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**What's in a Word?
Studies in Phonosemantics**

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0. Abstract

The notion that there is a regular correlation between the form of a word and its meaning is, of course, controversial. In this dissertation my intention has been to shed light on that controversy by conducting a variety of tests -- for the most part on a fairly large scale -- which quantify the extent of the correspondence between sound and meaning in words. I found in the course of this project that phonosemantic correlations were much more pervasive than I initially anticipated and certainly greater than is generally supposed in the linguistics literature. Furthermore, I cannot but see that these tests show that quite general *natural laws* are productively operative in language which account for most of the correlations observed. If further research indeed corroborates my findings, then it follows that the meaning of every word in every language is *in part* (only in part!) inherent in its form. The sign is therefore not wholly arbitrary, and it is not possible to devise an abstract representation of language which is entirely unrelated to the form of language itself. The most important results of the experiments in this dissertation seem to me to be these:

* I find that much confusion regarding linguistic iconism can be attributed to the assumption that 'word semantics' is best understood as 'word reference'. I believe these tests show this presumption to be unhelpful. If a word's meaning is analyzed into components -- only one of which is its referent -- it can be shown that some aspects of a word's meaning are arbitrary and others are not. It's therefore not the case that in some words or languages iconism holds more sway than in others. Rather since all words must have these requisite semantic components in order to function at all, the semantics of any word must be in part predictable from its form and in part not.

* Reference is essentially arbitrary. One cannot predict the referent of a word just by hearing it. In words with more concrete reference, the component of reference is more salient, and the iconic sound-meaning is consequently less salient. Therefore, the apparent effect of the sound-meaning is inversely proportional on the concreteness of the referent.

* Individual phonemes and phonetic features are meaning-bearing. They each have a unique semantics which can be identified by first measuring the semantic disproportions within phonologically defined classes of words and then the converse -- measuring the phonological disproportions within semantic classes. One finds in this way that every word which contains a given phoneme bears an element of meaning which is absent in words not containing this phoneme. One finds further than the effect of the phoneme-meaning varies with the position that the phoneme bears within the syllable. In addition, one finds that all phonemes which have a common phonetic feature also have a common element of meaning.

* It is important to distinguish types of sound-meaning correlations:

- The least fundamental kind of sound-meaning correlation is onomatopoeia. It does not concern me in this dissertation.

- The type of correlation which accounts for the '*phonesthemes*' or disproportions between semantic classes and phonological form is most commonly called '*Clustering*'. I refer to it also as *Phonosemantic Association* in order to emphasize that it is a side-effect of a natural and productive tendency in human psychology to associate any form with a coherent referent.

- The most fundamental and least salient type of linguistic iconism I will refer to as '*True Iconism*', or the level on which form and content are one. This type of correlation is universal, productive in every word, non-arbitrary, and blind to all higher level linguistic distinctions such as referent, part of speech, semantic class and argument structure.

I believe this dissertation provides stronger evidence for these 4 findings than any I have come across anywhere in the existing literature.

1. Introduction

1.1 Conflicting Data

The basic thesis presented in this dissertation -- that there is some level of regular correlation between the phonetics of a word and its meaning -- is controversial. Though the presumption of 'arbitrariness of the sign' seems to have dominated linguistic science since the mid-1960's, this has not always been the case. Apart from Hjelmslev and de Saussure, many of what we think of as 'great' pre-War linguists (Bloomfield, Jespersen, Sapir, Firth), wrote works in support of the position that either the sound or the articulation of words has a synchronic, productive effect on their meaning. In *The Sound Shape of Language*, Jakobson and Waugh wrote, "Linguists have begun to turn their attention toward the immediate and autonomous significance of the constituents of the verbal sound shape in the life of language... One cannot but agree with Coseriu (1969) when he acclaims Georg von der Gabelentz (1840-1893) as a 'precursor of present day linguistics' and especially as a promoter of the fruitful ideas on sound symbolism¹." The generativists did not, of course, end up following what Jakobson and Waugh perceived to be a rising interest in phonosemantics. To my knowledge, not a single phonosemantic work was written within the generative tradition, though many generative works do presuppose or explicitly claim the converse -- that the sign is completely arbitrary.

I believe it can be demonstrated that a lot of this controversy is due to general failure within the field to have come to an adequate understanding of what is meant by terms such as 'arbitrary' and 'word semantics' or 'meaning'. Specifically, 'meaning' has been largely limited to 'reference'. Clearly, one cannot predict the referent of a word from its form. Every word is of course arbitrary in this sense. I would only take issue with the presupposition that all word semantics can be reduced to reference.

One of the fundamental debates in linguistics -- and the primary debate which concerns me in this dissertation -- is most commonly known as the conventionalist/naturalist opposition. In my view, much of the uninteresting literature surrounding this debate can be traced back to two related false assumptions, one most commonly made by the naturalists, and the other by the conventionalists. In recent decades, conventionalism has been more in vogue, and consequently, throughout the latter part of this century, we seem for the most part to have been drawing the following conclusion:

The Conventionalist Overgeneralization

We cannot predict what referent a given sequence of phonemes will have in a given language. Therefore, there is no synchronous, productive correlation between the phonetics and the semantics of words whatsoever.

This reasoning fails on two counts. In the first place, just because no correlation between two phenomena has been found, this is not evidence that none exists. Existence of anything is much easier to prove than non-existence. Furthermore, this position presupposes that word semantics can be completely reduced to word reference -- an assumption that I will question deeply in the present work. The evidence provided in this dissertation suggests that certain aspects of word semantics can be predicted from its form, and others -- most notably and saliently the referent of the word -- cannot be.

The naturalists have drawn the converse conclusion based on the very same erroneous assumption --

that word semantics cannot be analyzed into identifiable components:

The Naturalist Overgeneralization

Some aspects of word semantics are derivable from phonetics, therefore all word semantics is derivable from phonetics.

In my view and in the view of most of the literature in phonosemantics dating back to Plato, neither of these positions is tenable. I believe the 14 experiments in this thesis show that word meanings are decomposable into various components, some of which are arbitrary and some not. Since no word can function without all these components, it follows that all word meanings are in part arbitrary and in part predictable from their form. Specifically, the referent determines what the word *is*. The sound does not directly affect what a word *denotes*, but what it *connotes*, not what it *is* but what it is *like*. That is, just by hearing the sound 'brump' in a language, one cannot predict whether the word refers to a sound or an animal or a verb of motion. But *if* 'brump' refers to a verb of motion, it will involve an initial breaching of some kind of impediment and a sudden, forceful conclusion.

1.2 Overview of Major Results

In this section, I will make no attempt whatever to substantiate what I consider to be my most important results -- I am only trying to explain what the results are. The reader is asked to withhold judgement regarding their validity until the evidence from the 14 experiments has been considered. Each of them will be discussed briefly in turn in this section:

1. The Phonosemantic Hypothesis
2. The Arbitrary Nature of Reference
3. Word Semantics is Not Reducible to Reference
4. The Universal Character of Clustering or Semantic Association
5. The Universal Character of True Iconism

One result of the 14 experiments outlined in this dissertation is to provide evidence for the following strong thesis:

The Phonosemantic Hypothesis

In every language of the world, every word containing a given phoneme has some specific element of meaning which is lacking in words not containing that phoneme. In this sense, we can say that every phoneme is meaning-bearing. The meaning that the phoneme bears is rooted in its articulation.

I am *not* hereby implying that the semantics of every or even any word is wholly determined by its form -- it is not. In arguments for the Conventionalist or the Naturalist Overgeneralizations, word semantics is nearly always presupposed to be a sort of unanalyzed, amorphous blob vaguely identical to the word's referent. It's my contention that a word's semantics has a definite structure and that a word means more than what it refers to. I therefore deal with the overwhelming masses of apparent counterevidence to the Phonosemantic Hypothesis (the existence of dialects, regular sound change -- both synchronic and diachronic, paradigmatic and syntagmatic, the impossibility of predicting referents based on phonetic form, etc.) by analyzing the structure of word semantics into discrete components with identifiable functions. Having done this, I can then show that some of these components are arbitrary in nature and others are not. These counterexamples concern only the arbitrary aspects of the word's semantics -- primarily its referent.

Let me here briefly describe what I understand to be the relationship between reference and semantic classes. Words which share a common element of reference are said to fall in the same 'semantic class'. The more unique and unambiguous a word's referent, the more 'concrete' it is said to be, the fewer words share its narrowest semantic class. Semantic classes may be organized hierarchically. The word 'daffodil' is in a semantic class of its own, since there are no real synonyms for 'daffodil' in English. It also, however, falls in a wider semantic class of bulbs (i.e. the word 'daffodil' shares *part* of the referent of other bulb flowers, but also in part has a referent that is unique only to it), and in a yet wider class of flowers in general, etc. I do not think it is most profitable to assume that each word in a language has a unique *referent*. Rather I think each word has a unique *meaning* but that words frequently share their *referents* with other 'synonymous' words. For example, although I think the word 'daffodil' does have a unique referent (i.e. no real synonyms, as is typical of Concrete Nouns), I think the senses of the words 'stamp', 'stomp' and 'tamp' which concern striking the foot against the ground all are most effectively viewed as sharing the same referent and differing semantically only by their various sound-meanings. The reason I

think this is the best way to look at it, is that I believe that the semantic differences between these particular senses of 'stamp', 'tramp', 'stomp', 'step', 'tamp' and related words can be shown to correlate very nicely with the variations in their phonological form.

I am assuming that a single string of phonemes can have several different referents, commonly thought of as 'word senses'. I frequently use the term 'word' when I have in mind a single word 'sense', one of several possible referents. Thus, I am assuming the phoneme string 'stamp' has, among others, a different referent than the one which fits in this particular semantic class, namely that of a postage stamp. On the other hand, the word 'daffodil' has, as far as I know, a single referent in English, and furthermore, no other words in English share that referent entirely. The phoneme sequences 'stomp' and 'tamp' also, as far as I know, have a single referent, but it is not unique to them -- they share this referent between them. The phoneme sequences 'stamp', 'tramp' and 'step' all have several referents, only one of which is the same as that of 'stomp'. There is a great deal to be said about the structure of a word which I will not delve into much in the present work, for that would take me very far afield. Typically when the various referents of a single phoneme string are obviously related by, for example, hyponymy or metaphor, they are thought of as 'senses' of the same word. Terms like 'word' and 'sense' are not at all well-defined, unfortunately, but it's impossible not to use them. Let the reader know, therefore, that I am aware of potential misunderstandings that can arise because of this, and that I will try to avoid them by being explicit when necessary.

Summarizing, then:

The Arbitrariness of Reference and Semantic Classes

The referent of a word cannot be predicted from its form. The fewer exact synonyms that a word has (the smaller the set of words that share its referent exactly) the more 'concrete' its 'reference'. ***The salience of iconic meaning in a word is related inversely to the concreteness of its reference.***

Word Semantics is Structured

Word semantics has a definite structure. 'Word semantics' cannot be reduced to 'word reference'. A word's semantics includes among other things its part of speech, its semantic class, its argument structure, the corresponding selectional restrictions, its referent and its phonological form. Some of these aspects of word semantics are 'arbitrary' in nature (in Saussure's sense) and others are not.

A very common objection to generalizations like the Phonosemantic Hypothesis is that one cannot in principle claim anything of such universal character without having examined every word in every language. I would actually state this objection even more strongly. One could not make such a universal claim as the Phonosemantic Hypothesis even ***after*** having studied every word in every language. Such universal claims cannot be made unless it can be shown that the relevant effects can be attributed to ***natural laws***. For example, gravity is a natural law, and using it, one can predict that objects when dropped will fall to the ground on Mars; they will not float upward. One can make this prediction without having ever turned a telescope on Mars, because one has understood that gravity ***must*** apply to anything composed of matter, even to planets one has never examined. One cannot, however, predict ***how fast*** objects will fall to the ground on Mars without having somehow estimated its mass. Similarly, if it can be shown that linguistic iconism reflects a natural law, then we ***will*** be able to predict that form must to some degree affect the semantics of

every word in every language. However, that effect will vary within certain parameters, and we will not therefore be able to predict exactly *what* the effect of sound on meaning will be for a given word in an arbitrary language without, for example, analyzing how concrete the word's referent is.

The position taken in much of the literature arguing for the arbitrariness of the sign is that such phonesthemic disproportions are mere side effects of etymological processes and say nothing significant about the nature of language itself. I will provide evidence here that the phonesthemic disproportions are indeed subject to natural laws and processes and therefore say a great deal about the psychology of speakers. Let me propose here one such natural law or universal process which I believe to be responsible for much of the data which will be presented here, and which if valid, would mean that at least one aspect of linguistic iconism is universal in nature:

Semantic Association

When semantic domain S is associated disproportionately frequently with phonological form X, then people will be inclined to associate semantic domain S with phonological form X productively.

Phonosemantic Association

When semantic domain S is associated disproportionately frequently with phoneme X, then people will be inclined to associate semantic domain S with phoneme X productively.

Phonosemantic Association is therefore a special case of Semantic Association. It is Semantic Association at the phoneme level. Semantic Association obviously does take place on the level of an entire word. A phoneme sequence in the form of a word occurs disproportionately frequently in a certain context, and a child learning languages then continues to use that word in that context productively. It is generally acknowledged that Semantic Association happens also on the level of the morpheme, i.e. that morphemes are meaning-bearing. One of the primary questions I ask in this dissertation may be phrased as, "How far down on the linguistic hierarchy does Semantic Association apply?" Virtually no linguist would claim that Semantic Association does not happen on the level of the word or the morpheme. Does it then happen on the level of the syllable? Bolinger, Rhodes, Lawler and McCune all provide evidence that Semantic Association occurs on levels lower than the syllable. (I'll try throughout not to clutter my exposition with specific dates, when the works I have in mind are easily recoverable from the bibliography.) Does it then occur on the level of the phoneme? The phonetic feature? The Phonosemantic Hypothesis is saying essentially that Semantic Association applies at least on the level of the phoneme. I will also provide evidence that Semantic Association goes down even to the level of the phonetic feature.

On reflection, I do not believe this to be such a strange proposal. Obviously, a certain semantic domain occurs disproportionately frequently in conjunction with a word or a morpheme. A child hears a word or morpheme in a given limited way and goes on to use it productively in that limited way. Why then should it be so strange to imagine that this process happens organically on the lower levels of the syllable and the phoneme? Why should not the child hear a phoneme and associate it as well with a limited context just as s/he does a word or a morpheme? Indeed, it makes little sense to me that a child would apply such a process down to the level of the morpheme, but somehow decide it should be applied no lower. It seems more likely that Semantic Association either is a universal tendency and applies everywhere equally, or it isn't a

tendency at all, and it applies nowhere. Analogously, a natural law in physics is presumed to apply universally and identically in all space and time frames if it applies at all. Furthermore, it seems to me that if Semantic Association were not a universal tendency -- at least on the level of the word -- then there would be no way to learn to talk at all.

One aspect of this research which eluded me for a long time was the recognition that Phonosemantic Association is not identical with True Iconism. Von Humboldt already in the middle of the 19th Century distinguished three types of linguistic iconism. One was the least pervasive type known as onomatopoeia. It is limited to a precise function and a very small semantic domain -- to words which either refer to a sound or to something which makes a sound -- and I will not discuss it in this dissertation. Another is the Clustering or Phonosemantic Association I have just outlined. And the third most fundamental, most universal, completely predictable and *least salient* type of iconism is what I call '*True Iconism*' -- the level on which form literally *is* meaning. I will sometimes call '*True Iconism*' simply '*Iconism*' in contexts where I think it cannot be confused with Clustering.

Phonosemantic Association has an element of arbitrariness in it. If a fundamental word like 'house' in a given language begins with an /h/, then Phonosemantic Association will cause words with similar sound and meaning to cluster to it, so that the language ends up with disproportionately many 'house' and 'home' words starting with /h/: hacienda, hall, hangar, harem, haunt/s, haven, hearth, hive, hogan, hold, hole, hollow, home, host, hostel, hotel, house, hovel, hut, hutch. The Process of Phonosemantic Association is, as far as I can tell, universal and potentially affects any word. But whether or not the basic word for 'house' in a given language starts with /h/ is a matter of reference and is arbitrary. And whether a group of speakers will tend to cluster a nonsense word like 'bamp' in the semantic class of 'collision' words with 'bump' or in the semantic class of 'incline' words with 'ramp' turns out also to be in part (though not entirely) arbitrary. So Clustering is not blind to semantic classes, hence not entirely blind to reference, and hence not entirely predictable - - it has an element of arbitrariness.

But True Iconism is completely predictable and completely blind to reference. It does not affect what semantic class the word falls into, what its part of speech is, what its argument structure is or anything else. It is purely meaning-as-form. It cannot even be described as a 'tendency' or a 'process' the way Semantic Association is. It lies even deeper than that. One can therefore see True Iconism most clearly once one has abstracted away from all other aspects of word semantics and examine a class of word senses which effectively have the same referent and argument structure: {flit, flutter, float, flutter, fly} or {stamp, tramp, tamp, tromp, step, stomp, ...}. I am suggesting that what distinguishes word senses which are as similar as these from one another is basically how they sound. In the first class, the final /ur/ makes the movement repetitive, the short /i/ makes the movement quick and short. In the second class, a pre-final /m/ makes the contact with the ground heavy. A pre-vocalic /r/ makes the motion go forward, and so forth. Let me define here a bit more formally what I mean by True Iconism so I can refer to it later.

True Iconism

True Iconism is the level on which a word means what it is. Viewed from the perspective of 'parole', True Iconism is among the least salient aspect(s) of word semantics often masked or buried by other levels. From the perspective of 'langue', True Iconism is the most fundamental aspect of word semantics on top of which all other layers of semantics are superimposed. The form of a word does not directly

affect what the word refers to, what its argument structure is, or any other aspect of its meaning. It only *directly* affects our understanding of what the word's referent is *like*, the word's *connotation*.

The form of a word does *indirectly* affect what a word refers to by Clustering. Clustering, in other words, is a process whereby words take on referents similar to the referents of similar sounding words which already exist in the language. It also causes a language to prefer borrowings that are compatible with the preexisting Clustering structure of the language, and if the borrowed word is not completely compatible, it tends to alter the word's meaning to make it compatible with the existing Clustering structure. To Iconism, on the other hand, reference is completely irrelevant.

1.3 Methods Employed

One finds in the literature two basic kinds of tests for sound-meaning correlations:

1. The existing vocabulary of a given language is classified according to both phonetic form and semantic domains to see whether certain phonemes are more or less prevalent in certain semantic domains than in others.
2. Informants are prompted with sounds, images, foreign words or nonsense words and asked to provide some kind of feedback based on their linguistic intuitions. These results are then examined to see if there if they display any sound-meaning patterns.

Tests of the first type tend to provide more specific data regarding the precise structure of word semantics than the second. However, no number of tests of type 1, regardless of coverage, can in principle prove that a universally productive natural law is involved. Tests of the second type *can* provide such evidence. Furthermore, tests of the first type tend to provide evidence for 'Clustering' or Phonosemantic Association, whereas the second type of test tends more readily to provide evidence for Iconism. Most of the tests outlined in this dissertation provide some evidence for both types of iconism.

The first type of test consists in classifying words into phonesthemes. 'Phonestheme' is a term first coined by John Rupert Firth (1930) to refer to a sound sequence and a meaning with which it is frequently associated. An example of a phonestheme is the English /gl/ in initial position associated with indirect light:

Reflected or indirect light -- glare, gleam, glim, glimmer, glint, glisten, glister, glitter, gloaming, glow

Indirect Use of the Eyes -- glance, glaze/d, glimpse, glint

Reflecting Surfaces -- glacé, glacier, glair, glare, glass, glaze, gloss

These make up 19 of 46 of the words beginning in /gl/ in my active, monomorphemic vocabulary of English. (I'll discuss the other /gl/ words shortly.) Surely 'indirect light' is too narrow a semantic domain, and 41% too high a percentage to support a claim that the relationship between /gl/ and 'light' is completely arbitrary. Nor is it, of course, completely predictable. The hope is that by looking more carefully at phonesthemes and drawing our distinctions more finely, we will be able to determine just what is predictable and what is not. Let me here describe very generally how I arrive at the conclusions outlined in the preceding section.

* ***Phonemes are meaning-bearing.*** When one classifies *all* English monosyllables into phonesthemes, one finds that disproportionately many words containing, for example, /k/ refer to containers, lids, collisions, acquisition, sticking and the like, and disproportionately many words containing /t/ imply a goal without specification as to whether that goal is reached, and disproportionately many words containing /f/ involve 'flight'. And the disproportions are quite large. (Disproportions can, of course, only be quantified if one classifies *all* the words in a language with a given phonological characterization. If one's empirical base is incomplete, one cannot apply a quantitative method and can therefore make no substantive claims.) However, that in itself is not enough to show that phonemes are meaning-bearing, for /k/ doesn't 'mean' anything as simple as 'collision'. If one, however, then looks at all words referring to 'collisions', one finds that those

containing /k/ are different in some identifiable way from those that do not contain /k/. These two types of data taken together, I believe, constitute very strong evidence that phonemes are meaning-bearing.

* *The salience of sound-meaning in a word is inversely proportional to the concreteness of its referent:* The basic evidence for this is that if one classifies a large set of words (like all the English monosyllables) into phonesthemes, one finds that about 3% don't fit in any phonestheme, and these 3% are always Concrete Nouns. That is to say, the **do** fit in one of the following Concrete Noun classes: people, titles, body parts, clothing, cloth, periods of time, games, animals, plants, plant parts, food, minerals, containers, vehicles, buildings, rooms, furniture, tools, weapons, musical instruments, colors, symbols, units of measurement.

* *Semantic Association happens productively even on the level of the phoneme:* One type of indirect evidence I will present that Phonosemantic Association is living and productive is the astounding generality of the phonesthemes as evidenced by tests of type 1. If there were no productive force maintaining this phonesthemic structure, then surely phonological shifts over the centuries would have long since disintegrated any discernible sound-meaning correlations in a language which has undergone as much change as English. Another more direct type of evidence involves tests of type 2 in which informants are asked to invent arbitrary definitions for nonsense words. If asked to make up definitions for nonsense words beginning with 'gl-', a disproportionate percentage of these definitions will concern reflected light or 'gluiness', just as a disproportionate percentage of /gl/ words in the English vocabulary concern reflected light or 'gluiness'. The informants therefore are productively 'Clustering' nonsense words with similarly sounding words in the existing vocabulary.

* *The productive nature of True Iconism:* One type of evidence for Iconism which has already been mentioned is to find a group of words which seem very similar in every way -- i.e. they have the same argument structure, part of speech, referent, etc.. If one then compares these words, one finds that there is a quite regular and intuitively 'iconic' correspondence between their phoneme structure and their connotations. Another type of evidence for Iconism consists in comparing phonological forms with word semantics across languages. If words containing a phoneme sequence k-v-n or s-t-r are always limited to a narrow range of semantic classes across unrelated languages and vocabularies that are not cognate, then the sequence k-v-n must have some universal meaning. Such tests provide evidence both for Clustering and for Iconism. Yet another type of evidence for Iconism is to ask naive informants to invent nonsense words to describe semi-abstract images. The words chosen for a given image are confined to a **much** more limited set of phonological forms than one would predict if the choice were purely arbitrary. Finally, phonesthemic classifications for a given phoneme resemble the phoneme's articulation. This would be a very strange coincidence indeed if there were no True Iconism active in language.

The initial experiments primarily test for Phonosemantic Association and the Phonosemantic Hypothesis, while the final experiments primarily test for Iconism; the intermediary experiments are evidence for both, with increasing emphasis on Iconism. The initial experiments offer more insight into the precise structure of word semantics, and the final experiments offer stronger evidence that these generalizations I have outlined are the result of productive natural laws, and are not solely explainable as historical artifacts. Since it is harder to see Iconism than Clustering, for the sake of ease of exposition, I present the Clustering experiments first.

1.4 Brief Outline

In chapter 2 of this dissertation, I will review several major works in what turns out to be a fairly extensive literature in phonosemantics. In chapter 3, I will outline the phenomenon in more detail as well as some theoretical preliminaries necessary to understanding the succeeding discussion.

In chapter 4, I present the data, methods and results for 14 experiments which yield positive evidence for a strong synchronic correlation between the phonological form and the semantics of words. I believe these to be repeatable experiments, in the sense that they can be applied with positive results by any native speaker to arbitrary phonemes, semantic classes and languages. If I am correct in this, then the results I present here submit to the fundamental requirement of all scientific claims, namely that they can in principle be falsified, but the results of repeatable experiments in fact support them. Indeed, the phonosemantic literature really consists in large part of a collection of hundreds of such varied experiments performed for languages worldwide and all yielding more or less the same conclusion with varying degrees of generality. Most of the tests presented in this work cover a large portion of the vocabulary and all have been applied to every word within a given semantic or phonological characterization. I believe I have been quite thorough in my coverage of the data so that I am in a position to quantify the results and draw conclusions from them. Most of the tests were applied to English; some were applied also to other languages; and in some cases, the language of the informant was irrelevant. The results of the tests are included in the Appendices. Each test is presented in the same order:

1. I describe in detail the method employed in the experiment.
2. For the sake of clarifying the discussion, I give an example of the results that appear in the relevant appendix. Hopefully, this will also make it possible to read through and understand the thesis without referring to the appendices.
3. I provide a detailed discussion of the results of the experiment, what I think the experiment shows, and what the consequences of the results are for linguistic science.

The concluding chapter 5 contains a theoretical discussion of all the results from all the tests taken as a whole. I also take up there some fundamental related issues in linguistics, such as semantic primitives, abstract semantic representations, linguistic universals, arbitrariness of the symbol, and the nature of semantic classes, and discuss how my findings affect my perspective on these issues.

Note: Throughout the dissertation, I occasionally allow myself to describe the phoneme effects a little informally for the sake of clarity and ease of expression. For example, in the discussion of experiment 9, I write, "The combination /t//p/ is often off balance (tip, topple, trip, steep, stoop, stumped, tipple, tipsy, top (the toy)), " rather than saying something like, "Words containing the consonants /t/ followed by /p/ often have an element of meaning which implies imbalance (tip, topple, trip, steep, stoop, stumped, tipple, tipsy, top (the toy))." I find this particular type of discussion is often facilitated by attributing a sort of poetic agency to the consonants themselves. But let the reader be aware that I am doing this consciously with the purpose of making the discussion easier to read.

2. Overview of the Phonosemantics Literature

2.1 The Beginnings of Phonosemantics

2.1.1 The Ancients

Like most other fields of modern research -- chemistry, astronomy, mathematics -- linguistics, and phonosemantics in particular, finds its beginnings in the mystical and religious literature of the various traditions. For example, in many traditions archetypal meanings were associated with the letters of the alphabet and used as oracles -- the Viking Runes, the Hebrew Kabbalah, the Arab Abjad, etc. References of this kind are very common in *The Upanishads*, *The Nag Hammadi Library*, the Celtic *Book of Teliesin*, as well as early Christian works that were rejected from the Biblical canon, the Shinto Kototama, and so forth. Several of these are reviewed and discussed in, for example, Stefan Etzel's (1983) dissertation and in Magnus (1999).

The first work that took a more modern, critical approach to the subject was Plato's *Cratylus* dialogue. In the first half of the *Cratylus*, Socrates argues with Hermogenes -- a proponent of the Conventionalist Overgeneralization -- that the foundation of word semantics must lie in phonetics: "That objects should be imitated in letters and syllables, and so find expression may appear ridiculous, Hermogenes, but it cannot be avoided -- there is no better principle to which we can look for the truth of first names." He then goes on to provide a number of examples, of phonosemantic correlations, none of which are so complete that they can be said to constitute proof or even particularly strong evidence. In the second half of the dialog, Socrates argues against Cratylus -- a proponent of the Naturalist Overgeneralization -- trying to tone down his extremist view as well.

Socrates provides what seems to most readers -- including the present author -- to be more compelling evidence against Cratylus than against Hermogenes. Many and perhaps most discussions of the *Cratylus* therefore interpret the dialog as concluding that there is no evidence for a correlation between phonetics and meaning. Other analyses of the *Cratylus* think of Socrates' mimetic musings as mistaken, but nonetheless not a bad try, considering how underdeveloped linguistic science still was in the 5th Century BC. I, however, interpret the dialog more along the lines outlined in Genette (1976), which suggests that Socrates' observations were not trivially mistaken nor was he in fact contradicting himself. Rather he was merely stating that neither extremist view could be wholly maintained. That is, it was neither true that phonetics had no effect whatsoever on word semantics, nor did it wholly determine word semantics. His view is perhaps stated best in these lines (which appear well into the dialogue when Hermogenes has largely been overcome):

SOCRATES: Imagine that we have no voice and no tongue, but want to communicate with one another... Would we not imitate the nature of the thing: lifting the hands to heaven would mean lightness and upwardness. Heaviness and downwardness would be expressed by letting them drop to the ground.

HERMOGENES: I do not see that we could do anything else.

SOCRATES: And when we want to express ourselves with the voice or the tongue or the mouth, the expression is simply the imitation of what we want to express?

HERMOGENES: I think it must be so.

SOCRATES: Nay, my friend, I am inclined to think we have not reached the truth as yet

HERMOGENES: Why not?

SOCRATES: Because if we have, we shall have to admit that people who imitate sheep or roosters or other animals are naming that which they imitate.

HERMOGENES: Quite so... But I wish you could tell me then, Socrates, what sort of an imitation is in a name?

SOCRATES: In the first place, I would say it is not a musical imitation, although that is also vocal, nor is it an imitation of that which music imitates. In my opinion, that would not be naming. Let me express it this way. All objects have sound and figure and many have color... But the art of naming does not appear to be concerned with imitations of this kind. The arts which have to do with them are music and drawing. Again, is there not an essence of each thing just as there is color and sound? And is there not an essence of color and sound as well as of anything else?

HERMOGENES: I should think so.

SOCRATES: Well, if anyone could express the essence of each thing in letters and syllables, would he not express the nature of each thing?

This dialogue raises all the major issues that run through the ensuing literature on the arbitrariness of the sign. On the one hand, there is a correlation between phonetics and semantics; on the other hand the sign is obviously arbitrary in significant ways. The essential nature of the correlation does not lie in mere imitation, or onomatopoeia. But it is an imitation of sorts -- an imitation, Socrates claims, of the *essence* of the thing to which the word refers.

It's pretty clear why modern science is not very happy with the notion of looking for the *essence* of a word or thing. Worse yet, Socrates proposes to mimic this abstract 'essence' of a concept or material thing in a completely different medium -- that of sound. It's hard to imagine what the essence of a 'chair' is, and harder still to imagine how that chair-essence might be represented as a sound. And if Socrates is right, it makes no sense that different cultures would elect to use completely different sounds to mimic this one essence unless one of the cultures is right and the others are wrong. And that -- for very understandable and appealing reasons -- is an abhorrent thought to the modern linguist. Not until the 20th Century were methods applied with any regularity which could address this very serious dilemma in the study of phonosemantics.

2.1.2 The 17th-19th Centuries

The subject was sporadically discussed in religious and mystical texts throughout the Middle Ages and Renaissance. In 1653, according to Genette (1976), John Wallis published a list of English phonesthemes in his *Grammatica linguae anglicanae* including among a great many others, for example:

- wr shows obliquity or twisting: **wry, wrong, wreck, and wrist**, “which twists itself and everything else in all directions.”
- br points to a breach, violent and generally loud splitting apart: **break, breach, brook**.
- cl reflects adherence or retention: **cleave, clay, climb, close**, “almost all of which come from **claudo**.”

He then went on to argue that in the case of several words at least, the bulk of their semantics could be analyzed down to a combination of their phonesthemes. For example in the word ‘sparkle’, the initial ‘sp-’ indicates dispersion (spit, splash, sprinkle); the medial ‘ar’ represents high-pitched crackling; the ‘k’ is a sudden interruption; and the final ‘l’, frequent repetition (wiggle, wobble, battle, twiddle, mottle, etc.)

John Locke (1689), on the other hand spoke out against the idea in his *An Essay on Human Understanding* as follows:

“Words... come to be made use of by Men, as the Signs of their Ideas; not by any natural connexion, that there is between particular articulate Sounds and certain Ideas, for then there would be but one language amongst all Men; but by voluntary Imposition, whereby such a Word is made arbitrarily the mark of such an Idea.”

Here we see an example of the Conventionalist Overgeneralization: Locke essentially argues that if there were any natural connection between Sound and Idea whatsoever, we would all be speaking the same language. I cannot but see that he draws this conclusion based in the presumption that there is only one level of word meaning, namely reference. As I mentioned, I think this presumption is mistaken.

In 1676, Gottfried Wilhelm Leibniz published a point by point critique of Locke’s book, entitled *New Essays on Human Understanding*. In it, he responds:

[On the connexion between words and things, or rather on the origin of natural languages] We cannot claim that there is a perfect correspondence between words and things. But signification is not completely arbitrary either. There must be a reason for having assigned this word to that thing. Languages do have a natural origin in the harmony between the sounds and the effect impressed on the soul by the spectacle of things. I tend to think that this origin can be seen not only in the first language, but in the languages that came about later, in part from the first one, and in part from the new usages acquired by man over time and scattered over the surface of the earth.

Throughout the 18th and 19th Centuries, many philosophers, poets, writers and Hermetics expressed sympathy or evidence for the Phonosemantic Hypothesis. These include Alexander

Pope, Emanuel Swedenborg, Novalis, Johann Wolfgang Goethe, Honoré de Balzac, Ernest Renan, Ralph Waldo Emerson, Victor Hugo, Henry David Thoreau, Rudolf Steiner, Lewis Carroll, Joseph von Eichendorff, Arthur Rimbaud, and Marcel Proust. In the 18th and early 19th Centuries, there was a scholarly tradition of mimesis in France, the original manuscripts of which are very hard to come by. I therefore take my information about this period second hand from Genette's (1976) excellent history entitled *Mimologiques* translated by Thaïs Morgan and published by the University of Nebraska Press and from Earl R. Anderson's (1998) valuable overview of the field entitled *A Grammar of Iconism*. In 1765, Charles de Brosses wrote *Traité de la formation mécanique des langages*, in which he argued that there existed a perfect language which was 'organic, physical and necessary'. In this primeval universal language, the sound conformed wholly to the meaning of the words. Then with time, this principle was corrupted by various means, and languages diverged resulting in our modern Babel. A few years later in 1775 Antoine Court de Gébelin wrote *Origine du langage et de l'écriture*. Gébelin, like Cratylus, took the position that all semantics is imitation. This is what I call an instance of the Naturalist Overgeneralization, again based on the presumption that word semantics cannot be analyzed into distinct components. Both Gébelin and de Brosses devoted a significant portion of their studies to orthographies, a topic which will not concern us in the present dissertation.

In 1808, the young Charles Nodier produced his *Dictionnaire des onomatopées*. The dictionary included entries such as:

Bedon {potbelly}: onomatopoeia of the noise of a drum.

Biffer {to scratch out}: noise made by a quill pen passed rapidly over paper.

Briquet {tinder}: noise of two hard bodies that violently collide with each other, breaking one into pieces

Nodier's youthful dream was to create the perfect phonosemantic language. Twenty years later, he writes of himself, "I... boldly pursued my ambitious career, for there were no obstacles whatever to an eighteen-year-old and no limit at all to his powers." Linguistic egocentrism or perfectionism is a particularly prevalent theme in the field of phonosemantics. The Naturalist Overgeneralization predisposes the researcher to think that some languages (most frequently his own native tongue) more truly exhibit this 'perfect' sound-meaning correlation than others. Plato seemed to think as much of Greek; Indian scholars argue the same for Sanskrit; Wallis found English to be superior, the Kabbalists claim that Hebrew is the most perfect tongue, and so on and so forth. De Brosses, on the other hand, argued for a perfect *primordial* language (albeit most closely resembling French). Nodier's dream of a perfect language, however, lay not in the past, but in the future.

But in 1834, in his *Notions élémentaires de linguistique*, Nodier changes his mind and writes, "It does not follow from this system that all creatures ought to be designated by universal homonyms, because for this it would be indispensable for each creature to offer itself only one single character and to be potentially judged by only one single sensation, a ridiculous limitation. Customs, inclinations, habits, susceptibility to impressions: all these are of great consequence in the function of the person doing the naming, as are the perceptible aspects, forms, qualities, behavior of the object named, and as are the place, time, circumstances in which the name emerges." Nodier here speaks out against the adamant Cratylist, who makes the error of thinking that arbitrariness or interpretation play no part in semantics, and it must follow that there is either only one language, or at least only one perfect language, all linguistic arbitrariness being perversions of this great

mimetic Truth. Notice in this quotation that he is no longer assuming that the sound affects what the word *refers to*, but rather what it is *like*.

In 1836 Wilhelm von Humboldt published *Über die Verschiedenheit des menschlichen Sprachbaues und ihren Einfluß auf die geistige Entwicklung des Menschengeschlechts*. In it, he distinguishes three types of relationships between sound and meaning in language. This distinction turns out to be very important, I feel, and it has not gotten its proper share of acknowledgement. Hartmut Traunmüller independently drew the same distinction on the Internet Sound Symbol list in 2000. The first class is what is generally called 'onomatopoeia' throughout the phonosemantic literature. It is based in acoustics rather than articulation and is limited to those referents which emit a sound:

“1. The directly imitative, where the noise emitted by a sounding object is portrayed in the word...”

Commentary: *In this dissertation, we will not concern ourselves with iconism of this first type (onomatopoeia), as it is much less pervasive and fundamental than iconism of the second two types.*

Von Humboldt's second type most closely resembles Socrates' notion of phonosemantic imitation... imitation of a semantic 'essence' by the actual articulation of the phoneme. This is very close to what I think of as **True Iconism** or simple **Iconism**-- iconism by natural law. If this type of iconism could be shown to hold, it would have to hold universally (which is to say that all words would be in some degree affected by it, though of course not entirely determined by it):

“2. The designation that imitates, not directly, but by way of a third factor common to both sound and object. It selects for the objects to be designated, sounds which, partly in themselves and partly by comparison with others, produce for the ear an impression similar to that of the object upon the soul: as **stand, steady, stiff** give the impression of fixity; the Sanskrit **li** that of melting, dispersal, dissolution; **not, nibble** and **nicety** that of finely and sharply penetrating. In this way objects that evoke similar impressions are assigned words with predominantly the same sounds, such as **waft, wind, wisp, wobble** and **wish**, wherein all the wavering, uneasy motion, presenting an obscure flurry to the senses, is expressed by the **w**, hardened from the already inherently dull and hollow **u**. This type of designation, which relies upon a certain significance attaching to each individual letter, and to whole classes of them, has undoubtedly exerted a great and perhaps exclusive dominance on primitive word designation. Its necessary consequence was bound to be a certain likeness of designation throughout all the languages of mankind, since the impression of objects would have everywhere to come into more or less the same relationship to the same sounds. Much of this kind can still be observed even in languages of today, and must in fairness prevent us from at once regarding all the likeness of meaning and sound to be encountered as an effect of communal descent.”

Von Humboldt's third class we find to be a quite general linguistic process which I have called **Phonosemantic Association** and will also informally call '**Clustering**' following Weinreich's (1963) terminology:

3. Designation by sound-similarity, according to the relationship of the concepts to

be designated. Words whose meanings lie close to one another are likewise accorded similar sounds; but in contrast to the type of designation just considered, there is no regard here to the character inherent in these sounds themselves. For its true emergence, this mode of designation presupposes verbal wholes of a certain scope in the system of sounds, or can at least be applied more extensively only in such a system. It is, however, the most fruitful of all, and the one which displays with most clarity and distinctness the whole concatenation of what the intellect has produced in similar connectedness of language...”

Commentary: *Contrary to Von Humboldt’s findings, my own experimental data, detailed in the following chapters, suggest that Clustering is still subject to the constraints of the inherent character of the sounds.*

Von Humboldt gave the following description of his conception of the phonosemantic process:

“But since language-making finds itself here in a wholly intellectual region, at this point there also develops, in a quite eminent way, yet another, higher principle, namely the pure and -- if the term be allowed -- quasi-naked **sense of articulation**. Just as the effort to lend meaning to sound engenders, as such, the nature of the articulated sound, whose essence consists exclusively in this purpose, so the same effort is working here toward a determinate **meaning**. This determinacy becomes greater as the field of the designandum still hovers effectively before the mind; for this field is the soul’s own product, though it does not always enter, as a whole, into the light of consciousness. The making of language can thus be more purely guided here by the endeavor to distinguish like and unlike among concepts down to the finest degree, by choice and shading of sounds. The purer and clearer the intellectual view of the field to be designated, the more the making of language feels compelled to let itself be guided by this principle; and its final victory in this part of its business is that principle’s complete and visible dominance... The crux of the matter is that significance should truly permeate the sound; that nothing in the sound but its meaning should appear, at once and unbroken, to the ear that receives it; and that, starting from this meaning, the sound should appear precisely and uniquely destined for it. This naturally presupposes a great precision in the relations delimited, since it is these that we are chiefly discussing at this point, but also a similar precision of the sounds. The specific and unphysical the latter, the more sharply they are set off from one another. Through the dominance of the sense of articulation, both the receptivity and the spontaneity of the language-making power are not merely strengthened, but also kept on the one right track; and since this power invariably deals with every detail of language as if the entire fabric that the detail deals with were simultaneously present to it by instinct, it follows that in this area, too, the same instinct is at work and discernible, in proportion to the strength and purity of the sense of articulation.”

In 1891, two years before his death, Georg von der Gabelentz published a very influential work entitled **Lautsymbolik**. According to Jakobson (1979), he cited among other things, evidence from child language acquisition. Like all of the researchers who preceded him, he invested a fair amount of thought into the interconnection between phonosemantics on the one hand and etymology and language origins on the other. He writes that words linked together by both sound and meaning

manifest 'elective affinities'. As we gradually acquire our mother tongue, our feeling for the sounds etymologizes without any regard to historical linguistics. This tendency does, however, in his view have a considerable effect on language evolution. This present dissertation will concern itself only very peripherally with the issues of language evolution. Its purpose is to provide evidence for productive synchronic phonosemantic processes.

At the end of the century, Maurice Bloomfield published two beautiful articles on sound symbolism. In 1895, he describes the phenomenon of Clustering as follows:

“Every word, in so far as it is semantically expressive, may establish, by haphazard favoritism, a union between its meaning and any of its sounds, and then send forth this sound (or sounds) upon predatory expeditions into domains where the sound is a first a stranger and parasite. A slight emphasis punctures the placid function of a certain sound element, and the ripple extends, no one can say how far... No word may consider itself permanently exempt from the call to pay tribute to some congeneric expression, no matter how distant the semasiological cousinship; no obscure sound-element, eking out its dim life in a single obscure spot, may not at any moment find itself infused with the elixir of life until it bursts its confinement and spreads through the vocabulary a lusty brood of descendents... The signification of any word is arbitrarily attached to some sound element contained in it, and then cogeneric names are created by means of this infused, or we might say, irradiated, or inspired element.”

The language of Bloomfield and von Humboldt gives a much better intuitive feel for the fundamental phonosemantic concepts than most of the literature written in the 20th century, but it does not provide the solid empirical base required to either prove or disprove the claim that there is a regular synchronic correlation between the articulation of a phoneme and its semantics, nor does it offer a way to make practical use of such a correlation. In order for that to happen, we must find a means by which we can define the relevant parameters clearly enough that we can then quantify the relationships or lack thereof. Most 20th Century literature on the subject is devoted to forming such an empirical base.

2.2 Pre-WWII Phonosemantics -- Major Trends in the 20th Century

2.2.1 Maurice Grammont

Grammont (1901) saw sound-meaning correspondences as the essence of poetry. These correspondences, though, are not in most cases purely onomatopoeic, purely imitative. He describes his intentions thus:

“Quel est le son d’une idée abstraite ou d’un sentiment? Par quelles voyelles ou par quelles consonnes le poète peut-il les peindre? La question même semble absurde. Elle ne l’est pas. Nous nous proposons précisément de montrer par une étude minutieuse des chefs-d’œuvre de nos plus grands poètes qu’ils ont presque toujours cherché à établir un certain rapport entre les sons des mots dont ils se servaient et les idées qu’ils exprimaient, qu’ils ont essayé de les peindre, si abstraites fussent-elles, et que la poésie descriptive n’est pas une chose exceptionnelle et à part, distincte de la poésie.

On peut peindre une idée par des sons: chacun sait qu’on le fait en musique, et la poésie sans être de la musique, est, comme nous le verrons plus loin, dans une certaine mesure une musique; les voyelles son des sortes de notes. Notre cerveau continuellement associe et compare; il classe les idées, les met par groupes et range dans le même groupe des concepts purement intellectuels avec des impressions qui lui sont fourniers par l’ouïe, par la vue, par le goût, par l’odorat, par le toucher.”

He observes that any ordinary French phrase can of course be rendered in any other language, but that an element of meaning becomes especially prevalent in poetry that makes it inaccessible to exact translation, and this he considers to be the contribution that sound is making to meaning. He therefore sees some utterances as more mimetic and therefore higher or better than others. He also, however, finds phonosemantics not just to be a function of parole; rather the phonemes have meanings implicit in them. He argues at some length that the fact that a phoneme's meaning is very broad, does not in any way mean that it has no semantics at all: since there are so few phonemes, one would expect them to have a broad meaning. His book is divided into various 'ideas' -- repetition, accumulation, sorrow, joy, irony, silence, smallness, etc. Grammont provides examples from great poetry exhibiting each of these 'ideas' and shows how they are expressed with the same types of sounds in the poetry not only of France, but also of other countries.

2.2.2 Velemir Khlebnikov

Khlebnikov was a Russian futurist poet of the early 20th Century, frequently cited by Roman Jakobson. His verse consisted mostly of words of his own invention, superficially similar to those in Joyce's *Finnegan's Wake*. He also, however, wrote purely linguistic works outlining the correlations he had observed between Russian phonemes and their meaning. He even produced a list of Russian phonemes followed by a brief semantic characterization of each. For example:

- v -- the return of one point to another (a circular path)
- m -- the breaking up of volume into infinitely small parts
- s -- the departure of points from out of one immovable point
- z -- the reflection of light from a mirror

2.2.3 Leonard Bloomfield

In 1909 and 1910, the better known Bloomfield -- Leonard -- worked on "A Semasiological Differentiation in Germanic Secondary Ablaut" in which he writes:

"We have seen how an old ablaut base -- a strong verb IE. **sleng-* Germanic **slinken* E. *slink*, let us say -- has given rise to a number of words -- as E. *slink* (strong verb): dial. *slank* (weak verb): dial. *slunk* (weak verb)... But it is natural, if not inevitable that such words should become semasiologically differentiated. E. *slink* 'sneak': dial. *slank* 'go about in a listless fashion': dial. *slunk* 'wade through a mire' are examples. What has determined the direction of this differentiation in meaning? In many cases, the old laws of derivation must have been decisive... But one cannot so explain the meanings of *slink* : *slank* : *slunk*, nor indeed the great majority of such modern Germanic word groups: another force has been at work. This force is the old inherent Germanic sense for vowel pitch... If a word containing some sound or noise contains a high pitched vowel like i, it strikes us as implying a high pitch in the sound or noise spoken of; a word with a low vowel like u implies low pitch in what it stands for... Its far reaching effects on our vocabulary are surprising. It has affected words not only descriptive of sound like E *screech*, *boom*... but also their more remote connotative effects. A high tone implies not only shrillness, but also fineness, sharpness, keenness; a low tone not only rumbling noise, but also bluntness, dullness, clumsiness; a full open sound like a, not only loudness, but also largeness, openness, fullness..."

Nor must the subjective importance of the various mouth positions that created the various vowel sounds be forgotten: the narrow contraction of i, the wide opening of a, the back of the mouth tongue position of u are as important as the effect of these vowels on the ear of the hearer."

He then goes on to itemize all the major roots in Germanic in order of the consonant sounds: first /p-p/ (N. *pipla*, *pupla*; E. *peep*, *pip*, *pipple*; etc.), then /p-f/ (S. *piff*, *paff*, *puff*; E. *piff*, *piffle*, *piffer*, *paffle*, *puff*; etc.) and so on, and he demonstrates that the correlations he noted hold throughout the entire vocabulary of Germanic. L. Bloomfield's view regarding the importance of sound meaning was strong enough that he could write:

"Since in human speech, different sounds have different meaning, to study the coordination of certain sounds with certain meanings is to study language."

Here for the first time we see the kind of data a modern scientist needs to verify a phenomenon and put it to use. Bloomfield's list of Germanic roots is as close to complete as he could make it. It therefore can't be said that he picked out certain words or phoneme combinations that supported his case and conveniently left out the others. He thereby made it possible for the first time to quantify the correlation, and this is the first step toward broadening the discussion from philosophy and speculation to real science.

2.2.4 Psycholinguistic Experiments -- Sapir et al.

Sapir began as a conventionalist who then converted to a naturalist position after running a few phonosemantic experiments of his own. He was one of the first to query native speaker intuitions about nonsense or foreign words in order to demonstrate that there was a productive correlation between sound and meaning. He described the purpose of his inquiry thus:

“We may legitimately ask if there are, in the speech of a considerable number of normal individuals, certain preferential tendencies to expressive symbolism not only in the field of speech dynamics (stress, pitch and varying quantities), but also in the field of phonetic material as ordinarily understood... The main object of the study is to ascertain if there tends to be a feeling of the symbolic magnitude value of certain differences in vowels and consonants, regardless of the particular associations due to the presence of these vowels and consonants in meaningful words in the language of the speaker.”

Sapir then asked about 500 subjects of all ages 60 questions of the following type: “The word ‘mal’ and the word ‘mil’ both mean ‘table’ in some language. Which type of table is bigger -- ‘mal’ or ‘mil’?” 83% of the children and 96% of adults consistently found ‘i’ to be smaller and ‘a’ to be bigger. Sapir did not, however, believe the feeling-tone that exists in words to be inherent to them, but characterized it rather as a “sentimental growth on the word’s true body”.

By testing the intuitions of English-speaking subjects, Newman also showed that English vowels could be placed on a scale of small to large, and that the size associated with each vowel reflected the size of the oral cavity during articulation. In actually analyzing 500 extant English words, however, he found no correlation between vowels and size. Chastaing (1962) ran 12 types of test all of which showed that people intuitively associate clarity with high front vowels and obscurity with low back vowels.

