3.Austroasiatic

3Alak [cɔɔ]

3Lawa [sɔˀ]

3Mon [klə]

3Souei [ˀacɔɔ]

3Vietnamese [k‘uyèn]

4.Austronesian

4Fijian [koli]

4Hawaiian [ilio]

4Indonesian [anjiŋ]

4Kemak [asu]

4Tolai [pap]

7.Dravidian

7Gondi [nai]

7Konḍa [nukuri]

7Mayalam [náy]

7Pengo [neku.r]

7Tamil [náy]

8.Indo-Pacific

8Amele [pa]

8Kare [kui]

8Mawan [kwʌ:r]

8Sihan [pʌy]

8Silopi [wʌy]

9.Niger-Khordofanian

9Basa [gbe]

9Ife [ãdşa]

9Igala [ãbĩa]

9Mbukushu [mbwá]

9Yoruba [âdşa]

10.North Amerind

10Biloxi [čụñki]

10Crow [biegyé]

10Hopi [puko]

10Menomini [ti·hsɛh]

10Tzotzil [¢'iʔ]

11.South Amerind

11Amahuaca [paihéŋa]

11Jaqaru [haĩ q'u]

11Lenca [aguingge]

11Tarascan [axuni] "deer" "animal"

11Totonac [kuri]

13.Nilo-Saharan

13Erenga [wui]

13Fongoro [bisi]

13Sinyan [bisi]

13Tama [wi]

13Yulu [bisi]

16.Sino-Tibetan

16Atsi [khùi]

16Burmese [khùi]

16Cantonese [gáu]

16Mandarin [dǒu]

16Tibetan [c'ĩ]

5 Language gloss "drink" v.t.i.,v.i., n.i.

1.Afro-Asiatic

1Amharic [ṭaṭṭa]

1Arabic [yašrabu]

1Burji [d'uw]

1Hausa [ša]

1Somali [abə]

3.Austro-Asiatic

3Cambodian [phək]

3Lawa [ñuʔ]

3Muong [ʔo̤ŋ]

3Thin [ʔɔɔk]

3Vietnamese [ʔúeŋ]

4.Austronesian

4Fijiian [gunuva]

4Indonesian [minumam]

4Nukuoro [unu]

4Pascuense [únu]

4Tonga [inu]

6.Indo-European

6Albanian [pi]

6Bengali [panîo]

6French [bwar]

6Gaelic [dyoč]

6Lithuanian [gerti]

9.Niger-Khordofanian

9Mbukushu [kúnwa]

9Ndebele [-naθa]

9Shona [čekunwa]

9Swahili [nywa]

9Zulu [p'uza]

10.North Amerind

10Blackfoot [sImI]

10Cakchiquel [kum]

10Hopi [hiiko]

10Ojibwa [minikwe:]

10Squamish [taq']

11.South Amerind

11Huitoto [yirode]

11Quechua [upiana]

11Reséigaro [-iˀdú]

11Totonac [k'ota]

11Tupi [uú]

13.Nilo-Saharan

13Erenga [liɟo]

13Fongoro [auw]

13Kara [áya]

13Merarit [ɟa]

13Mileri [liyo]

16.Sino-Tibetan

16Cantonese [yám]

16Gurung [θuba]

16Mandarin [hē]

16Newari [twonë]

16Tibetan [tūṅ]

17.Altaic

17Japanese [nomu]

17Korean [masi]

17Manchu [omImbI]

17Mongolian [o:'r]

17Turkish [iç]

6 Language gloss "eat" v.t.a., v.i.

1.Afro-Asiatic

1Amharic [balla]

1Arabic [ya'kulu]

1Burji [it-]

1Hausa [ci]

1Somali ['naya]

3.Austro-Asiatic

3Cambodian [sii]

3Chaobon [caaʔ]

3Lawa [som]

3Mon [ceaʔ]

3Vietnamese [ăŋ]

4.Austronesian

4Fijiian [kai]

4Indonesian [makan]

4Kemak [a]

4Maori [haupa]

4Tonga [kai]

8.Indo-Pacific

8Awa [nɔno]

8Bena Bena [na-]

8Fore [na-]

8Kamano-Yagiria [no-]

8Rao [mi]

9.Niger-Khordofanian

9Mbukushu [kúdya]

9Ndbele [-dla]

9Shona [-dya]

9Xhosa [-tya]

9Zulu [dla]

10.North Amerind

10Blackfoot [o:wat]

10Chorti [we']

10Hopi [noosa]

10Kwakiutl [hemxʔí d]

10Ojibwa [mi:cimaw]

11.South Amerind

11Amahuaca [cócoquín]

11Guarani [u]

11Jaquaru [palu]

11Totonac [huá]

11Tupi [umbaú]

13.Nilo-Saharan

13Erenga [ŋgʌn]

13Fongoro [usa]

13Merarit [šin]

13Mileri [ŋʌn]

13Tama [ŋan]

15.Austro-Tai

15Chrau [sa]

15Katu [ča]

15Mon [gɛ']

15Pearic [ča]

15Sedang [ka]

16.Sino-Tibetan

16Cantonese [sihk]

16Gurung [caba]

16Mandarin [čr̄]

16Newari [khān]

16Tibetan [sɛ̄ɛ̀]

7 Language gloss"food"

1.Afro-Asiatic:

1Amharic [mabəl]

1Arabic [ta'a:m]

1Hausa [abinsi]

1Somali ['únto]

1Burji [ítay]

2.Australian

2Aranda [amirna](vegetable only e.g.)