Numerous other tests of this nature have been conducted. Tsuru (1934) had native English speakers guess the meanings of 36 Japanese antonyms, and found that they guessed correctly much more than 50% of the time. Allport (1935) translated the Japanese words into Hungarian and repeated the experiment in order to filter out the possibility that Tsuru had subconsciously chosen words which bore some resemblance to related forms in English. The results were the same for Hungarian as for Japanese. Wissemann (1954) showed that when asked to invent words for noises which they heard, German speakers tended to associate certain phonemes with certain sounds more than with others. Fischer-Jørgensen (1967) begins her paper optimistically: “It is now generally accepted that speech sounds should not only be described in articulatory and in acoustic, but also in perceptual terms.” She interviewed 150-200 students in various experiments asking them to classify Danish vowels, and found that people intuitively classify vowels as having brightness and hue, but not saturation.

Others who undertook experiments similar to these include Köhler (1947), Brown, Black and Horowitz (1955), Maltzmann, Morrisett and Brooks (1956), Brackbill, Little (1957), Miron (1961), Weiss (1964), Peterfalvi (1970)

2.2.5 Otto Jespersen

Jespersen was perhaps the most adamant phonosemanticist prior to the Second World War. He wrote, “Is there really much more logic in the opposite extreme which denies any kind of sound symbolism (apart from the small class of evident echoisms and ‘onomatopoeia’) and sees in our words only a collection of accidental and irrational associations of sound and meaning? ...There is no denying that there are words which we feel instinctively to be adequate to express the ideas they stand for.” Jespersen saw phonosemantics not only as a force which was active in the inception of language, but as a productive synchronic influence in language evolution and use. “Sound symbolism, we may say, makes some words more fit to survive.”

2.2.6 Richard Paget

While L. Bloomfield suggested that both the phonetics and the articulation of a speech sound contributed to its meaning, Sir Richard Paget (1930: Chapters VII, VIII and IX) argues that articulation is in fact more influential than sound in this regard. He writes in Chapter VII:

“Observations of the actual resonance changes which occur in the production of the vowels and consonants show that we accept as identical sounds which are widely different *provided* they are made of similar postures or gestures of the organs of articulation.”

He lists a number of words in several languages demonstrating his position, but by no means lists them all. In the present work, I will also be correlating semantics with articulation rather than with acoustics, not because I necessarily agree with Paget’s position, but because articulations are much easier to nail down and classify than sounds.

2.2.7 African Ideophones -- Doke et al.

Doke was a scholar of Bantu languages, and introduced the notion of the ‘ideophone’, which he called a ‘radical’ and which developed into a whole body of literature in African linguistics. Apart from the work of Roger Williams Wescott, there is little sharing of ideas between the ideophone literature and that of linguistic iconism in general.

The ideophones are a grammatical classification of words whose function is iconic. These words are not limited to sound-imitation, but extend to people, manners, actions, states, colors and so forth. Doke defines the ‘radical’ as “a word, often onomatopoeic, which describes a predicate or qualificative in respect to manner colour, sound, state or action.” He distinguished it from the adverb which describes in respect to “manner, place or time”. The radicals, he says, are “found in great numbers” in Bantu and pattern differently syntactically and morphologically from other parts of speech.

William Samarin did a significant amount of ideophone research. He was particularly concerned with methods of identifying the specific meaning of an ideophone in a way that is comprehensible to non-native Bantu speakers. This proves to be a non-trivial task requiring very sophisticated lexicographic methods. Other major researchers in this field include Awoloyale, Childs, Maduka, Mamphwe, Mphande and Westermann. Unfortunately, much of the research in African linguistics by native speakers is relatively inaccessible in Western Europe and the United States.

2.2.8 John Rupert Firth

Although Firth coined the term ‘phonestheme’ and published lists of them, he felt that one had to be careful about overgeneralizing phonosemantic effects. He found no evidence for Humboldt’s “impressions on the ear resembling the effect of the object on the mind”. Like Sapir, he felt that speech sounds were meaning-bearing, but their meaning was not inherent to them. Rather the phonesthemes were a result of what he called “phonetic habit”, “an attunement of the nervous system”, something similar to what I call Clustering or Phonosemantic Association. Unlike Firth, I do find the meaning of speech sounds to be inherent to them. The most accessible evidence I provide for this is that the closer we get to being able to express this phoneme-meaning, the more it seems to reflect the phoneme’s articulation.

2.3 Structuralism -- Saussure

Although the contingency for a synchronic sound-meaning relationship prior to World War II was in general stronger than it has been for most of the latter half of the 20th Century, the field was by no means unified. The most celebrated opponent of the phonosemantic hypothesis is, of course, Ferdinand de Saussure (1916). In his chapter entitled "Nature of the Linguistic Sign", the second chapter heading reads unabashedly:

First principle: the sign is arbitrary

He then continues as follows:

"The link between signal and signification is arbitrary. Since we are treating a sign as the combinations in which a signal is associated with a signification, we can express this more simply as: *the linguistic sign is arbitrary*. There is no internal connexion between the idea 'sister' and the French sequence of sounds s-ö-r which acts as its signal. The same idea might well be represented by any other sequence of sounds. This is demonstrated by differences between languages, and even by the existence of different languages... The principle stated above is the organizing principle for the whole of linguistics..."

The arbitrary nature of the linguistic sign was adduced above as a reason for conceding the theoretical possibility for linguistic changes. But more detailed consideration reveals that this very same feature tends to protect a language against any attempt to change it."

Again, Saussure asserts the Conventionalist Overgeneralization, based on the presumption that word meaning is one single homogeneous thing -- the word's referent. He is stating that a regular correspondence between sound and meaning would render linguistic change impossible, and cause us all to be speaking the same language. He could only draw this conclusion *if* in his view 'word semantics' were reducible to 'word reference'.

Commentary: *Seen from my perspective, his argument runs analogous to the following: "There is no internal connection between the message of an advertisement and its size, style or color scheme. This is demonstrated by the existence of different advertisements for one and the same product. If this were not so, then all advertisements for a given product would be identical, and there would be no changes in advertisements over time." It just doesn't follow. One could only say such a thing if one assumes that the form of an advertisement not only should not, but in principle cannot affect its message. Indeed, the most effective advertising minimizes the product referred to and emphasizes size, style and color scheme. The most effective poetry in the view of many also emphasizes form over reference. I know of no place where Saussure even bothers to examine this assumption; he simply presupposes that anything that conveys anything significant to the listener is reducible to reference. I think once one does examine this assumption quantitatively in the context of natural language, one finds it to be simply false.*

If I were to draw the advertising analogy with the Naturalist Overgeneralization, then it would run like this: "Because size, style and color scheme do affect the message in an advertisement, it completely determines which product one is selling." How could that be? It's 'size, style and color scheme' which motivate the listener on a gut level to go out and buy something, but they of course have to be told

explicitly what to buy, because that is 'arbitrary'. It cannot be predicted from the size, style and color scheme of the advertisement alone. Every message necessarily has an arbitrary component of meaning which is referential and it has a form which affects the message in an unmediated, visceral way. And these two components of meaning are both part of the 'message' conveyed, albeit on quite different levels.

So I agree with Saussure that reference, the correlation between concepts/things and phoneme sequences is indeed essentially arbitrary. The strongest evidence I have to that effect, is that those words with the most narrow and rigid referents -- i.e. those referents on which people agree most -- are also those words which display the weakest sound-meaning correlation. The more poetic and vague a word's referent is, the more clearly the phonosemantic effect can be observed. Nouns display the effect much more weakly than verbs or adjectives and Concrete Nouns display the effect least of all. I find rather that there is an element of meaning in words which is essentially Iconic in Peirce's sense of the term, and that it is in this domain that the phonosemantic effect holds sway.

It's also curious that Saussure himself made quite a hobby of phonosemantics. Thais Morgan writes in the introduction to the English translation of Genette (1976):

“Yet even Saussure, the founder of structural linguistics, who introduced the notion of “arbitrariness” of the sign or its relative freedom from ties to the phenomenal world, also enthusiastically engaged in mimologics. Intrigued by what he called ‘anagrams’ and ‘paragrams’, Saussure filled many notebooks with eponymic analyses of Vedic and Homeric verses and inscriptions, discovering the names of ancient gods and heroes mysteriously concealed in letters and sounds. *Saussure’s notebooks are extensively cited in Jean Starobinski *Words upon Words: The Anagrams of Ferdinand Saussure*, translated by Olivia Emmet (New Haven, Yale University Press, 1979)”

2.4 Post-War Phonosemantics

Whereas many linguists prior to the rise of generative grammar held that some level of linguistic iconism was active in language, linguistic iconists were in a decided minority through the last four decades of the 20th Century. I am aware of several works in phonosemantics whose authors suppressed even their informal dissemination for fear that this would have a negative effect on their professional life. When the *Linguistic Iconism Association* was formed in 1998, many of its members wished to have their association with the group kept secret. Issues such as these pose difficulties to someone who is trying to present a complete account of the field. And as in any branch of scientific inquiry following the War, major Eastern European works such as those of Zhuravlev and Voronin were and still are sadly nearly unknown in the West, due to the imperviousness at the time of the Iron Curtain. Nonetheless, there were quite a few people who carried on research, who developed the field significantly in this period and who published in the West.

2.4.1 Dwight Bolinger

Dwight Bolinger of Harvard University was the primary proponent of phonosemantics through the late 40's and the 50's. In 1949, he published "The Sign is Not Arbitrary". In 1950, he published "Rime, Assonance and Morpheme Analysis", his most famous work on the subject, and one which formed the foundation on which many subsequent researchers (including John Lawler, Richard Rhodes and Keith McCune) based their hypotheses. Bolinger approached the field through an inquiry into the nature and status of the morpheme. He concluded that morphemes cannot be defined as the minimal meaning-bearing units, in part because 'meaning' is so ill-defined, and in part because there are obvious situations in which smaller units are meaning-bearing. He cites polyphonemic phonesthemes as the primary example. He writes, for example:

“ We need not limit ourselves to pairs, but may look for larger patterns. One tempting example is the cross-patterning of /gl/ ‘phenomena of light’ and /fl/ ‘phenomena of movement’ with (1) /itr/ ‘intermittent’, (2) /ow/ ‘steady’ and (3) /ur/ ‘intense’: glitter<->flitter, glow<->flow, glare<->flare... as for the terminal ‘morphemes’ in the above words, we find (1) evidenced also in titter, jitter, litter, iterate; (2) in slow, grow and tow and (3) in blare, stare and tear.”

Bolinger argued that one should regard at least the assonance and the rime of a monosyllabic root as ‘sub-morphemes’, on the basis that virtually all English assonances and rimes were found in the context of much narrower meanings than one would expect statistically.

2.4.2 Ivan Fónagy

Fónagy (1963) correlates phonemes with metaphors.

“Jeder Laut hat eine eigene Klangfarbe, die Vokale sind hell oder dunkel. Die Konsonante scheinen eine gewisse Konsistenz zu haben, sind hart oder weich, werden sogar in gewissen Fällen als feucht empfunden, der Einsatz eines Sonanten ist fest oder leise resp. weich, manche Engelaute sind schärfer als andere, auch die Silbe kann scharf geschnitten sein. Der Ton ist hoch oder niedrig, usw..”

Fónagy does not see 'wissenschaftliche Metapher' as having an aesthetic role, but as concerning only the content of the word. In his treatise of 123 pages, he outlines the meanings that have been given phonemes in the grammars of various languages throughout history. For example, nasal and velarized vowels are quite generally considered 'dark', front vowels as 'fine' and 'high'. Unvoiced

stops have been considered 'thin' by European linguists, whereas the fricatives were labelled 'raw' and 'hairy' by the Greeks. According to Hungarian linguist Révai, /g/ is hard and raw before /a/, /o/ and /u/, but softer before /e/ and /i/. Dionysus Halikarnassus found /l/ to be the softest and sweetest of the semi-vowels, as opposed to the sharper and more noble /r/. Leibniz says that those children who do not like the sharpness of the /r/ therefore replace it with the /l/. Palatalization makes things moister according to the linguists of many countries. Fónagy collected similar statements from the literature expressing the opinion that prosodic elements also have iconic meaning.

Fónagy viewed these 'metaphors' as having a physiological basis. Lower pitched sounds are in general considered more masculine, because the male voice is deeper. The unvoiced stops are articulated with more tension than their voiced counterparts, and therefore are considered 'harder'. He cited a study done by Hungarian researchers that asked deaf children how they experienced various phonemes subjectively. They responded much the way hearing children do, providing evidence that phonosemantics has an articulatory rather than an acoustic base. Finally, Fónagy argues that these metaphors very much influence our thought processes, including the evolution of science.

2.4.3 Hans Marchand

Marchand provided the first extensive list of English phonesthemes. He found that the meaning of a sound or sound sequence was also dependent on its position in the syllable. Marchand attributed meanings to even shorter sequences than L. Bloomfield or Bolinger were prepared to do. He wrote, for example, that "/l/ at the end of a word symbolizes prolongation, continuation" or "nasals at the end of a word express continuous vibrating sounds." Each such characterization was followed by a list of examples. Although Marchand was perhaps at the time the most cited of those who did extensive surveys of sound meaning correlations in the vocabulary of a given language, there are and were over a hundred others whose work was in some cases as extensive or even more so.²

Commentary: *If it is indeed the case, as I suggest that the Phonosemantic Hypothesis holds, then we would anticipate this evolution within the field -- namely that meaning would over time be associated with shorter and shorter strings of phonemes. Just as the meaning of a sentence is narrower than that of a phrase or single word appearing within that sentence, so the meaning of a string of phonemes is narrower than the meaning of any one of the phonemes which appears in that string. If only 20-40 phonemes must be combinable in such a way that they can bear the semantic weight for the phonemic level of the entire language, then one might anticipate that these meanings would be very broad indeed, very abstract and therefore hard to distinguish at first. Narrower meanings associated with longer phoneme strings would therefore be the first to be observed. As phonesthemes for longer strings were analyzed ever more closely, it would become apparent that the narrower meaning associated with a phoneme pair could be reanalyzed into a combination of more general meanings associated with each of the two individual phonemes.*

For instance, at first it is observed that /gl/ is frequently associated with reflected light, and /fl/ is associated with direct light. The phoneme sequence /bl/ is often associated with blindness, or absence of light, and /cl/ is associated with colors... Only then does one see that all of these phonesthemes lie in the semantic domain of 'light' and all of them also contain an /l/... so one hypothesizes that it's the /l/ that contributes the 'light' to the equation, and the variations that one observes among the phonesthemes between the inflections of light are functions of the phonemes other than /l/. The phoneme /b/ blocks the light (and not only light, as it turns out). The phoneme /g/ hides the source of

the light (and not only light). The phoneme /f/ displays the light (and not only light), and /k/ classifies the light (and not only light).

On the other hand, it is not so simple that we can say, "/l/ is light, /b/ is blockage, /k/ is classification, etc. One must look deeper than this into the nature of the interaction between individual phonemes. For example, light associated with /s/ almost always concerns 'seeing' and these words do not contain /l/... The phoneme /l/ in conjunction with /s/ generally appears in words concerning liquid and slipperiness. If a /p/ intervenes, the liquid splays or splashes out from a single point or source. (In Appendix I, the reader can find a complete list of the various contexts within which all these phonemes appear.) One could almost say that something about /b/, /k/, /g/ and /f/ allows /l/ to concern 'light', but something about /s/ disallows it. These patterns in clustering seem to me likely to be language-dependent, in the sense that I would expect to find languages other than English in which /s//l/ is disproportionately associated with light. I would also anticipate that if a given language clusters /f/ and /g/ with light, then the /f/ light will be direct universally, and the /g/ indirect. In a manner of speaking 'light' is like one possible 'sense' of /l/ which only manifests in certain contexts within a given language. Liquid, on the other hand, is another 'sense' of /l/ which may manifest in other contexts. What underlies or is common to all of these senses of /l/ is not so easy to discern. I find that it takes considerable time and patience to tease apart the puzzle.

2.4.4 Suitbert Ertel

Ertel(1972) is one of the few really comprehensive works in the field. He opens his work with the observation that phonosemantics cannot be easily combined with Saussurian structuralism or with Chomskian generativism, for the reason that both of these view language as, "ein von der psychologischen Realität abtrennbares Geistprodukt,... ein überindividuell objektiveres Gebilde oder als autonomes generatives System, das der mentalen Organization des individuellen Menschen lediglich als Vehikel bedarf." In other words, in his view, one of the difficulties that researchers have always had in accepting the Phonosemantic Hypothesis, or even a much weaker version of it, is that its acceptance requires a very different view of language than is generally accepted -- a view in which semantics cannot be abstracted away from language itself, and in which language as we know it cannot be abstracted away from man.

For some reason, the notion that the form and content of language can be so deeply intertwined, that as the form varies, so must content also vary, is a very hard pill for many linguists to swallow. It is similar to the observation in quantum electrodynamics that the observer cannot be meaningfully separated from the observed.

Ertel describes the purpose of his research as follows:

“Wenn -- wie gezeigt worden war -- zwischen der “Ebene” der Phonetik und der “Ebene” der Semantik allgemeinqualitative, also psychologische Vermittlungen bestehen, die universell in Erscheinung treten, dann müßten sich diese erst recht an spezifischeren und handlungsnäheren phonetisch-semantischen Kovariationen aufweisen lassen... Wenn auch für die Lautgebärde über das selektive Demonstrieren einselsprachlicher Beispiele hinaus ein für alle Sprachen gültiges breites Spektrum an Verflechtunge zwischen Phonetik und Semantik statistisch aufweisbar wäre, müßte man Grund haben, die radikale Trennung der beiden Ebenen aufzugeben.”

And that's just what he proceeded to do. He selected four fairly narrow semantic domains: words

for sounds, words of motion, words for actions performed with the mouth, and words for sound produced by animals. He then selected 175 German words in these 4 semantic classes, and had them translated into 36 languages covering most the major language families of the world. Finally he counted the frequency of the phonemes which occurred in each of the verbs and found that certain types of sounds occurred much more frequently with certain verbs than one would anticipate if the relationship between sound and meaning were purely arbitrary. Gargling is expressed in a large percentage of verbs with voiced sounds, spitting with labials and unvoiced plosives and so on and so forth.

Because Ertel's cross-linguistic tests were applied across a very broad range of languages, and not just to the Germanic languages, as in L. Bloomfield's tests, they suggest that sound-meanings are not merely side-effects of linguistic change, but that they are synchronically productive in modern languages and on some level universal. Three of the four classes of verbs that Ertel researched focussed on sounds or on verbs of the mouth -- classes which one would expect to be especially strongly influenced by mimetics. The present study includes a much broader range of words and semantic classes than does Ertel's, but unlike Ertel's work, it is also limited primarily to English.

2.4.5 Gérard Genette

To my knowledge, there has only ever been published one full length history of phonosemantics -- Genette (1976). Fortunately it is also a magnificent work. In 450 pages, Genette colorfully details the evolution of the linguistic iconism both among linguists and poets, in syntax, morphology and phonology. He has a wonderful grasp of the primary concepts and paradoxes that have determined the evolution of the field, and follows them over time. He also discusses a number of related issues -- the preoccupation with orthography and language origins, the relationship between phonosemantics and etymology, the sociology of the field, and so forth. Unfortunately, though Genette's work is a wonderful tribute to the field of phonosemantics, it has also been almost totally overlooked in the linguistics literature.

2.4.6 Roman Jakobson

Jakobson was probably the most influential phonosemanticist of the latter half of the 20th Century. Like von Humboldt, Maurice Bloomfield and Ertel, Jakobson had a very strong intuition for the wholeness of language. He felt that many distinctions, including the distinction between form and meaning drawn by structuralists, generativists (whom he considered to be descendents of the structuralists) and others were not entirely valid. He tried in many ways to show that this was the case. He was unlike most of the other linguists reviewed in this short history of the field who wrote one or two major works on the subject and then moved on to other things. With Jakobson, the interrelatedness of form and content was a theme that ran through all of his later work -- to him it was a very central topic. For example, his essay entitled 'Quest for the Essence of Language' concerned itself with linguistic iconism. His largest work on the subject, ***The Sound Shape of Language***, co-authored with Linda Waugh, was in some ways a response to Chomsky and Halle's ***Sound Pattern of English***, an account of what they felt had been overlooked in generative phonology. He did not leave behind volumes of well organized empirical data in the manner of Leonard Bloomfield or Marchand. Rather he was a philosopher who tended to appeal primarily to his readers' reason and intuitions.

Jakobson's view on the interrelatedness of sound and meaning was strongly influenced by his studies in poetics. He studied poetry throughout his life, and especially in later years, he wrote numerous analyses of poems seeking to get at what it was about the interrelations and juxtapositions of sound

that gave the poem its powerful emotional effect. Jakobson's thought resembled Grammont's in that to him, poetry existed when a writer was being attentive to the effect of form on content. A great many others have taken up Jakobson's thread of poetic analysis and expanded on it considerably. I have personally only read a few of these writings including several by John Robert Ross, Catherine Chvany and Masako Hiraga.

Another very powerful influence on Jakobson was that of the semiologist C.S. Peirce, whom Jakobson discovered after he came to the States and wrote of in the highest terms, calling him, for example, "the most universal and inventive of American thinkers". Peirce distinguished three types or levels of signs:

Level 1 or Firstness. Iconic. On this level there is no distinction between what a thing is and what it represents.

Level 2 or Secondness. Indexical. On this level, a sign by its nature points to something else, as smoke is an index of fire. But with Peirce, secondness runs much deeper than merely this. Secondness is quite generally the introduction of the 'other'.

Level 3 or Thirdness. Symbolic. It is only on this level that real arbitrariness in the Saussurian sense is introduced.

Jakobson writes, "The iconic and indexical constituents of verbal systems have too often remained underestimated." Frequently researchers who quote Peirce think in terms of some utterances as being more iconic, others more indexical and others more symbolic, and he did write some things which suggested this. But Peirce also said in many contexts that all of these levels are continually present and exerting influence in everything that confronts us, linguistic or otherwise. And Jakobson clearly thought the same, at least as it pertained to language, for he writes that the recognition of this "has vital consequences for linguistic theory and praxis". In a sense then, Peirce provided Jakobson with the key that he could use to resolve this paradox between the obvious arbitrariness of the sign that Saussure noted on the one hand, and the very general existence of phonestemes on the other. He did this by distinguishing different levels of sign, of recognizing that there is more than the obvious thirdness of word reference. There is also secondness and firstness. And arbitrariness and iconism happen on different levels. Furthermore he noted in "Quest for the Essence of Language" that Greenberg's Universals had an pronounced iconic quality about them, and went on to discuss this in reference to syntax and morphology.

Jakobson distinguished between a direct, relation between sound and meaning focussed in the right hemisphere of the brain, and 'double articulation', or an indirect, left hemisphere relationship, such as one finds in poetry, mythology, sound symbolism and synesthesia. In the present work I will not refer to double articulation, but rather view indirect iconism as a side effect of Clustering.

Jakobson prominent among those linguists (present author included) who do not consider form to be distinct from content. Hence he could not agree with the Saussurean structuralists and generativists that parole was absolutely secondary to langue. To Jakobson, langue was as much influenced by parole as the converse. While the generativists were emphasizing innateness, he emphasized pragmatics -- language exists for a reason (actually for several reasons), and that reason lies in the domain of parole more than langue. Together with Jakobson and his followers, I deny the complete arbitrariness of the sign and do not hold that it is possible to devise a completely abstract representation of language which is entirely unrelated to the form of language itself.

2.4.7 Roger Williams Wescott

Wescott was probably the most prolific of researchers on the subject of linguistic iconism during the 1960's and 1970's. He published many articles about specific correlations between sound and meaning that he had observed in English and in African languages, primarily Bini and Ibo. He remains perhaps the only researcher who united the African tradition of linguistic iconism initiated by Doke with the Western tradition of sound symbolism whose most outspoken proponents were Bolinger and Jakobson. Wescott is also a poet and an anthropologist. His research often goes into language origins, the relationship between animal communication and human speech and orthographic iconism. Dwight Bolinger in the introduction of *Sound and Sense* describes him as having the "most irrepressible imagination to be found among serious scholars," and adds that he was careful to use the word 'serious', for Wescott's research is indeed always founded on a very solid and extensive empirical base.

2.4.8 Richard Rhodes & John Lawler

This is one of the most cited works in phonosemantics in the last decade, and to my mind one of the richest in new perspectives and approaches to the field. Rhodes and Lawler(1981) begin by observing that for example, the Ojibwe word 'mdwesjiged' was cited by most speakers to mean only 'ring the church bells', when in fact, it was used in many contexts all of which could be characterized as 'be/make a sound at a distance'. When pressed on this point, Ojibwe speakers would agree that the verb was in fact used quite generally in these contexts. Rhodes and Lawler conclude that these other more general senses of 'sound at a distance' are derived by 'athematic metaphor' from 'ring the church bells'. They then point out several instances in both Ojibwe and English in which the true semantics of a word as it is used in practice is not fully derivable from the sum of its concrete 'senses'. They show this initially of English 'ring' which works much like Ojibwe 'mdwesjiged'. This more general meaning, they suggest, can be derived from combining the phonestheme or submorpheme meanings of the assonances and rimes of these words. The assonance, they argue serves as the modifier, and the rime serves as the head.

Commentary: *In the present work, I take these observations one fairly radical step further. Rhodes and Lawler see the basic senses of a word as the most fundamental, and on the level of parole, they undoubtedly are. Speakers are only consciously aware of the referents of a word, and will list the most salient when asked for the word's meaning. From this most basic sense, the more general usages or functions or senses of a word are viewed as spreading outward by means of comparison, a process they describe as 'athematic metaphor' by analogy with Lakoff and Johnson's 'thematic metaphors'. Indeed research presented in this work substantiates their findings that invented definitions for nonsense words often spring by Semantic Association from comparisons with similar words that actually do exist in the language.*

However, since this more general meaning such as 'sound at a distance' can also be analyzed in terms of the combined meanings of the phonesthemes which compose the word, I suggest that on the level of langue, the precedences are inverted -- that is, the Iconic meaning is most profitably viewed as the underlying substrate on which the senses are superimposed. In the case of 'ring', then, the underlying Iconic meaning is formed by the phonesthemes 'r-' and '-ing' (which I find to be further decomposable into the individual meaning-bearing phonemes /i/ and /G/). The specific referents to which 'ring' is applied are then secondary. Many works in phonosemantics view some words as fundamentally more iconic than others, some languages as more iconic than others. As mentioned above, I will argue that in fact linguistic iconism is equally pervasive in all words in all languages. What accounts for the apparent

differences in iconic usage in words is the rigidity or concreteness of its most common referents. The more specific the referent, the less room there is for the underlying iconic meaning to shine through.

Like Peirce, I find it easiest to describe what I have observed in terms of three levels of semantics -- the iconic, the classificatory and referential, although I am as yet unprepared to say exactly how my levels relate to those of Peirce. As mentioned, I see Iconic meaning as the substrate on which the other levels of meaning are built up. At the second level, I find a classificational system which is hard-wired, so to speak, into each language in a manner similar to that outlined by Rosch, Lakoff and Saussure. English, for example, divides words into 'furniture', 'cleaning', 'colors', and so forth. It does not classify words according to 'loud things' or 'red objects'. These facts are part of the grammar of English, and as speakers of English, we do not have a choice relative to this classification. Furthermore, these classes are not fundamentally sensitive to sound. Words for 'cleaning' or 'colors' or 'animals' or 'sounds' can take a great many phonetic forms. I find, however, that in order to see the distinctions in the semantics of various phonemes most clearly, one does well to abstract away from the classificational system inherent in the language by comparing words which fall in the same semantic class. If a word begins with /b/, in other words, this says nothing about whether the word refers to a noise or an animal or a color. Rather the /b/ tends to make the noise loud and sudden, the animal large and dangerous, and the color either very dark or very bright. To see the true Iconic effect of sound on meaning, then, one proceeds most effectively by comparing adjectives of anger with other adjectives of anger. If one compares adjectives for anger with verbs for twisting and turning, one's task becomes much more difficult.³

2.4.9 Keith McCune

Perhaps the most detailed and complete single work in the field of phonosemantics is Keith McCune's (1983) dissertation. McCune demonstrates for the first time in history that virtually every word in an entire language -- Indonesian -- has an iconic component of meaning. He follows the tradition of Bolinger (1950), Rhodes and Lawler (1981), in viewing the basic definition of a word to be extended to other meanings by various semantic processes, specifically what he calls subgroups, metaphors and Levi extensions, and most of the dissertation is devoted to the study of these processes. Although he analyzes all the Indonesian roots into assonances and rhymes, he suggests that these are in turn possibly further analyzable into individual phonemes, though he does not attempt such an analysis.

The fact that McCune analyzes the entire vocabulary of a language is very important in my view. Arguments of the form, "phoneme X correlates with semantic domain Y and here are some examples" are not particularly compelling. Without discovering a pattern that runs through *all* the words in a well-defined semantic domain, nothing has been proven conclusively. In order to demonstrate that the phonosemantic effect has any generality, one has to be in a position to quantify the phenomenon, to say "X% of words with phonological trait X in this language fall within semantic class Y." One can only do this if one's coverage of the given semantically or phonologically defined domain is essentially complete.

2.4.10 Yakov Malkiel

One of the most common and obvious arguments for the complete arbitrariness of the sign is that regular sound change would be impossible if it were constrained by linguistic iconism. If Latin /p/s always appear as Germanic /f/s, how can it possibly be maintained that /p/ means one thing and /f/ another, and that this distinction is largely based on articulation and therefore essentially universal or cross-linguistic? Malkiel addressed this issue in a number of articles which reappeared in a composite volume in 1990. He argued that although there is regular sound change, a lot is

going on behind the scenes in the process of sound change that is not generally acknowledged. For example, often when languages undergo dramatic sound shifts, much of the vocabulary also undergoes semantic shifts allowing the new forms to appear in contexts that they could not previously appear in and which prohibit them from appearing in contexts in which they were formerly permitted. In some cases words fall out of the vocabulary once their phonological structure is no longer appropriate to its meaning, and new forms are picked up through various forms of analogy, metaphor, etc. from words which exist and have more appropriate phonological structures. Robin Allott (1995) also points out that without even taking this into consideration, a large portion of the basic vocabulary in English is of either unknown, questionable or onomatopoeic origin.

2.5 Research in the 1990's

I have here attempted to provide a good sampling of the various approaches that have been taken to the subject and to outline the thoughts of those researchers whose work is known best. A glance at the bibliography, however, will convince the reader that there are a great many others who have also contributed to the field -- often in equally substantial ways. Many of them had developed the ideas independently before they were formally published, and many did voluminous amounts of analysis which form the underpinnings on which the phonosemantic claims are based. With a few very notable exceptions, it was only in the 1990's that women really came to the fore in the field. Major works produced in the 90's include Janice Nuckoll's phonosemantic account of Quechua; Cynthia Whissel's (1981-1999) works on the emotional nature of speech sounds; Kakehi Hisao, Lawrence Schourup and Ikuhiro Tamori's voluminous *Dictionary of Iconic Expressions in Japanese*; Leanna Hinton, Johanna Nichols and John J. Ohala (eds.) proceedings of the Berkeley conference in sound symbolism; Robin Allott's motor theory of language; Arie Poldervaart's Uto-Aztecan data; H. Fukuda's *Flip, Slither, Bang: Japanese Sound in Action*; Simone Raffaele's *Iconicity in Language*; Reuven Tsur's *What Makes Sound Patterns Expressive?*; Earl R. Anderson's wonderful overview of the field *A Grammar of Iconism*, and my own popularized account of the field entitled *Gods of the Word*. In addition, many works have come out on the Internet which have not been published formally. The *Linguistic Iconism Association* was formed in early 1998, and now has about 300 members.

3. Theoretical Preliminaries

3.1 Recapitulation of Basic Issues

In this dissertation, my primary purpose is to outline experiments which could in principle disprove the following generalizations, but which in fact support it:

The Phonosemantic Hypothesis

In every language of the world, every word containing a given phoneme has some specific element of meaning which is lacking in words not containing that phoneme. In this sense, we can say that every phoneme is meaning-bearing. The meaning that the phoneme bears is rooted in its articulation.

The Arbitrariness of Reference

Word semantics is not reducible to 'word reference'. The referent of a word cannot be predicted from how it sounds or how it is articulated. Words which share a common element of reference are said to fall in the same 'semantic class'. The fewer exact synonyms that a word has (the smaller the set of words that share its referent exactly) the more 'concrete' its 'reference'. *The salience of iconic meaning in a word is related inversely to the concreteness of its reference.*

Phonosemantic Association

When semantic domain S is associated disproportionately frequently with phoneme X, then people will be inclined to associate semantic domain S with phoneme X productively.

True Iconism

The connotation of a word is affected directly by its phonological form. On the Iconic level, a word means what it is. The form of a word does not *directly* affect what the word refers to, what its argument structure is, or any other aspect of its meaning. It only affects what the thing referred to in the word is *like*. Viewed from the perspective of parole, True Iconism or simply Iconism is among the least salient aspect(s) of word semantics. From the perspective of langue, Iconism is the most fundamental and pervasive aspect of word semantics on top of which all other layers of semantics are built.

The basic premise I maintain that allows me to assert that some aspects of every word's semantics are arbitrary and others aspects are not (i.e. that *both* arbitrariness and non-arbitrariness hold of every word) is this:

Word Semantics is Structured

Word semantics cannot be reduced to reference. A word's semantics is affected among other things by its part of speech, the way it fits into the semantic class structure of the language, its argument structure and its phonological form. Some of these aspects of word semantics are 'arbitrary' in nature (in Saussure's sense) and others are not.

As we have seen, there are basically two types of tests that phonosemanticists have conducted over the centuries.

1. The existing vocabulary of a given language is classified according to both phonetic form and semantic domains to see whether certain phonemes are more or less prevalent in certain semantic domains than in others. The initial 10 experiments are of this type.
2. Informants are prompted with sounds, images, foreign words or nonsense words and asked to provide some kind of feedback based on their linguistic intuitions. These results are then examined to see if there if they display any correlation between sound and meaning. The final 4 experiments are of this type.

Experiments of the first type can measure the extent of the phonosemantic influence in existing vocabulary and can provide us with a great deal of information about the nature of phonosemantic correlations. But no matter how many such experiments are run, they cannot in principle show conclusively whether or not the phonosemantic correlations are historical artifacts of an earlier linguistic process, or whether they reflect a natural law which must be completely general and which must therefore actively and synchronically affect every word in every language. To demonstrate this, one must perform experiments of type 2. Experiments of type 1 primarily provide evidence for Von Humboldt's type 3 iconism -- Clustering. And experiments of type 2 primarily provide evidence for Von Humboldt's type 2 iconism -- True Iconism.

Many of the publications in linguistic iconism in prior centuries and even in this one are more philosophical in nature than empirical. All of those which *deny* any regular relationship between sound and meaning that I have encountered are philosophical rather than empirical in nature. That is, they all explain on philosophical grounds why such a correlation is impossible rather than actually conducting a test to demonstrate that it in fact does not exist. In other words, in none of the 1970 entries in my full bibliography have I found an article in which an empirical test of one of the above two types was conducted with pervasively negative results. Indeed many linguists, such as Sapir and Bloomfield (and the present author) initially conducted such tests believing the results would give little or no support for linguistic iconism and ended up concluding the contrary.

I also intend in later chapters to provide an outline of the theoretical ramifications of these findings, but I first want to offer a fairly thorough corpus of supporting empirical data, for this is the foundation on which any succeeding discussions must stand.

3.2. Classification Systems

Before I continue on to discuss the tests, I would like to distinguish some different types of classificational systems. I discuss classificational systems in such detail, because the primary form of evidence I use for the Phonosemantic Hypothesis is the possibility of creating a certain kind of classificational scheme for all words which match a given phonological characterization. Consider what must be shown in order to demonstrate that a phoneme has meaning. It must be shown that all words which contain that phoneme have some element of meaning which words not containing that phoneme do not have. That is, it must be shown that words containing a given phoneme are associated with some semantic domain that words not containing that phoneme are not associated with. We can assume that if there is any such semantic domain, it will be very broad and very abstract, since there are only 24 consonants in English. So how would such a thing be demonstrated? We would first classify all the words containing a given phoneme, and then show that other words which don't contain that phoneme don't fit into that classification. This is what I propose to do, then, and this is the reason I will expend some effort now discussing the nature of classification.

In order to show that phonemes have meaning, we must have some notion of a coherent semantic domain and a coherent phonological description. I begin therefore by defining a **natural set** of words.

Natural Set

The set of all words which fit a given unified linguistic (phonological, morphological, syntactic or semantic) characterization.

For example, I will refer to the set of all words referring to food in all languages as a natural set. The set of all English words in a given person's vocabulary is a natural set. The set of all nouns containing the nominalizing suffix '-ment' is a natural set. The natural sets relevant to phonosemantics are those which have a unified phonological characterization, such as all monosyllables, or all monomorphemes beginning with /tr/. Sets defined by disjunctive characterizations such as 'the set of all words starting with /pl/ *or* referring to musical instruments' are not natural sets. Conjunctive sets such as 'the set of all words starting with /p/ *and* referring to a fruit' *do* form a natural set as I am defining it.

By a **Natural Classification**, I mean one having the properties 1-4 below.

Natural Classification

Criterion 1. Very nearly every word within the given natural set fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words in that natural set.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

The classes formed by a Natural Classification are called **Natural Classes**. There is a lot of imprecision in this definition, in terms such as 'very nearly' and 'relatively'. Hopefully, further research will be able to pin these down to precise ratios and percentages. For now, I appeal to the reader's common sense. An example of a Natural Classification for the words referring to foods would be:

Foods

Meats: ham, steak, beef,...

Milk Products: milk, butter, cheese,...

Fruits: peach, plum, apple, orange,...

Vegetables: potato, tomato, carrot, pepper,...

Sweets: cake, cookie, candy,...

Grains: wheat, oat, rice,...

Breads: bread, bun, muffin,...

etc.

A classification for the natural set of food which does not fit the criteria 1-4 would be:

Foods

Purple Food: plum, grape

Food Made from Petroleum:

Violet Food: plum, grape

Furry Food: kiwi, coconut

Food That Is Buried in the Ground:

These are the types of classifications that occur to us most readily for any given set of data. They are psychologically real. By means of Clustering, some phonemes in a given language may gravitate more toward some Natural Classes than others, but no Natural Class is the exclusive domain of any one phoneme.

It may seem that one could devise any number of Natural Classifications for a given set of data, but as Rosch(1973) and others have shown, this turns out not at all to be the case. Language conspires to limit the Natural Classes into which words can fall. English simply does operate in terms of, for example, words for 'food' subdivided again into 'meat', 'vegetables', 'fruits', 'breads', etc.. It does not operate in terms of 'words for objects that lean at an angle' or 'words for objects that can't easily be moved' or 'food that has been buried 4 months underground'. It doesn't even operate in terms of 'round foods' or 'soft foods', even though there are a fair number of foods which **are** soft and round. This means that part of the 'meaning' of the English word 'mango' is that it is classified as a fruit. That fact about 'mango' is built into English itself, and it is because of this that we can make a Natural Classification for food words which includes 'fruit' as a subset, whereas if we try to classify 'food' words according to other parameters, they do not fit the four criteria for a Natural Classification.

We cannot easily abstract away from these Natural Classifications, because they lie at the very heart of what for us distinguishes a word from a mere string of sounds. It is my contention that sound-meaning is actually more fundamental than reference or Natural Classes, but because we cannot in general stretch our mind enough to abstract away from the Natural Classes, we must work within them. I therefore look at classifications which meet even stiffer criteria than that of 1-4: those which include criteria 1-4 and then some. I will look at groupings of words which both fall within a given Natural Class **and** which also take on certain common semantic characteristics because of commonalities in their phonological form. These are what we call the 'phonesthemes'.

Consider the /gl/ phonesthemes mentioned in the introduction:

Reflected or Indirect Light -- glare, gleam, glim, glimmer, glint, glisten, glister, glitter, gloaming, glow

Indirect Use of the Eyes -- glance, glaze/d, glimpse, glint

Reflecting Surfaces -- glacé, glacier, glair, glare, glass, glaze, gloss

These all fall within the Natural Classes of 'light' and 'seeing' which include many words which contain neither /g/ nor /l/. 'Light', for example, is not the exclusive domain of any one consonant. 'Light' is a **natural semantic domain** or **Natural Class**. In these particular cases, however, if one accepts that Semantic Association can happen as low as the level of the phoneme, then there happens to be good evidence to suggest that the 'light' in these particular words comes from the /l/ and the indirectness comes from the /g/.

The evidence that the 'light' in these words comes from the /l/ takes the form of disproportions in semantic distribution among the phonemes. For example, apart from the abovementioned 'looking' verbs: gape, gasp, gawk and gaze, which do not directly concern light anyway, no light occurs in monosyllabic words containing /g/ but not /l/. But disproportionately many words containing /l/ and no /g/ refer to some aspect of light. And the disproportions are great.

When one looks at all the semantic domains that various phonemes favor across all the Natural Classes, one finds that they have a unified semantics that lies deeper than mere adherence to some group of Natural Classes. They are like light shone through so many prisms. One must initially consider the form of each prism as well as the nature of the light that emerges from it to determine what the original light is like. I find that the phoneme means something in its own right independently of all the classes it clusters toward. And it is this original, unified essence -- not the Clustering -- which I think of as True Iconism.

In this first experiments, I will be testing for the Phonosemantic Hypothesis by trying to form a more narrow Natural Classification for various natural sets which are phonologically defined. I will call such classifications '**Phonosemantic**'. Phonosemantic classifications are essentially classifications of phonesthemes. The first four criteria for a Phonosemantic Classification are merely the criteria for a Natural Classification as defined over natural sets which are phonologically defined:

Phonosemantic Classification

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

Criterion 7. A much smaller percentage of the words which do not match the relevant phonological characterization fit into any class.

Criterion 8. Those words that do **not** match the relevant phonological

characterization but which nevertheless do fit in the classification fit on average in a smaller percentage of classes, than those words which *do* match the phonological characterization.

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

This is a very tall order to fill, but in my view, these are the criteria that must hold if phonemes are to be shown to be meaning-bearing. And in my view, these criteria do indeed hold English. Before going on to more detailed tests, I will provide here a small illustrative example of the type of data that concerns us.

3.3. A Small Scale Example of the Phonosemantic Experiment

In attempt not to lose the forest for the trees in our discussion, let me now give a brief overview of the types of tests which will be conducted on a much larger scale in the following chapter. Consider once again /gl/ in initial position. (The upcoming tests will hopefully convince the reader that any polyconsonantal onset works equally well, but for the purposes of exposition, I find it clearer not to keep presenting new data.) One possible Phonosemantic Classification for English monomorphemes beginning with /gl/ might look like this:

Reflected or Indirect Light -- glare, gleam, glim, glimmer, glint, glisten, glister, glitter, gloaming, glow

Indirect Use of the Eyes -- glance, glaze/d, glimpse, glint

Reflecting Surfaces -- glacé, glacier, glair, glare, glass, glaze, gloss

Other Light or Sight -- globe, glower

Understanding -- glean, glib, glimmer, glimpse

Symbols -- gloss, glyph

Ease -- glib, glide, glitter, gloss

Slip -- glide, glissade

Quantities -- glob, globe, glut

Acquisition/Stickiness -- glean, glimmer, glue, gluten, glutton

Strike -- glance

Containers -- gland, glove

Joy -- glad, glee, gloat, glory, glow

Unhappiness -- gloom, glower, glum

Natural Feature -- glade, glen

One observes several things initially:

* The large majority of these various classes are ordinary cross-phonemic Natural Classes (Light, Sight, Surfaces, Thinking, Symbols, Motion, Quantity, Acquisition, Strike, Containers, Joy, Sorrow, Natural Features). One finds light, understanding, symbols, etc. in many other consonant sequences besides /gl/. For one thing, one finds reflected light in the word 'gleam', 'glim', 'gloaming' and 'glimmer', which all contain an /m/. These phonesthemes at first glance represent merely semantic disproportions among phonemes. And we cannot even be sure that they *are* disproportions unless we try sorting all other phonologically defined Natural Sets into these same classes. What one really sees in Phonosemantic Classifications of this type is the way that /gl/ manifests through the filters of these various Natural Classes. It remains to be seen whether /str/ or /fr/ pattern any differently.

* These classes are related to one another. There is, for example, a quite general thematic metaphor in English "Light IS Understanding" (Lakoff and Johnson, 1980). The symbols in /gl/ (gloss and glyph) are also related to understanding. Similarly, acquisition is related to sight and to quantities (glob, glut) and to containers. This preoccupation with acquisition, quantities and containers is quite general to the velar consonants. Ease, joy and understanding are also related to one another. This interrelatedness of the most prevalent semantic domains for a given

phoneme is one of the first intimations that each phoneme and phoneme sequence actually has a unified meaning which underlies all of these classes.

* One can also notice here that in addition to single consonants, often multiple consonant combinations will confine themselves to a semantic domain which is narrower than the sum of the parts requires. All of the semantic domains listed here are theoretically available within the semantic confines imposed by /g/ and /l/. But /gl/ tends to like to confine itself even more than necessary so that 40% of these /gl/ words concern light. This patterning in /gl/ is typical in that many of the natural semantic domains which are possible for /gl/ are in fact represented in English, but not uniformly so. Once again, this is an example of 'Clustering' or Phonosemantic Association.

* This clustering is to some degree specific to English. A high percentage of the words beginning in /gl/ in all the Germanic languages concern reflected light. In Russian, for example, too, there is a certain amount of vision (gladet' -- gaze, glanut' -- cast a glance, glaz -- eye, glazet' -- stare) and a lot of smooth surfaces (gladit' -- iron, gladkij -- smooth, glad' -- mirror-like surface, glazirovat' -- glaze, glazur' -- icing, glissir -- hydroplane, glyanets -- polish) but the percentage is lower due to the fact that other basic words begin with /gl/ and form vorteces for Clustering (glava -- head, main, glubok -- deep, golos' -- voice, glina -- clay, glup - - stupid). Clustering tends to be more language-specific, whereas true Iconism is universal.

Classifications like the one for /gl/ above verify criteria 1-6 for a Phonosemantic Classificational scheme. But in order to check for criteria 7-9, we must try putting words with a different phonological characterization into the classes tailored for /gl/. I will provide here one small example of this in order to demonstrate what happens quite generally cross-linguistically and cross-phonemically. Look first at the /fr/ words that do fit the characterizations provided for the /gl/ phonesthemes.

Reflected or Indirect Light -- glare, gleam, glim, glimmer, glint, glisten, glister, glitter, gloaming, glow

Indirect Use of the Eyes -- glance, glaze/d, glimpse, glint

Reflecting Surfaces -- glacé, glacier, glair, glare, glass, glaze, gloss

Other Light or Sight -- globe, glower: *fresco*

Understanding -- glean, glib, glimmer, glimpse: *frame (a question)*

Symbols -- gloss, glyph: *franc*

Ease -- glib, glide, glitter, gloss: *frank, free*

Slip -- glide, glissade

Quantities -- glob, globe, glut: *fraught, freight*

Acquisition/Stickiness -- glean, glue, gluten, glutton: *fraud, free, freeze, frisk, frog*

Joy -- glad, glee, gloat, glory, glow: *frank, free, frisk, frivol*

Unhappiness -- gloom, glower, glum: *fray, frazzle, fret, fright, frown*

Natural Feature -- glade, glen

Containers -- gland, glove: *frame, fret, fridge, frieze, frill, fringe*

Strike/Touch -- glance: *fray, french, frisk*

Exceptions -- *frail, frappé, freak, freckle, frenzy, fresh, friar, friend, fritter, frizz, frizzle, frock, from, frond, front, frontier, frosh, frost, froth, frowzy, fruit, fry*

Obviously, a much smaller percentage of /fr/ words fit in this classificational scheme than /gl/ words, and those words that do fit appear a little less frequently on average (an average of 1.3 times for /gl/ vs. 1.1 for /fr/). Thus criteria 7 and 8 of the Phonosemantic Classification are met in this small example. Furthermore, observe that in all these cases, the /fr/ words that fit the characterization given for these /gl/ phonesthemes actually fit the characterization differently (criterion 9). Whereas 41% of words beginning with /gl/ concern sight, only one /fr/ word 'fresco' is marginally related to sight. The understanding in /gl/ is receptive. In /fr/, the one word which marginally concerns understanding (frame a question) is directed outward toward the source of information rather than inward toward the one who understands. The 'Ease' in /gl/ concerns non-difficulty or superficiality. The 'Ease' words in /fr/, 'frank' and 'free', are oriented rather toward openness and liberty. The quantities in /fr/ (freight and fraught) both imply a predication -- something which is fraught or weighed down with or by something else. This is not true of the corresponding /gl/ words. The unhappiness in /gl/ is depressed. In /fr/ it is largely nervous or afraid. The /fr/ words classified here as containers are not really containers at all, but frames, borders or edges. The joyfulness in /gl/ differs from that in /fr/ in that it is more inwardly than outwardly expressed.

It is typical that in semantic comparisons of two different phonologically defined classes of words that half the words in each group don't fit in the other group's semantically based classification at all. The /fr/ words taken as a whole fall more easily into a different Natural Classification. Overall, when one seeks out a Phonosemantic Classification for /fr/, one gets a very different profile than what one finds in /gl/, even though, once again, most of the classes are natural and therefore not limited to a particular phonological form. Words beginning with /fr/ which did fit in the above /gl/ scheme are italicized:

Vulnerable, Young -- frail, freak, fresh, frosh, fruit, fry
Deceit -- *frame, fraud*
Freeze, Congeal -- *frame*, frappé, freeze, *fresco, fridge*, frost
Frame, Border -- *frame, fret, frieze, frill, fringe*
Disintegrate -- fray (come apart), frazzle, free, fritter, frizzle, frowzy, fry
Fuzzy, Frilly -- frappé, fray (come apart), frazzle, freckle, *frieze, frill, fringe*, frizz, frizzle, frock, frond, frost, froth
Nervousness, Fear -- *fray, frazzle*, frenzy, *fret, fright, frown*
Front, Far -- from, front, frontier
Friendly People -- friar, friend
Burden -- *fraught, freight*
Fun and Free -- *frank, free, frisk, frivol*
Exceptions -- franc, frog

The English /gl/ and /fr/ words, then, do meet the criteria of the Phonosemantic Classification, and therefore the sounds /gl/ and /fr/ appear to be affecting the meanings of the words that contain them.

An important question I ask in the following experiments, then, might be phrased as this: For any arbitrary phonological characterization in any arbitrary language, can a classification be found which meets criteria 1-9 for a Phonosemantic Classification above? That is, is this just a historical

artifact peculiar to English, or is some active, productive natural law at work? The initial tests in this chapter concern classifications of this type, many of them on a fairly large scale. I believe that in the experiments I outline below, I have found classifications which taken as a whole do meet these 9 criteria for a Phonosemantic Classification for the monosyllabic vocabulary of English. To the extent that these tests yield the same results in languages and semantic domains not covered in this work, then I cannot see but that it must be admitted that phonological form significantly affects the semantics of words universally.

After spending some time at this, the big question that begins to loom over one takes the form of, "What after all is the semantic distinction between 'gleam' and 'glimmer' and 'glisten' and 'glitter' and 'glow'? How do we characterize it? How do we learn it? Where does it come from?" It seems to me that the results of these experiments suggest that the essential differences between the words which fall together in narrow natural semantic domains of this nature can be attributed to the effects that phonology has on semantics. Once a phoneme is filtered through the Natural Classes, its semantic effect becomes amazingly specific. Consider once again the famous reflected light phonestheme this time sorted according to the other sounds which occur in these words:

Reflected or Indirect light

glare
 gleam, glim, glimmer, gloaming
 glint, glitter
 glisten, glister
 glow

glimmer, glister, glitter
 glisten

glare
 gleam
 gloaming, glow
 glim, glimmer, glint, glisten, glister, glitter

The most intense of these words is clearly 'glare'. Furthermore, /r/ occurs proportionally more frequently than any other consonant in words associated with 'intensity' in every natural semantic domain. (Genette has devoted a chapter to this, and my findings confirm it.) The /gl/ words which refer to a sparkly kind of light all contain a /t/. Those that additionally contain an /s/ are more intense and less superficial. This intensification is quite pervasive in English words containing /s/. (Consider effects of the type mash/smash, tamp/stamp, etc.) The word 'glint' connotes a mere suggestion of light. This is quite common in words containing an /n/ in pre-final position: hint, tint, faint, point, scent, taint, scant,... also fringe, glance, pinch, strand, tinge, twinge, hunch, sound out, get wind of, etc. There's a different quality to the light in words containing /m/ than in words containing /t/. It is less sharp and sparkly. The reflection seems to be against a smoother surface. This holds of other /m/ words concerning light as well (flame and beam). The phoneme /m/'s light is also not as abrasive as the light in 'glare'. The phoneme /r/ quite generally has a 'tearing' or 'ripping' quality. It frequently occurs in words in which the integrity of form is violated. The /m/ words differ from 'glow' not so much in the quality of the

light, but in the fact that the /m/ words imply a dawning or a beginning (the project was but a gleam/*glow in his eye), whereas 'glow' implies light in the fullness of its manifestation (She was all aglow/*agleam.). The 'gleam' in /m/ differs from the 'glint' in /n/ in that the /m/ suggests the beginning of something ongoing, and the /n/ suggests a hint of something caught in mid-stream. For example, if one walks past a door which is cracked open and sees a flash of light as one passes, that might be a 'glint' but not a 'gleam'. If one is motionless relative to the light but sees a touch of it through a crack that suggests that something interesting might be going on inside, then that's a 'gleam' more than a 'glint'. The labials quite generally appear in words concerning beginnings, and the dentals quite generally occur in words concerning linearity and ongoing processes.

Consider now other aspects of the phonology of these words. The disyllables that end in -er or -en all suggest a repetitive or unsteady quality to the light. This is not true of the monosyllables. The -er words imply that the sparkly effect happens all the time. The -en suggests that there is a particular light source relative to which the reflected light occurs (It's glittering, glimmering, glistening/ ?It's glistening. We prefer: It's glistening *in the light of the sun.*) The words containing a short 'i' all refer to light that is short-lived. The words containing other vowels all refer to light that is prolonged or ongoing. Of these, the high vowel (gleam) suggests a narrow band of light. Those containing /ow/ concern light that is not directed, all-pervasive.

It might be of interest now to consider the Norwegian words in the same semantic domain. To make the comparison with English easier, I will not include verbs of seeing or reflecting surfaces (glass, glatt, glette, glire, glitte, glitter, glor)

Light
glore
glans, glinse
glime, glimmer, glimte
glimte, glitre
glo, glø

Once again, the words containing a short /i/ refer to short-lived manifestations of light and those which contain other vowels in stressed position suggest more prolonged light. Once again, the word containing /r/ has an intensity the others don't. Once again, the /m/ words imply a less sparkly, smoother light than /t/, and also suggest the beginning of something. Once again, the words ending in -er/re suggest repetitiveness or an intermittent quality. Once again, the verbs that end in vowel suggest light or heat in the fullness of its manifestation. Norwegian also has a class of /ns/ words which do not occur in English words for light. These words have a quality of ease that one finds also in English 'dance', 'prance', 'glance', 'rinse', 'prince/ly', etc. The data in Appendix I suggests that the finesse and ease in these words is provided by the /n/, and the strength by the /s/, the light by the /l/ and the indirectness by the /g/. A close look at vowel semantics suggests that the short-lived quality of 'glinse' vs. 'glans' is attributable to the short /i/. Whether or not these similarities are attributable to common etymologies between the two languages, the fact remains that over thousands of years, /m/ and /t/ and /r/ all still correlate with a fairly specific and consistent aspect of light in words of both languages.

I am well aware that a discussion of this type does not constitute proof that these aspects of the phonemes are indeed affecting the semantics of /gl/ 'light' words as I suggest. But I do believe that a close look at all the data presented in Appendix I taken as a whole does constitute proof

that the effect of phonology on the semantics of English monosyllables is just that pervasive and just that specific. It has been presumed that correlations of this kind are coincidental and sporadic. The data presented here and in some other works in phonosemics shows that correlations of this nature are universal and productive. They cannot therefore be coincidental. Experiment I is the largest scale experiment in this dissertation. Unless one actually works laboriously through the data in Appendix I, however, it is very hard to see many aspects of what it shows. I will therefore augment that data with other experiments which address issues which can and should be brought into question.

3.4. Overview of the Experiments Conducted

First a series of several tests were conducted which analyzed the existing vocabulary of English, and of certain subdomains of the vocabulary of languages other than English. Following that, another series of tests were conducted, all of which queried informants regarding their intuitions about the semantics of nonsense words.

What follows is a brief description of the tests that I have run and will discuss below in more detail throughout the dissertation. The actual data resulting from each of the tests can be found in Appendices I-XIV.

Experiments Which Analyze Existing Vocabulary

Experiment 1 -- Classification First by Phoneme Sequence then by Semantic Domain (Section 4.1, Full data and results in Appendix I)

In this experiment, I extracted all the monosyllables familiar to me from Houghton Mifflin's *American Heritage Dictionary*. These words were divided into 24 classes, one for each consonant phoneme. I then devised a tentative phonosemantic working classification for each of these subclasses. Finally, the words within each of the resulting phonesthemes were subdivided again according to the phoneme's position within the syllable.

Only 3% of the 3485 monosyllables did not fall easily into a Phonosemantic Classification. All of these exceptional words did, however, fall into a limited set of Concrete Noun classes, that is to say they are nouns with rigid referential meanings. For example, the exceptional 'body parts' were 'beak, jowl, thigh'. The exceptional games were 'craps', 'golf' and 'whist'. To some extent, a different Phonosemantic Classification results in a different list of exceptions, but whenever I have formed a Phonosemantic Classification, all of the words which don't conform to the classification end up being Concrete Nouns. In addition to these 3% that don't fit in my phonosemantic classes, there are hundreds of words that fit in both the phonosemantic classes and the Concrete Noun classes. The exceptions tend to have a single narrow and well-defined non-idiomatic function in the language. Polysyllabic monomorphemes are considerably less likely to fit in the Phonosemantic Classification than are monosyllables.

This experiment provides us with a general idea of the preferred semantic domains for each phoneme and the percentages of words containing a given phoneme that can be characterized by these semantic domains. It also allows us to observe the semantic effect of phoneme position. Finally, it allows us to observe the relative nature of those words which do and do not easily submit to Phonosemantic Classification, namely that they are Concrete Nouns.

Precedents in the Literature -- There have been a number of studies which perform phonosemantic analyses of existing vocabularies.⁴ Unlike most of those predecessors, the present experiment lists not only words which fall into the phonesthemes listed, but also those which do not fall into phonesthemes listed. This, I believe, is significant, for only by covering the entirety of a well-defined portion of a vocabulary is one able to *quantify* the extent of the disproportions. And unless one can quantify the extent of the disproportions, an interesting hypothesis has perhaps been presented, but nothing substantive has been proven.

I've found only a very few works which cover large portions of a language's vocabulary in its entirety, none of them on as large a scale as my first experiment here. The most notable precedents

that I have come across are Bloomfield(1910), Ertel(1972), McCune(1983) and Lawler(1990). Neither Bloomfield, Lawler nor McCune take statistics in the manner that I do in Experiment 1, showing precisely what percentage of the vocabulary with a given phonological form falls within each phonestheme. Their works do, however, sketch the most important results of such statistical analyses, since they do cover the entirety of a well-defined portion of a vocabulary for a language or language group. Ertel does provide statistics over his results, but his experiment is more similar to later experiments I conducted, so his results are not commensurable with those of this experiment.

I believe this Experiment 1 is the first attempt to provide a semantic profile *of individual phonemes* in a systematic way over a large range of words. McCune mentioned in his dissertation that he thought it possible that even phonemes could be shown to have meanings and Richard Rhodes (personal correspondence) has told me that he independently realized that this was the case some years ago, but he has not had an opportunity to write anything up about it. Though one finds occasional mention of positional effects in the literature, I believe I am also the first to undertake in a systematic way an analysis of the *positional* effects of individual phonemes on meaning, as I do implicitly here in the first test and explicitly in the 8th and 9th tests (sections 4.8 and 4.9).

Experiment 2 -- Classification First by Phoneme Sequence, Subclassification by Semantic Domain and then Regrouping of Different Phonemes by Semantic Domain (Section 4.2, Full data and results in Appendix II)

In this experiment, all the monomorphemes in my active English vocabulary containing an /r/ in second position were classified by initial consonant. Then for each of these subclasses, a Phonosemantic Classification was created. Then the phonesthemes in each of these groups for similar Natural Classes were matched up. For example, the 'breaking' phonestheme for /br/ was aligned with the 'fracturing' phonestheme for /fr/, and an attempt was made to determine how these matching phonesthemes differed semantically. I find that one sees the effects of individual phonetic features more clearly if one conducts the experiment this way rather than by finding all the 'breaking' and 'fracturing' words first and then subdividing by initial consonant.

This experiment gives us a better view of what specific role each phoneme plays within a given semantic domain than the previous experiment. However, since it confines itself to a more limited portion of the English vocabulary, it does not so readily give one a broad overview of the semantics of each phoneme as did the first experiment. The level of specificity also allows one to see more clearly what the phonetic features have in common semantically. The semantics of the phonetic features is, of course, even more abstract than that of each of the phonemes.

Precedents in the Literature -- I don't know of any tests in the literature which fit this description. I have found this particular type of experiment the most effective and reliable means of identifying a semantic characterization of phonetic features. Many papers contain brief notes about the apparent semantics of particular phonetic features, but I've seen no attempt to conduct experiments which tried to get at these meanings in any systematic way. Wescott's (1971) paper on labiovelarity and derogation comes to some similar conclusions, though his methods are quite different.

Experiment 3 -- Natural Classes for Arbitrary Sets of Words (Section 4.3, Full data and results in Appendix III)

In the first two experiments, one analyzes sets of words into a Phonosemantic Classifications. As one conducts these experiments, the big question that looms in one's mind is the extent to which all

other words would fit just as easily into these same classes. Subjectively it may seem impossible that any arbitrary class of words could fit equally well into these same classes -- that 40% of all the words in the language could refer to reflected light, for example -- but often the judgements are subtler, and one can fool oneself. This test is a reality check. In it, each 10th word in alphabetical order is classified into a Natural Classification. The result is then compared with the Phonosemantic Classification found in Experiment 1 for words beginning with /b/.

One finds that words chosen at random do fall into a limited number of classes -- the Natural Classes -- but that these classes are neither as limited nor as specific as those which words beginning with /b/ can be classified into. Furthermore, once Natural Classes for a random set of words are formed, one finds that some classes have a preference for certain phonemes over others. In comparing this classification with a scheme found for words beginning with /b/, one finds certain of these classes represented in the /b/ words in large quantities and about half completely devoid of words beginning with /b/.

Precedents in the Literature -- I don't know of any papers comparing Phonosemantic Classifications for a given phonological form with random words.

Experiment 4 -- Classify Words Containing a Phoneme Sequence X into a Classification Designed for Words Containing Phoneme Sequence Y (Section 4.4, Full data and results in Appendix IV)

Another way to check whether all phonemes can be classified alike is to take a classification that works very well for words containing one phoneme and try to fit words containing another phoneme into these same classes as I did in the illustrative example comparing /gl/ and /fr/. In this case, I took all the monosyllables containing /l/ and tried to fit them into the /b/ classes. I found that whereas I could count on one hand the number of /b/ words which didn't fit in this scheme, about half of the words containing /l/ didn't fit in the /b/ classes at all. Those that fit best were those that also contained a /b/ or /p/ -- the class of 'bulging' and 'roundness'. Furthermore, those that did fit, fit differently. That is, although the defining (natural) characterization given for the /b/ class also fits some of the /l/ words, the words containing /l/ nevertheless differed from those containing /b/ in some observable way.

Precedents in the Literature -- I don't know of any published experiment of this type.

Classification First by Semantic Domain, then by Phoneme

These first four tests all begin with sets of words which have some common phonological characteristic and then classify them semantically. In the following tests, the procedure is reversed. I begin the next few tests by choosing all the words which fall in a natural semantic domain. I then subdivide these words according to their phonological form to see if I can discern any patterns. In this way, we can get a better overview over the phonosemantics of individual Natural Classes as well as a little more insight into Iconism (as opposed to only Clustering).

Experiment 5 -- Words Referring to Walking (Section 4.5, Full data and results in Appendix V)

In this experiment, I looked at all the monosyllabic verbs of motion in my English vocabulary which **must** be done on foot. These included primarily verbs of walking, running, jumping and dancing. One finds in this case that each phoneme has a surprisingly specific effect on the meaning in the context of a sufficiently narrow class. For example, all such walking verbs which begin with

a /t/ imply that the walking has a specific goal which may or may not be reached. Those containing /p/ imply that the walking involves discrete steps, and so forth.

Precedents in the Literature -- This is one of the more common types of phonosemantic experiment and it finds many precedents in the literature. There are several studies which subdivide words first into semantic domain and then analyze their phonological form in a manner similar to what I present in tests 5 and 7. McCune discusses the phonetics of various semantic domains in Indonesian in a similar manner. Such papers also include André (1966), Barry and Harper (1995), Bolinger (1946), Callebaut (1985), Cassidy, Kelly & Sharoni (2000), Chan (1995), Emeneau (1938), Ertel (1972), Fónagy (1963), Fónagy and Fónagy (1970), Gordon and Heath (1998), Greenberg and Sapir (1978), Hines (1994), Hough (2000), Jurafsky (1996), Langdon (1994), Leman (1984), Lihomanova (1999), Pentland (1975), Prokofieva (1995), Rhodes (1980, 1981, 1994), Sapir (1911), Tanz (1971), Traunmüller (1996), Wescott (1971, 1975, 1977, 1978), Whissel (1998), Whissel and Chellew (1994), Woodworth (1991). I'm not aware of any studies specifically concerning walking, though there's a study by Kendon (1972) on body motion and speech. Robin Allot has developed his phonosemantic motor theory of language based on the gestural equivalents to speech forms, and others have pointed out that phoneme meanings seem to be rooted in articulation -- the meaning of a phoneme, in other words, seems to be related to its literal physical shape. Works such as Rhodes (1994) and Wescott (1971) analyze the phonosemantic structure of words to a similar degree of specificity.

Experiment 6 -- The Bias in the Labials
(Section 4.6, Full data and results in Appendix VI)

In this experiment, certain classes were chosen which were known to favor labial consonants. These were:

- Bulges, Mountains, Humps and Peaks
- Fountains and Blowing
- Foundations
- Beginnings
- Pairs, Names, Pictures, Symbols

This experiment verifies that these classes do indeed overwhelmingly favor labial consonants. Furthermore, we find as in the previous experiment, that within such limited semantic domains, individual consonants do seem to have quite specific semantic effects.

Precedents in the Literature -- Though there are many papers which discuss the phonosemantics of a given semantic domain, I haven't found any which look at a range of semantic domains which are known to contain words characterized by a given phonological form. Emerson (1996) has done a quite thorough study of explosive words containing nasal stops, and Wescott (1971) is also similar. Neither of these is as thorough, I feel. They do not, for one thing, classify all the in the semantic domain words which do **not** have the relevant phonological form and they therefore cannot take statistics. However, Ertel's (1972) methodology and method of taking statistics seems to me very similar to this one. His study is cross-linguistic, and he finds the correlations between sound and meaning in the four semantic domains he researches to be universal.

Experiment 7 -- Locations
(Section 4.7, Full data and results in Appendix VII)

In this experiment, words which refer to places and which begin with certain specific consonants are taken into consideration. First the 'location' words beginning with /b/ were classified in two

ways -- one in a phonosemantic manner which favored /b/ words, and the other into Natural Classes which are equally applicable to words of any phonological form. Then words beginning with consonants other than /b/ were classified first according to the one scheme and then the other. It was demonstrated in this manner that certain Natural Classifications do indeed favor a given phonological form and others do not. Finally the same experiment was performed with words for locations in Russian beginning with /b/ and also with other consonants. It was found that the Russian words patterned very much like the English words, even though the classifications were initially created only for English words.

Precedents in the Literature -- This again is similar to Ertel (1972) in that it both limits itself to a given semantic domain and then performs a cross-linguistic analysis. This experiment is on a smaller scale than Ertel's. It also differs from Ertel in two ways. First, I combine a cross-linguistic analysis of a semantic domain with the methods used in Experiment 4. And second, I show that there are two types of natural classifications for a phonologically defined natural set of words.

The Effect of Position within the Syllable

If phonosemantics is truly Iconic in nature, then every distinction in form should give rise to some kind of semantic distinction. Thus I look also for the effect of position within the syllable on word semantics. I find that these experiments can only be effectively conducted after one has convinced oneself that each phoneme does indeed command a unique semantic domain, and only after one has a sense for what the specific semantics of each phoneme consists in. In addition to the semantic effect of Natural Classification, the effect of the phoneme itself must be filtered out before one can observe positional effects. The following two tests propose ways of getting a sense for the effects of position on word semantics.

Experiment 8 -- Positional Iconism -- Comparison of Similar Phonemes (Section 4.8, Full data and results in Appendix VIII)

In this experiment, all the English monosyllables in my vocabulary which contain /l/ or /r/ and which fall in one of the following semantic classes were classified into phonesthemes:

Non-Vehicular Motion, Vehicular Motion, Liquid in Motion, Sound, Speech,
Make Active, Scare /r/ -- Calm, Slow Down /l/, Curse or Criticize, Roads

In the previous experiments /l/ and /r/ have been shown to be quite similar phonemes also semantically. Furthermore, they both appear in many positions within an English syllable. In this experiment, words containing /r/ in each position and referring to e.g. non-vehicular motion were compared with words containing /l/ in the same semantic class and appearing in the same position within the syllable. It was found that although /r/ and /l/ each have their own unified semantics, the effect of that semantics is also colored by the position that phoneme occupies within the syllable. It was also found in this case and in the previous experiments that /l/ and /r/ consistently differ from one another semantically.

Precedents in the Literature -- I've not encountered any studies which match this description. This is the best method I have found for getting at the specific semantic difference between two phonemes. The comparison between the phonemes also makes the positional effects much clearer.

Experiment 9 -- Reverse Phoneme Order (Section 4.9, Full data and results in Appendix IX)

In this experiment most of the monosyllables in my vocabulary were taken into consideration. All

words containing a given pair of consonants were classified into Natural Classes. Then all words containing the same two consonants in the reversed order were classified into Natural Classes. Then the two classifications were compared in order to ascertain: 1. which classifications favored which order, and 2. what effect the order had on words in the same semantic class. In many cases the semantic effects of this reversal are not immediately obvious. For this reason, a detailed discussion of all the monosyllables containing /t/ and /r/ has been included in the discussion of this test.

Precedents in the Literature -- I'm not aware of any studies which match this description either.

Experiment 10 -- The Universality of Phonosemantics, the Case of /s//t//r/
(Section 4.10, Full data and results in Appendix X)

A final area which will concern us in these experiments which are based on existing vocabulary will be the universality of phoneme semantics. If the Phonosemantic Hypothesis has some validity, then it may or may not be the case that at least some of the association between phonology and word semantics is truly Iconic as opposed to being a by-product of Clustering. It may or may not be the case that these correlations are subject to natural laws and productive in living language as opposed to by-products of earlier historical processes. Indeed, though there is much indirect evidence to suggest that phonosemantics involves both Iconism and Clustering, and that it is productive, all these experiments actually only provide conclusive evidence for a conventional, non-productive as opposed to natural association between sound and meaning. To the extent that the association is in fact truly Iconic (natural), it must also be universal. In this experiment, we find that all the roots which appear in a wide variety of languages and which contain /s/, /t/ and /r/ in that order fall universally within a quite limited classification, and that words with other phonological forms do not fit in these classes.

Precedents in the Literature -- There are several studies of this type. The most prominent of these to my mind is again Bloomfield's monograph. I have also read Dempwolff (1925) and been influenced considerably by Salisbury's (1992) excellent unpublished cross-linguistic study of the k-v-n sequence. Of these, Salisbury's work is most similar to what I do here in Experiment 10.

Experiments Which Analyze Nonsense Words

In this final series of tests, I use informants' intuitions to analyze the semantics of nonsense words. These experiments allow us to examine to what extent Iconism and Phonosemantic Association are synchronically productive processes in a way that analysis of existing vocabulary never can, no matter how general the results of that analysis proves to be.

Experiment 11 -- Invented Definitions for Nonsense Words
(Section 4.11, Full data and results in Appendix XI)

In this experiment, visitors to a phonosemantic Web site were asked to provide definitions for nonsense words, such as 'baff', 'drulk', 'leb' and 'wentle'. This experiment overwhelmingly confirmed the existence and productive nature of Semantic Association, and it was argued that this Semantic Association must be happening on the level of the phoneme and not merely on the level of the word. No limitation was set on the definition that informants could provide, and yet on average 80% of the definitions fell into a few (on average about 4) fairly narrow natural semantic classes for each word, though these classes, of course, varied from word to word. Furthermore almost all of the definitions provided were very similar to the primary sense provided in the dictionary for some other common word which closely resembled the test word. It was found,

however, that certain words similar to the test word were consistently imitated, and other equally similar words were not.

Precedents in the Literature -- I've been informed of the existence of one paper by Cynthia Whissel and H. Nicholson (1991) on children's invented definitions for words. I've not had access to this paper, though in general I've found Whissel's work to be very thorough and interesting. Otherwise I know of no papers that discuss the results of an experiment similar to my experiment 11. The Internet has, however, made it much easier and less expensive to collect this type of data, so I would anticipate many more tests of this type to appear in the near future.

***Experiment 12 -- More Narrowly Limited Semantic Characterizations of Nonsense Words
(Section 4.12, Full data and results in Appendix XII)***

In this experiment, informants were asked to define 'nem', 'forp', and 'woat' within more narrow semantic domains. Questions took the form, "If 'nem' were a size, what size would it be.?" Once again it was found that the responses were not arbitrary.

Precedents in the Literature -- The most famous work along these lines is Sapir's (1929) study in which he asks informants questions of the form, "'Mal' and 'mil' are both words for 'table' in some language. Which table is bigger -- 'mal' or 'mil'?" Most of the studies which involve informant queries (see again endnote 2) ask them to guess the meanings of foreign words within certain limitations. Such experiments are in some ways similar to my experiment 12.

***Experiment 13 -- Invented Words for a Given Definition
(Section 4.13, Full data and results in Appendix XIII)***

In this experiment, the order of the questioning was reversed. Informants were provided with a definition and asked to provide a word which fit this definition. The definitions used were:

to scrape the black stuff off overdone toast
to drag something heavy into the water
to swarm over the head like mosquitoes
the texture of a hedgehog
the feeling you get falling downward on a roller coaster
the appearance of the sky before a storm
a paper cutter
a layer of pollen on plant leaves
the knobs on the spikes of a hairbrush

It was found that informants strongly preferred certain phonemes over others for each of the definitions. In some cases, the phonemes which were preferred appeared in the definition itself, but this was often not the case. Indeed, in 4 cases out of 325, two informants chose one and the same nonsense word for a given definition. If one figures the number of possible English syllables to be around 50,000, then the likelihood of this occurring is about 1 in 15.

Precedents in the Literature -- Much of the commercial interest in sound symbolism has come out of the naming industry, and consequently there are some studies of applicability of names both to people and products. This is similar to what I am trying to get at in Experiment 13, though I know of no one who has queried many informants asking them to invent words for definitions, as opposed to commercial products.

***Experiment 14 -- Invented Words to Describe Images
(Section 4.14, Full data and results in Appendix XIV)***

It was thought in the previous experiment that the word which appeared in the definition may have predisposed informants to choose certain phonemes over others by Phonosemantic Association. Of course, if the sign is arbitrary, then Phonosemantic Association should not be a factor in their decisions. But assuming it is in some degree not arbitrary, to what extent is the association natural, and to what extent conventional? Another test was therefore devised in which the informants were prompted with semi-abstract images rather than definitions. In the previous test, informants were asked to restrict themselves to monosyllables. In this test no such limitation was imposed. It was found once again that the nonsense words provided to describe these images were far from random. Indeed, of the 204 total responses to all 6 images, there were once again 2 identical pairs, and numerous near pairs. If I take the polysyllabic and words with ungrammatical syllable structure out of consideration, then the chance that there will be 2 identical pairs among the monosyllabic responses is about 1 in 14. However, taking into consideration that many responses were disyllables, the chance of 2 identical pairs shoots way up to about 1 in 74,000.

Precedents in the Literature -- There are several studies which discuss images and sound. Davis (1961) actually conducts a similar experiment. Related works include also Berghaus (1986), Helson (1933), Khatena (1969) and Schaefer (1970).

I have organized my presentation of each experiment in a manner which I hope will not leave the reader questioning why I have drawn the conclusions that I have. I begin with a description of the methodology of the experiment followed by a concrete illustrative example. Finally I discuss the results. The complete collection of data I compiled for the experiment can be found in the appendix with the same number. For example, the data for experiment 8 is in Appendix VIII.

4. Phonosemantic Experiments

4.1 Experiment 1 -- Classification First by Phoneme Sequence and then by Semantic Domain
See Appendix I for full data and results.

4.1.1 Methodology

- All the monosyllables familiar to me were extracted from Houghton Mifflin's *American Heritage Dictionary*.
 - These words were divided into 24 classes based on the consonantal phonemes that they were composed of. The consonants in my dialect of American English are /b/, /d/, /g/, /p/, /t/, /k/, /v/, /D/ (as in **bathe**), /z/, /Z/ (as in **beige**), /f/, /T/ (as in **bath**), /s/, /S/ (as in **wash**), /h/, /J/ (as in **jump**), /C/ (as in **cheese**), /m/, /n/, /G/ (as in **hang**), /r/, /l/, /w/, /j/. (Nonstandard (non-IPA) symbols are employed due to technical limitations.)
 - An attempt was made to find a Phonosemantic Classification for each of these subclasses.
 - The words within each of these resulting phonesthemes were then subdivided again according to position in the syllable. The following positions were identified:
 1. initial position.
 2. second position
 3. third position
 - F1. pre-pre-final position
 - F2. pre-final position
 - F3. final position
 - 114 of the 3485 monosyllables (or 3%) did not fall easily into a Phonosemantic Classification. These were placed in a different Natural Classification. All of these exceptional words fell into one of the following natural semantic classes. I will refer to these as the **Concrete Noun classes**:
Concrete Noun Classes (Nouns with Rigid Referential Domains)
people, titles, body parts, clothing, cloth, periods of time, games, animals, plants, plant parts, food, minerals, containers, vehicles, buildings, rooms, furniture, tools, weapons, musical instruments, colors, symbols, units of measurement.
- Notice that very few people disagree on what constitute the referents for a word in one of these classes. That is, people largely agree on which trees are oaks, which tools are hammers, which rooms are kitchens and so forth. This is not as true of other semantic domains. (In addition to being less ambiguous and more impervious to Clustering than other semantic domains, the Concrete Noun classes seem to be more nearly universal cross-linguistically than other semantic domains.)

4.1.2 Example

I endeavored to make the lists in Appendix I exhaustive.

The format of the output is as follows:

		Classification Type (Phonesthemes or Concrete Nouns)	
		Relevant Phoneme	
Superclass #	Superclass Descriptor	<i># words in SC, % -- words in SC/all words containing RPh</i>	
Phonestheme #	Phonestheme Descriptor	Word List	Position Indicator
		<i># words in phonestheme, % -- words in phonestheme/all words in this superclass</i>	

A sample entry:

A1. Consonantal Phonesthemes			
/x/			
A1	Walk, Run and Ride	133	13.3%
<hr/>			
1.	Walk, Run (No Vehicle)	1	
	race, raid, range, reach, rip, roam, romp, rove, run, rush		
	10	7%	
<hr/>			
1.	Walk, Run (No Vehicle)	2	
	break, crawl, creep, cross, cruise, drag, drift, drop(by), frisk, prance, press, prow, thread, trace, track, trail, tramp, tread, trek, tromp, troop, trot, trudge		
	23	6%	
<hr/>			
1.	Walk, Run (No Vehicle)	3	
	scram, scream, spread, spring, sprint, stray, streak, stream, stride, strike, stroll, strut		
	12	15%	
<hr/>			
1.	Walk, Run (No Vehicle)	F2	
	barge, charge, course, curve, dart, ford, forge, fork, forth, hurl, march, part, storm, swarm, swerve, warp		
	16	6%	
<hr/>			
1.	Walk, Run (No Vehicle)	F3	
	fare, near, scour, tear		
	4	3%	
<hr/>			

Explanation:

- The **A1. Consonantal Phonesthemes** indicates that this is the section of phonesthemically classified words
- /r/ is the relevant phoneme in this case
- **A1** is the superclass number
- **Walk, Run and Ride** is the superclass designator
- **133** is the total number of unique words in this superclass
- **13.3%** is the percentage of words in this superclass as compared to the total number of monosyllabic words containing /r/. That is, there are 1003 monosyllabic words in my vocabulary which contain /r/ and $133 = .133 * 1003$.
- **1.** is the phonestheme number
- **Walk, Run (No Vehicle)** is the phonestheme designator
- 1, 2, 3, F2, F3 refer to the relevant phoneme's position within the syllable
- In the first phonestheme: 'race, raid, range, reach, rip, roam, romp, rove, run, rush' is, I believe, the list of all monosyllables with /r/ in initial position and which have at least one sense which refers to non-vehicular motion with a human agent.
- **11** is the number of words in the first class
- **7%** is the percentage of words in the phonestheme as compared to all the monosyllables starting with /r/. There are 140 such monosyllables.

4.1.3 Discussion of Findings

4.1.3.1 Overview

The most important result of this experiment is, of course, that the phonology of a word affects its meaning. Furthermore, it has a much more specific effect on meaning than is generally supposed.

Much of my effort over the last years has been directed at trying to find a Phonosemantic Classificational system for each consonant for which the classes were as clear and indisputable and as obviously interrelated as possible. I do this in an effort to make the fundamental meaning underlying each phoneme very accessible, and of course in an effort to make the phonosemantic data as incontestable as I can. I have devoted myself primarily to English in part, of course, because English is my native tongue. But I also use English because there is a very common attitude -- even among those who accept linguistic iconism -- that it's not productive and therefore occurs only in obscure vocabularies of obscure languages that have undergone relatively little change over time. My findings show that iconism runs throughout the most basic vocabulary of at least one language in very broad usage... a language that has been as overwhelmed as any by foreign influences and radical and sudden diachronic changes.

This experiment provides evidence for criteria 1-6 of the Phonosemantic Classification, which as the reader will recall, constitute the criteria required to prove the *Phonosemantic Hypothesis* -- that all phonemes have an identifiable meaning:

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

In addition it provides strong evidence for the basic claim regarding the relationship between concrete reference and iconic meaning

The Arbitrariness of Reference

The salience of iconic meaning in a word is related inversely to the concreteness of its reference.

It provides only indirect evidence for general character of Phonosemantic Association and of Iconism:

Phonosemantic Association

When semantic domain S is associated disproportionately frequently with phoneme X, then people will be inclined to associate semantic domain S with phoneme X productively.

Iconism

The connotation of a word is affected directly by its phonological form.

In addition, this experiment:

1. provides a general idea of the semantic domains to which each phoneme is restricted and the percentages of words that fit into these semantic domains.
2. allows us to observe indirectly the effect that phoneme position has on the semantics of the word.

Appendix I sums up data compiled and analyzed over many years. Naturally, in the course of a project of such large scope, one makes many more specific observations than can be written down. Only the fundamental results are summarized here. In my more detailed discussion of this first test, I will limit myself to the following topics:

1. I will outline the major phonesthemes provided in Section A1 to give the reader an indication of the semantic domains associated with each of the English consonants. **(4.1.3.2)**
2. I will discuss the mechanism whereby concrete reference obscures the manifestation of phoneme meaning. **(4.1.3.3)**
3. I will discuss the nature of the 'senses' of the word and give a brief overview of the structure of word semantics suggested to me by the phonosemantic data. **(4.1.3.4)**
4. I will discuss how the position that a given consonant occupies within the syllable affects the semantics of the word. **(4.1.3.5)**

4.1.3.2 Semantic Domains of the Consonants

This Phonosemantic Classification shows that words containing each of the consonantal phonemes fall within the semantic domains listed below in the quantities and percentages indicated. I am not hereby suggesting that this is the ‘right’ phonesthemic classification. This data only provides one profile of the semantic domains to which each of the English consonants are constrained. If word-meanings were insensitive to phonological form, we would anticipate that these profiles would all be the same. But they are not. And though this remains to be proved, in the course of formulating these phonesthemes, it becomes obvious that it is impossible to make them the same.

Notice that the semantic characterizations of the consonants seem to resemble the articulation of the consonants themselves. For example, to pronounce /b/, one creates a barrier by closing together the lips; one builds up pressure behind the lips causing the cheeks to bulge slightly; and one releases the barrier to produce a sort of explosion. I think it’s not coincidental that 14% of words containing /b/ can be described as barriers and interferences, 6% involve binding, 11% concern bulging and 6% exploding. /b/ is one of the most ‘high pressure’ or subjectively ‘big’ consonants. Neither /d/, /g/ nor /p/, /t/, /k/ among the stops seems to involve as much air under pressure. And /b/ also involves disproportionately many words of bigness, money and large quantities. This similarity between a phoneme’s articulation and its semantic characterization as formed by Clustering is indirect evidence for True Iconism, i.e. that there is a direct, unmediated effect of form on semantic content in a word.

The percentages do not add up to 100%, of course, because for each consonant, each word fits on average in several phonesthemes. These profiles are compiled for all English consonants in all the positions in the word:

A1. Consonantal Phonesthemes

		/b/	
A1	Bulging, Brushy	64	11.4%
A2	Big, Much, Many	109	19.4%
B1	Barriers, Interference	76	13.5%
C1	Emptiness	35	6.2%
D1	Binding, Contact, Connection	33	5.9%
E1	Foundations, Carrying and Balance	50	8.9%
F1	Explosion, Blowing and Breaking	35	6.2%
F2	Departure	19	3.4%
F3	Hitting, Battling, Games	50	8.9%
F4	Bizarre and Chaotic	8	1.4%
G1	Noises and Music	36	6.4%
G2	Effusive Language and Writing	74	13.2%
G3	Bother and Bargain	19	3.4%
H1	Birth and Beginnings	45	8.0%
I1	Badness	31	5.5%
I2	Pain	43	7.7%
I3	Error	22	3.9%
J1	Water	68	12.1%
J2	Alcohol	16	2.9%
J3	Boats	27	4.8%
K1	Fire, Light	18	3.2%
K2	Saturated Color	20	3.6%
L1	Boards and Bricks	18	3.2%

		/d/		
A1	End, Death, Sleep, Drug	50	10.4%	
A2	Diminishment, Smallness	83	17.3%	
A3	Breadth, Dragging On	41	8.5%	
A4	Scarcity, Danger	60	12.5%	
A5	Confusion, Discord and Barriers	69	14.4%	
A6	Dark, Dirty and Dreary	97	20.2%	
B1	Divisions, Groups, Amounts	130	27.1%	
C1	Execution of Pending Process	91	19.0%	
C2	Motion	31	6.5%	
D1	Down	154	32.1%	
E1	Good, Dear	33	6.9%	
F1	Water	62	12.9%	
G1	Light and Color	11	2.3%	

		/g/		
A1	The Gullet	27	7.2%	
B1	Sound and Talk	33	8.8%	
B2	Voice	14	3.7%	
C1	Containers and Valleys	49	13.0%	
C2	Quantity	50	13.3%	
D1	Getting, Holding and Greed	77	20.4%	
D2	Blockage	38	10.1%	
E1	Giving	6	1.6%	
E2	Going	55	14.6%	
E3	Growing	26	6.9%	
F1	Goodness	15	4.0%	
G1	Light (Generally Indirect)	18	4.8%	
H1	Understanding	23	6.1%	
I1	Grids and Grains	12	3.2%	
J1	Death and Gloom	30	8.0%	
K1	Too Much Where It Doesn't Belong	112	29.7%	
K2	Not Enough Where It's Needed	106	28.1%	
L1	Hidden Source or Goal	117	31.0%	

		/p/		
A1	Prongs, Peaks, Points	105	15.8%	
B1	Puffy and Plane	84	12.6%	
C1	Containers and Enclosed Areas	74	11.1%	
D1	Parts and Pictures	91	13.7%	
E1	Groups, Units, Levels, Size	94	14.1%	
F1	Picking, Pulling	107	16.1%	
G1	Patrolling	20	3.0%	
H1	Pamper, Pester, Prepare	88	13.2%	
I1	Pouring, Putting, Pushing and Punching	183	27.5%	
J1	Stepping and Paths	48	7.2%	
K1	Endings, The Past	22	3.3%	
L1	Talk	72	10.8%	
M1	The Problem	62	9.3%	
N1	Heat	2	0.3%	

		/t/		
A1	Travel	125	15.0%	
A2	Cast, Blow, Flow	60	7.2%	
A3	Sprout, Bloat	19	2.3%	
A4	Coat, Cover	11	1.3%	

B1	Time and Counting	65	7.8%
C1	Fast, Bright, Lively	75	9.0%
D1	Up, Down, Around	77	9.3%
E1	Trying, Tending, Tiring	82	9.9%
E2	Trickery, Error, Nervousness	96	11.5%
F1	Teach, Tame	54	6.5%
F2	Language, Sound	60	7.2%
G1	Traits, Timbres, Tastes	42	5.0%
H1	Touch and Take	214	25.7%
H2	Tie, Tight, Still	130	15.6%
I1	Tips and Tops	146	17.5%
J1	Groups, Area	71	8.5%
K1	Tininess, Ending	148	17.8%
L1	Unpleasantness	55	6.6%

/k/

A1	Containers, Closure and Crevasses	167	20.2%
A2	Corners and Crinkles	105	12.7%
A3	Closeness, Catching, Collecting and Contact	243	29.3%
B1	Carrying, Crawling	64	7.7%
C1	Cutting, Ending, Weakness	141	17.0%
C2	Cruelty, Ache and Irritation	104	12.6%
D1	Kings and Commoners	33	4.0%
D2	Care, Control	66	8.0%
D3	Clumsy, Queer	74	8.9%
E1	Speaking and Throaty Sounds	31	3.7%
E2	Knowledge	67	8.1%

/v/

A1	Containers, Narrow Opening	29	20.0%
B1	Carving	5	3.4%
C1	Vying, Evil	20	13.8%
D1	Veering	7	4.8%
E1	Solving and Serving	8	5.5%
F1	Energy	27	18.6%
G1	Have and Empty	32	22.1%

/h/

A1	Function Words, Definite, Distant	18	56.3%
B1	Coming Close Up Against	7	21.9%
C1	Smooth and Flexible	4	12.5%
D1	Loathe and Soothe	7	21.9%
E1	Causatives	4	12.5%

/z/

A1	Grammatical Function	20	17.1%
A2	Ways and Means	5	4.3%
B1	Energy	19	16.2%
B2	Vibration	27	23.1%
C1	Pause, Fuse	38	32.5%
D1	Altered Consciousness, Smarts	22	18.8%
E1	Ease and Irritation	19	16.2%

/ʒ/

A1	Highfalutin	2	100%
----	-------------	---	------

/ʃ/

A1	Full and Fuzzy	63	15.6%
A2	Fizz, Fountain	20	5.0%
A3	Narrow Opening, Limitation	107	26.6%
A4	Foundations, Fuel	19	4.7%
B1	Weakness, Failure	53	13.2%
B2	Falling, Floating	28	6.9%
B3	Flight	20	5.0%
B4	Freedom, Fate	15	3.7%
C1	Face, Deceive	46	11.4%
D1	Fight and Fuss	52	12.9%
E1	Flap, Flick	29	7.2%
F1	Fire	14	3.5%
G1	Fun, Fine, Fast, Fable	46	11.4%
H1	Family, Sex	22	5.5%

/T/

A1	Theme	3	3.2%
B1	Through	14	14.9%
C1	Thick, Thin, With	28	29.8%
C2	Viscous, Frothy	5	5.3%
D1	Thrust, Thud	9	9.6%
E1	Thrill	7	7.4%
F1	Thrive	23	24.5%
G1	Heat, Thirst	5	5.3%
H1	Earth	6	6.4%
H1	Theme	6	6.4%
I1	Three	3	3.2%

/s/

A1	Smooth Movement	100	9.2%
A2	Walk	40	3.7%
A3	Sink	40	3.7%
A4	Smooth and Fast	37	3.4%
B1	Long	90	8.3%
B2	Circular	33	3.0%
B3	Small	50	4.6%
B4	Spread	39	3.6%
B5	Secrete	43	4.0%
C1	Source, Start	86	7.9%
C2	Stop, Stash	254	23.4%
C3	Seize, Seduce, Mix	81	7.5%
D1	Seek, See	56	5.2%
D2	Swallow	27	2.5%
E1	Struggle, Strike	103	9.5%
E2	Sever	65	6.0%
E3	Scrub	21	1.9%
F1	Strong, Spirited	102	9.4%
G1	Serve, Support	103	9.5%
H1	Several, Series, Size	151	13.9%
H2	Single, Symbol	40	3.7%
H3	Uncountably Many	41	3.8%
H4	Sex	20	1.8%
I1	Surface	85	7.8%
J1	Heat, Light and Fire	50	4.6%
K1	Nose	17	1.6%
L1	Money -- Spend, Save, Steal	75	6.9%
M1	Speak, Seduce	92	8.5%

N1	Soul, Spirit	112	10.3%
O1	Dirt, Spoilage, Sorrow, Sickness, Evil	239	22.0%

/S/

A1	Shake and Shatter	45	23.2%
B1	Shout	15	7.7%
C1	Sheet	27	13.9%
D1	Gush, Brash, Lush	20	10.3%
E1	Shelter	38	19.6%
E2	Shake Off	24	12.4%
F1	Shallow	36	18.6%
G1	Should	24	12.4%

/h/

A1	Have, Hold, Home	62	23.1%
A2	Halt	50	18.7%
A3	Hunger	19	7.1%
A4	Haste	21	7.8%
A5	Hosts, Heavy	15	5.6%
B1	Help and Hear	20	7.5%
C1	Center, Half	11	4.1%
C2	Holy, Health	10	3.7%
C3	High	27	10.1%
D1	Harm	47	17.5%
D2	Difficulty	21	7.8%
D3	Happy	24	9.0%
E1	Happen	6	2.2%
F1	Who and He	9	3.4%
G1	Containers	2	0.7%

/J/

A1	Join	25	14.7%
A2	Jab	14	8.2%
A3	Jutting, Jumping	36	21.2%
A4	Journeying	17	10.0%
B1	Joy, Jazzy	23	13.5%
C1	Judgement, Subtlety	6	3.5%
C2	Smallness	10	5.9%
D1	Giant and Gems	13	7.6%
D2	Junk	36	21.2%
E1	Job	8	4.7%

/C/

A1	Challenge, Forward Motion	119	62.3%
A2	Chew, Scratch	55	28.8%
A3	Scrunch	18	9.4%
B1	Chanting, Charm, Chum	15	7.9%
C1	Much, Money, Quantity	31	16.2%

/m/

A1	Measure	168	29.8%
A2	Match	28	5.0%
B1	Mask, Frame	57	10.1%
C1	Make and Maintain	20	3.6%
D1	Move and Mix	112	19.9%
E1	Must and May	12	2.1%
F1	Mash	55	9.8%

G1	Flames, Earth, Moisture	56	9.9%
H1	Boom	19	3.4%
H2	Mouth	25	4.4%
I1	Mistake	19	3.4%
I2	Mad and Monstrous	106	18.8%
J1	Mirth and Magic	41	7.3%
K1	Mind	22	3.9%
L1	Man	24	4.3%

/n/

A1	Number	45	8.4%
B1	None	99	18.5%
C1	Narrow, Near, Nudge	216	40.3%
D1	Distant	36	6.7%
E1	Bumps and Small Amounts	72	13.4%
E2	Nose	14	2.6%
F1	Line and Plane	66	12.3%
G1	Now, Nave, Knowledge	162	30.2%
H1	Fun, Fine	48	9.0%
I1	Nasty	89	16.6%
K1	Burn, Shine	17	3.2%
L1	Water	17	3.2%

/g/

A1	Noises	21	21.4%
B1	Strong, Bonk	17	17.3%
C1	Sting	4	4.1%
C2	Fling, Bring	11	11.2%
D1	Long, Sink, Hang	22	22.4%
E1	Wrong	21	21.4%
F1	Blank, Mysterious	13	13.3%
G1	Ring, Rink	21	21.4%
H1	Thing	3	3.1%

/l/

A1	Little	89	10.7%
A2	Long	76	9.1%
A3	Levels	13	1.6%
B1	Loop, Curl, Ball	89	10.7%
C1	Flat	93	11.2%
D1	Large, Prolonged	122	14.7%
D2	Prolonged Sound	24	2.9%
D3	Prolonged, Smooth Motion	51	6.1%
E1	Live, Hold, Lock	173	20.8%
F1	Lead, Lunge	43	5.2%
G1	Leave, Lose	66	7.9%
H1	Lone	35	4.2%
I1	Lend, Dole Out	27	3.2%
J1	Loot, Call, Blend, Collide	91	10.9%
K1	Lousy, Negative	154	18.5%
L1	Lash, Kill	95	11.4%
M1	Lie, Fall, Limp	111	13.3%
N1	Lift	41	4.9%
O1	Liking	106	12.7%
P1	Liquid	65	7.8%
P2	Light, Color	44	5.3%
P3	Heat and Cold	31	3.7%

P4	Land	31	3.7%
P5	Air	13	1.6%
Q1	Learning, Law	60	8.2%

/r/

A1	Run and Ride	135	13.9%
B1	Word, Ruckus	114	11.7%
C1	Emotion	228	23.4%
D1	Fire, Dark	46	4.7%
E1	Rot, Wrong	125	12.8%
E2	Rid, Ruin	220	22.6%
E3	Parts	57	5.9%
F1	Strength, Quantity, Intensity	185	19.0%
G1	Rise, Drop, Rank, Peer	68	7.0%
H1	Linear, Round, Wrinkle	162	16.6%
I1	Support, Hard, Work	116	11.9%
J1	Rule	50	5.1%
K1	Room, Where	110	11.3%
K2	Closeness, Connections, Taking	139	14.3%
L1	Prepare, Raw, Beginnings	117	12.0%

/w/

A1	Function Words, Not Known or Present	27	8.7%
B1	War	31	10.0%
C1	Wrong and Wild	29	9.4%
D1	Want	53	17.2%
E1	Work	16	5.2%
F1	Know	19	6.1%
G1	Away, Fro	56	18.1%
H1	Wee	21	6.8%
I1	Wind and Water	41	13.3%
J1	Wail, Whish, Wheeze	37	12.0%
K1	Waves	59	19.1%
L1	Walking, Whizzing	32	10.4%
M1	Whole and One	81	26.2%

/j/

A1	Extent	65	39.2%
A2	Young, Die	17	10.2%
B1	Try	21	12.7%
C1	Use, Yield, Pay	10	6.0%
D1	Protected, Secretive	10	6.0%
E1	Yay, Nay	46	27.7%
E2	Spirituality	3	1.8%
F1	Pronouns	13	7.8%

4.1.3.3 'Exceptional' Words and Concrete Noun Classes:

It was mentioned that 3% of English monosyllables did not fit in some phonosemantically defined class. It was also mentioned that all the dictionary senses of those 'aberrant' words fit in the (natural) Concrete Noun classes itemized above. These exceptional 3% of the monosyllables for this particular Phonosemantic Classification are:

People -- bach, bub, chef, gal, Jew, pa, senate, thane, vet, yid

Body Parts -- beak, jowl, thigh

Clothing -- drawers, gown, jeans, pants, togs

Games -- craps, golf, whist

Animals -- chimp, coon, cub, daw, deer, doe, drake, ewe, flea, foal, gnu, goat, hake, hare, hart, hen, loon, mare, moose, newt, pooch, prawn, pup, scrod, squid, stag, stork, swan, tern, thrush, tom, trout, wren

Plants -- beet, chard, chive, clove, cress, dill, kale, larch, maize, pear, phlox, plum, rice, rye, sedge, soy, tea, thyme, wheat, yew

Food -- beet, bran, chard, chive, clove, coke, dill, ghee, kale, kirsch, knish, lox, pear, plum, quiche, quince, rice, roe, rum, rye, schnapps, scone, scrod, slaw, soy, squid, steak, tea, thyme, torte, trout, veal, wheat, wine, wurst, yam

Materials -- jean, lye, myrrh, quartz, teak, zinc

Time -- June

Color -- mauve, roan, taupe, teal

Symbols -- dah, five, four, pi, schwa

Units -- ton

To some extent, a different Phonosemantic Classification would result in a different list of exceptions, but whenever I have formed a Phonosemantic Classification all of the words which don't conform to the classification end up being Concrete Nouns.⁶ In addition to these 3% that don't fit in my phonosemantic classes, there are hundreds of words that fit in both the phonosemantic classes and the Concrete Noun classes. Very broadly, these words listed here that fit in only the Concrete Noun classes (not the phonesthemic classification) tend to have a single narrow and well-defined function in the language. The word is rarely used metaphorically or poetically.