2Diyari [puka](vegetable only e.g.)

2Gumbaynggir [yuI'a]

2Dhuwal [n'aθa]

2Wailbri [maŋari]

3.Austro-Asiatic

3Mon [kənaʔ]

4.Austronesian

4Hawaiian [hiai]

4Indonesian [makanan]

4Tagalog [pagkain]

4Tolai [nian]

4Tonga [kai]

6.Indo-European

6Czech [potrava]

6French [alimã]

6Hindi [k' áná]

6Lithuanian [maistas]

6Russian [ɛda]

7.Dravidian

7Telegu [era]

7Tamil [uṇṭi]

7Toda [u·ṇ]

7Tulu [ūṭa]

7Brahui [irag']

9.Niger-Kordofanian

9Ewe [núḍùḍu]

9Ndebele [ukudla]

9Bobangi [boli]

9Swahili [čakula]

9Xhosa [ukutya]

10.Amerind-North

10Blackfoot [ao:wahsln]

10Chontal [galg'ejuaw]

10Crow [ba:ru:k]

10Hopi [nuva]

10Micmac [maman]

11.Amerind-South

11Aymara [mankka]

11Guarani [tembi'u]

11Tupi [miú]

11Huitoto [écagoɨ]

11Totonac [tahuá]

16.Sino-Tibetan

16Mandarin [ší rwù]

16Tibetan [sàja]

16Newari [ann]

16Cantonese [čāan]

17Altaic

17Japanese [šɔkumɔtsu]

17Turkish [y ɛ]

17Korean [ŭmsik]

17Uzbek [owkat]

17Azerbaijaini [xuraek]

8 Language gloss "mouth"

3.Austro-Asiatic

3Jehai [tənəd]

3Kensui [hañ]

3Mon [paiŋ]

3Semaq Beri [kənūt]

3Vietnamese [miêŋ]

4.Austronesian

4Fijiian [gusu:na]

4Kemak [i:bɔrrɔ]

4Malayan [mulut]

4Ponapean [ahu]

4Tagalog [bibíg]

7.Dravidian

7Kannada [kattu]

7Konda [gadli]

7Malayalam [karuttu]

7Tamil [karuttu]

7Tulu [kaṇṭelu]

8.Indo-Pacific

8Hiri Motu [uduna]

8Kare [kase-]

8Manit [ɛgɛrɛ-]

8Rao [dotomo]

8Silopi [owɛ-]

9.Niger-Khordofanian

9Bobangi [munye]

9Igbo [ónu:]

9Mbukushu [kánwál]

9Shona [muromo]

9Sango [yángá]

10.North Amerind

10Cakchiquel [či']

10Hopi [mo'a]

10Kwakiutl [sems]

10Menomini [to:n]

10Mixtec [yuhu]

11.South Amerind

11Aymara [laka]

11Jaqaru [šimi]

11Ouyana [yɨpota]

11Botocudo [himpmã]

11Inga [sim]

13.Nilo-Saharan

13Erenga [kul]

13Fongoro [tara]

13Kara [tá]

13Merarit [ˀawl]

13Nubian [ágil]

16.Sino-Tibetan

16Tibetan [k'a]

16Lisu [mənʌ̌]

16Lahu [mə̂gə̌]

16Akha [mø̀bø̄]

16Burmese [mêisèi]

17.Altaic

17Japanese [kuči]

17Korean [ip]

17Kurdish [dem]

17Turkish [ağiz]

17Uzbek [orŋz]

9 Language gloss "neck"

1.Afro-Asiatic

1Amharic [angat]

1Arabic [ʻunuq]

1Burji [marmári]

1Hausa [wuyu]

1Somali [lukunta]

3.Austro-Asiatic

3Khmuˀ [kâk]

3Kuy [təkɔɔŋ]

3Mon [kəˀ]

3Souei [təkɔɔŋ]

3Vietnamese [koˀ]

4.Austronesian

4Fijiian [domo]

4Hawaiian [a:i]

4Indonesian [léhér]

4Maori [hakii]

4Ponapean [kasaŋ]

7.Dravidian

7Konda [gaḍli]

7Kota [kaṛtl]

7Kuru≥k' [ḳ'ës]

7Mayalam [karuṭu]

7Tamil [karuṭu]

8.Indo-Pacific

8Girawa [pɛtu]

8Munit [ha]

8Murupi [gumara]

8Nake [fʌ:-]

8Rao [bəgrə]

9.Niger-Khordofanian

9Mbukushu [θíŋgo]

9Mvumbo [tšiuŋ]

9Shona [mutsipa]

9Swahili [ku]

9Zulu [Iŋgila]