A much higher percentage of polysyllabic than monosyllabic monomorphemes fail to fit in the Phonosemantic Classification. The reason for this is that the large majority of common monosyllables in English have been in the language for some time and have acquired a broad range of usages. Polysyllabic monomorphemes tend to a much higher degree to be more recent borrowings and to have very concrete reference.

By way of example, I include here a summary of my Concrete Noun classification for people words. A complete summary of all Concrete Noun classes, and a complete listing of the words themselves can be found in Section B1 of Appendix I. Notice that words for people are fairly evenly divided among the phonemes. Those phonemes which occur less frequently in the language in general also occur proportionally less frequently in People words. This is typical of the Concrete Noun classes.

Some of the classes are not marked sequentially, because the classificational system was set up to include also polysyllabic words. When the polysyllables were deleted from the list, some classes fell away altogether:

People
878 words
53% of Concrete Nouns

		<i>/b/</i>	
		63 words	7% of people words
1	Beautiful, Handsome, Sexy People	22	35%
2	Mean, Criminal People	11	18%
3	Big, Loud People	22	35%
4	Ugly, Stupid People	17	27%
5	Professions	8	13%
6	Children	4	6%
7	Smart, Enthusiastic People	3	5%
8	Other People	2	3%
9	Groups of People	12	19%

		<i>/d/</i>	
		26 words	3% of people words
1	Dear People	4	15%
2	Ladies, Gentlemen	7	27%
3	Titles	3	12%
4	Dummies	7	27%
5	Negative Women	3	12%
6	Mythical Beings	3	12%
7	Other People	2	8%

		<i>/g/</i>	
		29 words	3% of people words
1	Socially Inept People	9	31%
2	Mythical Beings	3	10%
4	Grumpy People	2	7%
5	Going People	4	14%
6	Gracious People	6	21%
7	Directing People	4	1%
8	Sexual Orientation	1	3%
9	Groups of People	5	17%

		<i>/p/</i>	
		37 words	4% of people words
2	Small People	6	16%
3	Mythic Beings	2	5%
4	Two People	2	5%
5	Substitutes	2	5%
6	Endearing Terms for Women	7	19%
7	Powerful People	3	8%
8	Priests	2	5%
9	Papas	4	11%
10	Prudes	3	8%
13	Unpleasant People	8	22%
15	Groups of People	2	5%
16	Other People	2	5%

		<i>/t/</i>	
		26 words	3% of people words
1	Teams	12	46%
3	Tyrants	1	4%
4	Young, Small People	5	19%

5	Groups of People	4	15%
6	Two People	2	8%
7	Travellers	6	23%
8	Sexually Appealing Women	4	15%
9	Unpleasant People	5	19%

52 words **/k/**
3% of people words

1	Kin	4	8%
2	Clique, Club, People with Special Knowledge	15	29%
3	Other Groups	1	2%
4	People of High Position	9	17%
5	Commoners	13	25%
6	Queer People	7	14%
7	Clowns	2	4%
9	Grouchy People	2	4%
10	Derogatory Terms for Nations	2	4%
12	Other People	3	4%

2 words **/v/**
0% of people words

3	Other People	2	100%
---	--------------	---	------

1 word **/z/**
0% of people words

1	People	1	100%
---	--------	---	------

23 words **/f/**
3% of people words

1	Friends, Family	3	11%
2	Groups of People	3	11%
4	Women	3	11%
5	Gay, Effeminate Male	4	14%
6	Mythological Beings	2	7%
7	Contemptible People	8	29%
8	Criminals	2	7%
9	Enemies	3	11%
11	Flirts	2	7%

6 words **/T/**
1% of people words

1	People	6	100%
---	--------	---	------

66 words **/s/**
8% of people words

1	Soul	2	3%
2	Mythological and Holy People	6	9%
3	Spirits, Spooks	3	5%
4	Sir, People of High Position	9	14%
5	Groups of People	7	11%
6	Servants	6	9%
8	Snobby People	2	3%
9	Contemptible People	8	12%
10	Sneaky People	4	6%
11	Slow People	4	6%
12	Stiff People	2	3%
13	Sloppy People	4	6%

14	Small People	4	6%
15	Drunk People	4	6%
16	Relatives	4	6%
17	Professions	5	8%
18	Other People	1	2%

13 words **/S/**
2% of people words

1	Pronouns	1	8%
2	Contemptible People	8	62%
3	Protectors	3	23%
4	Other People	1	8%

31 words **/h/**
4% of people words

1	General Person	3	10%
2	Negative People (Mostly Secretive and Evil)	12	39%
2	Judges	1	3%
3	Married Partner	2	7%
4	Unmarried Partner	2	7%
5	Comic People	2	7%
8	Hired People	2	7%
9	Other People	1	3%
10	Who	3	10%
11	He, She	5	16%

12 words **/J/**
1% of people words

3	Wonderful People	3	25%
4	Jerks	4	33%
5	Outsiders	1	8%
6	Guys	2	17%

12 words **/C/**
1% of people words

1	Chiefs and Champs	4	33%
2	Groups of People	1	8%
4	Informal, Friendly Words for People	3	25%
5	Children	2	17%
6	Derogative Words for People	2	17%

25 words **/m/**
3% of people words

1	Mothers	4	16%
3	Men	3	12%
4	Mates	4	16%
7	Gods	2	8%
8	Mavericks	2	8%
12	Small People, Servants	3	12%
13	Mutes	3	12%
16	Mobs	2	8%
18	Me	3	12%

9 words **/n/**
1% of people words

1	Small People	2	22%
2	Insignificant People	2	22%

3	People Who are Near	2	22%
5	Noble People	3	33%
6	People who Renounce Something	1	11%
		/l/	
		14 words	1% of people words
1	Lord, Lady	7	50%
4	Louts	3	21%
5	Other People	2	14%
		/r/	
		15 words	2% of people words
1	Rabble	10	67%
2	Royalty	2	13%
3	Other People	3	20%
		/w/	
		19 words	2% of people words
1	Common or General Words for People	3	16%
2	Abandoned People	2	11%
3	Children	3	16%
4	Unpleasant People	6	32%
5	Women	3	16%
6	Watchful People	4	21%
7	Competent People	3	16%
8	Other People	2	11%
		/j/	
		6 words	1% of people words
2	Naive or Inexperienced People	2	33%
3	You	3	50%
4	Other People	1	17%

I suggest that it is the specificity of reference that is interfering with the more obvious manifestation of iconic semantics. Let me provide an example to clarify why this is so. The consonant /b/ appears in initial position in words referring to loud sounds, explosions, irreverent behavior, bulging and large quantities much more frequently than one would expect statistically if phonology and semantics were completely unrelated. The phoneme /b/ also appears in initial position in a lot of words referring to large animals: bear, boar, bull, buck, behemoth, buffalo, etc. And even when the animal is small, it still tends to be among the largest or most irritating in its phylum: bee, beetle, bug. In some cases, like 'bug' and 'beast' and even 'bear', 'boar' and 'bull', the loud, irreverent connotative meaning is prevalent enough that *The American Heritage Dictionary* lists it as a separate sense. But the more obscure and specific the animal, the less likely this is to be the case. We don't say, "*He's such a bandicoot," probably in part because this animal isn't part of the average English speaker's everyday experience. In addition, the less specific the animal is (bug, beast, brute, animal, creature, critter), the more likely it is to be used metaphorically. It is these common or general terms that fall most easily in the Phonosemantic Classifications.

Strictly speaking, a 'buck' and a 'boa' and a 'bison' do not fit in the phonesthemes. At least according to most dictionaries, the word 'bison' has no alternate sense involving loudness, strength and obstreperousness in general. It only has what we think of as its 'basic' sense -- that of a bovine. Observe how this quality of concrete reference interferes with Phonosemantic Classification.

'Reference' answers the question, "What is word X?" That is, in general, the Natural Classification is organized along the semantic axis of metonymy/hyponymy. The phonological component answers the question, "What is X like?" In the case of non-concrete Natural Classes, these two questions often overlap. For example, "What is 'bungle'?" A bungle **is** a clumsy aggressive action -- that is its referent. That's also what a bungle is *like*. If we ask, "What is a 'bull'?" The answer is that it is a mammal, a male, a bovine. That's how it fits in its Natural Classification. It does not answer the question, "What is this animal like?" So what is this animal like? Speaking objectively, it is large, powerful, hairy, horned, etc. But folk mythology also makes it aggressive and clumsy. We speak of 'a bull in a china shop'. Is a bull factually clumsier or more aggressive than a hippo? That's not at all certain. Therefore, whereas 'bungle' *is* a clumsy action by its very definition, 'bull' is by definition a large mammal, and is only *perceived* as clumsy. If a bull is only perceived as clumsy, we are already on slipperier ground classifying it phonosemantically as 'clumsy' than we are classifying 'bungle' as 'clumsy'. In this case, *American Heritage* provides a 'clumsy' definition which allows us to classify 'bull' phonosemantically. In a similar manner, strictly speaking, a bison is a mammal with a certain DNA sequence, and that's all it is. 'Bisons' are close neighbors of 'bulls' and 'buffaloes', which also both begin with /b/. Does the /b/ in 'bison' predispose us to think of it as clumsy analogously with 'bull' and 'buffalo'? Perhaps. But there's no direct 'official' evidence for that within the language. To determine whether that is true, we cannot use dictionaries; we have to resort to psycholinguistic experiments.

Why is it that 'bull' and buffalo' are perceived as more clumsy than 'bison'? One possibility is that they both contain an /l/. The phoneme /l/ appears in a disproportionately large number of 'clumsy' words. The phoneme /s/ on the other hand occurs disproportionately frequently in words of competence: smart, snappy, sassy, swift, smug, style,... Most sloppy words that contain an /s/ also contain an /l/. If Phonosemantic Association happens on the level of the phoneme, then the evidence in fact suggests that the aggressiveness in 'bull' and 'buffalo' comes from the /b/, and the 'clumsiness' comes from the /l/. ⁷

So some of the words like 'bison' and 'pi' fall outside the Phonosemantic Classification, and one is initially inclined to think that the Phonosemantic Hypothesis cannot therefore be wholly maintained. The /p/ in 'pi' cannot directly be placed in a /p/ phonestheme for 'precision', though there is such a phonestheme. 'Pi' has no metaphorical usage meaning 'precise' or any other connotative usage for that matter -- it means 3.14159..., and that's all it means. Still I hope to demonstrate that there is good evidence to suggest that the precision so prevalent in /p/ otherwise is also likely to influence the English speaker's dynamic usage of the word 'pi', and that therefore even those words that don't fit in a Phonosemantic Classification are influenced by their sound. If this proves to be the case, that is, if the /p/ is having a semantic effect even in very Concrete Nouns (pi, spinach, piccolo, piranha), then it is most effective to view Iconic meaning as the fundamental level of word semantics, and to view referential semantics as superimposed on it.

4.1.3.4 Theoretical Status of Senses and Phonesthemes

Unlike a Natural Classification, a Phonosemantic Classification is not right or wrong unless it also violates the Natural Classes. Some Phonosemantic Classifications bring out certain semantic aspects of a given phoneme, and others bring out other aspects of the phoneme. The phonesthemes are therefore epiphenomena. I find that they are not psychologically real in the way that Natural Classes are. That is to say, I do not think they are part of 'langue'. I experience this subjectively as I work devising phonosemantic classes for a given set of data. I find that to some extent, I'm free how I would like to organize and present the phonosemantic data, and to some extent, I'm not free. Certain classifications are, so to speak, ungrammatical. Those which are ungrammatical are those which fail to do deference to the 'Natural Classes' built into English. But although I do not think of Phonosemantic Classifications as psychologically real, I do find them to be an extremely important device to make the phonosemantic data accessible and readable to the average researcher.

I think the senses of a word -- like the phonesthemes -- are useful, but not psychologically real. The reader will notice that the various dictionary senses or referents of the words in the Phonosemantic Classification in Appendix I are not explicitly marked. For example, 'cross' has many senses other than the motional one intended in the /r/ phonestheme used as an example in the previous section (4.1.2): 'to cross the street'. Yet nowhere in this experiment have I made a list of the senses for each of these words and then cross-referenced them with the occurrences of these words in the phonesthemes. It may be presumed that the reason for this is that the sense intended is obvious from the superclass and phonestheme designators, and this is in part true, but the reason for omitting references to the intended sense also runs deeper than this.

I distinguish, as mentioned, three levels of semantics: the iconic, the classificational and the referential. I will discuss them in much more detail in the final chapter of this dissertation. Suffice it to say for now that in my view, the iconic level of word semantics is fundamentally what makes word semantics sensitive to the phonological structure of the word. The classificational level is the level of Natural Classes, we have so frequently discussed. Each successive layer is superimposed on the previous. So the iconic level in semantics is primary. Superimposed on it is the classificational and superimposed on that again is the referential.

The senses of a word arise as a side effect of filtering the iconic meaning of a single word through the level 2 classificational system and then providing them with a referent at level 3. The phonesthemes arise analogously as a side effect of filtering the iconic meaning of all the words containing a given phoneme through the classificational system. Word senses therefore are epiphenomena, and like the phonesthemes themselves are not psychologically real -- not a part of 'langue', or the 'grammar'. And a brief comparison of the definitions provided in 3 different dictionaries of a few basic English words like 'get' or 'take' will convince anyone that lexicographers in no way agree on what constitute the correct 'senses' of a word.

Put another way, the sense of 'cross' that I have in mind in the above sample entry is actually **defined** as that sense which fits in the level 2 class of non-vehicular motion verbs with a human agent. Further giving it a sense definition would not only be redundant, but misleading, because it implies that word 'senses' are not analyzable in terms of more basic concepts. I believe that they are.

4.1.3.5 The Positional Effect

The process of coming to understand what specific effect each aspect of the word's phonology is having on its semantics is something like teasing apart a puzzle. One first uncovers what semantic domains are disproportionately represented in which phonemes. Then one goes into specific Natural Classes such as the 'light' words discussed above and observes how these more general tendencies manifest within a specific semantic domain. In addition to the pure effect of the phoneme on the meaning of the word, there is a positional effect that at least for me is much harder to discern at first. In order to see it, one has to first abstract away from the Natural Classes, and then abstract away from the semantics of each individual phoneme. It may seem trivial, but I find it to be no small matter to uncover which aspects of meaning are attributable to what.

As discussed above, non-vehicular motion is well represented in /r/ no matter what position it appears in. But in words of 'light' containing /g/ and /l/, both consonants must precede the vowel. Why? And what are the differences between the various /r/s for motion in the various positions? I will give some examples here to try to make clear what effect I believe the position of the relevant phoneme to have.

Briefly, a consonant which appears before the vowel has a function of 'setting the stage' for the action that plays itself out in the word. A consonant which occurs after the vowel constitutes a sort of conclusion or 'punch line'. The vowel is somewhat analogous to a verb in a sentence. It defines the nature of the flow or action. The initial consonants are like subjects, and the final consonants like objects. In addition, the positional effect depends on whether the consonant appears in absolute initial position or after another consonant. If it appears in absolute initial position, it is given free reign in a manner of speaking over the backdrop of the word. If a semi-vowel follows another consonant but precedes the stressed vowel, its effect is mitigated or modified by the initial consonant. The phonemes /l/ and /r/ are initially the most useful consonants to look at in English to get a sense for the effect of position on the semantics of the word, because they can occur in the most positions within English syllables.

Consider the words containing /r/ and referring to some kind of noise. There are 114 of them making up 13% of English monosyllables containing /r/:

- 1 Ruckus, Sound
 - 1 rage, rant, rap, rasp, rave, ring, roar, rout, row
 - 2 bray, breath, crack, crash, creak, croak, croon, crunch, cry, drawl, drone, drum, frog, groan, growl, grunt, shriek, shrill, thrum, trill, troll
 - 3 scream, scream, screech, strain, strike, stroke, strum
 - F2 bark, birl, burp, chirp, chord, dirge, fart, hoarse, horn, snarl, snort, storm
 - F3 birr, blare, chirr, churr, purr, roar, snore, whirr
- 2 Word, Speak
 - 2 brag, bring, broach, greet, grill, gripe, grouse, phrase, praise, prate, pray, prayer, preach, prove, threat, thresh, train, trope
 - 3

- screen, spread, spring, stress, stretch
 F2
 blurt, harp, spurt, word, yarn
 F3
 air, pour, prayer, share, square
- 3 Read, Write
 2
 braille, browse, draw, graph, phrase, press, print, proof, prose, trace
 3
 scrawl, scribe, script, scroll
 F2
 card, chart, clerk, forge, mark, term, verse, word
 F3
 score
- 4 Hear
 F2
 hark, learn, mark
 F3
 ear, hear

Notice that those words which have an /r/ in initial position tend to have a loud, devil-may-care quality about them. This quality runs throughout the phoneme /r/. Notice that /r/ does not occur in initial position in words of sound which require more focus or precision, specifically words involving coherent language. The phoneme /r/ can provide raw energy to something, but it implies no inherent control over this energy -- that control must be provided from without. Notice that nearly all the /r/ words of speaking have a great energy about them. Notice that /r/ doesn't occur in the most receptive of sound words -- those of hearing -- except after the vowel. When the energy that /r/ provides, in other words, happens at the receiving end of the speech event, /r/ appears after the vowel in English. Notice that if /r/ occurs in absolute final position in words for noises, the noise is prolonged. If /r/ occurs in pre-final position, the noise is cut short. Once again, this little exposition does not of itself prove anything. But hundreds of other examples of this nature can be found by looking at the data in Appendix I.

4.1.3.6 Summary of Results of Experiment 1 and Outline of Resultant Theories about Language

- Monosyllabic words in English which contain a given consonant fall within much narrower semantic domains than one would expect if the relationship between phonology and semantics were arbitrary. This semantic domain resembles the articulation of the consonant in question, and this is one piece of circumstantial evidence that the relationship between phonology and semantics is essentially '**Iconic**' in the Peircean sense. The phonology of a word has a much more pervasive and specific effect on its semantics than is generally supposed.
- There is a type of psychologically real classificational system which I term a '**Natural Classification**'. The phonesthemes are not in general psychologically real in the way that the Natural Classes are. Phonesthemes are subsets of the Natural Classes. They are epiphenomena resulting from the combination of Natural Classifications with the semantics of sound. Such a combined classificational system I call '**phonosemantic**'. Because of the epiphenomenal nature of the phonestheme, there is no one right Phonosemantic Classification. Various Phonosemantic Classifications make various aspects of phoneme semantics more accessible to analysis. The possibility of creating Phonosemantic Classifications as defined in this dissertation is one of the primary means I use for testing the '**Phonosemantic Hypothesis**' stated in the introduction. This particular experiment tests for criteria 1-6, but not criteria 7-9 of a Phonosemantic Classification.
- I find an additional process called '**Clustering**' or Phonosemantic Association. Clustering is the tendency for phonemes and phoneme sequences to become even more narrowly limited than their iconic semantics demands -- the tendency to try to assign a coherent referent to every phoneme or phoneme sequence. (The whole becomes more narrow than the sum of the parts.) For example, words beginning with /gl/ are inherently limited to a certain semantic domain by the very nature of the semantics of /g/ and the semantics of /l/. We find that a fairly large range of this potential is factually represented in the vocabulary of English, but disproportionately so. A much larger percentage of these /gl/ words fall into the sub-domain 'reflected light' than one would expect if the semantics of /gl/ simply were a combination of the semantics of /g/ plus the semantics of /l/.
- At the third level of semantics, a specific referent is assigned to each word. The more concrete and unambiguous the referent for the word, the less salient is its phonosemantics. The reason for this concerns what the word 'is'. If the referent for a word by its very nature is connotative or interpretive, then the word's phonosemantics can cooperate with its referent. If, however, the word refers to some concrete object in the world, and no room is left for connotation or interpretation, then the phonosemantics of the word seems to impose a connotation or interpretation to the word rather than affecting what the word actually refers to. For example, the verb 'bungle' **is** an aggressive, clumsy act by its very definition. Therefore the verb falls easily in phonesthemes for bungling and aggression. But the primary sense of 'buffalo' **is** merely a mammal with a certain DNA sequence, so it falls less readily into phonesthemes for bungling and aggression. The bungling and aggression of a buffalo is merely a cultural interpretation. Because 'buffalo' exists as a verb of bumbling and aggression, it can still be classified into these phonesthemes. But since no such formal usage for 'bison' exists, it falls outside the Phonosemantic Classification. This does not, however, mean that sound has no effect on its meaning, as can be demonstrated by other kinds of tests for the psychological reality of sound-meaning among native informants.
- Like the phonesthemes, the 'senses' of a word are not stored as part of langue. They are epiphenomena resulting from the combination of all three levels of word semantics -- the iconic,

the classificational and the referential.

- The position that a consonant occupies in a syllable also affects its meaning. Consonants that appear before the vowel form the backdrop for the action of the word, and consonants that appear after the vowel express the result of the action implicit in the word.

4.2 Experiment 2 -- Classification First by Phoneme Sequence, Subclassification by Semantic Domain and then Regrouping of Different Phonemes by Semantic Domain

See Appendix II for full data and results.

4.2.1 Methodology

- Find all monomorphemic or root words containing a given consonant in a given position in the word. In this case all monomorphemes in my active English vocabulary in which /r/ occurs in second position were used.
- Divide the words according to another phonological characteristic. In this case, the monomorphemic English words containing /r/ in second position were sub-classified by initial consonant.
- For each of these resultant classes, create a Phonosemantic Classification. If necessary, ignore Concrete Nouns.
- Now match up phonesthemes cross-phonemically that fall in the same Natural Classes. For example, the 'breaking' phonestheme for /br/ is aligned with the 'fracturing' phonestheme for /fr/ and the 'cracking' phonestheme in /kr/.
- Identify how these matching phonesthemes differ semantically.

4.2.2 Example

Rupture and Fractioning

/r/ appears in many words of destruction. The ruptures that are non-iterative show up when a stop consonant is in initial position. If the stop is voiced, we find an additional and related class of words which are fractioned into many pieces. If a fricative is in initial position, the result is broken into uncountably many fine particles. We can more or less characterize the effects of the phonological features in this classes follows:

- [+stop, +voiced] -- many distinct but countable parts
- [+stop, -voiced] -- snip off an end or pierce at a point
- [+fricative] -- mashed into single consistency, pieces are uncountably many
- [+labial] -- ends, points, tips
- [+dental] -- lines
- [+velar] -- rupture in a surface

The verbs are listed first followed by related words which are the results of the actions of these verbs.

a. Rupture

[+stop]

/b/

Break -- something hard broken off or severed into two or more pieces
bran, branch, breach, break, brief, brittle, brook, browse, bruise

/d/

Dig -- regular breaking downward through dirt
dredge, drill

Dirt -- that which remains from digging
dreck, dredge, dregs

/g/

No verb exists

Groove -- an open indentation in a surface, the deepest point is typically not visible
grave, groin, groove, grotto

/p/

Prick -- a long hard object with a point which pierces a surface at one point
prick, prickle, probe, prod, prong

/t/

Trim -- something linear and often growing the tips of which are cut back just slightly
trim

Trifle -- a small thing which has been made out to be bigger than it is
trifle, trinket, trite

/k/

Cut -- to cut a surface
crack, crop

Crack -- deformities in a surface
crack, cranny, crater, crease, crevasse

Crunch (Crinkling sounds) -- the sound of deforming a surface
crack, crackle, crash, crinkle, crunch

b. Fractioned/Many Pieces

[+stop, +voiced]

/b/

Branchy -- radiating lines from a base
bracken, braid, brake, bramble, branch, briar, bristle, broom, brow, brush

Breed -- offspring of a single source
brace, breed, brood, brother

Type -- a group which all fit a specific characterization and have a common source
brace, bracket, branch, brand

/d/

Drip -- liquid flowing linearly cut into drops
dribble, drip, drizzle, drop

Drop -- particles of liquid resulting from dripping
dribble, drip, drivel, drizzle, drop

/g/

Grind -- to push through a grid
grind, grate

Grid -- a network of lines crossing at 90 degrees to form squares
grate, grid, grill, grille, graph

Grainy -- small bits resulting from grinding
grain, gravel, grit

c. Broken into a Mass of Uncountably Many Tiny Particles

[+fricative]

/f/

Fray -- to split the tips of something soft into a mass of fuzz or foam
frizz, frizzle, fray, froth, fry

Frill -- intricate decorations at the edge
frill, frieze, fringe, frock

Froth -- foam, uncountable, small bubbles or bits, usually in liquid
(freckle), frost, froth

/T/

Thresh -- to flail something flexible and linear fairly violently
thrash, thresh

Thread -- a long piece of materials thinner than a string
thread

/S/

Shred -- to cut something solid into many small strips or particles
shred

The non-concrete monomorphemic words which have an /r/ in second position and which are not mentioned in Appendix II are:

brawn, bribe
graze, greet
prey, prowl, price, prairie
trace, trait, trend
crux
frail, fraught, frisk

4.2.3 Discussion of Findings

4.2.3.1 Evidence this Experiment Provides for the Major Theses in this Dissertation

Evidence for the Phonosemantic Hypothesis

This experiment does not so readily give one a general overview of the semantics of the whole phoneme as did the first experiment (4.1 -- Appendix I), but it **does provide** a better view of what specific role each phoneme has within a given semantic domain. This is the best test I've come up with for identifying the semantics of phonetic features.

This experiment provides evidence for criteria 1-6 and criterion 9 of the Phonosemantic Classification, which is required to prove the ***Phonosemantic Hypothesis***.

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

Evidence for Clustering

The fact that this test can be conducted at all is, of course, indirect evidence for ***Clustering***. But there is additional evidence for Clustering on another level. Consider this 'rupture' class above for voiced stops in initial position. The phoneme /r/ tends to rip, break, part and tear no matter where it's positioned in the word, and /d/ is downward and linear throughout the English lexicon (as well as frequently wet), but /dr/ in this rupture class is not just a vertical line that is fractioned into several pieces -- which is what the /d/ combined with the /r/ alone optionally predispose the word toward; the large majority of the /dr/ words specifically concern a vertical line ***of water*** that is fractioned into many pieces -- in other words, dripping water. The tendency is therefore to attribute an identifiable referent to /dr/ which is narrower than the semantic range formed by /d/ and /r/ alone. This Clustering manifests not as a single invariable referent, but only as skewed distributions -- a tendency to prefer dripping water over other potential referents.

Evidence for the Interference of Reference

The above example can be used to explain why one finds information about the semantics of phonetic features more readily by subdividing words into small groups defined by two phonemes rather than one first, and then recombining them, as I do in this experiment. The alternative would have been to create a Phonosemantic Classification for ***all*** the words containing /r/ in second position and then subdividing all the 'fracture' words according to initial consonant afterwards. Had I done this, I would have found no words for multiple fractioning beginning with /d/, because it wouldn't have seemed to me that 'dripping' involves a fracture, since it ***refers to*** a motion of water, and the dotted line is only ***how*** the water moves. However, having seen that there

is a very obvious ‘branching’ class in /br/ and ‘grid’ class in /gr/, and having seen from the previous ‘rupture’ class that in those cases as well, labials seem to imply a point and velars a surface, I am already asking myself, “If this pattern holds, then I would expect to find the form of a dotted line somewhere in words beginning with /dr/. Do I find such a thing?” Well, as it turns out, I do... dripping water. Had I, however, done the experiment the other way around, I wouldn’t have thought of ‘dripping water’ as a dotted line, but rather as downwardness and water. When I ask myself what other occurrences of ‘dotted lines’ I find commonly in the world around me, I’m hard pressed to think of any besides dripping water. So from this perspective, it’s not surprising that English has chosen /dr/ for dripping water. Performing the experiment in the order I suggest, in other words, helps focus attention away from the referential aspects of meaning and toward those aspects which are determined by sound, and this is why I think it is so effective in bringing out the meanings of the phonetic features.

Again, the characterizations of the phonetic features were all derived from the non-concrete word classes. The more concrete the semantic class, the more the referential aspects of the meaning -- like the ‘water’, as opposed to the linearity, in ‘dripping’ -- impose themselves on the researcher. So this aspect of the experiment also provides evidence that reference interferes with the salience of sound-meaning.

4.2.3.2 Common Semantic Domains for /r/ in Second Position

The natural domains which /r/ in second position was found to occur in frequently were:

- Rupture and Fractioning
- Garbage
- Negative People
- Iteration
- Deception
- Containers
- Verge, Brim
- Directed Movement Verbs
- Pressure
- Receiving
- Support
- Future
- Groups
- Grab/Crave
- Three

These are similar to the classes that were found for /r/ in Experiment 1 (Appendix I). Words in the following Natural Classes were also classified for this experiment:

- Heat
- Water
- Sound
- Emotion
- The Mind
- Materials
- Pretty

4.2.3.3 Characterizations of the Phonetic Features

By performing this experiment for this set of data, one arrives at the following characterizations of the phonetic features:

[+voiced]

many distinct but countable parts
dirty, angry
heavy duty
creative source, but little concern for results

[-voiced]

specific intention or result
an ongoing, preexisting or pending process

[+stop]

emphasis on a thing or product as opposed to a process
specific path, starting point, boundaries
receiving, support
end, point, boundary, container

[+fricative]

mashed into single consistency
soft
uncountably many
emphasis on the activity or process itself
release, no concern for the path
hysteria

[+labial]

a narrow opening
selected for a purpose
ends, points, tips, edges, initiation
senseless, empty waste of time or energy
completed, clear

[-labial]

sadness
fear
group selected for a purpose

[+dental]

linearity
natural motion, sleep/trance
implicit goal or direction
mid-stream, process

[-dental]

large size

[+velar]

surface
a mature process
gathering, grabbing, craving, excess
something hidden, unclear, unexamined

4.2.3.4 Characterizations of the Phonetic Features Sorted by Semantic Class

Iterative/Nonbreaking

[+stop, -voiced]

Containers

[+stop, -voiced]

Edge of Something

[+labial]

Directed Movement Verbs

[+voiced] -- no concern for the result

[-voiced] -- specific intention or result

[+labial, +stop] -- pressure onto something, often from within a container with a narrow opening like a well or the lungs

[+dental] -- natural linear motion, against resistance in /d/ and generally with little resistance in /t/ and /T/

[+voiced] -- motion over (/k/) or rooted in (/g/) a surface or terrain

[+stop] -- specific path

[+fricative] -- no concern for the path

Pressure

[+voiced] -- focus on the process, heavy

[-voiced] -- focus on the point of contact

[+labial, +stop] -- support or preparation from behind

[+dental, +stop] -- natural linear motion

[+voiced] -- pressure against a surface out in front

[+stop] -- pressure causes a permanent effect

[+fricative] -- solidify into a mass, effect in place only as long as the conditions maintain

Support

[+stop]

Future

[+labial] -- initiation

[+dental] -- propelling a process in mid-stream

[+voiced] -- a mature process

[+stop] -- emphasizes a starting point, boundaries

[+fricative] -- emphasizes the process itself

[+voiced] -- creation of something new

[-voiced] -- implies an ongoing, preexisting or pending process

Groups

[+labial, +stop] -- group selected for a purpose

[+dental] -- gathered by following a common goal

[+voiced] -- general gathering

Size

[+stop, -dental]

Grab/Crave

[+voiced]

Receiving

[+stop]

Garbage

[+labial] -- senseless, empty waste of time or energy

[+dental] -- that which is thrown or drained away

[+voiced] -- greasy or crumbly texture, excess from something eaten or used

[+stop] -- emphasis on the waste itself

[+fricative] -- emphasis on the activity of discharging and its subsequent release

[+voiced] -- dirtier, more heavy duty garbage

Derogative Terms for People

Was not able to see semantic patterns across the phonetic features

Deception

[-voiced]

The Mind

[+labial] -- completed, clear

[+dental] -- process, implicit goal or direction

[+voiced] -- unclear, unexamined

4.3 Experiment 3 -- Natural Classes for Arbitrary Sets of Words

See Appendix III for full data and results.

4.3.1 Methodology

- Choose a random set of words. In this case, every 10th English monosyllable in alphabetical order was used. This resulted in a random set of 342 words.
- Find a Natural Classification for this set of words.
- Separate off the Concrete Noun classes resulting from that classification.
- Look for phonological commonalities in the remaining classes. Break larger classes down into smaller ones if necessary.
- Compare the classification of random words to a classification found for a similar number of words sharing a common phonological trait. In this case, the 295 monosyllables with initial /b/ were used.

4.3.2 Example

I compare the random set of 342 with the 295 monosyllables beginning with /b/:

Bump

Random -- [+labial]: bulge, dune, heap, lobe, nub, paunch, rough

B-Words: bag, bale, ball, bay, bead, belch, bell, bilge, blimp, blip, bloat, blob, blouse, blow, boil, boll, boob, breast, bud, bug(eye), bulb, bulge, bum, bump, bunch, bun/s, burl, burst, bust, butt, butte

Incline/Fall

Random: cline, cock, prone, sheer, step, stoop, swoon

B-Words:

Float/Bounce

Random:

B-Words: ball, bank, bath, bathe, beach, bilge, birl, blimp, bloat, boat, bob, boil, bounce, bound, breach, breeze, buck, bulge, bump

Long/Thin

Random: flue, knife, oar, peg, pole, rake, saw, screw, shot, strand, thorn, trunk

B-Words (Sticks, Building Materials): balk, bar, bat, bead, beam, birch, birl, blade, bloom, board, bone, boom, bough, brace, branch

Foamy, Frilly

Random -- [+fricative]: frill, froth, shag

B-Words (Brushy): bang, barb, beard, bosk, braid, brake, branch, broom, brow, browse, brush, bur, burr, bush

Cry/Talk

Random -- /b/, /p/: bawl, beg, bill, bode, mot, pitch, preach, squib, weep, yawp

B-Words (Loud, Effusive): bah, barb, bark, bash, baste, bat, beard, beck, beef, beg, bend, bet, bid, bilge, bill, bis, bitch, blab, blame, bless, blot, blow, bluff, blunt, blurb, blurt, boast, bode, bolt, book, bore, bosh, boost, boss, bounce, bout, brag, brand, bull, bunk, butt, buzz

Exclamations

Random:

B-Words: bad, bah, bam, bang, bash, blah, blast, blaze/s, boo, boom, bosh, boy, bud, bull, bye

Noise

Random -- [+liquid]: bawl, blare, clang, cluck, grunt, hark, horn, peal, roar, taps, ti, tune, tweet

B-Words (Loud, Sudden): baa, bam, bang, bark, bawl, bay, beep, belch, bell, birr, blare, blast, bleat, bleep, blow, bomb, bong, boo, boom, brawl, bray, burp, burr, buzz

4.3.3 Discussion of Findings

This experiment provides evidence for all the criteria 1-9 of the Phonosemantic Classification, which is required to prove the Phonosemantic Hypothesis:

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

Criterion 7. A much smaller percentage of the words which do not match the relevant phonological characterization fit into any class.

Whenever words chosen at random are classified, they fall into the Natural Classification. Among these Natural Classes one will find the Concrete Nouns, but also others, many of which are represented in this data: water, fire and light; sound and language; big, medium, small; beginning, middle, end; strong, weak; good, bad; crime and deception; quantities and emptiness; long, round, flat; bumps and indentations; strong, weak; smooth, fuzzy, bumpy; dirt and washing; verbs of motion (vehicular, non-vehicular), verbs of contact, verbs of destruction, verbs of creation; verbs of wiggling and turning; happy, sad, angry, irritated; give, get; boundaries, containers, groups, impediments; etc.

However, one finds a number of classes which appear in the /b/ classification and therefore are very prevalent among words beginning with /b/, but which accept no words from the random list: These are boundaries(5% of monosyllables beginning with /b/ have at least one sense which refers to a boundary vs. 0% of random monosyllables), impediments(8% /b/ vs. 0% random), interference(11%! /b/ vs. 0% random), stopping and waiting(5%), binding and fastening(5%), floating and bouncing(7%), breaking(6%), exploding(5%), blowing(4%), departing(7%), badness(2%), crime(2%), emptiness and blindness(11%), carrying(6%), future(7%), immersion(4%), growth(6%). In all of these classes, there are, of course, some words which don't contain /b/, but the disproportions are great enough that in a random sampling, I came up with no matches in many cases.

The converse also holds. There were several classes which are quite common in the language generally, but which are relatively rare in words beginning with /b/: eating, taking and receiving, throwing and giving, spending, slowness, surfaces, ability. There were no words starting with /b/ that didn't fit in the Concrete Nouns or the /b/ phonesthemes. There were, however, 12 non-concrete random words which fell into a Natural Class which they shared with no other words in the random selection. These words were: air, mend, quark, sky, snide, stint, toy, troth, west, yep, yon, yum

Criterion 8. Those words that do not match the relevant phonological characterization but which nevertheless do fit in the phonothemic classification fit on average in a smaller percentage of classes, than those words which do match the phonological characterization.

The average word containing a /b/ in initial position falls into about 3 classes (which is typical of phonemes which begin about 300 monosyllabic words), and words in the random classification fit into an average of only about 1.5 classes.

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

Clustering will cause words with common phonological traits to be unevenly distributed among the natural semantic domains. In Appendix III some classes were marked to indicate which phonemes appeared there most frequently. For example, a disproportionately large number of the verbs of physical contact start with /b/. One can get an approximate picture of how the semantics of words containing /b/ is biased by looking at the variations in distribution between the words in the classification. In many cases, very few or no words beginning with /b/ appear in certain classes which are quite common in the language otherwise. Instead, words beginning with /b/ fall in other classes which are similar. Examples are slowness (from the randomly selected words) vs. interference and blockage (in words starting with /b/), ability and possibility (random) vs. the future (/b/), beginnings, middles and endings (random) vs. only beginnings (/b/), negativity and loss (random) vs. emptiness and blindness (/b/), weak (random) vs. blocked (/b/), touch (random) vs. beat (/b/), cut or chafe (random) vs. break (/b/), frills and froth (random) vs. brushy (/br/), take and receive (random) vs. bind and fasten (/b/), areas (random) vs. boundaries (/b/), etc.

Words which have common phonological traits and which fit into narrower semantic domains than those covered by the entire vocabulary will fit into subsets of the Natural Classes. For example, the language as a whole will have many words for people, and /b/ also has many words for people. But the words for people which begin with /b/ are confined to a subset of people. Words for people beginning with /b/ are outrageous, sexy, bad and beautiful. There are also many children and many groups of people in /b/. People in /p/ tend to go into the priesthood; they are often prudish or work in professions which give them authority and control over others. In the above classification, I have tried to indicate in one or two words what semantic trait distinguishes the words in a given class which begin with /b/ from all the other words in that class.

Once again, all the exceptions to the Phonosemantic Classification are Concrete Nouns, which constitutes evidence that the salience of iconic meaning in a word is related inversely to the concreteness of its *reference*.

There is evidence for Iconism as well. In addition to these disproportions in the Natural Classes,

each phoneme will deliver to the word within a given Natural Class a specific element of meaning. For example, of the /b/ words of physical contact, essentially all are violent (bat, beat, bash, bonk,...). And unlike their counterparts starting with /p/ (prick, pike, pin, poke,...), they rarely pierce the surface. The disproportions we observe are due to Clustering or Phonosemantic Association. But the specific meaning which each phoneme provides within a given semantic domain is a reflection of what I have called Iconism.

4.4 Experiment 4 -- Classify Words Containing a Phoneme Sequence X into a Classification Designed for Words Containing Phoneme Sequence Y

See Appendix IV for full data and results.

4.4.1 Methodology

- Choose a natural set of words which have some common phonological feature. In this case, all the English monosyllables beginning with /b/ were chosen.
- Find a Phonosemantic Classification for this set of words.
- Choose a different natural set of words which have some common phonological feature. In this case, all the English monosyllables beginning with /l/ were chosen.
- Try to fit these words into the Phonosemantic Classification found for the first set of words.

4.4.2 Example

A1 Bulging, Brushy

1 Bulging

/b/ Words -- bag, bale, ball, belch, bell, bilge, blimp, bloat, blob, blouse, blow, boil, boob, bulge, bum, bun/s, burl, burst, bust

/l/ Words -- lung

2 Bump

/b/ Words -- ball/s, bay, bead, blip, bloat, blob, boil, boll, boob, breast, bud, bug(eye), bulb, bulge, bum, bump, bun, bunch, bun/s, burl, bust, butt, butte

/l/ Words -- lobe, lump

3 Round

/b/ Words -- bale, ball, bead, bell, blimp, blip, bloat, blob, blotch, bowl, bulb, bulge

/l/ Words -- loop

4 Bend

/b/ Words -- bay, belt, bend, bight, bow

/l/ Words -- lens

5 Brushy

/b/ Words -- bang, barb, beard, bosk, braid, brake, branch, broom, brow, browse, brush, bur, burr, bush

/l/ Words -- lace, lash

4.4.3 Discussion of Findings

This experiment provides evidence for criteria 1-9 of the Phonosemantic Classification, which is required to prove the *Phonosemantic Hypothesis*.

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

Criterion 7. A much smaller percentage of the words which do not match the relevant phonological characterization fit into any class.

Criterion 8. Those words that do *not* match the relevant phonological characterization but which nevertheless do fit in the classification fit on average in a smaller percentage of classes, than those words which *do* match the phonological characterization.

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

• **Criteria 7 and 8** There are 295 monosyllables beginning with /b/ and 148 beginning with /l/ in my monosyllabic vocabulary. There were 4 words beginning with /b/ which did not fit in the Phonosemantic Classification designed for /b/, and all of these fit in the Concrete Noun classification. There are 4 words beginning with /l/ which do not fit in the Phonosemantic Classification designed specifically for /l/, and all of these were Concrete Nouns. Once again, all the exceptions to the Phonosemantic Classification are Concrete Nouns as evidence that the salience of iconic meaning in a word is related inversely to the concreteness of its *reference*. There were, however, 77 words beginning with /l/ which did not fit in any superclasses designed for /b/. Of these, 23 fit in the Concrete Noun classification. In addition, 24 words beginning with /l/ did not fit in any superclass designed for /b/. There are therefore 101 /l/-words -- or **68%** -- that fit in no /b/ phonestheme.

Let me provide an example to clarify what I mean by /l/-words that fit in the /b/ superclasses, but not the /b/ phonesthemes. There is a /b/ superclass for explosions and breakage. There is also a /b/ phonestheme for verbs of breakage. The phoneme /l/ starts two words -- lance and lathe -- which are not *verbs* of cutting like the /b/ words, but *nouns* referring to tools or weapons which cut. These words therefore fit in the natural 'superclass' of breakage and cutting, but not in the particular phonestheme to which words beginning with /b/ are confined. Thus 'lance' and 'lathe' constitute 2 of these 24. Similarly, the verb 'leak' is a verb related to breakage, but unlike all the /b/ verbs, it is not itself a type of breaking or cutting. Words beginning with /b/ fit in the /b/-based classification an average of 3.3. times. Words beginning with /l/ fit in the /l/-based classification an average of 3.2. times. Words beginning with /l/ fit in the /b/-based classification an average of 3/10 times, or one tenth as frequently.

The example given above is typical of what happens. Notice that although most of the bulging, circular and bumpy words beginning with /b/ do contain an /l/, very few words which actually begin with /l/ refer to anything bulging, circular or bumpy. Most of the /l/-words that are in this bulging class contain either an /b/ or a /p/. The one counter-example is 'lung', which happens to be a Concrete Noun.

• **Criterion 9** Notice that the /l/-words which do fit in this classification fit differently. This is easiest to see in comparing the word 'loop' with the circular words beginning with /b/. The 'loop' is a ring with a hole in the middle. The circular /b/ words that are hollow are 3-dimensional (and coincidentally contain an /l/). This 'loop' shape is typical of words containing /l/ in conjunction with other sounds beside /b/: leap, lip, lob and lop all involve that same 'loop'-shaped motion, though they are not themselves circles. (Leap, lip, lob and lop do not fit in this particular phonestheme with 'loop', because this phonestheme was reserved for nouns, not that there are any /b/ words involving circular motion.) When /b/ occurs before the /l/ in a 'bulging' word, the word tends to refer to some membrane or cover which is pushed outward from within by air or water pressure: ball, bloat, boil, bulge. Exceptions are blip, blob, bulb and boll. Three of four of these end in a labial stop and are semantically similar to 'lobe' in that they do not imply air or water pressure. The last two of these (bulb and boll) are Concrete Nouns.

• **Criterion 9** One can see this loop-shape also when /l/ is not in initial position: claw, coil, curl, fleece, flounce, fold, kilt, plait, pleat, reel, roll, scroll, sleeve, sling, spool, swirl, twirl, whirl, whorl. It is less obvious in comparing 'lobe' and 'lump' with the 'bumpy' /b/-words. The words 'lump' and 'bump' both fall in the same Natural Class. What then is, after all, the difference between words like 'lump' and 'bump' and how do we learn that difference?

Because there is so little which distinguishes 'lump' and 'bump' on the classificational and referential levels, then if I am at all correct in my hypotheses regarding word semantics, much of the semantic difference between the two can be attributed to **True Iconic** meaning differences, that is, to the unmediated effect that the phoneme /l/ vs. /b/ has on the semantics of these words. Every English speaker subconsciously recognizes the difference between a 'bump' and a 'lump'. A 'bump' is harder, more immobile and attached to the surface. A lump is moister, softer, more mobile and tends to be below the skin or in the cookie dough. These tendencies toward moistness, mobility and softness are quite generally typical of /l/ vs. /b/. It therefore sounds strange to talk of a 'bump' in the cookie dough or a 'lump' in the road.

• **Concrete Nouns** It is typical that only 4 Concrete Nouns beginning with /l/ do not fit in the Phonosemantic Classification designed for /l/, but 23 Concrete Nouns beginning with /l/ do not fit in the classification designed for /b/. A couple of examples may make clear why this is so. The animal 'leech' fits in an /l/ phonestheme of sucking and slurping, but not in any /b/ phonesthemes. 'Lamb' fits in an /l/ phonestheme for gentle things, but not in any /b/ class. 'Leaf' fits in an /l/ phonestheme for flat things, but not in any /b/ phonestheme... and so forth.

• **Concrete Nouns** There is a considerable number of /l/ words which neither fit in the Concrete Noun classes nor in any of the /b/ superclasses. These do, however, fit in classes typical of /l/:

Little: least, less, light, lint

Lead, Late, Follow: last, late, lax, lead, left, lest, lorn

Land: land, lawn, lea, loam

Fall, Lay: land, lay, lean, leap, lie, log, low, lug

Launch: leap, lunge, lurch
Lazy/Limp: limp, lithe, loaf, loll, lop, lounge
Lift: leap, lift, lob, loft
To the Side: lean, left, limp
Flat: lawn, lay, leaf, ledge, lie
Get, Eat, Take, See: lap, learn, leech, leer, lick, lunch
Run/ Walk/ Jump: leap, lick, lilt, look, lope, lug
Long: lane, limb, line
Happy: life, lift, light
Attraction: like, love
Life: life, live, live
lewd, lie (fib), like (similar), loom, lunge

By looking at this classification, one can begin to see what types of things /l/ conveys that /b/ does not. The phoneme /l/ conveys elements of linearity, light, laziness and loving where /b/ conveys bumpiness, burdens, business and brutality.

4.5 Experiment 5 -- Monolingual Classification First by Semantic Domain, then by Phoneme -- Words of Motion on Foot

See Appendix V for full data and results. -- Results are also listed in full below.

4.5.1 Methodology

- Locate all the words in a language which fit some narrowly defined semantic characterization. Try to insure insofar as possible that all these words fit in the same natural subclass, so that their referents, part of speech, argument structure, semantic class, etc. differ as little as possible. This tends to be easier to do with words other than the Concrete Nouns.
- In this case, I have used the monosyllabic words in my English vocabulary which in at least one of their senses refer to motion necessarily on foot. In this case I have excluded many words which *may* be verbs of walking, running, etc. and included only those for which the movement *must* be with the feet. For example, the verb 'stalk' is omitted, because it is grammatical to say that one stalks someone in a car as well as on foot. All the verbs of departure beginning with /b/ are omitted, because although in most cases the departure *can* be on foot, the mode of leaving is not specified inherently in the word, and any means of transport is possible. However, verbs of stamping, hopping and dancing which are not verbs implying motion from one point to another, but which necessarily involve the feet are included.
- Classify these by common phonological traits and attempt to determine whether individual phonemes are contributing specific aspects of meaning.

4.5.2 Example

This is a small scale test, so I include the relevant data here in its entirety. 1 -- initial position, 2 - second position, 3 - third position, F3 -- final position, F2 -- pre-final position, F1 -- 3rd from last position:

/H/, /z/, /Z/, /f/, /T/, /S/ -- no verbs of motion on foot contain these phonemes

/b/

1

Run, Jump - bound

/d/

1

Dance - dance

F3

Walk - plod, pound, stride, tread, wade, wend

Step - pound, tread

Run, Jump - bound

/g/

F3

Walk - slog

Run - jog

/p/

1

Walk - pace, plod, pound, prance

Step - pound

2

Run - sprint

Jump - spring

F3

Walk - tramp, trip, tromp, troop

Crawl - creep

Limp - limp

Step - stamp, step, stomp, tamp, tramp, tromp

Run - lope, romp, skip

Jump - hop, jump, leap, skip

/t/

1

Walk - tramp, tread, trek, trip, tromp, troop

Step - tamp

Run - trot

2

Walk - steal, stomp, stray, stride, stroll, strut

Step - stamp, step

F2

Walk - waltz

Dance - waltz

F3

Walk - strut

Run - sprint, trot

Skate, Ski - skate

/k/

1

Walk

Crawl - crawl, creep

2

Walk

Climb - scale

Run - skip
Skate, Ski - skate, ski
Jump - skip
F3
Walk - hike, trek
/v/
F3
Walk - rove
/s/
1
Walk - slog, steal, stray, stride, stroll, strut
Climb - scale
Step - stamp, step, stomp
Run - skip, sprint
Skate, Ski - skate, ski
Jump - skip, spring
F3
Walk - pace, prance, waltz
Step - prance, trounce
Dance - dance, waltz
/h/
1
Walk - hike
Jump - hop
/j/
1
Jump - jump
F3
Walk - trudge
Step - trudge
/C/
F3
Walk - march
/m/
1
Walk - march
F2
Walk - tramp, tromp
Limp - limp
Step - stamp, stomp, tamp, tramp, tromp
Run - romp
Jump - jump
F3
Walk - roam
/n/
F2
Walk - pound, prance, wend
Step - pound, trounce
Run - bound
Dance - dance
Jump - bound
/G/
F3
Run - spring
Jump - spring
/V/
1

Walk - limp
Run - lope
Jump - leap
2
Walk - plod
F1
Walk - waltz
Dance - waltz
F3
Walk - steal, stroll
Crawl - crawl
Climb - scale
/x/
1
Walk - roam, rove
Run - romp, run
2
Walk - prance, tramp, tread, trek, trip, tromp, troop, trounce, trudge
Crawl - crawl, creep
Step - tramp, tread
Run - trot
3
Walk - stray, stride, stroll, strut
Run - spring, sprint
Jump - spring
F2
Walk - march
/w/
1
Walk - wade, walk, waltz, wend
Dance - waltz
F2
Walk - rove, stroll, troop, trounce
Step - trounce
/y/
F2
Walk - hike
Crawl - creep, leap, steal, stride
Climb - scale
Jump - leap
Skate, Ski - skate
F3
Walk - stray
Skate, Ski - ski

4.5.3 Discussion of Findings

None of the words in this experiment have concrete reference, so this test provides no evidence for or against the inverse relationship of concreteness to the salience of iconic meaning. The experiment also provides only indirect evidence for general character of Phonosemantic Association. However it provides direct evidence for **Iconism** proper. It does not do much toward affirming the criteria for the Phonosemantic Classification, which primarily tests for Clustering. However, the test does provide some evidence for criterion 9:

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

But it does provide strong evidence in this way for the **Phonosemantic Hypothesis**. (Recall that a phoneme is defined only within its language. The phoneme /b/ in one language is not the same as the phoneme /b/ in others.

Phonosemantic Hypothesis

In every language of the world, every word containing a given phoneme has some specific element of meaning which is lacking in words not containing that phoneme. In this sense, we can say that every phoneme is meaning-bearing. The meaning that the phoneme bears is rooted in its articulation.

- The following is a comparison of how frequently the consonant phonemes appear in monosyllabic verbs of walking vs. monosyllables in the language overall:

Total Monosyllables: **3425**

Total Verbs of Walking: **48**

Phoneme	Total Words	% of Eng	Walking Verbs	%
b	352	10.3%	1	2%
d	399	11.6%	7	15%
g	266	7.8%	2	4%
p	502	14.7%	23	48%
t	723	21.1%	21	44%
k	649	18.9%	8	17%
v	99	2.9%	1	2%
H	32	.9%	0	0%
z	111	3.2%	0	0%
Z	5	.1%	0	0%
f	320	9.3%	0	0%
T	93	2.7%	0	0%
s	812	23.7%	21	44%
S	288	8.4%	0	0%
h	153	4.5%	2	4%
J	132	3.9%	2	4%
C	187	5.5%	1	2%
m	370	10.8%	10	21%
n	496	14.5%	5	10%
G	45	1.3%	1	2%
l	745	21.8%	9	19%
r	912	26.6%	23	48%
w	261	7.6%	4	8%
j	158	4.6%	2	4%

Phonemes that appear much less frequently in walking verbs than in the language generally are:

/b/, /f/, /s/

Phonemes that are too rare for statistics to be meaningful are:

/v/, /h/, /z/, /z/, /t/, /g/, /j/

Phonemes which occur in walking verbs with about the same frequency as in the language generally:

/d/, /g/, /k/, /h/, /j/, /C/, /n/, /l/, /w/

Phonemes which occur in walking verbs much more frequently than in the language generally:

/p/, /t/, /s/, /m/, /r/

- There is a subclass of walking verbs which contain predominantly those phonemes which occur much more frequently in walking verbs than in the language generally (/p/, /t/, /s/, /m/, /r/). It's very difficult to determine the effect of a phoneme in such small classes of words by examining one phoneme at a time, but by looking at classes of this type the patterning becomes much more apparent:

Most of the verbs of jumping contain a /p/. All 'jumping' verbs contain a labial stop:

bound, hop, jump, leap, skip, spring

Those that end in /mp/ imply a heavy landing compared to those that end in /p/ immediately preceded by a vowel.

jump, limp, romp, stamp, stomp, tamp, tramp, tromp

creep, lope, skip, step, trip, troop

One can see the effects of various consonants especially clearly in the verbs ending in /p/ and containing /t/ in the onset. There's often a verticality implicit in this combination throughout English (steep, stoop, tip, top, trip, topple). The /t//p/ combination also occurs in verbs of contact or touching whether using the feet and not (stamp, stipple, strap, tap, tamp, tamper, tape, trap, type)

Final /mp/ -- Something is Pressed or Mashed Underfoot:

stamp, stomp, tamp, tramp, tromp

Initial /tr/ -- Forward Motion

tramp, trip, tromp, troop

Initial /st/ -- Immobility, Stopping

stamp, step, stomp (out)

Those (non-jumping) verbs containing /p/ which also contain a liquid imply forward motion. Those verbs that contain a /p/ or have a dental stop after the vowel in general emphasize discrete steps as opposed to those that don't. All verbs that don't contain a /p/ imply forward motion:

Discrete Steps

Stationary Contain /p/ and no liquid

pace, pound, stamp, step, stomp, tamp

Forward Motion -- Contain /p/ and a liquid

creep, lope, limp, plod, prance, romp, sprint, tramp, trip, tromp, troop

Forward Motion -- [d,t] after the Vowel

march, skate, stride, strut, tread, trot, trudge, waltz

No Discrete Steps -- no /p/ or [d,t] after the vowel

roam, rove, run, scale, ski, slog, steal, stray, stroll, trek, trounce

Most verbs of running contain an /r/. All contain a liquid:

lope, romp, run, sprint

- Other phonemes also predispose walking verbs to take on a narrower set of meanings than would be the case if phonology had no effect on semantics:⁸

final /d/ -- *Implies an obstacle that has to be worked through*
bound, plod, pound, stride, tread, wade, wend

final /g/ -- *Implies heavy physical labor*
jog, slog

non-initial /k/ -- *implies a surface or area being covered*
hike, scale, skate, ski, skip, trek

initial /k/ -- *implies a crouched position*
crawl, creep

initial /h/ -- *often implies an uneven hop or limp, not so visible in monosyllables:*
hackney, halt, hitch, hobble, hock, hop, hulk, hunch, hunker, hurdle

pre-final /n/ -- *bounce*
bound, dance, pound, prance, trounce

initial /l/ (with /p/) -- *loop-shaped motion*
leap, limp, lope

final /l/ -- *prolonged motion*
scale, steal, stroll, crawl

initial /w/ -- *back and forth motion*
wade, waltz, wend
walk

4.6 Experiment 6 -- Monolingual Classification First by Semantic Domain, then by Phoneme -- Classes Typical of Certain Phonetic Features -- The Bias in the Labials

See Appendix VI for full data and results.

4.6.1 Methodology

• Locate all the words in a language which fit some narrowly defined semantic characterization. I used all the English monosyllables in my active vocabulary which fall in the following semantic classes. These classes were selected because I know them to emphasize the labials:

Bulges, Mountains, Humps and Peaks

Fountains and Blowing

Foundations

Beginnings

Pairs, Names, Pictures, Symbols

• Classify them by common phonological traits and attempt to determine whether individual phonemes are contributing specific elements of meaning to the word.

4.6.2 Example

Round Words

Initial Position

/b/ -- bale, ball, bay, bead, bell, blimp, blip, blob, blotch, bowl, bulb

/p/ -- pea, pearl, pill, pip, pit, plate, pock, pod, point, pore, puck

/r/ -- reel, ring, rink, roll, round, wrap, wreath, wrench, wrest, wring, wrist

/w/ -- waist, wheel, whirl, whorl

2nd Position

/p/ -- spin, spool

/r/ -- drill

/w/ -- swing, swirl, twirl, twist

3rd Position

/r/ -- screw, scroll, spring

Pre-Final Position

/m/ -- blimp

/r/ -- arc, arch, cirque, curl, earth, gear, girth, knurl, orb, pearl, swirl, torque, turn, twirl, whirl, whorl, world

/w/ -- bowl, coil, coin, cone, dome, globe, hole, hoop, loop, noose, orb, pore, roll, round, scroll, slouch

Final Position

/b/ -- blob, bulb, glob, globe, knob, lob, lobe, loop, orb

/p/ -- blimp, blip, drop, glop, grape, loop

/m/ -- dome

/r/ -- gear, spire, spur

/w/ -- screw

Percentages of words in above table which contain:

/b/ -- 14%, /p/ -- 30%, /v/ -- 0%, /f/ -- 0%, /m/ -- 3%, /r/ -- 48%, /w/ -- 30%

Monosyllabic 'round' words which do not contain a labial: disk

Curves and Ripples

Initial Position

/b/ -- bay, bend, bight, bilge, bow, bowl

/p/ -- plait, pleat, press, purl, purse

/v/ -- vault, veer

/f/ -- flare, flounce, flute, fold, frill, furl

/r/ -- rill, rock, roll, row, write, writhe

/w/ -- wad, wag, wake, wale, wall, warp, wave, wax, weave, web, weft, well, wend, whip, whirl, whorl, wick, worm, woof, worst/ed

2nd Position

/r/ -- crease, frill, press

/w/ -- squirm, swab, swap, swash, swat, sway, sweep, swell, swerve, swing, swipe, swirl, swish, swoop, twirl

Pre-Final Position

/p/ -- apse

/f/ -- weft, woof

/m/ -- clump

/r/ -- arc, arch, cirque, curl, curve, furl, girth, gnarl, knurl, purl, purse, squirm, swerve, swirl, turn, twirl, warp, whirl, whorl

/w/ -- bowl, cove, flounce, fold, loop, roll

Final Position

/b/ -- lob, lobe

/p/ -- clump, cusp, leap, loop, warp

/v/ -- cove, curve, swerve, wave, weave

/m/ -- squirm, worm

/r/ -- flare, gear, spire, spur, veer

/w/ -- bow, row

Percentages of words in above table which contain:

/b/ -- 15%, /p/ -- 21%, /v/ -- 9%, /f/ -- 10%, /m/- 4%, /r/ -- 41%, /w/ -- 55%

Monosyllabic curvy/ripply words which do not contain a labial: hunch, kink, sag, tuck

4.6.3 Discussion of Findings

Like the previous experiment, this experiment involves no words with concrete referents and is aimed primarily at detecting ***Iconism***, as opposed to ***Clustering***. It therefore does not directly address classification. However, as in the previous experiment, it provides evidence for criterion 9 of the Phonosemantic Classification, which is required to prove the Phonosemantic Hypothesis:

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

As in the previous experiment, classifications first by semantic domain and then by phonological form are helpful in getting an oversight over natural semantic domains. In addition, by selecting semantic domains in which labials appear disproportionately frequently, one can get a sense for the semantics of phonetic features and for how individual phonemes which are marked for those features pattern relative to them.

This experiment verifies that these classes do indeed overwhelmingly favor labial consonants. Furthermore, we find as in the previous experiment, that within such limited semantic domains, individual consonants do seem to have quite specific semantic effects.

4.6.3.1. Tendency for Certain Semantic Classes to Have Disproportionately Many Labials

Labial consonants appear in 96% of words in the following semantic domains. In the language generally, they appear in 68% of monosyllabic words:

Bulges, Mountains, Humps and Peaks
Fountains and Blowing
Foundations
Beginnings
Pairs, Names, Pictures, Symbols

These semantic domains and several others including:

Emptiness and Bareness
Impediments
Binding and Fastening
Departure and Separation
Better, Prime, More, Chief, Pro

both contain disproportionately many labials and have a semantic element in common which I describe as a 'bias'. This bias manifests geometrically as a hump, peak, mound or incline. The bias involves a 'ground' state and a second part which is offset from this ground state. For the purposes of this experiment, I have considered American /r/ to be a labial. It is pronounced with rounded lips and unlike /l/, it patterns with the labials semantically.

4.6.3.2. Tendency for Labials to Appear Disproportionately in Certain Semantic Classes

This disproportion toward the labials in these groups can be seen also by taking the inverse statistics, namely by observing what percentage of words containing a given consonant fall into these classes. I find once again that the labials usually fall in the highest percentiles:

Consonant Percentages in Monosyllabic 'Bumpy' Words

Total 'Bumpy' Words: 298 **Total Monosyllables:** 3425 **Percent:** 8.7%

<u>Consonant</u>	<u>b</u>	<u>p</u>	<u>f</u>	<u>r</u>	<u>w</u>	<u>l</u>	<u>s</u>	<u>t</u>	<u>n</u>	<u>m</u>	<u>v</u>
# Bumpy	81	97	46	128	107	99	87	68	49	33	8
Total #	373	532	333	1008	858	798	858	797	560	396	109
% Bumpy	22%	18%	14%	13%	12%	12%	10%	8%	8%	8%	7%

<u>Consonant</u>	<u>y</u>	<u>ng</u>	<u>k</u>	<u>g</u>	<u>sh</u>	<u>h</u>	<u>ch</u>	<u>j</u>	<u>d</u>	<u>z</u>	<u>th</u>
# Bumpy	64	8	48	17	10	10	12	7	24	6	1
Total #	927	106	698	278	158	156	187	133	431	115	93
% Bumpy	7%	7%	7%	6%	6%	6%	6%	5%	5%	5%	1%

<u>Consonant</u>	<u>dh</u>	<u>zh</u>
# Bumpy	0	0
Total #	33	5
% Bumpy	0%	0%

Consonant Percentages in Monosyllabic 'Fountain/Blowing' Words

Total 'Fountain/Blowing' Words: 160 **Total Monosyllables:** 3425 **Percent:** 4.7%

<u>Consonant</u>	<u>p</u>	<u>f</u>	<u>sh</u>	<u>l</u>	<u>s</u>	<u>t</u>	<u>r</u>	<u>b</u>	<u>w</u>	<u>n</u>	<u>m</u>
# Blowy	66	39	11	48	55	44	54	20	37	21	14
Total #	532	333	158	798	858	797	1008	373	858	560	396
% Blowy	12%	12%	7%	6%	6%	6%	5%	5%	4%	4%	4%

<u>Consonant</u>	<u>d</u>	<u>z</u>	<u>th</u>	<u>dh</u>	<u>v</u>	<u>ng</u>	<u>ch</u>	<u>j</u>	<u>y</u>	<u>k</u>	<u>h</u>
# Blowy	17	3	3	1	2	2	4	2	13	10	0
Total #	431	115	93	33	109	106	187	133	927	698	156
% Blowy	4%	3%	3%	3%	2%	2%	2%	2%	1%	1%	0%

<u>Consonant</u>	<u>g</u>	<u>zh</u>
# Blowy	1	0
Total #	287	5
% Blowy	0%	0%

Consonant Percentages in Monosyllabic 'Foundation/Support/Base' Words

Total 'Foundation/Support/Base' Words: 260 **Total Monosyllables:** 3425 **Percent:** 7.6%

<u>Consonant</u>	<u>m</u>	<u>b</u>	<u>f</u>	<u>r</u>	<u>p</u>	<u>v</u>	<u>t</u>	<u>s</u>	<u>n</u>	<u>d</u>	<u>l</u>
# Base	53	46	39	122	61	11	70	70	38	27	45
Total #	396	373	333	1008	532	109	797	858	560	431	798
% Base	13%	12%	12%	12%	11%	10%	9%	8%	7%	6%	6%

<u>Consonant</u>	<u>k</u>	<u>g</u>	<u>z</u>	<u>h</u>	<u>ch</u>	<u>j</u>	<u>y</u>	<u>sh</u>	<u>th</u>	<u>dh</u>
# Base	41	14	6	8	9	6	37	4	3	1
Total #	698	287	115	156	187	133	927	158	93	33
% Base	6%	5%	5%	5%	5%	5%	4%	3%	3%	3%

<u>Consonant</u>	<u>ng</u>	<u>w</u>	<u>zh</u>
# Base	2	20	0
Total #	106	858	5
% Base	2%	2	0%

Consonant Percentages in Monosyllabic 'Beginning' Words

Total 'Beginning' Words: 211 **Total Monosyllables:** 3425 **Percent:** 6.1%

<u>Consonant</u>	<u>r</u>	<u>v</u>	<u>b</u>	<u>d</u>	<u>g</u>	<u>p</u>	<u>f</u>	<u>m</u>	<u>w</u>	<u>n</u>	<u>t</u>
# Begin	117	131	35	39	25	42	25	30	62	40	42
Total #	1008	109	373	431	278	532	333	396	858	560	797
% Begin	12%	12%	9%	9%	9%	8%	8%	8%	7%	7%	5%

<u>Consonant</u>	<u>z</u>	<u>th</u>	<u>s</u>	<u>j</u>	<u>sh</u>	<u>h</u>	<u>ng</u>	<u>ch</u>	<u>k</u>	<u>l</u>
# Begin	6	5	40	6	6	7	4	6	20	23
Total #	115	93	858	133	158	156	106	187	698	798
% Begin	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%

<u>Consonant</u>	<u>y</u>	<u>dh</u>	<u>zh</u>
# Begin	25	0	0
Total #	927	33	5
% Begin	3%	0%	0%

Consonant Percentages in Monosyllabic 'Pair/Copy' Words

Total 'Pair/Copy' Words: 78 **Total Monosyllables:** 3425 **Percent:** 2.3%

<u>Consonant</u>	<u>m</u>	<u>v</u>	<u>p</u>	<u>dh</u>	<u>t</u>	<u>b</u>	<u>d</u>	<u>k</u>	<u>f</u>	<u>th</u>	<u>s</u>
# Copy	18	4	23	1	26	6	9	13	7	2	19
Total #	396	109	532	33	797	373	431	698	333	93	858
% Copy	5%	4%	4%	3%	3%	2%	2%	2%	2%	2%	2%

<u>Consonant</u>	<u>n</u>	<u>l</u>	<u>r</u>	<u>w</u>	<u>ch</u>	<u>sh</u>	<u>h</u>	<u>y</u>	<u>zh</u>	<u>ng</u>
# Copy	9	12	23	21	36	2	2	15	0	0
Total #	560	798	1008	858	187	158	156	927	5	106
% Copy	2%	2%	2%	2%	2%	1%	1%	1%	0%	0%

<u>Consonant</u>	<u>z</u>	<u>j</u>	<u>g</u>
# Copy	0	0	0
Total #	115	133	278
% Copy	0%	0%	0%

From perusing the above tables, one can observe that the various labials pattern variously relative to these classes. For instance, /m/ and /p/ occur more frequently in words referring to pairs, copies, pictures, reproductions, molds, mates and the like, but /f/ and /b/ do not. This aspect of /f/ and /b/ rather tends to manifest as ‘front’ (forth, fore, etc.) and ‘back’ (base, bottom, etc.). Furthermore, within a given broad semantic domain, different labials tend to cluster toward specific sub-domains of the larger domain. For example, in the first semantic sub-domain discussed above, that of bulges, humps, peaks and mounds, one finds the following patterns:

- All the /w/ words in this class involve motion, and most of these refer to some aspect of waves on the water.
- The appearance of fricatives (/f/ and /v/) in this class is very limited.
- All the /m/ words in this class also contain either /w/ or /p/.
- All the /r/ words in this class contain /k/ or /p/.

This again is an example of what was observed in the previous experiment, namely that within narrow natural semantic domains, one observes the effect of phonology on word semantics to be quite specific.

If one peruses these two sets of sample data, one can observe that the ‘round’ words contain a higher percentage of Concrete Nouns. Let me now more carefully consider a few words and phonesthemes from the ‘Mountains, Humps and Peaks’ classes, which lend themselves nicely to phonosemantic analysis:

Observations

Words Containing /b/ - bloat, blouse, bulge, bump, bunch

- The words containing /l/ imply some kind of liquid or gas pressing outward against a membrane.
- In the word ‘bunch’ a collapse is implied, as is the case with many words ending in /nC/ (scrunch, munch, cinch, pinch, etc.) (This /nC/ can be further analyzed into /n/ and /C/. The /n/ is responsible for the ‘narrowness’ or compactness in these words. The /C/ implies directed pressure (/t/) against something soft or fragile which resists it (/S/).)

/mp/ Class - bump, clump, hump, lump, plump, pump, rump, slump, stump

- I’ll consider here all the /mp/ words that imply a rounded forms rather than just the verbs of bulging. First observe what aspects of these words are **unrelated** to their Iconic sound meaning. The words, ‘bump, clump, lump, slump’ can be either verbs which create a form, or nouns describing the form itself. The words ‘slump’, ‘hump’, and ‘rump’ have an aspect of meaning which is arbitrary, namely that they are prototypically predicated of or attached to the back. The word ‘pump’ can be a verb or a Concrete Noun for an instrument which performs the action referred to by the verb. The word ‘plump’ can only be an adjective predicated prototypically of a person or animal and by metaphorical extension predicated of other things which resemble a belly (pies, for example). The word ‘stump’ has a verbal sense which has nothing to do with lumpiness. Therefore the only related senses of ‘rump’ and ‘stump’ are Concrete Nouns. The aspects of the meanings of these words which is not affected by Iconism include the fact that ‘rump’ is a body part and the fact that ‘stump’ is part of a tree. As these two aspects of meaning are so salient in these two nouns, I’ll not use them further in the comparison.
- The two words that start with a /p/, at least to my feeling, imply a nearly perfect spherical shape (a pumped ball, a plump ball). Perfection and roundness are very common in /p/. Lumps and bumps and humps and clumps are not necessarily so perfectly shaped.
- A ‘bump’ is hard and permanently affixed to the surface of something. A ‘clump’ results from ‘clustering’ things together. A ‘hump’ differs from a ‘bump’ in that its top is always the highest point on the thing which it is attached to. It also is prototypically attached to an animal’s back, a fact which is not determined by Iconism. A lump is under the surface, rather than on top, and it can move around. A ‘slump’ also prototypically is attributed to the back, and it is considered a dysfunction. The ‘dysfunction’ aspect of ‘slump’ falls in a phonestheme and thus although not truly Iconic is affected by a Clustering dynamic. But the fact that ‘slump’ is predicated of the back, is not in any way related to its phonological form as far as I can see. The aspect of the meaning of ‘slump’ which is Iconically determined by the /sl/ is the fact that it implies a smooth, natural, downward movement. The /l/ in ‘clump’, ‘lump’ and ‘slump’ correlates with flexibility and/or mobility.

Compression - bunch, clump, press, purse, wring

- These words either have a nasal in the rhyme or contain the consonants /p//r//s/ in that order.
- 'Bunches' are created by 'binding' and 'clumps' by 'clustering'. A 'bunch' generally implies that a 'band' is wrapped around a group of objects and drawn tight. The objects in a 'clump' do not require a 'band' around them, because they cohere naturally. This quality is very pervasive in /k/.
- The /p//r//s/ words involve two surfaces which are pressed together.
- Wringing involves a circular motion

Some Verbs of Roundness

1. **Cause Something to Turn** -- spin, swing, swirl, turn, twirl, twist, whirl

2. **Wind Something into a Round Shape** -- curl, reel, roll, twist, wring

- Many of these words contain /r/ followed by /l/ and many contain a /w/.
- /w//r//l/ -- The words which contain /w/ and end on /rl/ imply that the object spun is rotating on its own very fast. One generally 'twirls' a linear object of rigid shape which does not itself change form as a result of twirling. However, one swirls something which itself changes form, such as a liquid. The verb 'whirl' can be applied to rigid objects or liquids and can be used synonymously with either 'twirl' or 'swirl' in most cases.
- /G/ -- When one 'swings' something, as opposed to 'swirling', 'twirling' or 'whirling' it, one doesn't let go of it. It 'hangs' onto something, though it can continue to move circularly after one has stopped 'swinging' it.
- /p/ -- When one 'spins' something, it rotates along a surface resting on a single point (a single point is very typical of /p/).
- final /st/ -- When one 'twists' something, it is 'stuck'. It requires some force to unstuck it. The combination /st/ implies a static state in many words, which is to a large extent a result of Clustering.
- Pre-Final /r/ -- When /r/ immediately follows another consonant and precedes the vowel, the word tends to involve straightness or flatness. But when /r/ follows the vowel and precedes a final consonant, the word general implies some kind of curve, swerve, warp, twirl or turn. The nature of the curve depends on the final consonant. If the final consonant is an /l/, the turn is generally rapid and has its own momentum.

Obviously, one can proceed in this vein for a long time. I present these examples only to clarify what aspects of meaning one can find in a word and which of these are attributable to reference, argument structure, selectional restrictions, Clustering and Iconism.

Experiment 7 -- Multi-Lingual Classification First by Semantic Domain, then by Phoneme -- Words Referring to Locations

See Appendix VII for full data and results.

4.7.1 Methodology

- Select words from a relatively broad natural semantic class -- one which can be subclassified into smaller natural subdomains. In this case, all the monosyllabic roots in my English vocabulary which refer to a location were chosen. Words for 'location' are fairly evenly distributed throughout the phonemes. Other very broad (non-concrete) classes which are evenly distributed include words for time, emotion, groups of things, verbs of motion, words with positive connotations, words with negative connotations. These classes also do show some phonosemantic disproportions, but they are so large that all the phonemes are well represented in each class.
- Select a subset of these words which have a common phonological trait. In this case locations beginning with the consonant /b/ were chosen.
- Create a Phonosemantic Classification for this subset of words. (The reader will recall that a Phonosemantic Classification is a specific subset of a Natural Classification.)
- Create a different Natural Classification (into the subdomains) for the same set of words. There should be few words fitting the phonological characterization chosen in (b) which do not fit in both classifications. Here I must make a comment on this second Natural Classification. For every large semantic class, the language has natural cross-phonemic sub-classes organized by *referent*, or the Semantic Relation of metonymy/hyponymy. These classes are functionally determined, and in this respect, they are similar to concrete classes. For example, words for emotion break down into the primary emotions recognized by English -- anger, sadness, fear, happiness (which has a subset of funny words), etc.. Verbs of motion include verbs of motion on foot, by vehicle (again broken down by the type of vehicle), verbs of spinning, verbs of sliding, etc.. These basic classes are not essentially phonosemantic. They do not meet the additional criteria of a Phonosemantic Classification. For the purposes of this discussion, I will call them **Functional Classifications**
- Choose a second subset of words in this original broad semantic domain which have a different phonological trait in common. In this case, location words beginning with /g/ and /n/ were chosen.
- Classify these words according to both the phonosemantic and the functional classifications designed for the first set of words.
- Repeat the preceding steps for a different language. In this case, all Russian roots beginning with /b/ and /t/ which appear in Ozhegov's *Slovar' russkogo iazyka* and which refer to a location were chosen. Roots beginning with /g/ and /n/ were not used, because the few which did occur in Russian were almost all loan words. Many of the /b/ and /t/ location words also are loans, but there are many more of them and a much higher percentage of them are native Russian

4.7.2 Example

All the data from Appendix VII are included here:

Location Words Beginning with /b/

Functional Classification

Cosmic

Geographical -- basin, bay, bayou, belt, bend, bog, border, brink, butte

Political -- borough, burg

Streets -- boulevard, bridge

City Part -- beat, block

Home -- barn, barrack, base, bivouac, blind, bode, bungalow, bunker

Institutions/Businesses -- bank, bar, booth, boutique, brothel, bureau

Building Part -- balcony

Direction -- back, bottom, breech, by

Furniture -- bed, berth, bunk

Other -- babel

Exceptions: 3% (i.e. the word 'babel' doesn't fit in any of the above classes)

Location Words Beginning with /b/

Phonosemantic Classification

Container/Storage/Building -- bank, barn, barrack, belt, block, bode, booth, borough, boutique, bungalow, bunker, bureau

Backlogged/Boggy -- babel, back, bay, bayou, blind, bog

Connection/Road -- belt, bend, boulevard, bridge, by

Base/Bottom -- base, basin, bottom, breech

Sex/Alcohol -- bar, booth, boutique, brothel

Border -- balcony, border, brink

Bed -- bed, berth, bunk

Bump/Bulge -- bend, butte

Other -- beat(police), bivouac, burg

Exceptions: 1%

Location Words Beginning with /g/

Functional Classification

Cosmic -- galaxy, globe

Geographical -- gill, glacier, glade, glen, gorge, groove, grotto, ground, gulf, gully

Political -- grant

Streets -- gate

City Part -- garden, ghetto, green, grounds, gutter

Home --

Institutions/Businesses -- gallery, garrison, grange, guild

Building Part -- gallery, garage, garret, gate

Direction -- goal

Furniture -- garderobe

Other -- grave

Exceptions: 4%

Location Words Beginning with /g/

Phonosemantic Classification for /b/ Words

Backlogged/Boggy -- gulf, gutter

Base/Bottom -- ground, grave

Container/Storage/Building -- gallery, garage, garderobe, garret, garrison, grotto

Bump/Bulge -- globe

Border -- gate

Connection/Road -- gate

Sex/Alcohol

Bed

Other -- galaxy, garden, ghetto, gill, glacier, glade, glen, goal, gorge, grange, grant, green, groove, grounds, gully

Exceptions: 46%

Location Words Beginning with /n/

Functional Classification

Cosmic -- nadir, node

Geographical -- knob, knoll, narrows, neck, niche, nipple, node, notch

Political --

Streets --

City Part --

Home -- nest

Institutions/Businesses --

Building Part -- narthex, nave

Direction -- near, nether, next, nigh, north

Furniture --

Other -- nook

Exceptions: 5%

Location Words Beginning with /n/

Phonosemantic Classification for /b/ Words

Backlogged/Boggy --

Base/Bottom -- nadir, nether

Container/Storage/Building --

Bump/Bulge -- knob, knoll, nipple, node

Border --

Connection/Road -- node

Sex/Alcohol --

Bed --

Other -- narrows, narthex, nave, near, neck, next, niche, nigh, nook, north, notch

Exceptions: 58%

Location Words Beginning with /b/ -- Russian

Functional Classification

Cosmic -- bytie (world (in the Biblical sense), existence)

Geographical -- bassejn (pool), balka (gully), banka (shoal), barxan (sand hill), bereg (shore), boloto (swamp), bor (pine forest), borozda (fissure), bort (side), bresh; (gap), brovka (edge), brod (ford), bugor (knoll), buxta (bay)

Political -- bord'yur (border)

Streets -- bul'var (boulevard)

City Part -- blok (block)

Home -- barak (barrack), berloga (den), besedka (summer house), bivak (bivouac), bunker (bunker)

Institutions/Businesses -- bank (bank), banya (sauna), bar (bar), bir'a (exchange), bojnya (slaughter house), budka (booth), byuro (office)

Building Part -- balyustrada (balustrade), bastion (bastion), bashnya (tower), benuar (theater box), boks (isolation cubicle), brustver (parapet)

Direction --

Furniture -- buduar (boudoir)

Other -- baxcha (low-lying field), byk (pier)

Exceptions: 5%

Location Words Beginning with /b/ -- Russian

Phonosemantic Classification for /b/ Words

Backlogged/Boggy -- bassejn (pool), baxcha (low-lying field), boloto (swamp), buxta (bay)

Base/Bottom -- baza (base), balka (gully), bassejn (basin)

Container/Storage/Building -- baza (base), bank (bank), banya (sauna), barak (barrack), benuar (theater box), berloga (den), besedka (summer house), bivak (bivouac), bir'a (exchange), blok (block), bojnya (slaughter house), boks (isolation cubicle), budka (booth), buduar (boudoir), bunker (bunker), byuro (office), byk (pier)

Bump/Bulge -- barxan (sand hill), bawnya (tower), bugor (knoll)

Border -- balyustrada (balustrade), banka (shoal), bastion (bastion), bereg (shore), bord'yur (border), borozda (fissure), bort (side), bresh; (gap), brovka (edge), brod (ford), Brustver (parapet)

Connection/Road -- brod (ford), bul'var (boulevard)

Sex/Alcohol -- bar (bar)

Bed -

Other -- bor (pine forest), bytie (world, existence)

Exceptions: 5%

Location Words Beginning with /t/ -- Russian

Functional Classification

Cosmic --

Geographical -- tundra (tundra)

Political --

Streets -- trakt (highway), tupik (blind alley)

City Part --

Home -- tabor (camp)

Institutions/Businesses -- taverna (tavern), teatr (theater), traktir (tavern), tyur'ma (prison)

Building Part -- tambur (lobby), terem (tower room), terrasa (terrace)

Direction -- tuda (there), tut (here), tyl (rear)

Furniture --

Other -- ten; (shade), t'ma (dark)

Exceptions: 13%

Location Words Beginning with /t/ -- Russian

Phonosemantic Classification for /b/ Words

Backlogged/Boggy -- tryasina (quagmire), tupik (blind alley), tyl (rear)

Base/Bottom --

Container/Storage/Building -- taverna (tavern), tambur (lobby), teatr (theater), terrasa (terrace), terem (tower room), tualet (bathroom), tyur'ma (prison)

Bump/Bulge --

Border -- tyn (stockade)

Connection/Road -- trakt (highway)

Sex/Alcohol -- taverna (tavern)

Bed --

Other -- tabor (camp), ten; (shade), truyueba (slum), tuda (there), tundra (tundra), tut (here), t'ma (dark)

Exceptions: 35%

4.7.3 Discussion of Findings

This experiment provides evidence for all criteria 1-9 of the Phonosemantic Classification, which is required to prove the *Phonosemantic Hypothesis*. It also provides interesting evidence for the general character of Phonosemantic Association and Iconism, because it is cross-linguistic.

This experiment allows one to sense more clearly what the difference between the phonesthemes and the more general Natural Classes are and how words pattern relative to each of them. By using classifications designed for one language to categorize words in another language, one also gets a better sense for what is universal and what is language specific.

Location Words Beginning with /b/ -- English

Natural classification: *Exceptions*: 3%

Phonosemantic Classification: *Exceptions*: 1%

Location Words Beginning with /g/ -- English

Functional Classification: *Exceptions*: 4%

Phonosemantic Classification for /b/ Words: *Exceptions*: 46%

Location Words Beginning with /n/ -- English

Functional Classification: *Exceptions*: 5%

Phonosemantic Classification for /b/ Words: *Exceptions*: 58%

Location Words Beginning with /b/ -- Russian

Functional Classification: *Exceptions*: 5%

Phonosemantic Classification for English /b/ Words: *Exceptions*: 5%

Location Words Beginning with /t/ -- Russian

Functional Classification: *Exceptions*: 11%

Phonosemantic Classification for English /b/ Words: *Exceptions*: 35%

As predicted, words referring to locations beginning with /g/ or /n/ fit nicely in the Functional Classification, but not in the Phonosemantic Classification created for words beginning with /b/. This pattern seems to hold even when we apply the experiment to a different language.

The phoneme /g/ along with the other voiced and labial stops appears in disproportionately many words referring to containers. Notice that one class which many location words beginning with /g/ refer to valleys: gill, glen, gorge, grave, groove, grotto, gulch, gulf, gully, gutter. Some of these do fit into the 'backlogged' and 'bottom' classes of the /b/-based Phonosemantic Classification, but the 'valley' class is better, because it includes a greater percentage of the location words beginning with /g/. In other words, 'valley' rather than 'backlogged' and 'bottom' results in a classification for words beginning with /g/ which better fits criteria 1-4 for a Natural Classification. A large percentage of location words beginning with /g/ also refer to parks and other open green areas. These are completely unrepresented in /b/. Notice that these words tend to contain an /r/ which occurs in many other words concerning growth and increase: garden, glade, grange, grant, green, grounds.

Similarly, the words referring to bumps contain the phoneme /n/ even more frequently than /b/, but the bump-words which contain /n/ are small and knob-like (bend, butte vs. knob, knoll, nipple, node). Disproportionately many words beginning with /n/ refer to nearness (narrows, near, neck, next, niche, nigh, nook) and smallness (knob, knoll, narrows, neck, niche, nipple, node, notch, nest, nook).

The fact that we get very similar results for Russian words as for English words, even though the classification was originally designed for English is consistent with the Phonosemantic Hypothesis. This is a relatively small-scale experiment. Therefore the quantity of data is too small to take the exact percentages too seriously. Still, it is adequate to provide strong evidence for two important hypotheses. One is that there are different kinds of possible Natural Classifications for Location words, some of which are sensitive to sound and others that are not. The other is that there is a very clear tendency for Russian /b/ words to favor the English /b/ phonesthemes more than do Russian /t/ words.

4.8 Experiment 8 -- Positional Iconism, Comparison of Similar Phonemes

See Appendix VIII for full data and results.

4.8.1 Methodology

- Locate all the monosyllabic words or roots which contain each of two phonemes and which fall within a given natural semantic class. The broadest range of data can be found by selecting phonemes which can occur in many positions within the syllable. In this case, all English monosyllables in my vocabulary which contain /l/ or /r/ and which fall in one of the following semantic classes were chosen:

- Non-Vehicular Motion
- Vehicular Motion
- Liquid in Motion
- Sound
- Speech
- Make Active, Scare /r/ -- Calm, Slow Down /l/
- Curse or Criticize
- Roads

- Sort the words by position within the syllable
- Observe what effect (if any) position has on the syllable.
- Compare analogous words containing each of the two phonemes.

4.8.2 Example

Non-Vehicular Motion

Position: 1

/r/ Characterization: General running or walking, no source or path implied. Tends to be fast or wide ranging.

/r/ Word List: race, raid, range, reach, rip, roam, roar, romp, rove, run, rush

/l/ Characterization: General departure.

/l/ Word List: lead, leave, lope, lunge, lurch

Position: 2

/r/ Characterization: Motion's source or path is defined by initial consonant. Tends to be slow and limited. /tr/ suggests an implicit goal.

/r/ Word List: break, crawl, creep, cross, cruise, drag, drift, drop(by), frisk, prance, press, prow, thread, trace, track, trail, tramp, tread, trek, tromp, troop, trot, trudge

/l/ Characterization: With labials usually a flight from something specific, otherwise a burden is implied.

/l/ Word List: blast, blitz, blow, climb, flash, flee, fly, plod, plunge, slink, slip, slog, slosh

Position: 3

/r/ Characterization: Source and path defined. Tends to be fast or wide-ranging; /str/ is linear.

/r/ Word List: scam, scream, spread, spring, sprint, stray, streak, stream, stride, strike, stroll, strut

/l/ Characterization: Flight (intensified)

/l/ Word List: split

Position: F2

/r/ Characterization: An element of inevitability or lack of control implied. An obstacle is implied.

/r/ Word List: barge, charge, course, curve, dart, ford, forge, fork, forth, hurl, march, part, storm, swarm, swerve, warp

/l/ Characterization: Avoidance.

/l/ Word List: bolt, skulk

Position: F3

/r/ Characterization: Inevitability or passivity often implied. No implicit obstacle.

/r/ Word List: fare, near, roar, scour, soar, tear, tour, veer

/l/ Characterization: Pulling.

/l/ Word List: crawl, prowl, pull, steal, scale, trail

4.8.3 Discussion of Findings

This experiment provides evidence for all criteria 1-9 of the Phonosemantic Classification, which is required to prove the *Phonosemantic Hypothesis*. All the exceptions in this classification are once again words with *concrete reference*, providing evidence that the salience of sound-meaning is inversely related to the concreteness of the referent. This is also perhaps the best way I have found to compare the semantics of two phonemes. By including within our purview only words which fall within specific natural semantic domains, we get a better overview over those domains. This is the first test in which we see clearly the Iconic effects of phoneme *position* on word semantics.

• *General findings*

Some aspects of Iconic sound meanings are independent of position in the word, and other aspects of inherent or Iconic meanings do depend on position. Let me begin with an example where clustering centers around a fairly concrete referent so what I talk about is easy to see. The consonant /n/ is in a number of words associated with the 'nose'. The fact that /n/ is associated with the 'nose' is not dependent on the position /n/ occupies within the word. But the *role* that the nose plays in the word does depend on the position where the /n/ appears. In initial position, the word actually refers to a nose: neb, nib, nose. In second position, the word is most likely to refer to actions of the nose or things coming from the nose: snap, snarl, sneeze, sniff, snore, snort, snot, (snout), snuff. And in pre-final position, the nose becomes passive, rather than active, and the word refers to smells, or things which affect the nose: scent, stench.

This example is typical. The sound that appears in initial position generally defines the backdrop, the basic ground on which the word is built. In second position after an initial consonant, a sound's meaning is still having an agentive effect. Its effect will also be modified and directed by the initial consonant, which determines the basic premise of the word. In positions after the vowel, the effect of the consonant's meaning becomes passive and expressive of a result. In pre-final position, that result is modified by the effect of the final consonant. In final position, the meaning of the consonant expresses the end result of the scenario implicit in the word. It would be interesting to discover whether this pattern differed for SOV or VSO languages.

• **Characterizations of positional effects in these semantic classes**

Non-Vehicular Motion

Position 1:

/r/: General running or walking, no source or path implied. Tends to be fast or wide ranging

/l/: General departure.

Position 2:

/r/: Motion's source or path is defined by initial consonant. Tends to be slow and limited.

/tr/ suggests an implicit goal

/l/: With labials usually a flight from something specific, otherwise a burden is implied.

Position 3:

/r/: Source and path defined. Tends to be fast or wide-ranging. /str/ is linear

/l/: Flight

Position F2:

/r/: An element of inevitability or lack of control implied. An obstacle is implied

/l/: Avoidance.

Position F3:

/r/: Inevitability or passivity often implied. No implicit obstacle

/l/: Pulling.

Vehicular Motion

Position 1:

/l/: General Departure

Position 2:

/r/: Effortful, implies a burden and a direction

/l/: Easy sliding or flying over water or through air

Position F2:

/r/: More focussed on steering than burden

/l/: Steering

Position F3:

/r/: Steering, directedness or a burden

/l/: Pulling or Steering

Liquid in Motion

Position 1:

/r/: Downward. No limited path. Defined goal

/l/: No limited path. Defined source.

Position 2:

/r/: Downward. Along a narrow, linear path

/l/: Downward.

Position 3:

/r/: Outward. More forceful

/l/: Outward. More forceful.

Position F2:

/r/: Uncontrolled

/l/: Uncontrolled.

Position F3:

/r/: Defined source

/l/: Downward. Uncontrolled.

Sound

Position 1:

/r/: Wild or unrestrained. Source of sound not narrowly specified

Position 2:

/r/: Source of sound more narrowly defined. Sound is more restrained. Sound produced intentionally

/l/: Source of sound is an orifice. Sound produced intentionally

Position 3:

/r/: Strained voice (/k/) or string (/t/).

Position F2:

/r/: Unintentionally produced sound of limited duration

/l/: Unintentionally produced sound of limited duration.

Position F3:

/r/: Unintentionally produced prolonged sound

/l/: Unintentionally produced prolonged sound.

Speech

Position 1:

/r/: Incoherent

Position 2:

/r/: Coherent, having specific intent

/l/: Coherent, having specific intent. Pleading in /p/, blame otherwise

Position 3:

/r/: Outward. More forceful.

Position F2:

/r/: Uncontrolled or prolonged

Position F3:

/r/: Defined source. Need to express something repressed

/l/: Defined source. Wish to talk.

Make Active -- /r/, Calm Down -- /l/

Position 1:

/r/: General criticism or attempts to irritate

/l/: General calming

Position 2:

/r/: Putting somebody through something

/l/: Interference with ongoing activity.

Position 3:

/r/: Increased forcefulness, driving away

Position F3:

/r/: Scare

/l/: Discontinuation

Curse, Criticize

Position 1:

/l/: General criticism

Position 2:

/r/: General Criticism

/l/: Criticism for something specific

Position 3:

/r/: Criticism intensified

Position F2:

/r/: Yelling, implies condescension

/l/: Implies authority

Position F3:

/l/: Implies an effect has been brought about. (resultative)

Roads

Position 1:

/r/: General

/l/: Something which leads to

Position 2:

/r/: Directed through or over.

Position F2:

/r/: Uncontrolled
/l/: Something one follows

• **Summary of positional trends:**

The liquids /l/ and /r/ tend to supply the driving force to the word. If the liquid is /r/, it is active or self-propelled. If the liquid is /l/, it is passive and conforms to its environment. Very informally it can be helpful to think of the effect of /r/ as similar to that of fire, and the effect of /l/ as similar to that of water.

Onset: When /l/ or /r/ appears in the onset, the activity referred to by the word is nearly always agentive. Consonants in the onset form the stage or backdrop for the form that plays itself out in the word.

Initial Position: The most general words within that semantic domain. Activity tends to be broad, unspecified and wide ranging. This is especially the case for sonorants in English, since they cannot be followed by other consonants which would further specify the nature of the action.

Second Position: When a liquid in the onset follows one consonant, that preceding consonant both inhibits the motion, sound or activity and directs it. Motion is directed along a path (initial dental), burdened (initial velar) or blocked (initial labial). Sound is implied to issue from a specific source. Speech has a specific intent; it's no longer just incoherent ranting or contentless chatter.

Third Position: When a liquid appears in third position, then /s/ is in initial position. Quite generally /s/ in initial position intensifies the activity. Therefore words in which the liquid appears in third position share the directedness and limitations of second position, but they tend to be stronger. This can also result in other changes. For example, when a liquid appears in second position in words for water in motion the water generally flows downward with gravity. But when the liquid consonant appears in third position, and /s/ therefore appears in first position, the water tends to be sprayed or splashed outward or upward. The sequence /tr/ in initial position generally implies travel along a path, but when an /s/ precedes the /tr/, that path is more likely to be strictly linear and the motion along it is likely to be very rapid.

Rhyme: When /l/ or /r/ appears in the rhyme, the activity referred to by the word is nearly always unintentional and/or out of control. A liquid following the vowel can also result in torque or turning.

Pre-Final Position: When a liquid consonant appears in pre-final position, the activity tends to be unintentional or uncontrolled. But the consonant following the liquid cuts the action short or inhibits it in some way. For example, when a liquid appears in pre-final position in words for sound, the sound is cut short.

Final Position: When a liquid appears in final position, the action referred to by the word is almost always prolonged. It can also imply that a lasting effect has been brought about which makes the verb resultative.

4. As always, when one compares two phonemes in the same natural semantic domain, one finds that in certain respects they pattern differently. The phonemes /l/ and /r/ are very similar, but they differ most clearly in that /r/ is active and /l/ is passive. For this reason, in Natural Classes which emphasize this, such as the /r/ class 'To Make Active' one can find that words containing /l/ are rare or absent. The /l/ class which is most similar to the /r/ class 'Make Active' is just the opposite, to 'To Calm Down'. In addition, it is interesting to note that in words referring to some form of 'making active', the /r/ precedes the vowel. If the /r/ follows the vowel, the effect is rather to 'scare'. 'Scaring' can have the inhibiting effect of the 'calm down' class for /l/, but when this is the case, the /r/ inhibits by making active rather than making passive.

4.9 Experiment 9 -- Reverse Phoneme Order

See Appendix IX for full data and results.

4.9.1 Methodology

- Create bi-consonantal phonesthemes for every monosyllabic word or root with a given phonological characterization. In this case, all the monosyllabic words in my English vocabulary were taken into consideration. Many words were, however, systematically excluded from the comparison:
 - Those words which had less than two consonants were systematically excluded.
 - If neither of the relevant consonants appeared in the onset of the word, the word was not used in the comparison.
 - Those words for which the two relevant consonants never appeared in reverse order were excluded. For example, there are many English monosyllables which have a /b/ followed by a /C/ (branch, beech, bunch, breach, etc.), but I found none which contain /C/ followed by /b/. For this reason, the /b//C/ words were excluded as well. Occasionally some classes which had no inverse correlates were optionally mentioned, because they seemed interesting.
 - In addition, if some words had no corresponding inverse class, they were often also excluded. For example, there are words of beginning containing /b/ and then /r/, but no corresponding words of beginning containing /r/ and then /b/, so the 'beginning' /br/ class was not mentioned. Words which had only two consonants, both of which were the same were also excluded.
 - Combinations of [+glide]-C vs. C-[+glide] were also not discussed, because post-vocalic glides generally act as vowels.
- Align phonesthemes for the consonants ordered in one way with phonesthemes for the same consonants ordered the other way according to common Natural Classes.
- Look closely at the distinction in meaning between the two classes, and try to determine exactly what semantic components seem to be inverted.

4.9.2 Example

Linear

/t//r/ -- stair, straight, strait, strand, strap, straw, streak, stream, street, stretch, string, strip, stripe, strobe, track, trail, train, tree, trench, tress, trough, trunk
/r//t/ -- sprit

Steer, Trace vs. Root, Brunt

/t//r/ -- **Steer/Trace**: steer, trace, track, trail, train, trawl, tree(v), trend, turn
/r//t/ -- **Root/Brunt**: brunt, Christ, crest, fruit, root, sprout, thrust

Paths/Roads

/t//r/ -- **Simply Exists**: stair, stream, street, stretch, strip, track, trail, trench, trough
/r//t/ -- **Directed to a Place**: route

Cunning

/t//r/ -- **Single Event**: trap, trick, trip, turn
/r//t/ -- **Capacity**: craft, droit, grift

Motion

/t//r/ -- stray, streak, stream, stride, strike(out), stroll, strut, tour, train, tram, tramp, trawl, tread, trek, trip, tromp, troop, trot, truck, trudge
/r//t/ -- crate, draft, drift, freight, raft, rout, sprint

Strapped/Rooted

/t//r/ -- starch, store, strap, tar, term, troth, truss
/r//t/ -- drought, frost, rest, roost, root, rut, thrift

Strict/Rote

/t//r/ -- stern, straight, strict, terse

/r//t/ -- rate, right, rite, rote

Tire/Rot/Rust

/t//r/ -- starve, strand, strike, strip, terse, tire, trite

/r//t/ -- drought, frost, roast, root, rot, rout, rust

Trap/Wrest/Root Out

/t//r/ -- strip, trap, trump

/r//t/ -- draft, grift, rent, root, rout, wrest, thrift

Tear/Grate

/t//r/ -- tear, trim

/r//t/ -- grate, rift

Strange/Rapt

/t//r/ -- stare, stark, strange, strike, trance

/r//t/ -- rapt

Stress/Riot

/t//r/ -- storm, strain, stress, stretch, strife, strike, strive, torque, try

/r//t/ -- grunt, prate, rant, riot, rout

Strong/Bright

/t//r/ -- star, stark, strike, strong, torque, troll, trove, trump, trunk, try

/r//t/ -- bright, front, grant, great, greet, grist, prompt, raft, rapt, sprite

Frustration

/t//r/ -- strain, stress, strife, tear, tire

/r//t/ -- drat, fret, fright, grate, grunt, rout, rut, threat

Initiation/Creation

/t//r/ -- start, stir, stork, strike(out)

/r//t/ -- craft, draft, sprout, wright

Contact

/t//r/ -- strike, stroke, strum, tramp, tread, treat, tromp, trounce

/r//t/ -- print, thrust

Which? Words Implying Options

/t//r/ -- stair, strain, term, tier, tract, trade, trait, trend

/r//t/ -- rate, route

Quantity

/t//r/ -- streak, stream, tribe, trick, troop, trope, troupe, trove

/r//t/ -- fraught, graft, grant

Turning

/t//r/ -- steer, stir, tire, torque, trade, trill, turn, twirl

/r//t/ -- script, wrest, wrist, writ, write

Light/Fire

/t//r/ -- star, strobe, torch

/r//t/ -- bright, drought, frost, roast

Truth/Right

/t//r/ -- troth, truce, true, trust, tryst

/r//t/ -- Christ, right

Derogatory Terms for People

/t//r/ -- trash, turd, twerp

/r//t/ -- brat, brute, grit, rat, rout, runt, rust

As with the previous experiment, this one gives insight into the role of phoneme position in Iconic meaning. By forming bi-consonantal phonesthemes and comparing them with the monoconsonantal phonesthemes in Appendix I, one also gets a better sense for how Clustering gradually limits the semantic range of phoneme combinations. We have seen already that the semantics of the /gl/ combination disproportionately reflects the semantics of /g/ combined with the semantics of /l/ so that most words beginning with /gl/ fall in a much narrower semantic domain than the

combination /g/ plus /l/ would allow. In this experiment, we observe that this pattern is quite general. Finally, by observing what happens to semantics when the phonemes are inverted, one can get a better sense for the Iconic semantics of each of the two phonemes under consideration.