10.North Amerind

10Jacaltec [nuk]

10Kwakiutl [k'úk'un'a]

10Micmac [jìtaĝan]

10Navaho [ákós]

10Zoque [kʌkʌ]

11.South Amerind

11Aymara [kunka]

11Cavinena [e:piti]

11Chama [e:piki]

11Guarani [ajú]

11Huitoto [kɨmaigo]

15.Austro-Tai

15Brîou [takoŋ]

15Chrau [ŋko]

15Katu [tuar]

15Pearic [kɔ:k]

15Sedang [krôk]

16.Sino-Tibetan

16Burmese [lé]

16Cantonese [géŋ]

16Lisu [kətsi]

16Mandarin [bwódz]

16Tibetan [ɛmgul]

10 Language gloss "nose" n., n.i.

1.Afro-Asiatic

1Amharic [afənç̣a]

1Arabic [manaḥiṛ]

1Burji [súna]

1Hausa [hansi]

1Somali [san]

3.Austro-Asiatic

3Alak [muh]

3Cambodian [crɑmoh]

3Vietnamese [mũy]

3Muong [muy-]

3Lawa [maah]

4.Austronesian

4Fijiian [uku:na]

4Hawaiian [ihu]

4Indonesian [hiduŋ]

4Maori [ihu]

4Tagalog [iloŋ]

8.Indo-Pacific

8Gal [no-]

8Gumalu [mɛtɛ-]

8Kare [nɛmɛ-]

8Rao [ra:tə]

8Sihan [mɛdɛ-]

9.Niger-Khordofanian

9Ewe [ŋɔtí]

9Igbo [í mi]

9Shona [mhuno]

9Swahili [pua]

9Xhosa [impumlo]

10.North Amerind

10Squamish [mə'qsn]

10Quiche [txa'm]

10Hopi [yaqa]

10Micmac [siĝon]

10Navaho ['ácí í h]

11.South Amerind

11Huitito [dofo]

11Quechua [singa]

11Reséigaro [-hitákó]

11Totonac [quincán]

11Tupi [tin]

13.Nilo-Saharan

13Erenga [miši]

13Tama [àmit]

13Runga [mɔ̀ndú]

13Bora Mabang [bɔɲ]

13Mileri [misi]

15.Austro-Tai

15Chrau [muh]

15Katu [moh]

15Pearic [mətot]

15Sedang [môh]

15Thai [ya:lmuk]

16.Sino-Tibetan

16Newari ['nās]

16Tibetan [nə́kuù]

16Mandarin [bí dz]

16Cantonese [beih·]

16Burmese [hná]

11 Language gloss "spit" v.t. or v.i. etc.

1.Afro-Asiatic

1Arabic [buṣaaq]

1Burji [tuf]

1Hausa [tofa]

1Somali [anḍúuf]

1Amharic [täffa]

3.Austro-Asiatic

3Vietnamese [fún]

3Kensiu [bej]

3Kintaq [bej]

3Bateg [təf]

3Temoq [θɔh]

4.Austronesian

4Hawaiian [kuha]

4Indonesian [ludah]

4Manam [mwaŋo]

4Tahitian [tuha]

4Tonga [a'a'nu]

6.Indo-European

6Hindustani [θúk]

6Icelandic [spýta]

6Lithuanian [yiešmas]

6Pali [bhuhesike]
6Rumanian [pămînt]

9.Niger-Khordofanian

9Mbukushu [θipa]
9Ndebele [k'afula]
9Shona [-pfira]
9Swahili [tema]
9Zulu [p'umisa]

10.North Amerind

10Crow [¢úə]
10Hopi [töha]
10Kwakiutl [kwísˀid]
10Micmac [lusgwatign]
10Squamish [pə'x̌·n]

11.South Amerind

11Guarani [udɥvú]
11Huitoto [tuánote]
11Quechua [tucana]
11Reséigaro [čhóo]
11Totonac [čujmak'án]

12.Uralic

12Finnish [sylkea]
12Hungarian [pökni]

13.Nilo-Saharan

13Twampa [t'ak']

15.Austro-Tai

15Brîou [kučóh]
15Chrau [čhoh]
15Katu [katwiq]
15Pearic [čhu:s]
15Sedang [ka'čôw]

16.Sino-Tibetan

16Cantonese [tou]

16Mandarin [tùtán]

16Tibetan [lupə]

17.Altaic

17Japanese [¢ubaki]

17Korean [č'impaet']

17Turkish [tükur]

17Azerbaijaini [tüpur-]

12 Language gloss "suck" v.t., v.i. etc.

1.Afro-Asiatic

1Amharic [mäṭṭäṭa]

1Arabic [yamuṣṣu]

1Burji [t'unt·']

1Hausa [čotsa]

1Somali [núugayya]

3.Austro-Asiatic

3Kensiu [jəhud]

3Temiar [jɔd]

3Semai [nɔ:ʔ]

3Semaq Beri [sɔ̃k]

3Bateq Nong [jɔt]

4.Austronesian

4Kemak [mus]

4Manam [siŋ]

4Maori [momi]