4.9.3 Discussion of Findings

This experiment provides evidence for criterion 9 of the Phonosemantic Classification, which is required to prove the *Phonosemantic Hypothesis*:

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

This experiment is one for which the data appears to me hardest to access intuitively. For this reason, this experiment was reserved as one of the last of those which analyze existing vocabulary. In previous experiments, I have been trying to simply establish the validity of the Phonosemantic Hypothesis. In the ensuing discussion, I will take the liberty of assuming it to be true, and hypothesizing about the influence of individual phonemes in more detail. As a result, this experiment is likely to be particularly unconvincing to the skeptic, and I acknowledge this in advance. However, if the analysis presented here is accepted, it provides quite strong direct evidence for Iconism.

If a set of related words containing any two consonants in one order is compared with words in the same Natural Class containing those same two consonants inverted, one can often discern an observable semantic distinction between the two classes of words which can be characterized as an inversion in the roles played by two semantic factors.

In some cases, I have included with the data a brief description of the semantic distinction I find between the two classes which are compared, and in other cases not:

Trance/Stun

/t//s/ -- *Self-Induced*: trance

/s//t/ -- *Exercises Power*: still, stop, strap, stump, stun

Long/Thin

/t//s/ -- tress

/s//t/ -- splint, sprit, staff, stake, stalk, stem, stick, stilt, stipe, stitch, straight, strait, strand, strap, straw, streak, stream, street, stretch, string, strip, stripe, strobe, stroke, strum

Strike/Stamp

/t//s/ -- trounce

/s//t/ -- smite, stamp, stomp, strike, stroke, strum, stub, swat

In general, the more concrete the reference of the words being classified, the more difficult it is to articulate the differences between the two classes. This again confirms what we have found in previous experiments, that the more concrete or unambiguous the referent of a word, the less accessible is its phonosemantics.

Nowhere in Appendix IX, have I discussed the real semantic distinctions I perceive at the level of detail that I perceive it. I will therefore provide an example below in which I discuss the semantics of a number of these classes of words which contain /t/ and /r/ in more detail. The discussion below is informal and is not intended as proof, but only to open up a realm for discussion and research. The discussions provided here are compelling enough to me to be worthy of mention, but to my mind, the proposals made here remain hypothetical awaiting corroboration

from further evidence.

Linear Words

/t/-r/: stair, strand, strap, straw, streak, stream, stretch, string, strip, stripe, strobe, track, trail, train, tree, trench, tress, trough, trunk

/r/-t/: sprit

/tr/-t/: straight, strait, street

The /t//r/ class is 22 times as linear as the /r//t/ class. Furthermore, the particular type of linearity in the word 'sprit' is not represented in the /t//r/ class. It is the class of long, solid, rigid objects which are not attached to anything and through which nothing runs. But this class is heavily represented in /p/: paddle, pawl, peg, pestle, pick, picket, pike, pile, pin, piton, pivot, pock, poker, pole, post, probe, prod, prong, prow; spade, spar, spear, spike, spine, spit, splint, spoke, sprig, sprit, spur. These make up 9% of words beginning with /p/ and 17% of words with /p/ in second position. Given this, I hypothesize that /r//t/ is not linear at all, only /t//r/ is linear, and the linearity in the word 'sprit' comes from the /p/, not the /r/ and the /t/. This is the kind of reasoning I use to determine consonant meanings.

We may then ask ourselves what makes the particular consonant combination /t//r/ linear, and why is /r//t/ not particularly linear? A careful look at the phonesthemes in Appendix 1 show that words containing /t/ very often involve directedness toward a goal without specification as to whether that goal is reached. My findings also corroborate an observation made in much of the phonosemantic literature over the ages, namely that /r/ implies a very active, dynamic energy. If the directedness in /t/ forms the backdrop or frame within which the energy of /r/ plays itself out, then it seems reasonable that the energy would be directed toward the goal defined by /t/ and the result will be linear. If, however, a vowel intervenes between /t/ and /r/, or if /r/ comes first, making the backdrop of the word's semantics merely the energy of /r/, then /r/ would not necessarily be directed linearly. The phoneme /r/ in initial position tends to be 'random'. This can be seen in many semantic domains, such as the verbs of motion discussed above. Verbs of non-vehicular motion beginning with /r/ often imply wandering over a large area. This is not true of non-initial /r/ in the onset:

1. Walk, Run (No Vehicle) 1

race, raid, range, reach, rip, roam,
romp, rove, run, rush

11 8%

1. Walk, Run (No Vehicle) 2

break, crawl, creep, cross, cruise, drag, drift,
drop(by), frisk, prance, press, prow, thread,
trace, track, trail, tramp, tread, trek, tromp,
troop, trot, trudge

23 6%

1. Walk, Run (No Vehicle) 3

scram, scream, spread, spring, sprint, stray,
streak, stream, stride, strike, stroll, strut

12 15%

The linear words formed by /p/ are static. The phoneme /p/ is a stop and a labial both. Its contribution to the word tends to have a static quality. By contrast, the linear /t//r/ words tend to have a direction. The most obvious exceptions to this generalizations are 'strap', 'strip', and 'stripe' which all end in /p/. Additional exceptions are 'strand', 'string' and 'tress'.

Nothing flows through or along the linear /p/ words except when the /p/ is in final position: pipe, stipe, tap. The analogous linear /t//r/ words through or over which something flows: stair, strait, straw, stream, street, track, trail, tree, trench, trough and trunk are not in general covered over -- they are not pipe-shaped containers as are the /p/-final words. The one exception is 'straw'. Words in which /p/ appears much more commonly denote containers than words in which /r/ or /t/ appear.

Paths, Roads

/t/-r/: stair, stream, stretch, strip, track, trail, trench, trough

/r/-t/: route

/tr/ -- /t/: street

Paths and roads tend to be linear, and like the words of linearity, they prefer /t//r/ to /r//t/. The one /r//t/ word in this class differs from all the others semantically. Stairs, streams, troughs, trails, trenches and all the other /t//r/ word exist independently of a particular trip. They are there whether one travels them or not. A single route can involve any number of tracks, trails, streets and trenches. These facts are consistent with the hypothesis that in the /t//r/ class, the directedness forms the background, and the fact of traveling over it or not is secondary, whereas in 'route', the energy -- the travel- forms the background, and the direction is appended onto that. (In Mid-Western usage, the word 'route' contains the vowel /aw/ and is only applicable to a specific trip. In New England, the vowel is /uw/ and the word can (but need not) refer to a specific highway. Whereas in Colorado, one says 'Highway 128', in New England, one says 'Route 128'.)

Steer, Trace vs. Root, Brunt

/t//r/: steer, trace, track, trail, train, trawl, tree(v), trend, turn

/r//t/: brunt, Christ, crest, fruit, root, sprout, thrust

Although I have aligned /t//r/ with /r//t/ words of a different Natural Class, this was the best match I could come up with. Both classes concern a guiding or initiatory influence. Several cases like this of 'creative' comparisons are included in Appendix IX. If I could find no words in the same Natural Class, I tried first to match opposites, and only if that was also impossible, did I align classes that had something else in common. In the /t//r/ class here, the /t/ -- the direction, the track -- comes first and the energy of the /r/ follows it. The /r//t/ class can be subdivided into words which refer to a source (brunt, Christ, and root), those which refer to a result (fruit), and those which refer to an outward directedness (sprout, thrust). 'Crest' is a climax in mid-stream. In all these cases, though, a forceful, supportive energy forms the background of the semantics of the word, and directedness comes after.

Trickiness and Craft

/t//r/: trap, trick, trip, turn

/r//t/: craft, droit, grift

The /t//r/ words all refer to a specific event. The /r//t/ words refer rather to an ability, disposition or advantage of some sort... something that can be put to use. The /t//r/ class is much more prone to duplicitousness than the /r//t/ class. In the /t//r/ class, I hypothesize that a specific direction (/t/) comes first, and then energy (/r/) is put behind it. In the /r//t/ class, the ability (/r/) comes first, and the word ends with a /t/ indicating that this energy can be directed toward some goal.

Verbs of Motion

/t//r/: stray, streak, stream, stride, strike(out), stroll, tour, tramp, trawl, tread, trek, (trip), tromp, troop, trudge

/r//t/: crate, (draft), draft, drift, freight, raft, rout, sprint

/tr/-t/: strut, trot

The /r//t/ class can be subdivided into words involving carrying (crate, draft (horse), freight), words involving motion which happens of itself driven by an outside force (draft (air), drift, raft, rout), and 'sprint' which fits neither of these characterizations. The /t//r/ words corresponding to the 'freight' and 'drifting' of /r//t/ refer to vehicles (train, tram, truck). Vehicular motion differs from the drifting class in that a vehicle has a driver who has an intended direction (/t/). In the 'drifting' class, the powers of nature govern the direction, and consistent with this, the /r/ comes first.

Strapped and Rooted

/t//r/: starch, store, strap, tar, truss

/r//t/: drought, frost, rest, roost, root, rut, thrift

The /t//r/ words all refer to something that wants to go somewhere, and something else which hinders it from following its natural course. The /r//t/ words often concern what happens in the natural course of things. None of them imply the stressfulness of the corresponding /t//r/ class. The /tr/ words imply intention, and except for the word 'thrift', the /r//t/ words do not.

The exception to this is the word 'thrift' which involves intentional intervention, and which starts with an unvoiced dental very similar to /t/. This intervention in 'thrift' differs, however, from the intervention in the /t//r/ class in that the /t//r/ class involves grabbing something and pinning it down forcibly against its will. The will to go somewhere -- the directedness (/t/) -- comes first in this class and forms the background for the word. In 'thrift', however, the energy of /r/ is not running directly counter to the directedness of /t/. Rather, the energy is buffered by two fricatives -- /th/ and /f/ -- and the purposiveness of all this comes last in the /t/... one is thrifty for a reason, and that reason is represented by the /t/.

Specifically what I believe happens semantically on the Iconic level in a word like 'thrift' is this: 1. There is a thicket, a difficulty (th). 2. There is an energy which approaches this preexisting difficulty, and is therefore directed at it (through). 3. Then the 'verb' follows -- the vowel 'i', which describes the nature of the action which plays itself out in the word. The character of this phonemic 'verb' is small and confining. This becomes clearer if one imagines that 'thrift' were pronounced 'thraft' or 'throft' -- these words would perhaps suggest that much larger quantities of money were being laid aside. These three sounds /Tri/ represent the situation set up by the word. The solution to the situation is /ft/ which also appears in words like 'sift' and 'shift'. 4. The solution is to filter (/f/ -- fence, filter, file, fickle, frisk, ferret, etc.) this /r/ energy (roof, reef, raft), and 5. all of this is directed toward a goal (/t/). In the word 'thrift', however, there is no indication implicit as to whether the goal of the thriftiness is achieved. This is another characteristic of /t/.

The /T/, /r/, /i/, /f/ and /t/ all take on various flavors in various Natural Classes with various referents. That is, if 'thrift' had been a verb of motion (I thrifted merrily down the road) or a verb of violent contact (He deserves a good thrifting), the above description would have been a little different, but the basic dynamic would have been the same.

Strict, Rote

/t//r/: stern, terse

/r//t/: rate, right, rite, rote

/tr/-/t/: straight, strict

A stern or strict person adheres to rules (directedness) first, and asks whether the rules are worthy of being adhered to second. In the word 'right', what comes first is the natural order represented by the /r/. The person who is directed toward the natural order comes after. In the case of 'right', it does matter whether the rule is correct. 'Stern' differs from 'strict' in that it concerns something which affects emotions rather than conduct. The intent to influence conduct implicit in the word 'strict' is consistent with a final /t/. This is also true of 'straight', as in 'straight as an arrow'.

Truth and Right

/t//r/: troth, truce, true

/r//t/: right

/tr//t/: trust, tryst

I said that in 'right' the /r/ perhaps represents natural law, which the /t/ follows. Let us consider the /t//r/ in 'truth' in this context. In mathematics, one is more likely to say, 'That's right,' than to say, 'That's true.' Mathematics is an internally consistent world independent of the kind of mapping to the so-called real world that language involves. That, I suggest, is the domain of /r/. Perhaps when we say, 'that's right', we mean the calculations are consistent with this natural, wild logic, which is mathematics. The /t/ follows the /r/. But when we say 'that's true', we mean that nature is consistent with our statement -- the /r/ follows the /t/. In the lower case sense of 'true', a statement is made (/t/), and then we look to see what the world is like and we say either, 'that's true' (i.e. the mapping from language to the so-called real world is accurate), or we say 'that's false.'

There are instances in which one can reply either, 'That's right' or 'That's true.' If a person says to his boss, "I have been doing my best to be diligent," the boss can respond simply, "That's right." Or she can say, "That's true, but..." If she responds, "That's right," she's making a statement not only about the correctness of his sentence, but about the

correctness of his conduct in general. From her perspective, his conduct was right as well as his statement. If she says, "That's true," she agrees that his sentence accurately reflects the situation in the world (his /r/ does follow his /t/), but she still leaves open the possibility that his /t/ did not follow his /r/, his general direction may still not have been consistent with the natural order of things, and so she thinks he may ultimately not have served the best possible end.

In the expression "To thine own self be true" what does the 'true' refer to here? It follows a natural law, just like 'right'. Why can't we then say, "To thine own self be right"? I think that the word 'right' doesn't start out with the requisite directedness of /t/ that would make 'to thine own self be right' make sense. Shakespeare says that my action, my /r/ follows my own inner direction, my /t/. I am specifically true to myself. One is true **T**o something. One is only right **a**bout something.

Tiring, Rotting and Rusting

/t//r/: starve, strand, strike, strip, terse, tire

/r//t/: drought, frost, roast, rot, rust

The /r//t/ words in this class all concern natural causes, acts of God and the like. This is typical of /r/. The goal-directedness from the human perspective then follows. A drought becomes a drought, when some living being expects or needs water and doesn't get it. One can't talk about a drought on the moon where there's never any water and where there's nothing which needs water. That presence of human purposiveness in the word 'drought' is introduced by the /t/, but it comes after the basic fact of dryness, which is natural and oblivious to my human purpose. Similarly, we don't talk of the oxidation of natural minerals lying around on mountains as 'rust'. It's only called 'rust' when it happens to some human implement intended for some purpose, and when this oxidation starts interfering with this purpose we call it 'rust'. That human purpose implicit in the word is the /t/. The word 'rot' is similar in this respect. By contrast, the words in the /t//r/ list are not referring to natural events, but either to manmade events or events which happen to people. So the background or set on which the word plays itself out is human purposiveness -- the /t/. When the /t/ is preceded by an /s/ in the first class there's an additional force which interferes. When the /r/ precedes the vowel in this class, the process is itself purposive (strand, strike, strip). When the /r/ follows the vowel, the process is natural (starve, tire), but it is interfering with human purpose.

Trap, Wrest and Root Out

/t//r/: strip, trap, trump

/r//t/: draft, grift, rent, root, rout, wrest, thrift

The /t//r/ words all involve acquisition by trickery. Once again I suggest that the /t/ indicates a direction, which in this case is misleading. Then a violence is done with /r/, and the /p/ is the punchline. The combination /t//p/ is often off balance (tip, topple, trip, steep, stoop, stumped, tippie, tipsy, top (the toy)). The phoneme /t/ is the dreamer, and /p/ is a reality check. In the /r//t/ class, energy comes first. I suggest that /r/ is the phoneme that actually does the grabbing. All of these /r//t/ words, however, also imply that the acquisition is purposeful, and if my hypothesis is correct, then that's what the /t/ contributes. When the word does not contain a /t/ (grab, pick, grasp, hold, etc.), there's no implication that somebody is 'taking' in order to make use of. It's just a simple statement of acquisition or possession. If this line of reasoning is correct then in both these classes, the /r/ is exerting the energy to acquire, but in the /t//r/ class, the /t/ functions to focus attention misleadingly, and in the /r//t/ class, the /t/ is used to imply that the acquisition has a purpose.

Tear, Grate

/t//r/: tear, trim

/r//t/: grate, rift

In all these words, I believe the /r/ is doing the actual cutting. The other sounds detail the circumstances of that cutting. When the /r/ follows the vowel, the word often implies that something is either turning or out of control, or it implies an imbalance or deviation of some kind. Compare 'creep', 'crawl' vs. 'careen', or 'trail', 'track' vs. 'turn', 'torque'. So too the word 'tear'. One can tear something in a controlled manner, but compared to 'trim', it involves creating a direction with one hand which runs counter to an energy introduced by the other. By contrast, the direction and the ripping are both going the same way in 'trim'. This is analogous to what happens in words involving motion, like 'trail', 'track', 'tram', etc. In these words, a direction is first determined, and then the /r/ gives the word motion. The word 'grate' implies the 'grid' typical of /gr/ (grill, graph, etc.). Velars can form a surface in this way. In /k/, the surface gets cracked, crinkled, crumpled, etc. when followed by /r/. So in 'grate', the background is a the perforated

surface of /gr/, and then something is directed at it (/t/). In the word 'rift', the action is a force of nature. This is disproportionately frequent when /r/ is in initial position. The words start with the earthquake of /r/, then the vowel, and then /ft/ -- fissure and directedness. The phonemes /f/ and /v/, true to their pronunciations often appear in words involving a narrow opening on the surface. In both 'tear' and 'rift', the energy of /r/ is running counter to the directedness of /t/. In the case of 'tear', however, the directedness is primary and the energy secondary. Consistent with this, 'tear' can be intentional. In 'rift', the natural energy is primary, and the contrary direction is secondary.

Strange and Rapt

/t//r/: stare, stark, strange, strike, trance

/r//t/: rapt

All the words in the first class also contain an /s/. When /s/ begins the word, attention is initially directed toward some thing which is bizarre. When /s/ is in the end, as in 'trance', the focus begins with the state of a person, the directedness of their attention, and the /s/ emphasizes the strangeness not of the thing being viewed, but of the viewer. The directedness in all cases concerns attention. In the words beginning in /st/, attention is directed at this strange object. The /r/ could be contributing the power which can hold attention. The strangeness that appears in the /t//r/ class but not in the word 'rapt' probably does not come from the reordering of /t/ and /r/, but from the /s/. The phoneme /s/ occurs in disproportionately many 'strange' words throughout the English vocabulary. The words 'trance' and 'rapt' both refer to the state of the viewer. In the case of 'trance' there is no outside object which is holding attention. The directedness of attention happens first reinforced by the energy of /r/ which is focussed in the same direction as the /t/, since they both occur on the same side of the vowel. A trance is intentional. One is rapt, however, in spite of oneself. The energy to transfix comes first, and attention is directed afterwards. It is drawn to a particular point -- to the /p/. In trance, attention is not on a specific thing or as the /p/ in the word 'rapt' implies. The focus of attention in 'trance' is the Now, the Nothing, all of which occur frequently in words containing /n/.

Stress and Riot

/t//r/: storm, strain, stress, stretch, strife, strike, strive, torque, try

/r//t/: grunt, prate, rant, riot, rout

/str/ is a stressful combination. Words beginning in /tr/ alone do not refer to stressful activities or situations. Words which begin with /r/ refer to a much less controlled activity than those which begin with a consonant followed by /r/. This is especially true of /p/ which occurs proportionately in the greatest number of words involving limitations imposed by outside authority. Words in the /t//r/ class refer to situations in which one has set out deliberately to perform some task. In the /r//t/ class, on the other hand, some dysfunction has already occurred. Then the word implies that there is an uncontrolled outburst of energy in reaction to it. The reason for the outburst is secondary. Ranting, rioting and routing all occur for some reason, and that reason I suggest may be represented by /t/. Compare 'grunt' with 'groan', for example. One can just be groaning in one's sleep for no particular reason, but one doesn't grunt in one's sleep. One has to be conscious to grunt, and one grunts because of something uncomfortable or unappealing.

Strong and Bright

/t//r/: star, stark, strike, strong, torque, troll, trove, trump, trunk, try

/r//t/: bright, front, grant, great, greet, grist, prompt, raft, rapt, sprite

The /r//t/ class is on the whole brighter and peppier than the /t//r/ class. This is consistent with the hypothesis that the /r/, which produces the energy, is enslaved to the /t/ in the first class. The phoneme /t/ comes first and has an agenda for /r/. But in the second class, /r/ is not so constrained. The directedness of attention in /t/ is at /r/'s disposal rather than the other way around.

Words of Initiation and Creation

/t//r/: stir, strike(out)

/r//t/: craft, draft, sprout

/tr//t/: start

In the first class, the project (/t/) already exists. It is then executed (/r/). In the /r//t/ class, the project is either in the planning stages, or else, as in 'sprout', it represents a natural process.

Words of Contact

/t/ɾ/: strike, stroke, strum, tramp, tread, tromp, trounce

/ɾ/t/: print, thrust

/tɾ/t/: treat

The words 'thrust' and 'print' imply a final directedness pointed outward but with an uncertain effect. 'Printing something' and 'thrusting' express an intent, but no certain outcome (the thrust of an argument). The word 'print' can also refer to a footprint or imprint, a telltale sign of something that has been. In that case too, the energy which produced the sign came first, and the direction follows. In the /t/ɾ/ class, the directedness is much more controlled, and the energy implicit in the /ɾ/ can once again be thought of as directed in the service of the /t/.

4.10 Experiment 10 -- Cross Linguistic Phonesthemes /str/

See Appendix X for full data and results.

4.10.1 Methodology

- Create a Phonosemantic Classification (C) for all words in some language (L) containing some phonological characterization (P). In this case all the English monomorphemes in my active vocabulary were selected which contain /s/, /t/ and /r/ in that order, and in which at least the /s/ appears in the onset.
- Try to fit words with other phonological characterizations into C. In this case all monomorphemes beginning with /v/ and with unvoiced 'th' were selected.
- Try to fit words from languages other than L having phonological characterization P into C. In this case, all root words (not only monosyllables) matching P from the dictionaries listed below were used:

Albanian	Stefanllari	<i>Albanian-English, English Albanian Dictionary</i>
Catalan	Buxton	<i>Diccionari Català-Anglès</i>
German		<i>The New Cassell's German Dictionary</i>
Modern Greek	Liddell&Scott	<i>Greek-English Lexicon</i>
Hindi		<i>The Oxford Hindi-English Dictionary</i>
Indonesian	Echols&Shadily	<i>An Indonesian-English Dictionary</i>
Irish	Dinneen	<i>Irish-English Dictionary</i>
Lithuanian		<i>Routledge's Lithuanian Dictionary</i>
Norwegian	Landrø & Wangensteen	<i>Bokmålsordboka</i>
Russian	Ozhegov	<i>Slovar' russkogo iazyka</i>
Welsh	Evans	<i>Welsh-English, English-Welsh Dictionary</i>

4.10.2 Example

English /str/ Words

Phonosemantic Classification

Straight -- stair, steer, stork, straight, strait, strand, strap, straw, streak, stream, street, stretch, string, strip, stripe, strobe, stroke

Strong/Stern -- starch, star, stark, steer (animal), sterling, stern, storm, strain, strangle, stress, stretch, strict, strike, strive, strong, structure, struggle, stubborn

Start -- start, startle

Struggle -- stir, storm, strain, strangle, stream, stress, stretch, strife, strike, strive, struggle, stubborn

Stop -- stare, stark, starve, sterile, stern, store, strangle, strict, strip, stubborn

Strange/Distant -- star, stark, startle, storm, story, straggle, strange, strangle, stray

Stroll -- steer, stir, straggle, stray, stride, stroll, strut

Stretch/Spread -- star, starch, stork, straddle, straggle, strain, stretch, strew, stride, strive, struggle, strum, strut

Strike -- stir, strangle, strike, stroke, strum

English Words Beginning with /v/

Straight -- valley?, vane?, vein, vine

Strong -- very, vim, vigor, verve

Struggle -- venge, vie, volley?

Stop

Start

Strange

Stroll

Stretch/Spread

Strike

Exceptions -- vale, valley, van, vat, vase, vial, vault, vessel, vile, villain, viper, vamp, voice, vote, vouch, vow, view, veer, veil

Irish /str/ Words

Straight -- starr (tooth, tusk, jut, rough pull, fit of anger, round of boxing, sturdy), starran (projection), steotar (sugar stick), storn (straddle pin), straibeir (lash), straic (strip of cloth, stroke of a cane, state, level, pride), straille (tall, lazy aimless person), straimead (tape, streamer, heavy stroke), straip (strap), stran (prominent tooth), strapa (strap), strat (stay between masts), streaclan (band, gaiter), strearac (tree creeper), strileaman (long, nervous person), strioc (stripe, repentance), striocail (making tracks, striving), striolla (girth, girdle), strior (impulse, gust, enthusiasm, stripe), strioradan (anything hanging, limp), striopan (strip, streamer), striopar (strip, tatter), stroc (iron keel band), stropa (strophe), struic (crest, ridge), strup (curved spout), strut (ostrich), sutrog (candle)

Strong -- feistear (regulation, equipment), sataire (pusher, intruder), seitreac (strong, sturdy, braying, sneeze), siotrail (bellowing), sotaire (strong fellow), starr (tooth, tusk, jut, rough pull, fit of anger, round of boxing, sturdy), starramail (sturdy, resolute), starranac (troublesome, stubborn), starrog (hill, summit, obstinant female), stiuir (steering, guiding, attitude), storc (large animal or person), storfath (snort), straic (strip of cloth, stroke of a cane, state, level, pride), straimead (tape, streamer, heavy stroke), strairiun (audacity), strapaire (vigorous, well-built person), streaclac (drag, pull), strior (impulse, gust, enthusiasm, stripe), striorac (windy, rough), stro (stress, excitement, dallying, tyranny), stroinear (overbearing, uppish), sturraide (impudent person), sturracalac (sturdy)

Start

Struggle -- sataire (pusher, intruder), siotram (tantrum), starr (tooth, tusk, jut, rough pull, fit of anger, round of boxing, sturdy), starram (stutter), starramail (sturdy, resolute), starranac (troublesome, stubborn), starrog (hill, summit, obstinant female), stracail (trudging), stradain (fit of temper), straille (mat, carpet, anything confused), straimp (displeasure, huff), strainnc (grimace), strairiun (audacity), strangad (pulling, twitching), straoi (great effort), streaclac (drag, pull), strearail (climbing), streill (crying expression), strileaman (long, nervous person), strioc (stripe, repentance), striocail (making tracks, striving), striorac (windy, rough), stro (stress, excitement, dallying, tyranny), strogadgail (struggling), stroigreamail (combative), stroinear (overbearing, uppish), strucail (negotiating, huckstering), struirim (stress, break), strus (stress, difficulty), sturraide (impudent person)

Stop -- feistear (regulation, equipment), istir (in), ostar (food stores, inn-keeper), satarn (Saturday), seatar (gland, library, bookcase), sotairealta (placid), starram (stutter), starrogact (staring), startoir (historian), stioroip (stirrup), store (store, treasure), stracail (trudging), straic (strip of cloth, stroke of a cane, state, level, pride), straille (tall, lazy aimless person), strainin (colander), stran (delay), strat (stay between masts), streara (stile), striolla (girth, girdle), striomuigte (rigid, stiff in the legs), stro (stress, excitement, dallying, tyranny), stroigin (cement), stronncugad (stiffening), struirin (weaver's glue)

Strange/Distant -- astranac (wayfarer), astrolaide (soothsayer), straille (mat, carpet, anything confused), strailin (untidy, awkward), straipeac (anything unkempt), strampalaide (awkward person), strampalta (trampling, awkward), streabog (useless article), streacla (trifle), straclanac (straggling, ragged), strodair (good for nothing), stroile (aimless person), stroiliur (careless), stroinre (stranger, vagrant), stroinrearta (foreign), strullog (clumsy female), strut (ostrich)

Stroll -- astranac (wayfarer), stracail (trudging), strae (wondering, stray), strearail (climbing), striocail (making tracks, striving)

Stretch/Spread -- seitreac (strong, sturdy, braying, sneeze), starrog (hill, summit, obstinant female), strabaille (prodigality), strabar (big mouth, grin), straboid (prostitute), straca (stratum, layer), straille (mat, carpet, anything confused), straoideac (waster), streannc (splash), streanncan (tune, lilt, rush of fluid), striapac (harlot), strioradan (anything hanging, limp), triorail (undressing), struic (crest, ridge)

Strike/Tear -- starr (tooth, tusk, jut, rough pull, fit of anger, round of boxing, sturdy), stiuraide (hussy), straibeir (lash), straic (strip of cloth, stroke of a cane, state, level, pride), straillead (act of rending), straimead (tape, streamer, heavy stroke), strampail (stamping, striking), strampalta (trampling, awkward), striopar (strip, tatter), striudai (parts), stro (stress, excitement, dallying,

tyranny), stroc (stroke, sharp pang), stroic (tatter), struirim (stress, break)

Exceptions -- iostar (entertainment, lodging), stirean (sturgeon), striog (small drop), stur (dust), sutrall (lamp)

4.10.3 Discussion of Findings

This experiment provides evidence for all criteria 1-9 of the Phonosemantic Classification, which is required to prove the *Phonosemantic Hypothesis*. The first part of the experiment in which words beginning with /v/ and /T/ are compared with words containing /s//t//r/ serves as a control for the comparison I make with words containing /s//t//r/ in other languages. If we find that English words starting with /v/ and /T/ fit the Phonosemantic Classification for English /s//t//r/ words considerably less well than words containing /s//t//r/ in other languages (as we in fact do), then this is evidence that phoneme semantics is to some degree universal or subject to natural law. The universality of phoneme semantics is also evidence that Iconic meaning is both productive and central to word semantics.

- All of the senses of all of the English /s//t//r/ monomorphemes fit in the following classes:

Straight, Strong/Stern, Start, Struggle, Stop, Strange/Distant, Stroll, Stretch/Spread, Strike

Each word fits on average in 1.8 of these classes.

-

<u>Language</u>	<u>Phonology</u>	<u>% Which Fit</u>	<u>Words/Class</u>	<u>Total words</u>
English	/s//t//r/	100%	1.8	52
Greek	/s//t//r/	98%	2.1	28
Irish	/s//t//r/	97%	1.4	114
Norwegian	/s//t//r/	97%	1.5	77
Catalan	/s//t//r/	96%	1.4	74
Welsh	/s//t//r/	96%	1.1	24
Hindi	/s//t//r/	95%	.8	20
Russian	/s//t//r/	95%	1.2	49
Indonesian	/s//t//r/	91%	1.2	23
Lithuanian	/s//t//r/	82%	1.1	17
Albanian	[s,S]/t//r/	95%	1.4	15
German	/S//t//r/	91%	1.2	76
English	Initial /T/	60%	.6	35
English	Initial /v/	37%	.4	28

• As for English words in which the /s/ doesn't appear in the onset, the majority don't fit in any of the abovementioned classes:

- **Don't Fit:** aster, asterisk, bastard, bister, bistro, blister, buster, canister, caster, castor, cistern, cloister, cluster, custard, dastard, Easter, ester, fester, fluster, glister, hamster, lobster, luster, minestrone, minstrel, mister, mustard, mystery, nostril, ostrich, oyster, pastor, pastry, pasture, pester, poster, psalter, tapestry
- **Do Fit:** austere, baluster, banister, bluster, bolster, filibuster, foster, maestro, master, monster, muster, plaster, roster

I have observed previously that although some aspects of a phoneme's semantics seem to remain constant regardless of the position that the phoneme occupies within the syllable, other aspects of the Iconic meaning vary when the phoneme occupies various positions. Varying positions particularly affects the interactions between various phonemes in a manner described in the discussion of 'Phoneme Physics' in endnote 8. I have observed in the previous experiment, for example that when a monosyllable begins with the sequence /tr/ the energy implicit in the /r/ seems to flow in the direction of the /t/. But when a vowel intervenes between /t/ and /r/, as in 'torture' and 'turn' and 'terror' and 'torque', then the word tends to refer to something which is off balance or rotating either literally or metaphorically. If there is any validity in this perspective, then the above data would suggest that the 'stretching' and 'stressful' and linear qualities of /s//t//r/ depend to some degree on the /s/ appearing in initial position. When the /s/ is not initial, I hypothesize that the dynamic between the /s/, the /t/ and the /r/ shifts.

• In this small set of words, one can find a large number of sets of opposites. One finds many words for straightness, but also no small number for straggling, straying and strewing. One finds words for both stopping and starting or strolling, for both strength and starvation/straggling. One finds both strangeness and strictness. ***This phenomenon of finding opposites is very common in Phonosemantic Classifications.***

This may at first glance appear to be counterevidence to the hypothesis that phonemes can be associated with a unified semantics. Antonyms in general have more semantic characteristics in common even than synonyms. For example, the antonym of the word 'long' is not 'carpet' or 'politics'. The antonym of the word 'long' is almost identical to it in all respects. It only differs along the single semantic axis of 'size'. When we look at phoneme semantics, we look through the perspective of morphemes, which are one linguistic level higher. The processes of classification and reference at the higher levels can be viewed as prisms that fraction the single semantic axis 'length' into two different aspects of 'length', namely 'long' and 'short'.

• I would point out as well a fairly serious counterexample to the ***Phonosemantic Hypothesis***. In German and Albanian, the sequence of sounds /st/ either cannot occur at the beginning of a word at all, or occurs with only very limited distribution. Instead, we get a palatalized /St/ initially. Still, the German words containing /S//t//r/ fit fairly neatly into these classes. In fact, in certain dialects of American English, like my sister-in-law's San Antonio dialect of Texan (which I refer to simply as "Texan"), the initial sequence /str/ is pronounced /Str/.

The fact that these words fit so neatly into the /s//t//r/ pattern for English suggests to me that the Phonosemantic Hypothesis is not the final word on the matter. The problem with my formulation of the Phonosemantic Hypothesis is that the term 'phoneme' is not well defined in cases where some feature is unspecified. In all likelihood, it is the numerous phenomena such as these which

probably account for the fact that relatively little research has been done in phonosemantics over the centuries.

I think the distinction between Clustering and Iconism can come to our aid in this situation. The effects we observe here concern phonesthemes, hence Clustering. Clustering is a process which tends to apply unified semantic domains to *phonemes*. In cases where the term 'phoneme' is ill-defined, such as in Texan /Str/, where there is an underspecification of phonetic features, then the *Phonosemantic Hypothesis* as I have formulated it (in terms of 'phonemes') will be similarly ill-defined. In this dissertation, I'll not go into this problem in detail other than to point out that if we can come up with a vocabulary which can give a name for that underspecified /S/ in /Str/, then I can put that term into my formulation of the Phonosemantic Hypothesis, and it will still hold.

Now I think one can test for Iconism proper (as opposed to Clustering) in these instances and show that it still holds. One source of such evidence has already been provided. I observe above that words beginning with /T/ in English fit the /s//t//r/ classification better than those that begin with /v/. I observe further that 15 of the 20 /T/ words that fit in the /s//t//r/ classification contain an /r/. The /T/ class is therefore both phonetically and semantically similar (but not identical) to the /s//t//r/ class. Facts such as these also confirm an observation that I have made earlier, that certain semantic traits are common to each phonetic feature as well as to each phoneme. We would expect this if phoneme semantics is, as I suggest, fundamentally Iconic. If a phoneme's semantics is rooted in its articulation, then phonemes with common elements of articulation would have common elements of meaning as well. Therefore if the Phonosemantic Hypothesis is true, then we would anticipate a great deal of semantic overlap between words containing /s//t//r/ and those containing /S//t//r/.

Like Von Humboldt and Jakobson, I have also observed that Clustering is not fundamentally Iconic in nature, though it still seems to remain constrained within the deeper limitations imposed by Iconic semantics. Whereas Iconism must hold sway on the level of phonetics, but not on the level of phonemics, Clustering seems to be blind to allophonic variations. And word initial /Str/ in German and Texan, is, of course, an allophonic variation of word initial /str/. I do not speak Albanian at all, but if Albanian orthography accurately reflects its pronunciation, then word initial /Str/ and /str/ are not allophonic variations in that language, though /str/ seems to have quite limited distribution, particularly to loan words. If the Phonosemantic Hypothesis is in essence correct, then we would predict that variations in truly Iconic meaning would occur between syllable initial 'str' and 'shtr' in languages or dialects like Texan and German, but that Clustering would treat syllable initial 'shtr' in German and Texan the same as syllable initial 'str' in other languages, because in these contexts, the *phoneme* pronounced 'sh' is the same as the phoneme pronounced 's' in other contexts. In languages like Albanian, however, where there appears to be a phonemic distinction between word initial /str/ and word initial /Str/, we would predict that in addition to Iconic variations between the two phoneme sequences, there would also be differences in their Clustering dynamic. The evidence from Albanian provided in this little survey does not support this, but this evidence is too slight in comparison with the evidence I have provided otherwise to be conclusive.

It may seem that the distinctions between the Iconic semantics of Mid-Western and Texan English, for example, are precious small, and extremely difficult to discern. We would expect this to a large degree, because the phonetic differences between Mid-Western and Texan English are few compared to their phonetic similarities (i.e. Texan much more closely resembles British

English than it resembles Japanese, for example). It's exceedingly difficult to hone in on Iconic semantics at the phoneme level and lower, because major distinctions in Iconic meanings across languages are always accompanied by major semantic distinctions on every other level as well. As we have seen, the most effective means I have found to get at phoneme semantics is to narrow the natural semantic domains insofar as possible, and then compare words that are virtually synonymous.

4.11 Experiment 11 -- Invented Definitions for Nonsense Words

See Appendix XI for full data and results.

4.11.1 Methodology

• Devise a list of monomorphemic words which have no referent in the language in question. Endeavor to insure that each of the consonants in the language is represented in the list. The nonsense words or *quasi-words* (following the terminology used in Slavic linguistics) I used were:

baff, bamp, bipple, boag, cand, cass, corm, culk, desp, dom, drulk, flug, forp, fum, glon, gooble, gurfus, gusp, guzzy, hask, hort, husp, jethom, lant, leb, loog, lorch, mant, morp, muggle, nop, plamp, plork, preet, rammop, rapple, rost, rulp, rummer, sant, sarl, shob, shong, spreck, sumble, tam, teetle, thad, thell, torg, veest, voap, vom, wentle, widder, wogger, yoosh, yorch

Some quasi-words were removed and others added to the list during the course of the 8 months during which the experiment was conducted. Quasi-words were removed when a pattern seemed to have been established, and relatively few changes occurred in semantic distribution. Other quasi-words were added to replace them

• Ask informants to write definitions for these quasi-words. Informants were free to write definitions for only those quasi-words which interested them. All data was acquired over the course of 8 months from a Web Page posted at my site at the following URL:

<http://www.conknet.com/~mmagnus/>.

• Sort the definitions by common semantic features.

Following each entry or definition are five fields in parentheses and delimited by commas. The first field is the unique number assigned to each informant. The second field indicates the sex of the informant: F for females and M for males. The third field indicates the informant's age. The fourth field is Y if the informant felt they had a good understanding of phonosemantics before filling in the form, Y/N if they feel they have some background, otherwise it is N. The fifth field indicates the informant's native language. Fields are simply left blank if the informant did not supply the relevant information.

4.11.2 Example

baff

Trick/Error:

- * a trick (2,,,English)
- * a mistake (5,,,English)
- * confused (6,,,English)
- * to throw up (7,F,10,Y,English)
- * to deceive (10,F,38,Y,English)
- * an exclamation expressing confusion, being presented with a conundrum, or a series of mental hurdles. (11,M,46,Y,English)
- * to avoid, duck or miss. (20,F,27,N,English)
- * baffle, to confound or confuse (22,F,,N,English)
- * confusion (40,M,20,N,English)
- * to stump someone (41,,,English)
- * baffle, confuse (44,M,79,N/Y,English)
- * something which confuses people (47,M,20,Y/N,English)
- * the sound of a shot as in "pif" -- "paf" / a single act of baffling (59,M,66,N,Russian)
- * to baffle (67,F,37,Y/N,English)
- * a sound effect in cartoons, like biff, boff, and bam: refers to a slip without falling (79,,,English)
- * to astound and confuse by a sudden aggressive act of mental dexterity and transcendent reason. (87,M,49,Y/N,Australian English)
- * a lie (91,F,,N,English)

* confuse (95,M,28,N,English)

Push/Hit:

- * to push away (8,...,English)
- * to tap someone (9,...,English)
- * a bludgeon (12,F,29,N,English)
- * the sound made by a punch (14,M,31,N,English)
- * to blow or breathe out gently, as on hot food or to mist up a pane of glass (15,F,37,Y/N,English)
- * a short sharp hit (23,F,30,N,UK English)
- * vt. -- to strike suddenly, causing deflation, n. -- a stick used to hit something soft (26,M,23,N/Y,English)
- * to discipline by a quick smack of the hand to the head of the person who is in trouble. (29,M,23,N,English)
- * to hit, without meaning to hurt. (31,M,40,N,English)
- * to hit with a flat object like cricket paddle (38,M,59,Y,English)
- * hit hard, or a hard hit with the whole hand; "she baffed him when he tried to assault her" or "she gave him a good baff..." (53,F,41,N,Dutch and English)
- * a fighting staff (55,F,17,Y/N,English and Mandarin)
- * a long stick with a hook used for herding sheep (62,F,50,N,English)
- * something hard that hits you on the head (66,F,11,N,English)
- * an open palmed slap to the back of the head (71,M,25,N,English)
- * sound of fist hitting pillow. (75,M,37,Y/N,English)
- * to fall (118,F,19,N,English)
- * to strike a person in the head so that it causes wonderment (80,F,54,N,English)
- * an emotion; the way you feel after you have been dumped into a river while rafting on rapids (82,F,17,N,English)
- * laugh? maybe to hit someone. like bash. (84,F,22,N,English)
- * to strike on the back of the head (94,M,56,Y,English)
- * a cane, split at one end into narrow strips, used to practice fighting with. (99,F,43,Y/N,English)

Laughter/Condescension

- * an embarrassment, usually when one laughs at a joke one has told (4,...,English)
- * to make fun of someone (36,F,26,N,English)
- * a bad and clownish joke. (45,M,29,N,English)
- * v. to laugh incessantly at silly things (51,M,27,N,English)
- * laugh? maybe to hit someone. like bash. (84,F,22,N,English)
- * facet. derogation of another. verb. ridicule, belittle. (90,F,23,N,Australian)
- * to laugh at someone in a condescending manner. (97,M,26,N,English)

Impediment:

- * to push away (8,...,English)
- * to deceive (10,F,38,Y,English)
- * an exclamation expressing confusion, being presented with a conundrum, or a series of mental hurdles. (11,M,46,Y,English)
- * n. an impediment of some sort, v. to impede or frustrate progress or completion (27,M,61,N,English)
- * to discipline by a quick smack of the hand to the head of the person who is in trouble. (29, M, 23, N,English)
- * n. the mouthpiece used by sports participants (30,F,22,N,English)
- * a fighting staff (55,F,17,Y/N,English and Mandarin)
- * to stifle, to prevent flow through. i.e. There was too much air flowing through the intake relief valve so Jim baffed it off. (81,M,25,N,English)
- * a cane, split at one end into narrow strips, used to practice fighting with. (99,F,43,Y/N,English)

Sound:

- * the sound made by a punch (14, M,31,N,English)
- * the sound of a shot as in "pif" -- "paf" / a single act of baffling (59,M,66,N,Russian)

- * explosion (61,F,34,Y/N,Russian)
- * sound of fist hitting pillow. (75,M,37,Y/N,English)
- * a sound effect in cartoons, like biff, boff, and bam: refers to a slip without falling (79,...,English)

Lazy/Dull/Slow

- * without energy (37,M,53,N,English)
- * a way to handle things that aren't too big (60,M,49,Y/N,English)
- * someone who is lazy. Kinda like a couch potato. It describes a unmotivated personality. (86,F,40,N,English)
- * dullish in colour, but glossy surfaced (92,M,23,N,English)

Misc:

- * a type of sporting equipment (1,...,English)
- * an automobile part (3,...,English)
- * a person with large, fat cheeks (13,M,22,N,Portuguese)
- * very simple but profound (17,M,27,Y,English)
- * the space underneath a computer or a monitor (46,M,17,Y/N,English)
- * a sort of penguin (49,...N,English)
- * quick (63,M,38,N,Russian)
- * people doing dogs bark (68,F,38,N,Spanish)
- * noun: presentation to executives by middle management (70,...,English)
- * (adj) really fast and powerful. e.g. "that was a baff lightening in the storm last night". or "you're the baffest hockey player ever". (72,F,23,N,English)
- * Sleet or snow. Hence Baffin' Bay. (76,F,55,N,English)
- * nautical term for the tip of a spar. (77,M,40,N,English)
- * v, to waffle (83,M,43,N,English)
- * a floating bridge (93,F,52,N,English)
- * a potato and turnip casserole, garnished with nuts and marshmallows (96,F,29,N,English)

glon

Light:

- * a type of bright light (1,..)
- * to shine (2,..)
- * to shine (7,F,10,Y,English)
- * a sheen (10,F,38,Y,English)
- * light (17,M,27,Y,English)
- * to look at something shiny or reflective (55,F,17,Y/N,English and Mandarin)
- * literary word for a kind of light (60,M,49,Y/N,English)
- * to shine in the distance (67,F,37,Y/N,English)
- * a harsh glare. (97,M,26,N,English)
- * the moment just before the sun sets on a partly-cloudy evening in the spring. (99,F,43,Y/N,English)
- * to have a shiny quality (111,M,21,Y/N,English)

Pretty/ Cheerful:

- * to decorate (9,..)
- * a pretty person (12,F,29,N,English)
- * to feel happy, proud and joyous (20, F, 27, N,English)
- * a person that spreads cheer (66,F,11,N,English)
- * an inexpensive stone made to resemble a diamond. (75,M,37,Y/N,English)
- * fake beauty (84,F,22,N,English)
- * happiness (106,M,47,N,English)
- * something new or fresh, like things are in spring. "The leaves were glon and bright." (109,M,36,Y,English)

Hang Around/Keep/Adhere:

- * to lie around doing nothing (8,..)

- * to tag-along with a group of people (11,M,46,Y,English)
- * to keep something beyond its usefulness (62,F,50,N,English)
- * gluttony (68,F,38,N,Spanish)
- * to take, to understand (95,M,28,N,English)
- * to stick to (108,..)
- * to become overly attached to a place (113,F,24,N,English)

Learn:

- * to learn something from something (36,F,26,N,English)
- * verb- to understand (110,F,29,N,English)

Scotland/Scandinavia:

- * a Scotch drink (6,..)
- * to miss Scotland (71,M,25,N,English)
- * a still cold lake in the middle of a haunted Scandinavian forest (72,F,23,N,English)
- * n. Type of Scandinavian garden deity. (77,M,40,N,English)

Misc:

- * a small rodent-like animal (3,..)
- * to run past the finish line (4,..)
- * an electronic mess up in a computer lab (5,..)
- * something which acts as a mast or a hard drive (41,..)
- * a dark gloomy land (46,M,17,Y/N,English)
- * past participle of "glaw", meaning "to trick a person into agreeing to a contract" (47,M,20,Y/N,English)
- * a chief (50,M,15,N,English)
- * a particle in some physics (59,M,66,N,Russian)
- * a plant (78,F,19,N,English)
- * recently left the premises (79,..)
- * a buttock (94,M,56,Y,English)
- * a shield (104,M,53,N,Spanish)
- * v, to wish, want, desire (112,F,24,Y,Indonesian)

4.11.3 Discussion of Findings

As expected, there are a higher than average percentage of Concrete Noun senses in the 'Exceptions'.