4Tahitian [ote]

4Tonga [huhu]

6.Indo-European

6Icelandic [syúga]

6Lithuanian [čiulpti]

6Old English [sucan]

6Pali [cusati]

6Rumanian [suge]

7.Dravidian

7Toda [ixc-]

7Tamil [uṇ]

7Kota [uṉ]

7Telegu [kuḍucn]

7Kuwi [ūndali]

9.Niger-Khordofanian

9Igbo [ịrá]

9Mbukushu [yamwa]

9Shona [svetu]

9Swahili [fyondu]

9Xhosa [ncanca]

10.North Amerind

10Blackfoot [s:ta:]

10Crow [dá·či]

10Ixil [¢'ub']

10Navaho ['eešto't]

10Winnebago [wi:kom]

11.South Amerind

11Cashibo [cucuka]

11Marinahua [čočo]

11Shipibo-Conibo [ˀoyo]

11Tacanan [čočo]

11Chacobo [coco]

13.Nilo-Saharan

13Miza [ɔ-ndrɔ́]

13Ojila [ndrɔ]

13Logo [ndro]

13Lugbara [ndru']

13Lokai [ndrɔ́]

17.Altaic

17Japanese [suu]

17Korean [bal]

17Manchu [jembe]

17Turkish [ɛm]

17Uzbek [simip]

13 Language gloss "swallow" v.t.,v.i.

1.Afro-Asiatic

1Arabic [yabtalíu]

1Hausa [ha'diya]

1Somali [líquaya]

1Burji [d'eem-]

1Amharic [waṭa]

4.Austronesian

4Fijiian [tiloma]

4Hawaiian [iale]

4Indonesian [teguk]

4Nukuoro [holo]

4Tahitian [horomii]

6.Indo-European

6Albanian [kaptɔy]

6Bengali [khoao]

6Croatian [gutati]

6French [avaye]

6Lithuanian [ryti]

7.Dravidian

7Tamil [viṛukku]

7Kodagu [mugg-]

7Telegu [mriṇgu]

7Konda [erg-]

7Toda [iṛk-]

8.Indo-Pacific

8Hiri Motu [hadonoa]

8Kare [aŋgʌn-]

8Girawa [niˀanɛ-]

8Munit [kurũyɛ-]

8Kamba [unub-]

9.Niger-Khordofanian

9Ewe [minu]

9Igbo [í lò]

9Mbukushu [mína]

9Shilluk [mwɔni]

9Zulu [gwIŋa]

10.North Amerind

10Choctaw [bạlakači]

10Crow [ap·áhik(y)]

10Tzotzil [bik']

10Mohawk [atskahu]

10Yokuts [meeki]

11.South Amerind

11Guarani [mokô]

11Quechua [miypuna]

11Huitoto [čičode]

11Tupi [umocóne]

11Totonac [huá]

12.Uralic

12Finnish [niela]

16.Sino-Tibetan

16Newari [grās]

16Cantonese [tàn]

16Tibetan [mĩkeuu tāān]

16Gurung [k'lxyoba]

16Burmese [myóu]

17.Altaic

17Japanese [nɔmikɔmu]

17Turkish [yutma]

17Korean [samk'i]

17Manchu [nuŋ]

14 Language gloss: "tooth"

1.Afro-Asiatic

1Amharic [ṭər s]

1Arabic [asnáàn]

1Burji [irk'a]

1Hausa [hak'ora]

1Somali [ílig]

3.Austro-Asiatic

3Alak [canañ]

3Cambodian [tmɨñ]

3Kuy [kənɛɛy]

3Mon [n ɛ́]

3Vietnamese [nă ñ]

4.Austronesian

4Hawaiian [naniho]

4Indonesian [gigi]

4Tonga [nifo]

4Palauan [uí ngel]

4Tahitian [niho]

8.Indo-Pacific

8Angoram [sisiŋ]

8Hiri Motu [isena]

8Kare [ogo-]

8Munit [ai-]

8Rao [tragə]

9.Niger-Khordofanian

9Bobangi [linô]

9Dogon [tónu]

9Mbukushu [dyegho]

9Zulu [izinyo]

9Swahili [jino]

10.North Amerind

10Zoque [tʌjɔ]

10Navaho ['awo']

10Menomini [pet]

10Chontal [lahay]

10Blackfoot [mohl:kIn]

11.South Amerind

11Aymara [k'ači]

11Huitoto [ízido]

11Quechua [quiru]

11Totonac [tatzan]

11Tupi [ainha]

13.Nilo-Saharan

13Bora Mabang [sat^ik]

13Masalit [kʌcínè]

13Merarit [ŋoŋod]

13Runga [sʌ̀dì]

13Tama [ŋíít]

15.Austro-Tai

15Brîou [kaneiŋ]

15Chrau [sê'č]

15Katu [kaniâŋ]

15Pearic [kho:y]

15Sedang [haneq]

16.Sino-Tibetan

16Burmese [swé]

16Cantonese [ŋàh]

16Mandarin [yá]

16Maru [tsòi]

16Tibetan [sō]

15 Language gloss "vomit" v.t., v.i.

1.Afro-Asiatic

1Amharic [asmaläsa]

1Arabic [qay'ʾ]

1Burji [huusad·']

1Hausa [amai]

1Somali [yuẍ(w)ət]

3.Austro-Asiatic

3Vietnamese [ói]

3Kensiu [kəˀ]

3Semai [ke:ˀ]

3Temoq [kuˀ]

3Sre [haˀ]

4.Austronesian

4Indonesian [muntah]

4Manam [kulena]

4Nukuoro [hagaku]

4Tagalog [sumuka]

4Tahitian [tu:tu:]

6.Indo-European

6Czech [zvrasɛti]

6Dutch [brakɛn]

6French [vomir]

6Nepali [okeunu]

6Norwegian [kaste]

8.Indo-Pacific

8Bagupi [pa-]

8Girawa [ˀɛsɛ-]

8Kare [pasa-]

8Panim [buhade-]

8Hiri Motu [mumuta]

9.Niger-Khordofanian

9Bobangi [lua]

9Ndebele [hlanza]

9Swahili [kokomoa]

9Mbukusu [ruθa]

9Ewe [ḍexě]

10.North Amerind

10Biloxi [knə]

10Crow [kará]

10Kwakiutl [gókwala]

10Ojibwa [šikakowe:]

10Tzotzil [k'ɛb]

11.South Amerind

11Reséigaro [iˀkapu]

11Totonac [lĩp'atlánán]

11Guarani [gue'é]

11Huitoto [cɨcuede]

11Jaqaru [ahri]

15.Austro-Tai

15Brîou [kuta]

15Chrau [hòq]

15Katu [kâta]

15Pearic [čhəŋut]

15Sedang [hêa]

16.Sino-Tibetan

16Atsi [phat]

16Cantonese [ŋáu]

16Lisu [peˀ]

16Mandarin [tù]

16Tibetan [cūkpə]

16 Language gloss "water" n.i., n.

1.Afro-Asiatic

1Amharic [wəha]

1Arabic [maa']

1Burji [wáa]

1Hausa [ruwa]

1Somali [bíyyó]

3.Austro-Asiatic

3Brao [daak]

3Bru [dəəʔ]

3Mon [dac]

3Muong [dák]

3Vietnamese [nɨ́ək]

4.Austronesian

4Fijiian [wai]

4Kemak [biːa]

4Manam [daŋ]

4Tahitian [vai]

4Tolai [tava]

8.Indo-Pacific

8Bemal [že]

8Bena Bena [nagami]

8Fore [wani]

8Gende [nogoi]

8Sihan [vʌ]

9.Niger-Khordofanian

9Igbo [m̀mí rí]

9Shona [mvura]

9Swahili [maji]

9Ndebele [amanzi]

9Xhosa [amanzi]

10.North Amerind

10Choctaw [fičak]

10Chorti [ha']

10Hopi [paahu]

10Micmac [samĝwan]

10Kwakiutl ['wa:p]

11.South Amerind

11Huitoto [jaɨnoi]

11Jaqaru [uma]

11Quechua [yacu]

11Totonac [č'učut]

11Tupi [i]

13.Nilo-Saharan

13Bongo Bagirmi [mane]

13Erenga [káal]

13Fongoro [mʌn]

13Kara [mana]

13Logo [yí]

16.Sino-Tibetan

16Burmese [yéi]

16Cantonese [séui]

16Gurung [kyu']

16Mandarin [šwěi]

16Newari [nā]

17.Altaic

17Japanese [mizu]

17Korean [mul]

17Manchu [muke]

17Mongolian [us]

17Turkish [su]

APPENDIX B
SUPPORTING DICTIONARY REFERENCES FOR 16 GLOSSES

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APPENDIX C
CODING PARAMETERS FOR ALL GLOSSES

Table C-1
Ethnoanatomical Glosses and Vowel Coding Tallies

Glosses:	Breast	Tooth	Nose	Neck	Mouth
Vowel Types and Classes:					
Front High Round	0	0	0	0	0
Front Mid Round	1	0	0	0	1
Front Low Round	1	0	0	0	0
Central High Round	0	0	0	0	0
Central Mid Round	0	0	0	0	0
Central Low Round	0	0	0	0	0
Back High Round	20	3	15	16	14
Back Mid Round	11	17	11	9	8
Back Low Round	0	0	3	3	1
Front High Unround	10	25	18	13	13
Front Mid Unround	13	9	4	7	8
Front Low Unround	0	0	0	0	0
Central High Unround	0	1	0	0	1
Central Mid Unround	0	2	5	3	4
Central Low Unround	18	20	20	22	23
Back High Unround	0	0	0	0	0
Back Mid Unround	0	2	0	2	1
Back Low Unround	0	0	0	1	0
Front Vowels	24	32	23	18	22
Back Vowels	29	22	26	30	23