This experiment provides evidence for criteria 3-6 of the Phonosemantic Classification:

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

This is the first experiment that provides incontrovertible evidence for the productive character of **Phonosemantic Association**. Even if the pervasiveness of Iconic phonosemantics in the extant vocabulary of a language could be demonstrated, it is still necessary to demonstrate its productivity in living speech. For this purpose, one must obtain field data from informants, as is done in the last four experiments. The tests yield the following three results, which would not hold if the sign were truly arbitrary:

- The definitions invented for quasi-words are not evenly distributed all over the semantic spectrum. Informants were left completely free to invent whatever definition they chose. They were given no other instructions than this. And yet in every case, about 80% of definitions fell into a few semantically interrelated domains.
- The large majority of invented definitions resembled definitions for similar-sounding words, which I will henceforth refer to the **Model** for Clustering. Some informants suggested that I attempt to use only quasi-words which didn't resemble any other words in English. That is easier said than done. I endeavored, however, to include quasi- words which both resembled existing words and those which did not, which both had many potential Models and which did not. I left the informants free to choose which words they would define. With one or two exceptions, I feel all the informants understood that the intent was not to consciously associate the words with other words, but simply to write any definition at all which they felt suited the query word. They were explicitly told that there were no 'right' answers. And I found that informants for the most part simply avoided quasi-words which had few Models. They frequently said explicitly that they had no particular feeling for them. Those that did fill out definitions for these 'difficult' quasi-words with few Models almost always filled out definitions for all of the other quasi-words as well. Examples of quasi-words which seem to evoke little interest in informants include 'leb', 'jethom', 'rammop', 'sant' and 'sarl'.
- Informants frequently express a sentiment that such-and-such a quasi-word 'seems' or 'feels' like it should mean this or that. Despite the fact that the large majority of informants said they had no idea what sound symbolism or linguistic iconism was, about half added completely unsolicited comments of the type, 'Baff feels like it should be more abrasive than 'buffet'.' Or 'I don't get a very clear sense for this

word.’ or ‘I think I may have been too influenced by the word ‘bump’ when I defined this word.’ If there were no Phonosemantic Association and no Iconism, what linguistic intuition could possibly lie at the root of comments such as these?

Although the informants’ definitions in general resembled definitions of existing English words, I also found that they were selective in which Models they tended to choose as a basis for their definitions. For example, the word ‘drulk’ seemed overwhelmingly to evoke definitions concerning weariness, unpleasantness, sorrow and hindrances. And there are indeed disproportionately many words resembling ‘drulk’ which concern these semantic domains. Yet there are a fair number of other potential Models for ‘drulk’ which were not used. For example, the largest /dr/ phonestheme contains words for flowing liquid (drink, drain, drip, drop, etc.). But *all* the definitions that concerned flowing liquid for the word ‘drulk’ concerned drinking, and all but a couple of these concerned intoxication, probably due to the similarity with the word ‘drunk’. Most English words ending in /l//k/ do not have sorrowful connotations: bilk, bulk, elk, hulk, ilk, milk, silk, skulk, sulk, talc. It seems that the effect of the low back vowel in combination with both the onset /dr/ and the rhyme /lk/ tends to predispose informants to overwhelmingly limit their definitions for ‘drulk’ to something sorrowful and unpleasant.

Similarly, definitions for the word ‘gurfus’ tend overwhelmingly toward stupidity and anger, yet most words which end on /rf/ do not have such connotations: barf, dwarf, scarf, serf, surf, terf, wharf. The same is true of words beginning with /g/ followed by a vowel followed by /r/: cigar, garb, garbage, garble, garden, garderobe, gargle, gargoyle, garland, garlic, garment, garner, garret, garrison, garter, garth, gear, gherkin, gird, girdle, girl, girt, girth, gore, gorge, gourd, gourmet, guard, gurgle. Nor is it true of words beginning with /g/ and containing an /f/ after the vowel: gaffe, gift, glyph, golf, goof, graft, graph, grief, griffin, grift, gruff, guff, gulf. Informants seemed to hear a combination of ‘grief’ and ‘durus’ in the word ‘gurfus’. Why did they not hear a combination of ‘gurgle’ and ‘graph’ or ‘surf’ and ‘canvas’?

This phenomenon of selective comparison is quite general, and it is among other things this which leads me to believe that Semantic Association is occurring productively not only on the word level, but on the phoneme level as well. It is not the case that the only criterion for an informant’s choice of a Model is that the word sound similar. And they do not invent a definition for the new word based on the Model in an arbitrary way. If that were the case, then the invented definitions would vary a great deal more than they in fact do. It seems that one must resort to semantics at least on the level of the phoneme in order to account for the fact that these invented definitions fall into as narrow semantic domains as they do.

For example, in a number of cases, a nonsense word will be given a definition resembling a very similar existing Model, but with some slight twist. Frequently more than one person will characterize this slight difference in the same way. For example, ‘bamp’ very closely resembles ‘bump’ and no less than 30% of definitions for ‘bamp’ could be characterized as ‘strike’. Needless to say, much less than 30% of words in the language overall can be characterized as forms of ‘striking’. But more than this, ‘bamp’ was a particular type of ‘striking’. More than one person characterized bumping as striking in one or more of the following ways: (1) on the head or (2) across strings or (3) with a vehicle, (4) with a flat object, (5) with a soft object, (6) lightly, (7) producing a noise.

‘Bumping’ is also prototypically light, it seems to me. But it does not tend to produce a sound,

and it cannot to my feeling ever be used of playing a stringed instrument. Furthermore, 'bumping' is prototypically unintentional, and most, but not all, of the definitions for 'bumping' described intentional contact. I find it not unreasonable to imagine that the flatness, intentionality and sound are somehow an effect of changing the vowel from /U/ to /æ/, especially considering that /æ/ appears in disproportionately many words of flatness and sound, and /U/ appears in disproportionately many words concerning bumps, and upwardness as well as 'muffling'. (I have no data concerning agentiveness in relation to these vowels.) If this indeed proves to be a plausible account of the data provided here, then it must be admitted that Semantic Association or Clustering happens on the phoneme level, and that there therefore is such a thing as productive phonosemantics. It seems to me also likely that the fact that people tend to model their definitions after some similar sounding words and not others can be in part attributed to True Iconism.

Though this generalization does not hold uniformly, informants seemed to prefer a Model which differed from the query word by a vowel rather than a consonant. If the query word did vary from the model by a consonant, then the two consonants were more likely to differ along the axes of voicing and occlusion than along the axes of sonority or point of articulation. In other words, the Model for 'bamp' was more likely to be 'bump' than 'damp' in part because 'bump' differs from 'bamp' by a vowel rather than a consonant.

Total informants:		Age	#
109		Didn't Provide Age	19
Distribution by Sex		10	1
Didn't Provide Info	16	11	1
Female	40	15	1
Male	53	17	3
Distribution According to Knowledge of Phonosemantics		18	1
Didn't Provide Info	16	19	2
Familiar	13	20	3
Somewhat Familiar	14	21	1
Not Familiar	66	22	3
Distribution by Native Language		23	7
English	99	24	2
Dutch	1	25	4
Indonesian	1	26	3
Italian	1	27	3
Mandarin	1	28	2
Persian	1	29	6
Portuguese	1	30	1
Russian	3	31	1
Spanish	3	32	2
Distribution by Age		33	1
Age	#	34	2
Didn't Provide Info	19	36	2
Under 12	2	37	4
13-19	7	38	3
20-29	34	40	4
30-39	16	41	1
40-49	15	43	3
50-59	12	45	1
60-69	3	46	2
Over 70	1	47	1
		48	1
		49	2
		50	1
		51	3
		52	1
		53	2
		54	1
		55	1
		56	1
		57	1
		59	1
		61	1
		66	1
		67	1
		79	1

Semantic Distribution:

baff	Responses: 80	Obvious Models Not Used: buff, beef, calf, half, bad, bag, bat, back, bath,...
	Push/Hit:	22 28% buffet, bash
	Trick/Error:	18 23% baffle/bluff
	Impediment:	9 11% buffer
	Laughter/Condescension	7 9% buffoon, laugh
	Sound:	5 6% bam, bang
	Lazy/Dull/Slow	4 5% buffoon
	Misc:	15 19%
bamp	Responses: 87	Obvious Models Not Used: damp, camp, lamp, champ
	Strike/Hit:	26 30% bump
	Dysfunction:	14 16% cramp, bump
	Sound:	12 14% bam
	Smallness:	11 13% damp, limp
	Ramp/Increase:	5 6% ramp, jump
	Misc:	19 22%
bipple	Responses: 10 (recent addition)	
	Ripples:	3 30% ripple
	Baby	3 30% bib, nipple
	Misc:	4 40%
boag	Responses: 54	Obvious Models Not Used: beg, bode, bone, bore, bow
	Bog:	10 19% bog
	Uncontrolled:	8 15% rogue
	Monster/Big Animals:	8 15% rogue, bug?, big, boar
	Container:	8 15% bag, bowl
	Boat/Sail/Float:	6 11% boat
	Misc:	14 26%
cand	Responses: 59	Obvious Models Not Used: band, sand, manned, land, card, cant
	Container:	12 20% can
	Open/Honest:	10 17% candid
	Exclusion	5 8%
	Bright:	5 8% candid
	Candy:	5 8% candy
	Oil:	3 5% candle
	Fruit/Veggies/Food:	3 5%
	Collect/Protect	3 5% contain
	Gentle/Sweet Disposition	3 5% kind
	Misc:	10 17%
cass	Responses: 60	Obvious Models Not Used: bass, gas, pass, mass, lass, cash, cat, calf,
	Covering/Container:	18 30% can, cab, cap
	Condescending/Uncaring:	13 22% class, cuss, sass
	Crude/Destructive:	12 20% crass
	Misc:	17 28%
corn	Responses: 12 (recent addition)	Obvious Models Not Used: dorm, form, worm, court, course
	Seed/Grain:	3 25% corn
	Misc:	9 75%
culk	Responses: 49	Obvious Models Not Used: cult, cluck, kilt, kirk, conk
	Shell/Cover/Cohesive:	18 37% cask, caulk, clink, cloak, cup
	Old/Fragile:	6 12% crank, creak, crick
	Solitary/Separation:	5 10% sulk, bilk, clique
	Large:	4 8% bulk
	Catch Unawares:	3 6% culprit, cunning
	Misc:	13 27%
desp	Responses: 44	Obvious Models Not Used: desk
	Downwardness	23 52% desperation
	Negative, Person:	7 16% desperado

	Dust:	2	5%	dust
	Sound:	2	5%	
	Misc:	10	23%	
dom	Responses: 41	Obvious Models Not Used:	dim, dumb, dime, doom, mom, doll, dot, dock...	
	Cover/Enclosure/Building:	12	29%	dome, dam, dorm
	Ceremonial/Authority:	11	27%	dominate, deem
	Ornament:	3	7%	don
	Circular:	3	7%	dome
	Sexual:	2	5%	dominatrix, dame
	Misc:	10	24%	
drulk	Responses: 66	Obvious Models Not Used:	droll	
	Weary/Unpleasant/Sad:	34	52%	sulk, dregs, dull
	Drinking/Intoxicated:	12	18%	drink, drug
	Hindered Motion:	8	12%	drag
	Large	4	6%	bulk
	Containers:	3	5%	
	Misc:	5	8%	
flug	Responses: 54	Obvious Models Not Used:	plug, shrug, tug, lug, rug, hug	
	Mistaken/Clumsy:	16	30%	flaw, bug
	Flying/Floating:	14	26%	fly, float, flung
	Strike/Hit/Break Up:	11	20%	slug, flog
	Drink:	3	6%	chug, mug, flow
	Misc:	10	19%	
forp	Responses: 51	Obvious Models Not Used:	corpus/corporeal, fork, force, form, frappe	
	Repeated Precise Turn:	10	20%	flip
	Error:	8	16%	fault, flip, flub
	Hit/Collide/Touch:	7	14%	flip, flop, flap
	Junk, Burp:	6	12%	fart, burp, gorp
	Give/Throw:	4	8%	flip, burp, fart
	Disappear:	3	6%	usurp
	Misc:	13	25%	
fum	Responses: 44	Obvious Models Not Used:	fume, fame, bum, come, some, chum, fur, farm,...	
	Goo/Scum/Film/Smoke:	14	32%	scum, film, foam
	Error/ Confusion/ Mess:	7	16%	fumble, bummer, clumsy, dumb, fuck
	Soft:	5	11%	fuzzy, gum, thumb
	Fee, fie, foe:	5	11%	fum
	Easy/Pleasant:	4	9%	fun
	Hold Together:	2	5%	gum
	Misc:	7	16%	
glon	Responses: 44	Obvious Models Not Used:	glen, gloom, non-, lawn, wan, yon, gallon...	
	Light:	11	25%	gleam, glow, gloss
	Pretty/ Cheerful:	8	19%	glad, glow
	Hang Around/Keep/Adhere:	7	16%	glom
	Scotland/Scandinavia:	4	9%	
	Learn:	1	2%	glean
	Misc:	13	30%	
gooble	Responses: 45	Obvious Models Not Used:	gab, gable, glue, good, god, grab,...	
	Weird/Unattractive/Messy:	18	40%	goober, goo, garble, goon, goosh, ghou
	Eat/Drool:	12	27%	goober, goo, guzzle
	Quantity:	9	20%	google, gob
	Animals:	3	7%	
	Misc:	3	7%	
gurfus	Responses: 8 (recent addition)	Obvious Models Not Used:	surf, terf, girl, gurgle, gird, girth,...	
	Clumsy/Incoherent/Stupid:	5	63%	dork, churl, doofus
	Misc:	3	37%	
gusp	Responses: 43	Obvious Models Not Used:	hasp, gap, grasp, grip	
	Mouth/Nose:	14	33%	gasp, gulp

	Dust/Mist/Wind:	14	33%	gust
	Fish:	5	12%	guppy
	Misc:	10	24%	
guzzy	Responses: 9 (recent addition)	Obvious Models Not Used: busy, cousin, guzzle, gizzard		
	Rough/Dirty/Awkward:	4	44%	guck, gum, gunk
	Bubbles:	3	33%	fizzy
	Misc:	2	22%	
hask	Responses: 48	Obvious Models Not Used: ask, bask, task, haste, sass,...		
	Cover/Fastener:	16	33%	hamper, husk, hasp, mask
	Tear/Rip/Cough:	13	27%	hoarse, hack
	Plant Matter:	7	15%	basket, husk
	Danger:	4	8%	hazard
	Misc:	8	17%	
hort	Responses: 45	Obvious Models Not Used: hurt, heart, hoard, hard, hired, torte, port, court,...		
	Sickly/Scary/Misshapen:	14	31%	abort, horrid
	Animal:	8	18%	hart, herd
	Attention:	4	9%	hark, hear
	Sex:	3	7%	whore
	Horticulture:	2	4%	horticulture
	Misc:	14	31%	
husp	Responses: 78	Obvious Models Not Used: hump, asp, hip, happy, husband,...		
	Container/Cover/Fastener:	15	19%	husk, hasp, clasp
	Breath/Whisper	15	19%	gasp
	Plant:	12	15%	husk
	Edge	8	10%	cup
	Disapproving	8	10%	hush
	Insect:	4	5%	wasp
	Misc:	16	21%	
jethom	Responses: 29	Obvious Models Not Used: method, jut, jot		
	Throw Off/Liquid/Jetsam:	12	41%	jetsam
	Flight:	3	10%	jet
	Restless/Irritable:	2	7%	random
	Misc:	12	41%	
lant	Responses: 48	Obvious Models Not Used: pant, plant (green), can't, Santa, rant, want, lank,...		
	Lean/Tendency/Slant:	14	29%	slant
	Light:	7	14%	lamp
	Slow/Relaxed:	4	8%	lento
	Insincere:	4	8%	plant
	Bugs:	3	6%	ant
	Misc:	17	34%	
leb	Responses: 23	Obvious Models Not Used: lip, liberate, lab, lob, lobe, lube, plebe, flub,...		
	Amount:	4	17%	flab
	Move:	3	13%	
	Extroverted/Outgoing:	3	13%	blab, blurb, led
	Lesbian:	2	9%	Lesbian
	Disease:	2	9%	flub
	Misc:	9	39%	
loog	Responses: 56	Obvious Models Not Used: look, loot, like, ghoul, leek, lack, luck, slug,...		
	Long:	11	20%	loom, loop, sluice, log?, leg, league
	Connection/Sticky:	9	16%	glue, lock
	Waste:	6	11%	lose, loose
	Clutching	5	9%	bag, bog, lug
	Liquid/Water Animals:	5	9%	loon, gull, lake
	Bog:	4	7%	bog, lake
	Difficulty:	3	5%	lug, lag
	Misc:	13	23%	

lorch	Responses: 44	Obvious Models Not Used: larch, porch, lord, lorn, launch, lunch, lynch,...	
Clumsy:	8	18%	dork, coarse, lurch
Fire/Light:	6	14%	light, torch, scorch
Bent:	5	11%	corner, torque, arch
Spooky:	5	11%	orc, morgue,
Force/Pull:	5	11%	force
House:	3	7%	church
Animals:	3	7%	
Misc:	9	20%	
mant	Responses: 46	Obvious Models Not Used: pant, mint, mount, can't, shan't, malt, mart, mast	
Cover:	9	20%	mantel
Fall/Lie:	7	15%	slant, plant
Insect/Marine Animal:	7	15%	manatee, ant
Meaning/Wisdom/Spirit:	6	13%	meant
Plant:	4	9%	plant
Group:	2	4%	amount
Talk:	2	4%	mantra, rant, chant
Misc:	9	20%	
morp	Responses: 63	Obvious Models Not Used: prom, perm, morn, map	
Sleep/Death/Depression:	11	17%	mort, mourn
Strange/Unbalanced:	9	14%	morbid
Creature:	7	11%	
Emptiness/Clean:	6	9%	mop
Chewy:	5	8%	
Round/Blob:	5	8%	gorp?
Change/Morph:	5	8%	morph
Join:	3	5%	merge
Stupid:	2	3%	
Misc:	10	16%	
muggle	Responses: 71	Obvious Models Not Used: mangle, make, meek, giggle, hagggle,...	
Wiggle:	18	25%	wiggle
Unclear/Covered Over:	13	18%	smuggle
Deceptive/ Theft:	13	18%	smuggle, mug
Close By/Involved:	12	17%	mingle
Animal:	5	7%	
Misc:	10	14%	
nop	Responses: 45	Obvious Models Not Used: nape, cop, hop, mop, pop, shop, nod, slop, know	
Inactive/Absent/Negation:	14	31%	not, nap, stop
Small Bump or Hole:	11	24%	knob, snap
Strike:	6	13%	nip, snap, knock, chop
Misc:	14	31%	
plamp	Responses: 62	Obvious Models Not Used: lamp, damp, champ(hero), pamper, vamp,...	
Strike/Bring Together:	18	29%	plop, stamp, clamp, slam
Heavy:	9	15%	stamp, tramp, plump
Flat:	7	11%	plate, ramp, plank
Immobile:	7	11%	plant, camp
Orderly/Disorderly:	6	10%	
Blocked Liquid:	4	7%	
Misc:	11	18%	
plork	Responses: 11 (recent addition)	Obvious Models Not Used: cork, perk, park, lark, lurk, port,...	
Drop:	6	55%	plunk
Sound:	3	27%	plunk
Misc:	2	14%	
preet	Responses: 62	Obvious Models Not Used: greet, meet, peat, part, port, street, sleet,...	
Proper/Picky/Groom:	18	29%	preen
Feminine/Pretty:	13	21%	pretty, sweet
Birds:	8	13%	preen

	Talk:	4	6%	preach, prate
	Small:	4	6%	teeny
	Whistle:	3	5%	tweet
	Animal:	2	3%	
	Misc:	10	16%	
rammop	Responses: 6 (recent addition)			Obvious Models Not Used: ram, rum, rim, rime, rhyme, room,...
	Repetitive Motion:	6	100%	gallop, wallop
rapple	Responses: 54			
	Repetitive Motion:	13	24%	ripple
	Sound/Language	8	15%	rap
	Fruit Vegetables:	7	13%	apple
	Cover:	5	9%	wrap
	Destruction:	4	7%	rip
	Fight:	4	7%	grapple
	Sweets/Stimulants:	3	6%	
	Garbage:	2	4%	
	Running Liquid	2	4%	drip, drop
	Misc:	6	11%	
rostr	Responses: 44			Obvious Models Not Used: lost, wrist, post(pole), cost, host, tossed,...
	Heat/Cold:	11	25%	roast
	Roster:	7	16%	roster
	Rest:	5	11%	rest, roost
	Remainder/ Rust:	4	9%	rust, rest, last
	Bird:	3	7%	roost, rooster
	Guide:	3	7%	post
	Misc:	11	25%	
rulp	Responses: 9 (recent addition)			Obvious Models Not Used: roll, rill, rile, rail, reel, rip, rope,...
	Belch/Gulp:	3	33%	gulp, burp
	Misc:	6	67%	
rummer	Responses: 10 (removed after a short time)			Obvious Models Not Used: bummer, rammer,...
	Rum:	5	50%	rum
	Loud Noise:	2	20%	rumble
	Misc:	3	30%	
sant	Responses: 54			Obvious Models Not Used: sand, sang, ant, pant, can't, shan't, salt,...
	Prayer/Blessing	8	15%	saint
	Static:	7	13%	sit
	Motion:	6	12%	sent
	Message/Meaning/Know:	4	8%	sense
	Up/Down:	4	8%	slant
	Location:	3	6%	plant, point
	Alcohol:	2	4%	
	Health:	2	4%	sanity, sanitation
	Misc:	16	31%	
sarl	Responses: 13			Obvious Models Not Used: snail, sail, surly, gnarl, scowl
	Sarcasm/Snarl/Wit:	5	38%	snarl
	Cloth:	3	7%	sari
	Misc:	5	38%	
shob	Responses: 22			Obvious Models Not Used: shop, shot, shawl, ship,...
	Rid:	6	27%	shove, rob
	Irritation:	5	23%	bosh, bother, shush, shock
	Shove:	4	18%	shove
	Misc:	7	32%	
shong	Responses: 35			Obvious Models Not Used: long, wrong, tong, shoddy, shop, sham
	Clothing:	8	23%	thong, sarong, shawl
	Asia:	5	14%	sarong, Hong Kong
	Sex:	5	14%	dong
	Sound:	4	11%	gong, bong, song, shot

	Straps:	4	11%	thong,sling
	Leave/Cut Off:	4	11%	
	Misc:	5	14%	
spreck	Responses: 28			Obvious Models Not Used: spank, sprocket, spoke, spike, prick, pike,...
	Dust/Spray:	12	43%	spray, spread, spark
	Talk:	4	14%	sprechen, speak
	German:	3	11%	sprechen
	Pull/Lift:	3	11%	pick
	Misc:	6	21%	
sumble	Responses: 73			Obvious Models Not Used: nimble, rumble, grumble, thimble, resemble
	Quiet/Humble/Small:	21	29%	humble
	Walking/Dancing:	16	22%	amble
	Gathering:	13	18%	assemble
	Slow/Feeble/Bland:	4	5%	humble
	Approximate/ Chance:	3	4%	resemble
	Stumble:	3	4%	stumble, fumble
	Hot:	2	3%	simmer
	Misc:	11	15%	
tam	Responses: 17			Obvious Models Not Used: time, timid, teem, tome, bam, dam, gam, lamb,...
	Covering:	5	29%	top
	Touch:	4	24%	tan, ram, tap, tamp
	Care For:	2	12%	tame
	Dark:	2	12%	tomb
	Misc:	4	24%	
teetle	Responses: 65			Obvious Models Not Used: tote, toot, tight, tut, beetle, street
	Back and Forth:	28	43%	teeter
	Smallness:	16	25%	teeny, tot, fetal
	Silly/Sweet:	10	15%	tease, sweet
	Kettle:	2	3%	kettle, tweet
	Tortoise:	2	3%	turtle
	Misc:	7	11%	
thad	Responses: 21			Obvious Models Not Used: bad, thud, sad, mad, fad, pad, tad, had,...
	Person:	7	33%	dad, lad, cad
	Strike:	6	28%	thump, pad
	Misc:	8	38%	
thell	Responses: 27			Obvious Models Not Used: thrall, thrill, fell, hell, gel, them, then, there
	Nature:	4	15%	dell
	Spell:	4	15%	spell
	Yell/Noise:	4	15%	yell, bell, tell, knell
	Shell:	3	11%	shell
	Sell:	2	7%	sell
	Misc:	10	37%	
torg	Responses: 82			Obvious Models Not Used: torte, torn, tag,...
	Heavy/Large/Force:	25	30%	torque, tug
	Fictional Creature	13	16%	orc, borg
	Tool, Machinery:	12	15%	
	Turning:	11	13%	torque
	Clothing:	7	9%	toga
	Sorrow:	2	2%	morgue
	Fire:	2	2%	torch
	Misc:	10	12%	
veest	Responses: 75			Obvious Models Not Used: vest, vice, vote, west, messed, lest, east
	Animals:	13	17%	beast
	Small:	9	12%	least
	Going:	6	8%	veer
	Fierce	6	8%	beast
	Fabric:	6	8%	

	Mold etc.:	5	7%	yeast
	Energy/Essence:	4	5%	
	Holland:	4	5%	
	Twist/Pull	3	4%	twist
	Meadow/Grassland:	2	3%	
	Misc:	17	23%	
voap	Responses: 51	Obvious Models Not Used:	vapid, rope, dope, Pope, cope, hope, evoke,...	
	Clean/Soap:	12	24%	soap
	Motion -- Walk/Swoop:	11	22%	swoop, lope
	Pout:	6	12%	mope
	Lining:	3	6%	
	Vote:	3	6%	vote, nope
	Misc:	16	31%	
vom	Responses: 93	Obvious Models Not Used:	mom	
	Speed/Force/Enthusiasm	22	23%	move, bomb
	Exclusion/Vomit:	20	22%	vomit
	Sound:	17	18%	bomb
	Spreading:	11	12%	
	Hat/Hair:	5	5%	
	Mantra	3	3%	Om
	Misc:	15	16%	
wentle	Responses: 64	Obvious Models Not Used:	candle, handle,...	
	Covering/ Enclosure:	18	28%	mantle, sandal, bundle
	Small/Poor/New:	10	15%	little,
	Repetitive:	9	14%	spindle, stencil, trundle
	Gentle:	7	11%	gentle
	Pretty:	7	11%	
	Food:	4	6%	
	Wooing:	3	5%	want
	Man-made:	2	3%	
	Misc:	5	8%	
widder	Responses: 48	Obvious Models Not Used:	bidder, kidder, wider, water, waiter,...	
	Repetitive:	16	33%	founder, launder, wiggle
	Diminish/Die:	13	27%	wither
	Tools/Machinery:	7	15%	
	Misc:	12	25%	
wogger	Responses: 10 (recent addition)	Obvious Models Not Used:	logger, lager, slugger,...	
	Unpleasant Person:	6	60%	bugger, bother
	Wavering:	3	30%	wiggle, wobble, totter
	Misc:	1	10%	
yoosh	Responses: 41	Obvious Models Not Used:	youth	
	Sound:	15	37%	whoosh
	Swift:	7	17%	whoosh, swish
	Breath/Solar Plexus	6	15%	whoosh
	Downward:	2	5%	swish
	You:	2	5%	you
	Misc:	9	22%	
yorch	Responses: 8 (recent addition)	Obvious Models Not Used:	porch, march, year, church,...	
	Sound:	3	38%	yell, yodel, yap
	Fire:	2	25%	scorch, torch
	Misc:	3	38%	

4.12 Experiment 12 -- More Narrowly Limited Semantic Characterizations of Nonsense Words

See Appendix XII for full data and results.

4.12.1 Methodology

• Prompt informants with queries of the type, “If ‘X’ were a type of ‘Y’, then what type of ‘Y’ would it be?” where ‘X’ is a nonsense word, and ‘Y’ is an action, quality or thing. The words used were: ‘nem’, ‘forp’, and ‘woat’.

4.12.2 Example

If ‘nem’ were a size, what size would it be?

Small: small; small; little; little; little; little; little; small; little; little; small; little; little; little; little; little, of course; little; little; little; little; little; little; little; small; small; little; little; medium small; small; small; little; little; little; little; little (size of a mouse); little; little; little; little; little, n implies negation; small; small; small but not tiny; med-small; little; little; little; little; little; little, little, little, little; little; little; little; little; little; little; small; small; little; little; little; little; little; little; little

Medium: medium; medium small; med-small

Big: big; big; big; big; big; big; big; big; big; big; big; big

Other: neither, na, both

4.12.3 Discussion of Findings

This experiment is primarily intended to test for Iconism proper more than for Clustering or the Phonosemantic Hypothesis. I thought that by limiting the Natural Class of the response in advance, I might be able to get more specific and concrete results regarding the productivity of Iconic meaning in language. In some cases, the responses were quite clear, but not in all. Because the semantic domains are defined in advance, this test says little about Phonosemantic Association, and nothing, of course about the nature of reference. However, to the extent that there are disproportions, it does offer direct evidence for Iconism proper.

It was found that when the choices were basically limited to three, as in the above example, results were somewhat, though not astoundingly clearer. It was also found that when there existed phonesthemes for the sounds in the words within the semantic domains queried, results were clearer.

The above example is further evidence that Semantic Association occurs on the phoneme level. Disproportionately many English words containing /m/ and /n/ concern size. Most words containing /n/ and /m/ and involving size do not in general refer to something small, however. In fact, a majority of them are large. We find, for example:

Large: many, enormous, mounds, mountains, numerous, main

Medium: norm, normal, main-stream

Small: minimum, minus, minute

I also find that when different words are compared within a single Natural Class, they are intuited a priori to have semantic distinctions. Specifically, the motion of ‘forp’ was understood to be different from that of ‘woat’. If these responses are representative, then ‘forp’ prototypically implies a sudden and very fast downward motion as if from tripping, whereas ‘woat’ prototypically implies the motion of large waves on the ocean.

'nem': Size

Small: 66

Medium: 3

Large: 11

Neither or Both: 3

'nem': Bodily Function

Secretion: 16

Mouth/Throat: 15

Nose: 8

Digestion: 6

Sleep: 4

Other: 19

woat: Motion

Waves/Water: 21

Slow/Constant: 18

Stumbling: 15

Heavy: 6

Fall: 4

Other: 10

forp: Motion

Abrupt/Ungraceful: 20

High Speed: 12

Falling: 9

Bouncing: 7

Circular: 5

Splitting: 2

Other: 8

4.13 Experiment 13 -- Invented Words for a Given Definition

See Appendix XIII for full data and results.

4.13.1 Methodology

- Prompt the informant with a definition and ask him or her to provide a quasi-word to match it.

The definitions used were:

to scrape the black stuff off overdone toast
to drag something heavy into the water
to swarm over the head like mosquitoes
the texture of a hedgehog
the feeling you get falling downward on a roller coaster
the appearance of the sky before a storm
a paper cutter
a layer of pollen on plant leaves
the knobs on the spikes of a hairbrush

- Remove from consideration compound words composed exclusively of existing words.
- Remove from the word obvious suffixes and prefixes (-ity, -ate, -tion, etc.).
- Examine the resulting words or roots to see if they exhibit significant disproportions in phoneme distribution.

Following each entry or definition are five fields in parentheses and delimited by commas. The first field is the unique number assigned to each informant. The second field indicates the sex of the informant: F for females and M for males. The third field indicates the informant's age. The fourth field is Y if the informant felt they had considerable understanding of phonosemantics before filling in the form, Y/N if they feel they have some background, otherwise it is N. The fifth field indicates the informant's native language. Fields are simply left blank if the informant did not supply the relevant information.

4.13.2 Example

the knobs on the spikes of a hairbrush

apin (83,M,43,N), bips (107,F,46,N), bleps (84,F,22,N), bliks (110,F,29,N), blom (91,F,,N), blon (66,F,11,N), bloobs (99,F,43,Y/N), bools (104,M,53,N) (Spanish), bops (95,M,28,N), bubs (80,F,54,N), clob (87,M,49,Y/N), dids (88,M,38,N), dins (96,F,29,N), dolbs (114,M,36,Y/N), frzl (106,M,47,N), glibs (67,F,37,Y/N), gynt (111,M,21,Y/N), jibs (109,M,36,Y), knicks (100,M,67,N), knubs (76,F,55,N), knurbles (81,M,25,N), koops (94,M,56,Y), kwip (97,M,26,N), mub (71,M,25,N), pabs (77,M,40,N), pibblits(90,F,23,N), pims (72,F,23,N), pins (68,F,38,N) (Spanish), pipple(108,,), ploinks (92,M,23,N), pobs (101,M,48,N), prelt (112,F,24,Y) (Indonesian), probs (113,F,24,N), pul (116,F,15,N), scalrotundities (79,,), skooks (85,M,33,Y), slibs (93,F,52,N), spoke (78,F,19,N), spup (86,F,40,N), twerm (75,M,37,Y/N)

Notice that I did not remove from consideration words like 'spoke' which do exist in English, but which cannot be used to refer to the knobs on the spikes of a hairbrush.

4.13.3 Discussion of Findings

This experiment provides quite strong direct evidence for the existence of Iconism proper as a productive force in language. To the extent that informants preferred the phonemes that appeared in the definition itself, the test also constitutes direct evidence for Clustering. However it does not apply particularly to Phonosemantic Classifications. It also says nothing that I can discern about the character of reference.

It was found that there were large discrepancies in which phonemes were preferred for each of these definitions. In some cases, the phonemes which were preferred appeared in the definition itself, but this was often not the case. Perhaps the most striking result of this particular experiment was the number of identical nonsense words provided for the same definition. There were a total of 349 responses of which 325 conformed to grammatical English syllable structure. This was an average of about 40 responses per definition. There were 4 identical pairs and numerous groups of words that were nearly identical. If one figures the number of phonologically allowable English monosyllables at approximately 50,000, then the chance of getting 4 identical pairs out of 325 responses is about 1 in 16. If you take into consideration that many responses did not conform to English syllable structure, the likelihood of 4 identical responses drops considerably.⁹

In some cases, phonemes from the original definition were used much more frequently than in others. For example, words for 'to scrape the black stuff off overdone toast' used a much greater percentage of the /s/, /k/ and /r/ in 'scrape' than one finds in the language overall. The phoneme /p/, however, did not occur any more frequently in the quasi-words than in the language in general. Words for 'to drag something heavy into water', did not emphasize the /r/ of 'drag', though /d/ and /g/ did appear more frequently than in the language overall. The phonemes /f/, /l/ and /h/, however, were emphasized just as strongly. For the definition, 'to swarm over the head like mosquitoes, the /s/ of swarm appeared significantly more frequently, but the /w/, /r/ and /m/ did not. The phoneme which appeared most out of proportion in these invented words for 'swarming' was /z/.

All responses, not only those which conformed to grammatical English syllable structure were included in the data for the charts which follow. Phonemes in bold are those which appeared much more frequently than usual in the given context, and phonemes in italics appeared much less frequently in the given context than in the language overall:

to scrape the black stuff off overdone toast:

Number of Responses: 41 out of 42

Number Which Did Not Fit English Syllable Structure: 1 out of 42

Pairs of Identical Words: 1 (/skriC/)

Other Very Similar Words: krat, krachot, krinch, krut; krabe, krav, krup, krusp, prak; krois, krusp; skraff, skruff, skrap; skranch, skrich, skrich, skrutch, skrudge, skrank, skrick; sklik, sklur; skrat, skeet; shrik, shrip

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	1	2%	10%
/d/	2	5%	12%
/g/	1	2%	8%
/p/	8	20%	15%
/t/	10	24%	21%
/k/	28	68%	19%
/v/	3	7%	3%
/H/	0	0%	1%
/z/	1	2%	3%
/Z/	0	0%	0%
/f/	3	7%	9%
/T/	1	2%	3%
/s/	22	54%	23%
/S/	2	5%	8%
/h/	1	2%	4%
/J/	1	2%	4%
/C/	7	17%	5%
/m/	2	5%	11%
/n/	4	10%	14%
/G/	1	2%	1%
/l/	4	10%	22%
/r/	34	83%	27%
/w/	0	0%	8%
/j/	0	0%	5%

to drag something heavy into the water:

Number of Responses: 40 out of 43

Number Which Did Not Fit English Syllable Structure: 3 out of 43

Other Very Similar Words: blave, bloaf, broof; hlunf, glunf, harve, huf; swarf, swarsh, hoash, woof; floaur, flomp, floog; gleb, greb

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	6	16%	10%
/d/	8	20%	12%
/g/	8	20%	8%
/p/	7	18%	15%
/t/	5	13%	21%
/k/	2	5%	19%
/v/	2	5%	3%
/H/	0	0%	1%
/z/	0	0%	3%
/Z/	0	0%	0%
/f/	11	28%	9%
/T/	2	5%	3%
/s/	9	23%	23%
/S/	4	10%	8%
/h/	4	10%	4%
/J/	2	5%	4%
/C/	2	5%	5%

/m/	3	8%	11%
/n/	9	23%	14%
/G/	3	8%	1%
/l/	17	43%	22%
/r/	11	28%	27%
/w/	4	10%	8%
/j/	0	0%	5%

to swarm over the head like mosquitoes

Number of Responses: 40 out of 43

Number Which Did Not Fit English Syllable Structure: 3 out of 43

Pairs of Identical Words: 1 (/biz/)

Other Very Similar Words: beez, bist, bizz, bizz, briz, peeeesh, frazz, sizz, spuzz, swizz, whaze, ziz, ripz; shraf, shum, slif, spuzz, svet, swape, swizz; zirr, ziz, zlit; vant, virn; bist, tsib, blit, svet, tawm

Phoneme	#	%	% in All Monosyllables
/b/	7	18%	10%
/d/	1	2%	12%
/g/	3	28%	8%
/p/	5	13%	15%
/t/	10	25%	21%
/k/	1	2%	19%
/v/	3	8%	3%
/H/	0	0%	1%
/z/	14	35%	3%
/Z/	0	0%	0%
/f/	7	18%	9%
/T/	0	0%	3%
/s/	8	20%	23%
/S/	6	15%	8%
/h/	1	2%	4%
/J/	0	0%	4%
/C/	0	0%	5%
/m/	6	15%	11%
/n/	7	18%	14%
/G/	1	2%	1%
/l/	8	20%	22%
/r/	9	23%	27%
/w/	3	8%	8%
/j/	3	8%	5%

the texture of a hedgehog

Number of Responses: 39 out of 42

Number Which Did Not Fit English Syllable Structure: 3 out of 42

Pairs of Identical Words: 1 (/sprik/)

Other Very Similar Words: kret, skruk, rickee, crisk; kleik, kill; flick, fluck, pilk, plack, plick, plunk, prake, spick, sprick, sprick, vicklen; bresk, heckkee, juck; ramber, rumo

Phoneme	#	%	% in All Monosyllables
/b/	5	13%	10%
/d/	1	3%	12%
/g/	3	8%	8%
/p/	11	28%	15%
/t/	5	13%	21%
/k/	25	64%	19%
/v/	2	5%	3%

/H/	0	0%	1%
/z/	1	3%	3%
/Z/	0	0%	0%
/f/	6	15%	9%
/T/	0	0%	3%
/s/	9	23%	23%
/S/	2	5%	8%
/h/	2	5%	4%
/J/	2	5%	4%
/C/	0	0%	5%
/m/	2	5%	11%
/n/	6	15%	14%
/G/	1	3%	1%
/l/	10	26%	22%
/r/	21	54%	27%
/w/	0	0%	8%
/j/	4	10%	5%

the feeling you get falling downward on a roller coaster

Number of Responses: 39 out of 42

Number Which Did Not Fit English Syllable Structure: 3 out of 42

Pairs of Identical Words: 0

Other Very Similar Words: kink, eek, kiks; foom, foosh, froosh; slon, sloum; woomp, oom, ump, ung; yee, yeete

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	5	13%	10%
/d/	1	3%	12%
/g/	1	3%	8%
/p/	6	15%	15%
/t/	3	8%	21%
/k/	6	15%	19%
/v/	1	3%	3%
/H/	0	0%	1%
/z/	1	3%	3%
/Z/	0	0%	0%
/f/	6	15%	9%
/T/	0	0%	3%
/s/	5	13%	23%
/S/	5	13%	8%
/h/	3	8%	4%
/J/	1	3%	4%
/C/	0	0%	5%
/m/	9	23%	11%
/n/	7	18%	14%
/G/	2	5%	1%
/l/	9	23%	22%
/r/	9	23%	27%
/w/	6	15%	8%
/j/	4	10%	5%

the appearance of the sky before a storm

Number of Responses: 39 out of 41

Number Which Did Not Fit English Syllable Structure: 2 out of 41

Pairs of Identical Words: 0

Other Very Similar Words: blish, bloonch, bluj, bo, borl, brould, browl; blark, brak; doar, drade, drel, druden; dtrum, durm

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	10	26%	10%
/d/	14	36%	12%
/g/	7	18%	8%
/p/	3	8%	15%
/t/	4	10%	21%
/k/	6	15%	19%
/v/	1	3%	3%
/H/	0	0%	1%
/z/	0	0%	3%
/Z/	0	0%	0%
/f/	1	3%	9%
/T/	0	0%	3%
/s/	4	10%	23%
/S/	4	10%	8%
/h/	1	3%	4%
/J/	1	3%	4%
/C/	1	3%	5%
/m/	9	23%	11%
/n/	7	18%	14%
/G/	1	3%	1%
/l/	16	41%	22%
/r/	19	49%	27%
/w/	3	8%	8%
/j/	0	0%	5%

a paper cutter

Number of Responses: 41 out of 42

Number Which Did Not Fit English Syllable Structure: 1 out of 42

Pairs of Identical Words: 0

Other Very Similar Words: clish, slike; cuck, cutch, krish, schick, schink, sirk, skitch, snick, srick; kip, knip, plact; schnip, snarp; scrat, scur; shern, shray, shrut; shiff, shomp, slom, slipe, splize; zingt, zug, zuuter; effor, iper, pouter; tator, zuuter

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	1	2%	10%
/d/	0	0%	12%
/g/	2	5%	8%
/p/	12	29%	15%
/t/	11	27%	21%
/k/	19	46%	19%
/v/	0	0%	3%
/H/	0	0%	1%
/z/	4	10%	3%
/Z/	0	0%	0%
/f/	4	10%	9%
/T/	0	0%	3%
/s/	12	29%	23%
/S/	12	29%	8%
/h/	0	0%	4%
/J/	0	0%	4%
/C/	2	5%	5%
/m/	2	5%	11%
/n/	6	15%	14%
/G/	2	5%	1%
/l/	11	27%	22%
/r/	6	15%	27%

/w/	1	2%	8%
/j/	1	2%	5%

a layer of pollen on plant leaves

Number of Responses: 40 out of 43

Number Which Did Not Fit English Syllable Structure: 3 out of 43

Pairs of Identical Words: 1 (/fif/)

Other Very Similar Words: fice, foss, fulz; fif, fiff, herf, hev, if; flust, must, pust; phloo; melf, pluft, priff; plin, plonnen, plun, pone

Phoneme	#	%	% in All Monosyllables
/b/	3	8%	10%
/d/	4	10%	12%
/g/	3	8%	8%
/p/	9	23%	15%
/t/	11	28%	21%
/k/	0	0%	19%
/v/	1	3%	3%
/H/	0	0%	1%
/z/	1	3%	3%
/Z/	0	0%	0%
/f/	18	45%	9%
/T/	2	5%	3%
/s/	10	25%	23%
/S/	2	5%	8%
/h/	3	8%	4%
/J/	0	0%	4%
/C/	1	3%	5%
/m/	5	13%	11%
/n/	6	15%	14%
/G/	0	0%	1%
/l/	13	33%	22%
/r/	9	23%	27%
/w/	6	15%	8%
/j/	3	8%	5%

the knobs on the spikes of a hairbrush:

Number of Responses: 37 out of 39

Number Which Did Not Fit English Syllable Structure: 2 out of 39

Pairs of Identical Words: 0

Other Very Similar Words: apin, blon, pin; bip, blep, blood, bop, bub, pab, pibblit, pipple, pob, prob, spup; blep, blik, blom, blon, bool, clob, dolb, glib, prelt, pul, slib; knick, skook; mub, pim, pin; knub, knurble, koop, kwip, spoke, plink

Phoneme	#	%	% in All Monosyllables
/b/	23	58%	10%
/d/	5	13%	12%
/g/	2	5%	8%
/p/	20	50%	15%
/t/	5	13%	21%
/k/	13	33%	19%
/v/	0	0%	3%
/H/	0	0%	1%
/z/	1	3%	3%
/Z/	0	0%	0%
/f/	1	3%	9%
/T/	0	0%	3%

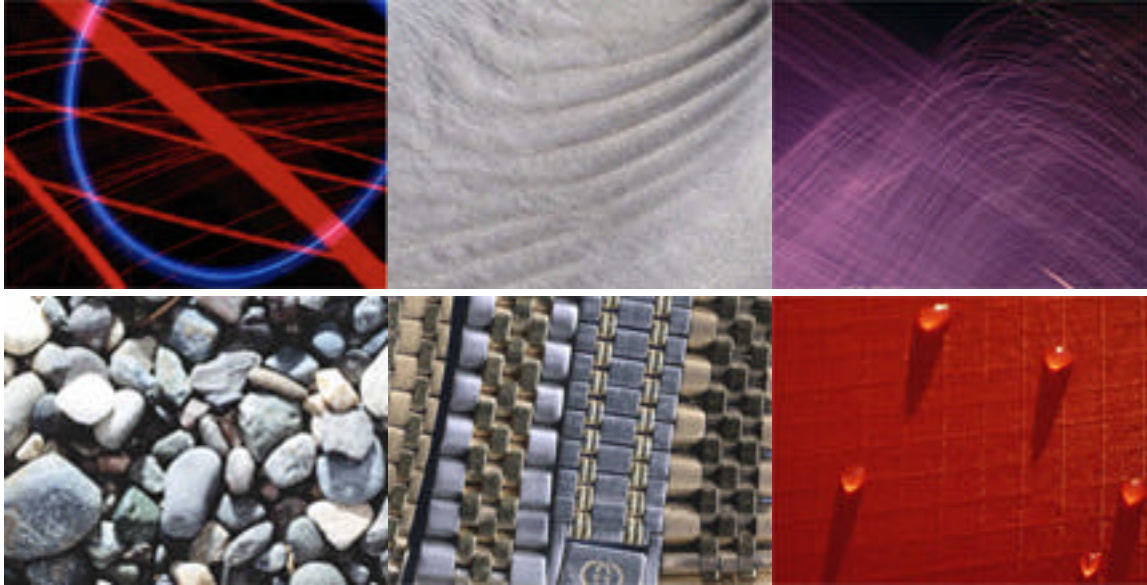
/s/	5	13%	23%
/S/	0	0%	8%
/h/	0	0%	4%
/J/	1	3%	4%
/C/	0	0%	5%
/m/	4	10%	11%
/n/	9	23%	14%
/G/	1	3%	1%
/l/	18	45%	22%
/r/	6	15%	27%
/w/	2	5%	8%
/j/	0	0%	5%

4.14 Experiment 14 -- Invented Words to Describe Images

See Appendix XIV for full data and results.

4.14.1 Methodology

• Prompt the informant with an image and ask him or her to provide a nonsense word to describe it. The images included in this experiment are:



- Remove compounds composed exclusively of existing words. (These occurred in about 2% of responses.)
- Remove obvious suffixes and prefixes (-ity, -ate, -tion, etc.) (These occurred in about 7% of responses.)
- Examine the resultant words to see if they exhibit significant disproportions in phoneme distribution.

Following each entry or definition are five fields in parentheses delimited by commas. The first field is the unique number assigned to each informant. The second field indicates the sex of the informant: F for females and M for males. The third field indicates the informant's age. The fourth field is Y if the informant felt they had considerable understanding of phonosemantics before filling in the form, Y/N if they feel they have some background, otherwise it is N. The fifth field indicates the informant's native language. Fields are simply left blank if the informant did not supply the relevant information.

4.14.2 Example

Sparks

shirnessed (76,F,55,N), spectratressial (77,M,40,N), graas (83,M,43,N), sirrilno(90,F,23,N), skir (95,M,28,N), spleems (94,M,56,Y), fil (99,F,43,Y/N), lev (113,F,24,N), lule (107,F,46,N), milt (111,M,21,Y/N), scrintch (103,F,32,N), scrit (108,...), smurl (115,...), fezzery(75,M,37,Y/N), maz (86,F,40,N), shmum (85,M,33,Y), sked (84,F,22,N), swespious(81,M,25,N), fesh (87,M,49,Y/N), frell (97,M,26,N), swibs (93,F,52,N), vescentic (96,F,29,N), fil (99,F,43,Y/N), flir (109,M,36,Y), flix (106,M,47,N), fuw (112,F,24,Y,Indonesian), shiff (104,M,53,N,Spanish), shoof (101,M,48,N), snitz (114,M,36,Y/N), zar (116,F,15,N), ploy (71,M,25,N), bitter (78,F,19,N), deel (80,F,54,N), bluh (82,F,17,N), nor (89,M,57,N), tume (as well) (92,M,23,N), wew (110,F,29,N)

4.14.3 Discussion of Findings

This experiment was specifically designed to test exclusively for True Iconism, and the results seem to me to constitute quite strong evidence that there is such a productive force active in language. It prompts the informant with images rather than words. It therefore does not apply to Phonosemantic Classification and obviously says nothing about the nature of reference or Phonosemantic Association.

Once again, the most striking result of this particular experiment was the number of identical words provided by different informants. If one figures the number of phonologically allowable English monosyllables at approximately 50,000, then the number of possible disyllables is on the order of 2.5 billion. There were a total of 207 responses averaging about 34 responses per picture. Of these, many were not monosyllables and 5 did not even conform to grammatical English syllable structure. Nonetheless, there were 2 totally identical pairs and 2 pairs that were identical but for a different suffix. Again, using the formula in endnote 9, if I eliminate all polysyllables and words with illegal syllable structure, the chance of getting two pairs of identical responses out of the 172 monosyllables would be about 1 in 14. One can't, of course, make any sensible calculations which includes the responses which don't conform to English syllable structure at all, because there are an infinite number of such responses.

But let me recalculate including all 202 legal mono- and polysyllabic responses which I received. There were 202 total legal responses. Of these, 172 were monosyllables and 30 were disyllables. There were therefore 5.7 times as many monosyllabic as disyllabic responses. If I then give the disyllables one 5.7th the weight of the monosyllables and recalculate, the likelihood of one identical pair occurring shoots way up to about one in 18,000, and the likelihood of two identical pairs is about 1 in 74,000.