Table C-2.
Ethnoanatomical Glosses and Consonantal Coding Tallies

Glosses:	Breast	Tooth	Nose	Neck	Mouth
Consonant Articulations and Manners:					
Bilabials	21	3	27	11	19
Labio-Dentals	2	1	1	2	0
Interdentals	1	0	0	1	0
Dental-Alveolars	33	42	34	32	35
Alveolar-Palatals	5	2	2	1	3
Palatals	8	9	6	2	5
Labio-Velars	1	2	0	2	3
Velars	7	20	11	35	22
Uvulars	0	1	3	1	0
Glottals	4	10	15	5	5
Stops	23	30	24	42	32
Fricatives	14	26	28	14	11
Affricates	4	2	2	1	2
Nasals	26	26	40	22	26
Glides	7	7	4	1	7
Trills	7	5	3	9	7
Laterals	1	4	2	7	7
Approximants	12	15	8	14	19
Obstruents	30	44	44	46	43
Resonants	33	38	42	32	40

Table C-3.
Physiological Glosses and Vowel Coding Tallies

Glosses::	Cough	Vomit	Suck	Eat	Drink	Swallow	Spit	Chew
Vowels:								
Fr. Hi Ro.	1	1	0	0	0	0	3	0
Fr. M. Ro.	2	0	0	1	0	0	2	0
Fr. Lo Ro.	0	0	0	0	0	0	0	0
Ce. Hi Ro.	1	0	0	0	0	0	0	0
Ce. M. Ro.	0	0	0	0	0	0	0	0
Ce. Lo Ro.	0	0	0	0	0	0	0	0
Bk. Hi Ro.	8	19	22	8	20	18	23	19
Bk. M. Ro.	18	7	11	5	11	11	8	7
Bk. Lo Ro.	0	0	7	1	2	1	1	0
Fr. Hi Unr.	12	8	10	10	13	26	12	13
Fr. M. Unr.	9	14	6	5	6	12	8	9
Fr. Lo Unr.	0	0	0	0	0	0	0	0
Ce. Hi Unr.	1	1	0	0	0	0	0	0
Ce. M. Unr.	2	4	1	0	3	0	2	0
Ce. Lo Unr.	25	31	14	33	21	25	28	36
Bk. Hi Unr.	0	0	0	0	0	0	0	0
Bk. M. Unr.	1	0	0	2	0	1	0	0
Bk. Lo Unr.	0	1	1	1	1	2	2	1
Fr. Vowels	23	21	16	16	19	32	21	20
Bk. Vowels	31	26	39	16	33	31	30	27

Table C-4.
Physiological Glosses: Consonantal and Manner Codings

Glosses:	Cough	Vomit	Suck	Eat	Drink	Swallow	Spit	Chew
Features:								
Bilabials	6	16	12	10	17	22	18	20
Labio-Den.	3	1	2	0	1	2	9	4
Interden.	0	1	0	0	2	0	3	0
Dent-Alve.	33	32	37	30	32	38	39	36
Alveo-Pal.	2	2	6	4	2	2	8	6
Palatals	3	4	17	11	11	13	8	11
Labio-Vel.	2	3	2	3	8	3	5	1
Velars	28	23	8	14	12	23	16	22
Uvulars	3	2	0	1	1	1	1	0
Glottals	13	13	4	7	8	9	11	7
Stops	41	40	37	27	31	38	41	34
Fricatives	28	22	21	12	13	11	32	24
Affricates	1	1	5	3	2	2	9	2
Nasals	9	15	25	19	23	25	16	28
Glides	5	4	7	8	14	15	8	6
Trills	9	6	6	0	5	8	3	7
Laterals	7	5	3	5	2	9	5	8
Approx.	21	14	10	12	17	27	13	18
Obstruents	49	46	44	38	36	42	48	41
Resonants	29	24	30	30	34	43	26	35

Table C-5.
Culturally Primary Glosses and Vowel Coding Tallies

Glosses:	Water	Dog	Food
Vowel Types and Classes:			
Front High Round	0	0	0
Front Mid Round	0	0	0
Front Low Round	0	0	0
Central High Round	0	0	0
Central Mid Round	0	0	0
Central Low Round	0	0	0
Back High Round	12	16	20
Back Mid Round	3	5	4
Back Low Round	0	0	0
Front High Unround	18	23	18
Front Mid Unround	6	9	7
Front Low Unround	0	0	0
Central High Unround	2	0	0
Central Mid Unround	2	1	1
Central Low Unround	28	18	39
Back High Unround	0	0	0
Back Mid Unround	2	3	0
Back Low Unround	0	0	1
Front Vowels	22	28	24
Back Vowels	18	25	26

Table C-6
Culturally Primary Glosses and Consonatal Coding Tallies

Glosses:	Water	Dog	Food
Consonant Articulations and Manners:			
Bilabials	18	14	19
Labio-Dentals	5	0	1
Interdentals	0	0	1
Dental-Alveolars	27	26	43
Alveolar-Palatals	4	1	4
Palatals	7	10	7
Labio-Velars	8	7	4
Velars	11	22	19
Uvulars	0	1	0
Glottals	4	7	4
Stops	18	39	32
Fricatives	19	13	13
Affricates	2	2	2
Nasals	21	12	27
Glides	13	10	8
Trills	3	5	8
Laterals	1	6	7
Approximants	16	20	18
Obstruents	35	42	38
Resonants	33	27	42

APPENDIX D
INITIAL RANKINGS OF FEATURES AND GLOSSES

Table D-1

Consonantal Raw Score Ranking for 16 Glosses

	Bilabial	Dental-Alve	Palatal	Labio-Velar	Velar	Glottal
1	Nose (27)	Food (43)	Suck (17)	Water (8)	Neck (35)	Nose (15)
2	Swallow (22)	Tooth (42)	Swallow (13)	Drink (8)	Cough (28)	Cough (13)
3	Breast (21)	Spit (39)	Eat (11)	Dog (7)	Swallow (23)	Vomit (13)
4	Chew (20)	Swallow (38)	Drink (11)	Spit (5)	Vomit (23)	Spit (11)
5	Food (19)	Suck (37)	Chew (11)	Food (4)	Dog (22)	Tooth (10)
6	Mouth (19)	Chew (36)	Dog (10)	Vomit (3)	Chew (22)	Swallow (9)
7	Water (18)	Mouth (35)	Tooth (9)	Mouth (3)	Mouth (22)	Drink (8)
8	Spit (18)	Nose (34)	Breast (8)	Eat (3)	Tooth (20)	Chew (7)
9	Drink (17)	Cough (33)	Spit (8)	Swallow (3)	Food (19)	Dog (7)
10	Vomit (16)	Breast (33)	Food (7)	Neck (2)	Spit (16)	Eat (7)
11	Dog (14)	Vomit (32)	Water (7)	Suck (2)	Eat (14)	Mouth (5)
12	Suck (12)	Neck (32)	Nose (6)	Tooth (2)	Drink (12)	Neck (5)
13	Neck (11)	Drink (32)	Mouth (5)	Cough (2)	Water (11)	Water (4)
14	Eat (10)	Eat (30)	Vomit (4)	Breast (1)	Nose (11)	Breast (4)
15	Cough (6)	Water (27)	Cough (3)	Chew (1)	Suck (8)	Suck (4)
16	Tooth (3)	Dog (26)	Neck (2)	Nose (0)	Breast (7)	Food (4)

Table D-2

Manner of Articulation Raw Score Ranking for 16 Glosses

	Stop	Fricative	Affricate	Nasal	Glide
1	Neck (42)	Spit (32)	Spit (9)	Nose (40)	Swallow (15)
2	Cough (41)	Cough (28)	Suck (5)	Chew (28)	Drink (14)
3	Spit (41)	Nose (28)	Breast (4)	Food (27)	Water (13)
4	Vomit (40)	Tooth (26)	Eat (3)	Breast (26)	Dog (10)
5	Dog (39)	Chew (24)	Water (2)	Tooth (26)	Spit (8)
6	Swallow (38)	Vomit (22)	Tooth (2)	Mouth (26)	Food (8)
7	Suck (37)	Suck (21)	Nose (2)	Suck (25)	Eat (8)
8	Chew (34)	Water (19)	Mouth (2)	Swallow (25)	Breast (7)
9	Food (32)	Breast (14)	Drink (2)	Drink (23)	Tooth (7)
10	Mouth (32)	Neck (14)	Dog (2)	Neck (22)	Suck (7)
11	Drink (31)	Food (13)	Chew (2)	Water (21)	Mouth (7)
12	Tooth (30)	Dog (13)	Food (2)	Eat (19)	Chew (6)
13	Eat (27)	Drink (13)	Swallow (2)	Spit (16)	Cough (5)
14	Nose (24)	Eat (12)	Neck (1)	Vomit (15)	Vomit (4)
15	Breast (23)	Mouth (11)	Cough (1)	Dog (12)	Nose (4)
16	Water (18)	Swallow (11)	Vomit (1)	Cough (9)	Neck (1)

Table D-3

Vowel and Semi-Vowel Raw Score Ranking for 16 Glosses

	Front Vowels	Back Vowels	Approximants	Resonants
1	Tooth (32)	Suck (39)	Swallow (27)	Swallow (43)
2	Swallow (32)	Drink (33)	Cough (21)	Food (42)
3	Dog (28)	Cough (31)	Dog (20)	Nose (42)
4	Food (24)	Swallow (31)	Mouth (19)	Mouth (40)
5	Breast (24)	Neck (30)	Chew (18)	Tooth (38)
6	Nose (23)	Spit (30)	Food (18)	Chew (35)
7	Cough (23)	Breast (29)	Drink (17)	Drink (34)
8	Water (22)	Chew (27)	Water (16)	Water (33)
9	Mouth (22)	Vomit (26)	Tooth (15)	Breast (33)
10	Vomit (21)	Nose (26)	Vomit (14)	Neck (32)
11	Spit (21)	Food (26)	Neck (14)	Eat (30)
12	Chew (20)	Dog (25)	Spit (13)	Suck (30)
13	Drink (19)	Mouth (23)	Breast (12)	Cough (29)
14	Neck (18)	Tooth (22)	Eat (12)	Dog (27)
15	Eat (16)	Water (18)	Suck (10)	Spit (26)
16	Suck (16)	Eat (16)	Nose (8)	Vomit (24)

APPENDIX E
ACTUAL RANKINGS OF FEATURES AND GLOSSES

Table E-1

Actual Rankings of 16 Glosses on 15 Tested Features (1-8)

	Bilab.	Dent-Alve.	Pal.	Lab-Vel.	Vel.	Glot.	Front Vowel	Back Vowel
Breast	3	9.5	8.5	14.5	16	13.5	4.5	7
Nose	1	8	12	16	13.5	1	6.5	10
Mouth	5.5	6	13	7.5	6	11.5	8.5	13
Tooth	16	2	7	11.5	8	5	1.5	14
Neck	13	12	16	11.5	1	11.5	14	5.5
Dog	11	16	6	3	6	9	3	12
Water	7.5	15	10.5	1.5	13.5	13.5	8.5	15
Food	5.5	1	10.5	5	9	13.5	4.5	10
Cough	15	9.5	15	11.5	2	2.5	6.5	3.5
Spit	7.5	3	8.5	4	10	4	10.5	5.5
Vomit	10	12	14	7.5	3.5	2.5	10.5	10
Drink	9	12	4	1.5	12	7	13	2
Suck	12	5	1	11.5	15	13.5	15.5	1
Eat	14	14	4	7.5	11	9	15.5	16
Swallow	2	4	2	7.5	3.5	6	1.5	3.5
Chew	4	6	4	14.5	6	9	12	8

Table E-2

Actual Rankings of 16 Glosses on 15 Tested Features (8-15)

	Stop	Fric.	Affr.	Nasal	Glide	Res.	Approx.
Breast	3	9.5	3	4.5	9.5	8.5	13.5
Nose	1	2.5	9	1	14.5	2.5	16
Mouth	5.5	15.5	9	5.5	9.5	4	4
Tooth	16	4	9	4.5	9.5	5	9
Neck	13	9.5	15	10	16	10	10.5
Dog	11	12	9	15	4	14	3
Water	7.5	8	9	11	3	8.5	8
Food	5.5	12	9	3	6	2.5	5.5
Cough	15	2.5	15	16	13	13	2
Spit	7.5	1	1	13	6	15	12
Vomit	10	6	15	14	14.5	16	10.5
Drink	9	12	9	9	2	7	7
Suck	12	7	2	7.5	9.5	11.5	15
Eat	14	14	4	12	6	11.5	13.5
Swallow	2	15.5	9	7.5	1	1	1
Chew	4	5	9	12	12	6	5.5

APPENDIX F

PHONETIC CHARACTERS

Table F-1

Vowel Coding Phonetic Characters

Front High Round	u̇, U̇
Front Mid Round	ø, ȯ
Front Low Round	œ, ɔ̈
Central High Round	ʉ
Central Mid Round	ȯ
Central Low Round	ɔ̇
Back High Round	u, U
Back Mid Round	o
Back Low Round	ɔ
Front High Unround	I, i
Front Mid Unround	ɛ, e
Front Low Unround	æ
Central High Unround	ɨ
Central Mid Unround	ə
Central Low Unround	a, ɑ
Back High Unround	ï, Ï
Back Mid Unround	ʌ, ɤ
Back Low Unround	ä, æ̇

Table F-2
Consonant Phonetic Coding Characters

Bilabials	p, pʻ, p', b, b', bʻ, ɸ, m, ɓ, β,
Labio-Dentals	f, v, ɱ
Interdentals	θ, ð
Dent-Alveolars	t, t', ṭ, ṯ, d, d', ḍ, ḏ, s, ṣ, z, ẓ, l, r, ¢, n, ṉ, ɗ, ...
Alveo-Palatals	š, ž, ǰ, č, ñ, ɲ
Palatals	c, j, ç, y, ç', ʎ, ɟ
Labio-Velars	w, w'
Velars	k, k', g, g', x, ɣ, ĝ, ŋ, ɫ, ɠ
Uvulars	q, q', G, G', χ, ʁ, ɴ, ʀ
Glottals	ʔ, h, ɦ
Stops	t, t', ṭ, ṯ, d, d', ḍ, ḏ, p, pʻ, p', b, b', bʻ, k, k', g, g', q, q', G, G', ʔ, c, ɟ,
Fricatives	f, v, θ, ð, χ,, h, ɦ, ħ, ɸ, s, ṣ, z, ẓ, ɬ, ɮ, ç, š, ž, j, x, ɣ, ĝ, ʁ, ʕ,
Affricates	¢, ƛ, λ, č, ǰ
Nasals	m, ɱ, ŋ, n, ñ, ɴ, ɲ, ṇ, ṉ
Glides	(Semi-vowels)....w, w̥, y
Trills	r, r̃, ṛ, ṟ
Laterals	(Liquids) l, ḷ , ḻ
Approximants	(Frictionless Coninuants)....l, y, w, r, ...
Obstruents	(Non-Resonant) Stops + Fricatives + Affricates
Resonants	(Sonorant) Nasals + Approximants

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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