In addition to 2 identical pairs, there were numerous examples of near pairs:

Light: zire, zrat, zwirzle

Sand: flimps, slipsail, schwa, sulva, spland, sweb, bluss, swin

Stones: calcaceous, cruk, kok; crubnel, petrocurvate, stroc, kruk crad

Watchband: ro, ro, rogt; jakey, jig

Sparks: shiff, shoof, fesh, fezzery, fliks; frell, fil, flir, fliks; skrinch, skrit, skirnessed, skir, spektratress, snitz; swesp, swibs

Water: dit, dits; glip, gloop; blit, blart, blon; ploid, proid, polt, prold; pim, pom

As in the previous experiment, all responses, not only those which conformed to grammatical English syllable structure were included in the data for the charts which follow. Phonemes in bold are again those which appeared much more frequently than usual in the given context, and phonemes in italics appeared much less frequently in the given context than in the language overall:

Light

Number of Responses: 34

Number Which Did Not Fit English Syllable Structure: 1

Pairs of Identical Words: 1 (/flur/)

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	4	12%	10%
/d/	2	6%	12%
/g/	1	3%	8%
/p/	6	17%	15%
/t/	5	15%	21%
/k/	6	17%	19%
/v/	2	6%	3%
/H/	0	0%	1%
/z/	7	21%	3%
/Z/	1	3%	0%
/f/	6	17%	9%
/T/	0	0%	3%
/s/	4	12%	23%
/S/	1	3%	8%
/h/	0	0%	4%
/J/	0	0%	4%
/C/	2	6%	5%
/m/	3	9%	11%
/n/	7	21%	14%
/G/	2	6%	1%
/l/	12	35%	22%
/r/	18	53%	27%
/w/	4	12%	8%
/j/	1	3%	5%

Sand

Number of Responses: 35

Number Which Did Not Fit English Syllable Structure: 1

Pairs of Identical Words: 1 (lape, leypate)

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	6	17%	10%
/d/	5	14%	12%
/g/	1	3%	8%
/p/	7	20%	15%
/t/	3	9%	21%
/k/	5	14%	19%
/v/	3	9%	3%
/H/	0	0%	1%
/z/	1	3%	3%
/Z/	1	3%	0%
/f/	8	23%	9%
/T/	1	3%	3%
/s/	14	40%	23%
/S/	4	11%	8%
/h/	0	0%	4%
/J/	0	0%	4%
/C/	0	0%	5%
/m/	2	6%	11%
/n/	7	20%	14%
/G/	0	0%	1%

/l/	18	51%	22%
/r/	10	29%	27%
/w/	4	11%	8%
/j/	0	0%	5%

Stones

Number of Responses: 33

Number Which Did Not Fit English Syllable Structure: 0

Words Which Fit the Form /kVk/: 3

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	8	24%	10%
/d/	4	12%	12%
/g/	6	18%	8%
/p/	5	15%	15%
/t/	10	30%	21%
/k/	17	52%	19%
/v/	2	6%	3%
/H/	0	0%	1%
/z/	1	3%	3%
/Z/	0	0%	0%
/f/	0	0%	9%
/T/	0	0%	3%
/s/	11	33%	23%
/S/	0	0%	8%
/h/	1	3%	4%
/J/	1	3%	4%
/C/	2	6%	5%
/m/	3	9%	11%
/n/	4	12%	14%
/G/	0	0%	1%
/l/	8	24%	22%
/r/	14	42%	27%
/w/	1	3%	8%
/j/	0	0%	5%

Watchband

Number of Responses: 33

Number Which Did Not Fit English Syllable Structure: 1

Pairs of Identical Words: 1 (/row/)

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	3	9%	10%
/d/	4	12%	12%
/g/	2	6%	8%
/p/	4	12%	15%
/t/	13	39%	21%
/k/	16	48%	19%
/v/	1	3%	3%
/H/	0	0%	1%
/z/	6	18%	3%
/Z/	0	0%	0%
/f/	1	3%	9%
/T/	1	3%	3%
/s/	6	18%	23%
/S/	0	0%	8%
/h/	0	0%	4%

/J/	1	3%	4%
/C/	2	6%	5%
/m/	6	18%	11%
/n/	9	27%	14%
/G/	1	3%	1%
/l/	10	30%	22%
/r/	17	51%	27%
/w/	1	3%	8%
/j/	0	0%	5%

Sparks

Number of Responses: 36

Number Which Did Not Fit English Syllable Structure: 1

Set of Very Similar Words: 1 (shiff, shoof, fesh, fezzery, fliks; frell, fil, flir, fliks; skrinch, skrit, skirnessed, skir, spektratress, snitz; swesp, swibs)

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	3	8%	10%
/d/	3	8%	12%
/g/	1	3%	8%
/p/	4	11%	15%
/t/	8	22%	21%
/k/	6	17%	19%
/v/	2	6%	3%
/H/	0	0%	1%
/z/	7	19%	3%
/Z/	0	0%	0%
/f/	9	25%	9%
/T/	0	0%	3%
/s/	18	50%	23%
/S/	5	14%	8%
/h/	0	0%	4%
/J/	0	0%	4%
/C/	1	3%	5%
/m/	5	14%	11%
/n/	7	19%	14%
/G/	0	0%	1%
/l/	14	39%	22%
/r/	15	42%	27%
/w/	3	8%	8%
/j/	0	0%	5%

Water

Number of Responses: 36

Number Which Did Not Fit English Syllable Structure: 1

Pairs of Identical Words: 1 (/dit/) (also glip, gloop; blit, blart, blon; ploid, proid, polt, prold; pim, pom)

<u>Phoneme</u>	<u>#</u>	<u>%</u>	<u>% in All Monosyllables</u>
/b/	10	28%	10%
/d/	6	17%	12%
/g/	3	8%	8%
/p/	13	36%	15%
/t/	8	22%	21%
/k/	3	8%	19%
/v/	0	0%	3%
/H/	0	0%	1%
/z/	1	3%	3%

/Z/	0	0%	0%
/f/	2	6%	9%
/T/	1	3%	3%
/s/	6	17%	23%
/S/	0	0%	8%
/h/	1	3%	4%
/J/	1	3%	4%
/C/	0	0%	5%
/m/	5	14%	11%
/n/	4	11%	14%
/G/	0	0%	1%
/V	18	50%	22%
/r/	9	25%	27%
/w/	1	3%	8%
/j/	2	6%	5%

5. Some Observations Regarding the Nature and Structure of Language

5.1 Introduction

The question that led to this research arose as I was developing spelling checker dictionaries. As I typed the dictionaries into the computer, I found, as I moved from the B's to the C's, that the semantics of the words themselves seemed to change. Then same thing happened when I finished C and started D. Again and again I felt this strange effect. Something about the words with different initial letters felt different in some undefinable yet unmistakable way. At some point, I decided to spend an hour or two classifying words to see whether or not this peculiarity might have some basis in semantic predispositions among the phonemes -- semantic predispositions that perhaps could even be quantified. I was sufficiently surprised by the regularity of the results that I found myself drawn to devise the experiments outlined herein.

In expressing what I have observed, I sought a way -- any way -- to articulate what I observed. The means by which an empirical fact gets articulated is really irrelevant so long as what was observed can be expressed clearly enough that others can understand it, and perhaps verify it for themselves. What follows regarding the 'theory' underlying the data just presented is written in that spirit. It is not an attempt to set up a coherent framework that I feel reflects some ultimate truth.

5.1.1 Informal Overview of the Empirical Facts

Before I proceed to offer a more formal description of my findings, let me first itemize in as straightforward terms as possible what I believe these 14 tests to show.

- ***Phonosemantic Hypothesis:*** I believe the data in Appendices I-XIV taken as a whole to constitute very strong evidence for the Phonosemantic Hypothesis:

The Phonosemantic Hypothesis:

In every language of the world, every word containing a given phoneme has some specific element of meaning which is lacking in words not containing that phoneme.

In this sense, we can say that every phoneme is meaning-bearing. The meaning that the phoneme bears is rooted in its articulation.

- ***Natural Classification:*** In order to devise proofs for the Phonosemantic Hypothesis, I define various types of classification systems. I first defined 'Natural Classifications'. One intuitively classifies to be ungrammatical; this suggests that the Natural Classes are psychologically real. I use the following four criteria to discover the Natural Classes of a language:

Natural Classification

Criterion 1. Very nearly every word within the given natural set fits in some semantic class.

Criterion 2. Each semantic class contains a fairly large percentage of the words in that natural set.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Again, natural classifications are defined over natural sets of words, and semantic classes themselves must be composed of words in a natural set. A natural set must be definable by means of a single non-disjunctive characterization. For example, 'all French monosyllables' form a natural

set, as do 'all Chinese words referring to birds' as do 'all words beginning with /p/ **and** referring to a fruit'. But disjunctive characterizations, like 'Russian verbs of motion **or** Russian words beginning with /s/' do not describe natural sets. The natural sets over which the natural classifications in this dissertation are defined are those which are characterized in terms of the phonological form of the word, such as 'all English monomorphemes with /r/ in second position'.

We cannot easily abstract away from these Natural Classifications, because they lie at the very heart of what for us distinguishes a word from a mere string of sounds. Sound-meaning actually underlies all word semantics. But because we cannot in general stretch our mind enough to abstract away from the Natural Classes, we must work within them and through them if we wish to catch glimpses of the effects of phonosemantic Iconism.

• ***Phonosemantic Classification:*** If one is to prove the Phonosemantic Hypothesis for a language, then the language must be shown to conform to the stricter criteria for a ***Phonosemantic Classification*** outlined below. From this definition it is clear that the phonesthemes are subject to the first four requirements of a Natural Classification and then some. All classifications must submit to the limitations imposed by a language's Natural Classes, and this is true also of the ***phonesthemes***, which taken as a whole form what I have called a Phonosemantic Classification:

Phonosemantic Classification

Criterion 1. Very nearly every word with the given phonological characterization fits in some semantic class.

Criterion 2. Each semantic class contains a large percentage of the words which match that phonological characterization.

Criterion 3. There are relatively few semantic classes in the classification.

Criterion 4. The semantic classes in the classification are distinct

Criterion 5. Each word fits into an average of a fairly large number of classes.

Criterion 6. The semantic classes are narrowly defined. By a 'narrowly defined' semantic class, I mean one which encompasses a small percentage of words in the language as a whole.

Criterion 7. A much smaller percentage of the words which do not match the relevant phonological characterization fit into any class.

Criterion 8. Those words that do ***not*** match the relevant phonological characterization but which nevertheless do fit in the classification fit on average in a smaller percentage of classes, than those words which ***do*** match the phonological characterization.

Criterion 9. Any class in a Phonosemantic Classification can be defined narrowly enough that words not matching the relevant phonological characterization are excluded from it.

As one develops a Phonosemantic Classification for a set of words bearing a common phonological trait, one finds that although one cannot grammatically violate the Natural Classes, one has a good deal of liberty otherwise to classify things as one wishes. Various Phonosemantic Classifications emphasize or suppress diverse aspects of the phonosemantics. For this reason, some aspects of a Phonosemantic Classification are not psychologically real in the way that the Natural Classes are psychologically real. Phonosemantic classifications are nevertheless important, because it is the possibility of creating them which serves as the primary method I have used for verifying the Phonosemantic Hypothesis. If one is to show that phonemes have meanings, one must show that

they are associated with some semantic domain which other phonemes are not associated with. Speaking in information theoretical terms, we must show that phonemes must carry information. This is essentially the requirement that Phonosemantic Classifications impose.

- ***Phonosemantic Association:*** So monosyllabic words in English which contain a given consonant fall within much narrower semantic domains than one would expect if the relationship between phonology and semantics were arbitrary. I find this is in large part due to a ***natural process*** called '***Clustering***' or what I have termed Phonosemantic Association:

Phonosemantic Association

When semantic domain S is associated disproportionately frequently with phoneme X, then people will be inclined to associate semantic domain S with phoneme X productively.

Clustering is effectively the tendency for language to associate identifiable referents with every form. Informally, it is the tendency to try to make everything mean something coherent. Because of Semantic Association, we also find the reverse phenomenon -- that phonemes are disproportionately represented in certain Natural Classes called the phonesthemes.

- ***Resemblance to Articulation:*** This semantic domain which becomes associated with each phoneme through Phonosemantic Association resembles the articulation of that phoneme. When the resemblance cannot in principle be literal (because, for example, there is no literal way for the articulation of /g/ to resemble reflected light), then the resemblance is metaphorical. (In this case, the phoneme /g/ is articulated with a closure deep in the throat, and this translates metaphorically into 'hiddenness'. Thus light in /g/ has a hidden source -- it is reflected. The /l/ is the most 'liquid' of consonants. That is, it's articulation conforms to that of its neighbors. This translates metaphorically into things which have mass but no particular form, like air, water, and also light.) This seems to me one piece of circumstantial evidence that phoneme semantics is not only conventional in nature, but also natural, or ***Iconic***.
- ***Specificity of Iconic Effects:*** Further evidence that phoneme semantics is inherently natural or Iconic can be found in the very specific semantic effect that the presence of a given phoneme has when words which fall within the same very narrow Natural Classes are compared. This effect again tends to resemble the articulation of the relevant phoneme, albeit as it is projected metaphorically onto the Natural Class under study. For example, in whatever context, /r/ tends to have an intense and abrasive effect on word semantics. The phoneme /t/ tends to presuppose directedness toward some goal. The phoneme /k/ tends to cut, classify and contain, and so forth. For example, in the Natural Class of light, this 'cutting' manifests as 'color'. In the Natural Class of geological formations, the 'cutting' manifests as 'coves' and 'crevasses'. In the Natural Class of 'music', the cutting manifests as 'chords' and 'keys'.
- ***Interference of Concrete Reference:*** The more concrete and unambiguous the ***referent*** for the word, the more difficult it is to fit into a Phonosemantic Classification. Throughout our experiments, those words which did not fit in the Phonosemantic Classification without exception fit in one of the following Natural Classes, which we term 'the Concrete Nouns':

Concrete Nouns:

people, titles, body parts, clothing, cloth, periods of time, games, animals, plants,

plant parts, food, minerals, containers, vehicles, buildings, rooms, furniture, tools, weapons, musical instruments, colors, symbols, units of measurement

The reason for this pattern apparently concerns what the word refers to. If the referent for a word by its very nature is connotative or interpretive, then the word's phonosemantics can cooperate with its referent. For example, 'slide' *is* a smooth motion. The smoothness and slipperiness so common in /sl/ shows up in the actual referent for 'slide'. If, however, the word refers to some very concrete and identifiable object in the world, then the phonosemantics of the word seems to impose a connotation or interpretation on the word rather than affecting what the word actually refers to. For example, the referent for 'dog' is an animal. Its referent is not that of a ugly animal. The dreariness which appears disproportionately in words containing /d/ manifests in 'dog' as a **connotation** superimposed on the word 'dog'.

- ***Opposites:*** If a Phonosemantic Classification includes a given semantic domain, it's very common for it also to include the ***opposite*** of that semantic domain. For example, words containing /p/ disproportionately often involve putting and picking up, pouring and also sponging, points and planes, problems and their solutions, etc. Words containing /k/ feature kings and commoners, catching and dismissing, combining and cutting, cruelty and kindness, etc. It was pointed out that a word and its opposite are very similar in meaning. This phenomenon would make sense if we thought of Iconic meaning as a substrate which underlay other levels of meaning. What was therefore one thing -- Length -- on the level of Iconic meaning would be viewed as two aspects of that thing -- Long and Short -- through the prism imposed by the Natural Classes and reference.
- ***Positional Iconism:*** The position that a consonant occupies in a syllable also affects its meaning. Consonants that appear before the vowel form the backdrop for the action of the word, and consonants that appear after the vowel express the result of the action implicit in the word.
- ***Cross-Linguistic Iconism:*** When all words matching a given phonological form are compared cross-linguistically they tend to fall into the same Phonosemantic Classification also in vocabularies that are not cognate. Furthermore, if the relationship between phonology and word semantics were attributable only to Clustering and therefore wholly conventional and not Iconic (as e.g. Sapir believed), then one would not predict that this would be the case. The preponderance of cross-linguistic phonesthemes therefore constitutes evidence for the Iconic and productive nature of phonosemantics.
- ***Productivity:*** When informants are asked to perform experiments which reveal their linguistic intuitions regarding the semantics of quasi-words, the results consistently show that Phonosemantic Association is productive. Furthermore, the fact that native speakers consistently prefer to associate nonsense words with some phonologically similar words and not others, suggests that factors other than Clustering are also affecting their intuitions.

5.1.2 The Paradox

The first issue that one generally confronts in considering the possibility of a large scale phonosemantic correlation -- and which in my view tends to lead both neutralists and conventionalists to jump prematurely to inaccurate conclusion -- is the obvious paradox implicit in the Phonosemantic Hypothesis. If there is some correlation between phonetic form and word semantics, how can this possibly be reconciled with regular sound change, not to mention the

existence of diverse languages, synchronic phonological processes of all sorts and any number of other very obvious counter examples?

As the history of linguistics demonstrates, the tendency has been to jump to the conclusion that they can't be reconciled, and that there therefore can be no phonosemantic correlations. One decides in advance of even investigating the data that there's no point wasting one's time. After having looked for some time at the data and having become convinced that phonosemantics at least deserves further consideration, one is next tempted to jump to another conclusion -- that phonosemantics must be a fossil of earlier etymological processes, and that it therefore must be more pervasive some languages and vocabularies than others.

In this dissertation I have endeavored to make clear to the reader in replicable experiments why I myself felt cornered into accepting the pervasiveness, cross-linguistic, Iconic and productive nature of phonosemantics. Any reader who still finds him- or herself in doubt is challenged to conduct the tests I have outlined for any language. It is my belief that anyone who gives the data the same level of attention that I have, must come to the same general conclusion. And the phonosemantic literature amply supports this position. It was only the process of actually performing the experiments that has made converts of most phonosemanticists, present author included.

What then are we to do about the paradox? The undeniability of both sets of conflicting data forced me to reposition myself relative to this issue. If we can no longer deny that pervasive phonosemantic correlations coexist with equally pervasive and apparently conflicting phonological processes of other types, then it no longer makes sense to ask *whether* phonosemantic correlations can be reconciled with the overwhelming masses of counterevidence. They *have* to be reconcilable, because they both exist. The question therefore only remains *how* they can be reconciled.

In the remainder of this discussion, I will assume that the Phonosemantic Hypothesis is valid. If I have failed through these 14 experiments in raising any doubts in the reader regarding arbitrariness of the sign, then I shall have nothing more to say on the subject. Rather I will proceed from asking *whether* it holds to inquiring *how* it can hold.

Generally when one encounters an apparent paradox, it is the result of failure to draw fine enough distinctions. One is treating two things which really are different as if they were the same. In this case, I believe the resolution to our paradox lies in the recognition that word semantics is not one unified thing, but that it is structured -- some parts of a word are affected by phonological change and some parts are not. Jakobson found his resolution to the paradox by distinguishing three levels of word semantics in a manner outlined by C. S. Peirce, and my approach is very similar. I do not take issue with Jakobson and Waugh. The reason I do not use their terminology is that I have approached the subject over time in my own way in isolation from their work, and consequently have found my own way of expressing what I believe to be a similar insight.

5.2 The Structure of a Word

Let me begin by itemizing the various pieces I find in the puzzle and then proceed to attempt to interrelate them. The reader will please forgive the extent to which I simply reiterate fundamentals for the sake of exposition.

5.2.1 Structural Levels

I assume word semantics to consist in at least the following components:

Structural Levels

Phoneme -> Phonetic Feature
Morpheme
Word

All the data provided in these 14 experiments is confined to monomorphemes, and most of it is confined to monosyllables. So I will be dealing in the following discussion only with phonemes as analyzed into phonetic features and with words. Affixation will not play a role in my discussion.

5.2.2 Semantic Levels

I recognize at least these three levels of semantics:

Semantic Levels

1. Iconism
2. Classification
3. Reference

No word exists that does not have semantics on all three levels. Put another way, a word that does not have these three levels of semantics is not a word. The referent is the most accessible semantic level viewed from the perspective of *parole* and the least fundamental viewed from the perspective of *langue*. Iconic meaning is the most basic semantic level from the perspective of *langue* and the most obscure from the perspective of *parole*. The classificatory level lies in between these two.

5.2.2.1 Iconism

I have argued on several grounds that from the viewpoint of *langue*, the most basic semantic level is the Iconic. Our description of word semantics is simplified if we think of the synesthetic effect of the sound as underlying other processes which are superimposed on it. The most important argument for this analysis is that in many ways -- some of which I have tested for -- words can be shown to have a meaning which is broader than the combined semantics of all of its dictionary senses. Furthermore, it can be shown that this broader semantics is related to its phonological structure in a regular way. I think we therefore most effectively view this Iconic meaning as the substrate underlying and uniting the semantics of a word, and we view other aspects of semantics as superimposed upon it.

I have shown this to be the case :

- when analyzing invented definitions for nonsense words. (Experiment 11)
- when comparing phonesthemes cross-linguistically. (Experiment 10)
- when analyzing sets of words whose meaning is so similar that the only differences between them appears to pattern regularly with the phonological structure of the word. (Experiments 2, 5, 6, 9)
- in the fact that the phoneme profiles that result from Phonosemantic Association resemble the articulation of the phoneme. (Experiments 1, 6)
- in the fact that phonetic features seem to have a coherent meaning. (Experiment 2, 6)
- in the fact that a phoneme's position in a word seems to affect how it influences the word's semantics. (Experiments 8, 9, 10)
- in the fact that words invented even for semi-abstract images resemble each other *much* more than one would anticipate if there were no Iconism active in language. (Experiment 14)

The Iconic effect can also be seen in areas I have not considered, such as in idioms, metaphorical usage, poetic and productive speech.

I think of Iconism much in the way I understand Peirce. The Iconic dimension abstracted away from the levels of classification and reference must be one unified thing which refers to nothing other than itself. The Iconic is the level on which form *is* content, on which the word *means* what it *is* (structurally). I have observed that when Phonosemantic Classifications are found for monosyllabic words containing some arbitrary consonant, the words tend to fall into classes which reflect the phoneme's articulation. This is, however, only indirect evidence for Iconism; it is not Iconism as I understand it. The Iconic meaning that lies at the root of word semantics as I understand it can only be experienced as a feeling-tone, which becomes articulated as something more concrete when it is viewed through the prisms of the Natural Classes.

5.2.2.2 Classification

As mentioned in the text, languages divide words into Natural Classes. English, for example, divides words into 'clothing', verbs of 'striking', 'musical instruments', and so forth. It does not classify words according to 'rectangular things' or 'objects which can break'. These facts are functionally determined and are part of the grammar of English. As speakers of English, we do not have a choice relative to this classificational system. As mentioned on several occasions, the criteria we use for determining a Natural Class are the four criteria which define a Natural Classification.

More intuitively, this can be observed in the fact that Natural Classes are not fuzzy sets. 'Washing' is a form of cleaning -- no two ways about it. Dogs are animals -- no ambiguity there either. Anger is an emotion and rage is anger, etc. Furthermore, sorrow and befuddlement are not anger and televisions are not animals. Of course, one can come up with examples of words that fall in the grey zone. Is plankton a plant or not? Tests could be devised to show that in the mind of a given English speaker 'plankton' either falls in a Natural Class of 'microorganisms' or it doesn't. It either is a 'plant', or it isn't. I suspect, people sometimes think they are classifying a word one way, when they in fact aren't. For example, if I come home from work and tell my daughter, "I saw a beautiful plant this afternoon," and she feels later deceived when she learns that what I saw was plankton, then she does not classify 'plankton' as a plant whether she consciously *thinks* it's a plant or not. The English word 'plant' in her vocabulary does not include 'plankton'. In fact, I find once one starts testing in this way for how people actually use a word rather than how they think it *should* be used, confusion or fuzziness regarding Natural Class adherence is remarkably rare.

The Natural Classification is hierarchical. The Natural Class of mammals falls in the Natural Class of animals, as does the Natural Class of domesticated vs. wild animals. There is a fair amount of overlap among the Natural Classes as well. For example, many plants are also food, so plants fall into one Natural Classification based on their biological structure and some of them also fall in another classification based on how we prepare them for food.

True Iconism is inherently blind to the Functional Classes. It can be shown that True Iconism affects what the word is *like* rather than what the word *refers to* -- it affects its connotation as opposed to its denotation. The inherent blindness of Natural Classes to phonological form can be observed in several ways. First, phonemes are distributed fairly evenly in the Functional Classes and the Concrete Noun classes in particular. Second, if one chooses some less concrete class, such as 'verbs of washing' one generally finds almost all the phonemes represented, though usually not

with the same frequency as one finds them in the language overall -- Clustering gives rise to disproportions. Third, one tends to find that each phoneme gravitates toward words concerning certain types of washing. Fourth, it is exceptionally rare that I have found a Natural Class for which every word contains a given phoneme, and in the cases where this seems to be the case, the Natural Class is very narrowly defined indeed.

However, there is another phonosemantic process which I have called *Phonosemantic Association* or *Clustering*, which does give rise to disproportions between certain kinds of Natural Classes, called phonesthemes, and phonological forms. *Phonosemantic Association does not conspire to make each semantic domain have a certain phonological form, but the inverse.* Phonosemantic Association in general conspires to associate with each phonological form a unified conceptual semantic domain. Phonosemantic Association is a special case of a more general tendency in human psychology which I call Semantic Association which seeks to attribute a unified meaning to any form whatsoever. The phonesthemes or phonological disproportions in the Natural Classes are a side effect of Phonosemantic Association.

In this context, experiment 7 (see Appendix 7 and 4.7ff) is particularly instructive. There I divided Location words into two types of Natural Classifications. One of these was a Phonosemantic Classification which only accommodates words with the appropriate phonological form. The other was a Functional Classification for the same set of words, which is by definition not phonosemantic and which accommodates with equal ease words with any phonological form so long as they belong in the Natural Class concerned. Hence there seem to be two really distinct components of language operating simultaneously. The Functional Classification of Location words is the one we all think of when we think of locations: geographical vs. political divisions, buildings, streets, rooms, etc.. The Phonosemantic Classification is a mix-match of various kinds of classes -- whatever the given phoneme seems to prefer. /b/ in English happens to have a lot of bogs, beds, bottoms of things and borders. This comes out as a sort of haphazard intersection between the classes of things that gravitate toward /b/ and the types of things we classify as 'places'. And there's no one right phonesthemic classification the way there are right and wrong (grammatical and ungrammatical) Functional Classifications.

It's therefore a curious thing, and a pretty strong indication that Iconism is indeed universally active, that *Russian* works about the same relative to *both* types of English Location classifications. One does find Clusterings that are specific to English. The fact that 'bunk' and 'berth' exist in English is probably in part responsible by Clustering for the fact that in English 'bed' also starts with /b/. But the fact that /b/ has a lot of words of blockage, barriers, binding and bases or foundations appears to be pervasive throughout languages and arguably also reflects its articulation.

5.2.2.3 Reference

5.2.2.3.1 Reference in General

I'm not prepared to discuss the nature of reference here -- whether it be a mapping onto a class of objects in the phenomenal world or more functionally defined. But whatever the nature of reference, we come back to the fact that the phoneme strings /kæt/, /dag/ and /hors/ all belong in a single class. The classificational level of semantics does not inherently express what they all refer to, only that they belong together. However, each member in a given Natural Class has a common element of reference. Although on the level of Classification, 'cat', 'dog' and 'horse' are just members of a class, on the level of Reference, it is clear that they all *refer to* mammals.

I think we do well to think of each unique referent as governing its own Natural Class. For example, 'dove' and 'pigeon' form a Natural Class because they have the same referent, but in my English, 'chipmunk' forms a Natural Class all its own. I know no co-referent for 'chipmunk'. I find most of the Concrete Nouns, therefore, to fall at the lowest level into very small Natural Classes -- classes often consisting of only one member.

I think of many of the less concrete Natural Classes, therefore, as containing many words for the same referent. For example, probably it's easiest to think of all the English monosyllables for forms of 'jumping' as having the same referent, namely jumping. I think the differences between 'hop' and 'bound' and 'jump' are due not to differences of reference, but primarily due to phonosemantic differences which define the inflections of jumping. There are other non-Iconic (arbitrary) differences between words which have the same referent. Their argument structures can vary. In this case their semantic selectional restrictions vary somewhat -- the prototypical subject for 'jump' is a person, whereas for 'hop', it tends to be an animal. Each of these words has senses apart from the sense in which they share a common referent ('jump' a car, bell 'hop', outer 'bound'), but these senses will be interrelated metaphorically -- each in their own way -- with the motional referent that they have in common. An excellent demonstration of deep reaching correlations between Natural Classes and argument structure is found in Levin (1993).

5.2.2.3.2 Concrete Reference

I have defined the Concrete Nouns as those nouns which are members of a particular set of Natural Classes. I also think of Concrete Nouns as those words whose referents people agree upon. That is, people in general differ as to what constitutes 'intelligence' or 'politics' or 'beauty', but they all pretty much agree on what objects in the world constitute the sets of 'goats' or 'hammers'. In addition, we have just observed that Concrete Nouns are those which on the lowest level of the hierarchy rarely share their referents with other words in the language. That is, many other animals share the 'animal' aspect of the referent for the word 'fox', but very few (if any) share *all* the aspects of the referent of the word 'fox'. This is not in general the case with Natural Classes other than the Concrete Nouns.

I have pointed out that whenever I have formed a Phonosemantic Classification, all of the words which don't conform to the classification end up being Concrete Nouns. In general, the Concrete Nouns are less susceptible to Clustering. The phonemes are more evenly distributed in the Concrete Nouns than in other words. I've also observed that whereas it's often possible to correlate the specific inflections of light or motion in very narrowly defined Natural Classes with their phonological form, this is not in general possible with the Concrete Nouns. If I take a very narrow class of Concrete Nouns, such as words for spices, it's very hard to see any correlation between the types of spices and the phonological forms of the words used to refer to them. This would make sense if we thought of each Concrete Noun as governing its own semantic domain or Natural Class, because it has a unique referent. If there are 30 words which share a referent with 'shine', then one can compare them phonosemantically and find that the inflections of light are related to the inflections of phonological form in the words. But if there is only one word in English for 'coriander', then there's nothing to compare phonosemantically. Seen another way, in the Concrete Nouns, the effect of the articulation of a word on its meaning cannot be observed through the medium of phonestemes, because there are no other words which fall in a common Natural Class with it. The concreteness of the reference has isolated the word, and left it with nothing to be compared to.

As I've mentioned, it seems that certain senses of certain words must at all cost have very clear referents. That is, I think it's important that for a few words, like 'goat' and 'hammer' we all agree which objects in the world they refer to. I think the entire infrastructure of a language depends on these words with very unambiguous referents. If these words loosened their grip so that we could argue as much about what things are 'goats' as we can argue about what things are 'inane' or 'restorative' or 'musical', then language would cease to be usable as a tool to talk **about** anything. If it so lost its grip on the phenomenal world that no one agreed on what any word referred to, then it would become a completely self-referential mush -- all sound and fury quite literally signifying nothing. So these Concrete Nouns cannot loosen their grip to allow the freer dimension of their inherent semantics to become too salient or we lose the ability to convey information. It's so important that certain words remain anchored in what they refer to, in other words, that there's little leeway for the form to give expression to what they are like. If we get too carried away with what certain words are like, we might start arguing about what they refer to, and that would be disastrous.

Other words are then linked up to the Concrete Nouns by means of Semantic Relations, like hyponymy, meronymy, etc. We might say that language is anchored in the phenomenal world by means of concrete reference and these concrete words are in turn anchored to other words by means of Semantic Relations. For example, 'house' is a concrete noun. Pretty much every native speaker of English agrees on which objects in the world are 'houses'. They also agree that a mansion **is a** house -- that is, there is a relationship of metonymy/hyponymy between the words 'house' and 'mansion'. Indeed, we agree that a 'mansion' is a **big** house. We may, however, disagree about which big houses are mansions. The word 'mansion', in other words, has a looser grip on its referents than does the word 'house' and it is anchored to 'house' by a Semantic Relation.

5.2.3 Semantic Association

Reference really applies at the level of the word, not the phoneme, morpheme, or sentence. When we label something, we give it a word. Like reference, classification applies on the syntagmatic level of the word -- it is words which are classified. And as mentioned, all words in a given Natural Class bear a common element of reference. For this reason, we can also think of Natural Classes as having a referent. Iconism, on the other hand, is not applicable to any linguistic level (phoneme, morpheme, word). And Semantic Association applies on all linguistic levels (phoneme, morpheme, word).

Semantic Association seeks to imbue linguistic structures -- phonemes, words, morphemes, etc. -- with informational content. On the level of the word, this semantic disproportion is glaringly obvious, because that is the level at which we name things. The disproportionately small semantic domain within which a word is used is introduced into language consciously. We consciously decide that the string 'enchilada' will be used in the context of only one very specific type of thing in the phenomenal world, and that 'swift' will only be used in a different context. But this reference that is consciously assigned on the level of the word trickles down to the levels of the morpheme -- where the nature of the semantic disproportions is semi-conscious, and the phoneme and the phonetic feature where we are largely unconscious of the semantic disproportions. Nonetheless, all these lower levels, as I have tried to show, have informational content, because they are associated with semantic sub-domains, rather than with the entire semantic range of the language.

The result is that the phoneme, like the word, also governs a unified semantic space different from

the semantic space of all other phonemes. And like a word, a phoneme has something akin to interrelated senses, such as we have seen many times throughout the dissertation in lists like these:

		/d/	
A1	End, Death, Sleep, Drug	50	10.4%
A2	Diminishment, Smallness	83	17.3%
A3	Breadth, Dragging On	41	8.5%
A4	Scarcity, Danger	60	12.5%
A5	Confusion, Discord and Barriers	69	14.4%
A6	Dark, Dirty and Dreary	97	20.2%
B1	Divisions, Groups, Amounts	130	27.1%
C1	Execution of Pending Process	91	19.0%
C2	Motion	31	6.5%
D1	Down	154	32.1%
E1	Good, Dear	33	6.9%
F1	Water	62	12.9%
G1	Light and Color	11	2.3%

In phoneme semantics, one can see the purely Iconic level, which affects the feeling-tone of words like 'glimmer', 'gleam' and 'glitter'. There the various inflections of light are reflected synesthetically in the sound in a manner which can't be articulated in words, because the effect of the sound is on a level that lies lower than the classificatory or referential levels of meaning. And one can also see a phoneme semantics operative on higher levels in schema such as that outlined above for /d/ in which phonosemantic classes are not purely musical, so to speak, but can to some degree be conceptualized and analyzed in concrete terms. It is only this latter type of semantics which I associate with Clustering.

5.2.4 Semantic Relations and Subcategorization

I think of Semantic Relations as functions which relate words and Natural Classes of words to one another. The classes of Mammals and Animals are interrelated by metonymy/hyponymy. The word 'long' is related to the word 'short' by antonymy, and so forth. In addition to Semantic Relations, we have in syntagmatics, of course, subcategorization and semantic selectional restrictions. I've found in the course of developing a lexical database that verbs select semantically for Natural Classes. And there is, of course, a universe of complexity in these domains, with which the reader may be familiar and which lie outside the purview of this discussion.

Concrete nouns in general enter into less complex networks both syntagmatically and paradigmatically than do other words. If we look at a Natural Class whose reference is not wholly concrete, but at least much more concrete than that of some Natural Classes -- the class of light -- we find the situation already considerably more complicated than what we find in most Concrete Nouns. We find, for example, several types of verbs involving light. In the Natural Class of 'looking' verbs, light serves as an instrument. There is a class of verbs for avoiding light: blink, flinch, blur, squint, etc. There is another class of transitive verbs in which light illuminates something else: flood, light up, illuminate, etc. And there is of course a class of intransitive verbs which simply express different inflections of light: glow, glare, shimmer, shine, etc. In addition to these, there are nouns for light. There are simply nouns for various inflections of light: beam, bolt, sheen, ray, etc. There are nouns for objects whose purpose is to illuminate: lamp, bulb, globe, light, chandelier, etc. There is a class of words for times when it is relatively light: day, dawn, dusk, etc. There is a class of nouns for which light plays a sort of instrumental role, such as reflecting surfaces (glass, glaze, gloss, mirror, etc.) and a class of nouns referring to things through

which light prototypically shines: (film, lens, glass, window,...). There is a class of gleaming celestial bodies (sun, moon, star, planet, comet...). And then there are the adjectives... The Natural Class of 'light' is related to large Natural Classes of words, such as words for color, for darkness and for fire. Fire in turn is related to classes for heat and dryness. In Natural Classes predominated by verbs, like 'Motion', the situation is more complex still.

All evidence that I have encountered suggests that phonosemantic Iconism is fundamentally blind to all of this. It sees no parts of speech and no Natural Classes and no phonemes or morphemes or Semantic Relations or paradigms. All these conceptual distinctions lie on higher levels of semantics. What we see in the phonesthemes and in the effect of phonological structure on the semantics of very narrowly defined Natural Classes seems to me the reflection of Iconism through the prism of these other overlying factors. And it is for this reason probably, that Socrates thought of Iconic meaning as being the essence of the word and as relating synesthetically to the 'essence' of the thing to which it referred. In the case of light, as we have seen, the sounds in 'glitter' or 'gleam' do not relate synesthetically to the *referent* associated with the Natural Class 'light', but to what the light is *like* -- to the various specific inflections of light implied by these words.

5.3 How the Proposed Word Structure Accounts for the Empirical Facts

Now that we have considered the various basic components of words semantics, let us consider how they interact to produce various phenomena related to those we have observed in these 14 experiments.

5.3.1 Phoneme Physics and Classification

If what I say is correct, then on the most fundamental level, a word is a reflection of its articulation, and that aspect of its semantics can be thought of as reflecting the physics of the mouth during articulation. The articulation of /r/ has enough kinetic force inherent in it to break the barrier of /b/, and the complex /br/ therefore appears in words in which the barrier is broken. The phoneme sequence /br/ appears disproportionately frequently in the Natural Class of breakage, and in the Natural Class of geometric form, this /br/ interaction manifests as 'brushiness'. The phoneme /l/, on the other hand, only has sufficient energy to make /b/ 'bulge' into a 'ball' shape. It does not break the /b/. The energies implicit in the two phonemes more or less cancel each other out, and /b/ and /l/ therefore appear in many words of literal and metaphorical 'balance' when they appear on opposite sides of an intervening vowel.

The physical forces and their reflection in word semantics can, in other words, be abstracted away from the Natural Class to which the word is assigned. It is the dynamic substrate which underlies the word. When the dynamic implicit in /br/ is revealed through the prism of the Natural Class of geometric form, it manifests as 'brushiness', whereas the dynamic force implicit in /bl/ manifests through the Natural Class of 'geometric form' as a 'bulge'. When /br/ manifests through the Natural Class of 'groups' of things, it is a type or division (brand, branch, breed), whereas /bl/ manifests as a collective (bloc, block, blend). When /br/ manifests through the Natural Class of 'growth', it manifests as reproduction (breed), whereas /bl/ manifests as blossoming and blooming. Through the Natural Class of impediments, /bl/ manifests as a blockage or emptiness (blur, blind, blot, bluff, blunt, blear, etc.) behind which one thing is retained, whereas /br/ manifests as a boundary between two things (brim, bridge, brink). Through the Natural Class of 'fire', /bl/ manifests as light, and /br/ as heat.

5.3.2 Phonosemantic Association and Iconism

Phonosemantic Association cannot violate the physics of Iconic semantics, but within the confines imposed by it, Clustering seeks to associate with each phoneme a unified conceptual whole. This is especially clear in semantic domains which cannot be reflected in articulation. For example, the phoneme /k/ forms a container of the mouth. So, for that matter, does /g/. The containers that cluster into /k/ tend to have a cover and/or fastener and they tend to be for human use. Those that cluster into /g/ tend to be natural formations and they tend to have no cover. Quite generally, voiced consonants tend to cluster toward the natural world -- physical processes, natural phenomena, etc., and unvoiced consonants tend to cluster toward human purposes and designs. As far as I can see, these distinctions have no basis in articulation. The mouth is no more closed and locked during the articulation of /k/ than the articulation of /g/. Surely natural phenomena cannot be associated with voicing on any other basis than a conceptual one. This cannot be an essentially Iconic association. But it might be a metaphoric connection. I can imagine that people subjectively feel that voiced sounds are somehow more earthy, forceful and natural than unvoiced sounds.

That all of these Clusterings are still subject to the limitations imposed by Iconism can also be seen in the fact that the Clustered words also fall into other phonesthemes. The 'plant babies'

which Cluster into /b/ are not little powdery spores or spiky pine cones, but those that bulge just as the phoneme /b/ itself does: bulb, blossom, bloom, peach blow, etc. And the /b/ paraphernalia associated with babies works this way also. A 'bib' is a barrier. A 'burp' is an explosion. A 'bubble' is a bulge. And so forth. These are domains which are all Iconically related to /b/ as well.

5.3.3 Phonosemantic Association and Natural Classes

Consider the semantics of two similar phonemes. The pronunciation of the phoneme /p/ differs from that of /b/ only in voicing; yet their semantic worlds are quite distinct. An unvoiced sound has more precision than its voiced counterpart. It is not as heavy. Similar to what we saw for /l/ and /r/ in Experiment 8, most phonesthemes for /b/ have a corresponding phonestheme for /p/, but the corresponding phonesthemes also differ in some respect. The result in /p/ is not an explosion, but a more precise 'placement'. The barrier in /b/ manifests as parting, separation and selection in /p/. The bulge in /b/ has a corresponding precise 'point' in /p/, which can be spread into a 'plane' when followed by /l/ or /æ/. Like /b/, /p/ has a labial 'bias' (see experiment 6 -- the Bias in the Labials), although it takes a different form.

When we compare the two very closely related phonemes /b/ and /p/, a number of patterns emerge which are difficult to correlate only with their respective pronunciations. Where /b/ has balloons and bulges, /p/ has pebbles and peaks? Where /b/ has boards and branches, /p/ has pikes and prongs. Where /b/ has beating, /p/ has mostly pricking.

/b/ phonesthemes include:

/b/ Phonesthemes

Round Things -- bagel, ball, balloon, bangle, bead, bell, belly, berry, bladder, blimp, blip, blister, blob, blotch, bobbin, bowl, bracelet, bulb, bulge, button

Bumps -- balls, barrow, bay, bead, belly, blip, blister, bloat, blob, boil, boll, bolster, boob, booby, bosom, boss, breast, bubble, buckle, bud, bug(eye), bulge, bum, bump, bun, bunch, union, buns, burl, bust, butt, butte

Boards -- balk, bar, batten, bead(window), beam, billet, bloom, board, boom, brace

Hit -- bandy, barge, bash, baste, bat, bate, batter, bean, beat, belt, biff, blow, bludgeon, bob, bolt, bomb, bombard, bonk, boot, bop, bounce, brain, brake, bray, breeze, bruise, brush, buck, budge, buff, buffet, bump, bung, bunker(golf), bunt, bust, butcher, butt

/p/ phonesthemes include:

/p/ Phonesthemes

Point -- pastille, pea, pearl, pebble, pecan, pellet, penny, pence, period, pill, pimento, pimple, pip, pit, pixel, pock, point, pore, port, pox, prick, puck, pupil

Peak -- pass, peak, pedestal, perch, pike, pile, pinnacle, point, pole, pyramid, pyre

Prong -- paddle, pale, pawl, peg, perch, pick, picket, pike, pile, pin, piton, pivot, pock, poker, pole, post, probe, prod, prong, prow

Pierce -- peck, peg, pick, pierce, pike, pin, pinch, pink, pitch, plant, plug, poke, prick, prickle, probe, prod, prong, prop, punch, put

The /p/ words in each case tend to be sharper, and often harder. The phoneme /p/ tends to be smaller than /b/, less violent and more precise. And on the whole, the phonesthemes can be seen to reflect the articulation of the labial stop. The /b/ and /p/ classes fall into common Natural Classes like this:

Round Things: blip, point
Elevated: bump, peak
Sticks: board/branch, prong
Violent Physical Contact: beat, pierce

Within each individual phoneme, however, the corresponding phonesthemes cluster together differently. That is, points in /p/ are in a common semantic class with blips and bubbles in /b/, and prongs in /p/ are in a common semantic class with boards and branches in /b/. But prongs and points in /p/ are also in a semantic class together, because prongs have points. Boards and branches, on the other hand, in general share no class with the bulges and bubbles of /b/.

When one looks at how the more narrowly defined phonesthemes fit into superclasses, they cluster like this:

/p/ Clustering: {points, prong}, {prong, pierce}, {point, pierce}, {peak, prong}
/b/ Clustering: {bubble, bump}, {beat, branch}

It seems to me that this curious array of facts can be described fairly well in terms of the notions presented in this dissertation. Because /b/ and /p/ have similar articulations, we would expect them to have similar semantics, assuming that Iconism is active in language. If it is not, then this array of facts is indeed mysterious. The fact that these /b/ and /p/ words fall into identifiable classes which can be compared in this manner is evidence for the psychological reality of Natural Classes. But the differences in the Clustering dynamic as described in this last little table cannot, it seems to me, be accounted for by Iconism and Natural Classes alone -- we need the additional notion of Clustering to explain this... the tendency of the mind to try to get each phoneme to signify a unified conceptual space. The Clustering dynamic such as that described in this little table is very similar to the thematic metaphoric interrelationships between words sentences described by Rhodes and Lawler(1981). The difference is that these are partial lexical entries for phonemes rather than for words.

5.3.4 Iconic Meaning and Syntagmatic Context

Inclusion of a linguistic form in the context of other similar forms limits the semantic range of that form. For example, when one puts the word 'take' in the context 'take up', only one part of its semantic potential is being made use of. If one puts it in the context 'take over', then a different part of its semantic potential is being highlighted.

This happens also on the phoneme level. For example, 'drown' and 'drip' emphasize the downwardness and wateriness in /d/, whereas 'dim' and 'daunt' emphasizes its 'diminishing'. Since not all aspects of a phoneme meaning are equally salient in every word, we have to look at all the words to become familiar with the meaning of the phoneme. Similarly, we have to look at all the possible contexts (senses) of a word to get a feel for its Iconic meaning.

This tendency for a higher level to fracture a single thing into many can be seen especially in the many opposites that one perceives among the phonesthemes. As we have mentioned, it is extremely common to find a concept and its direct opposite heavily represented within the phonesthemes for a single phoneme. (I'm being careful to use the word 'opposite' rather than 'antonym', which has a

narrower definition than I intend.) Examples of opposite phonesthemes in /h/ include Heaven/Hell, high/hole, help/harm,... In /n/ we find now/never, nice/nasty, noon/night, etc. We also pointed out that the opposite of a word is very similar to it semantically. When one looks at phonemes, one looks through the perspective of morphemes or in this case words. The higher level is like a prism that fractures the underlying unified semantics. What was one thing, like 'length' at the phoneme level, looks like two opposite things 'long' and 'short' from the perspective of the morpheme.

Notice that placing a word in a context imposes on it a limited function. A dictionary sense is nothing more than a heuristic description of a range of related functions that this word is commonly used for. In fact, every novel context (phrase or sentence) which a word appears in defines for it a new sense. Every context is a function and every function is a sense. Reference is closely related to function. What determines what a word refers to is how the word must be used.

Very informally, I'd like to draw an analogy between a word and a person, because I think it clarifies how I think about this. On one level, a person's body just is what it is -- tall or short, fat or thin, strong or weak. On another level, a person can give her body a function as a musician or linguist or mother or basketball player. These functions, like the functions of a word are not intrinsic to the body type. They are arbitrary, taken up for a time and perhaps laid aside for a time. The person may have several functions, and her tendency will be to Cluster -- to draw on her music when she plays basketball or does linguistics. These professions are what this person's body is *used for* at a given place or time. They define how she is interconnected in the larger scheme of things. It's the same with a word. The phonological structure of a word are analogous to the body of a person. It has certain predispositions already built in. It is strong or weak, fat or thin. Those predispositions in part determine what the person or word will do well. Once a person takes on a job, that natural predisposition will flavor the *way* that the person does the job -- whether she tends to be quick and effective or slow and thoughtful, outgoing or withdrawn. Similarly, when a word 'glimmer' takes on a job as a 'light' word, it does its job a certain way. If the job that a person does is very limited, like flipping burgers, then the person's individuality will not be as obvious in performing that role. In the same way, concrete reference blocks the salience of Iconic meaning. The fact that a person flips burgers, however, does not in any way diminish their inherent nature or their potential to express themselves creatively in other realms. Similarly, it's not the case that some words are inherently more Iconic than others. The extent to which their Iconism is visible is simply dependent on the function they are fulfilling.

So a person's job expresses only one facet of their personality, which doesn't cease to exist just because they have this job. Similarly, when one puts a word in a sentence -- one gives it a job -- only one facet of its meaning gets illuminated, but that doesn't mean its native form ceases to exist or loses its potential to affect things Iconically. And similarly a phoneme when used within the context of one Natural Class exhibits only one facet of its potential, but doesn't thereby lose the potential.

5.3.5 Senses and Phonesthemes

The result of this interplay between Iconic meaning and the other aspects of semantics, including classification and reference is to fracture what was one thing -- the Iconic meaning -- into lots of separate things -- the word senses. The word's various senses arise as a result of this process, and that's why we have referred to them as epiphenomena throughout this dissertation. As a result of this fracturing, it becomes difficult to perceive the original whole which holds everything together.

Reference does this by taking a possible context for a word very seriously, and reifying a contextual meaning. It makes static what was fluid by limiting it to a context.

Phonesthemes are very similar to word senses. **Phonesthemes** are not generally defined as a set of words which have a common element of phonological form and semantics. Rather they are defined as a phonological form and its corresponding semantics. And just as a single word has multiple senses, so a single consonant has multiple phonesthemes. Just as senses are the result of classifying the one underlying meaning of the word into the various contexts in which it can appear, so phonesthemes are the result of classifying the one underlying phoneme semantics into the various contexts within which it can appear. This is why I speak of phonesthemes also as epiphenomena.

5.3.6 Basic Words and Senses

Obviously on the level of the word, Semantic Association seeks to associate with a string of sounds a unified semantic whole. With few exceptions, the various senses of a word are interrelated by metaphoric extension, hyponymy and other semantic processes. There is an analogous process on the level of the phoneme. Semantic Association is sensitive to the most basic words of a language, as it is sensitive to the most basic senses of a word, and it conspires to expand on the semantics of that more basic word by developing words which both sound similar and have a similar meaning.

For example, /b/ by its Iconic nature implies pressure built up behind a barrier and then a rupture of that barrier. In English, that is metaphorically connected with birth, and the basic English words 'birth', 'bear' and 'baby' all begin with /b/. Around these words we find Clustering in the plant world of buds, blooms and blossoms, and in the animals world, we find disproportionately many words like 'cub', 'breed' and 'brood'. In addition to this, we find disproportionately many words associated idiomatically and peripherally with birth, babies and children: big with child, bib, burp, bubble, breaking water, not to mention a spectrum of words associated with beginnings: booting a computer, boarding a ship, breaking new ground, the brink of disaster, broaching a subject, etc. Many of these words also contain an /r/. In Russian, birth tends to be predominated more by /r/ and less by /b/ than in English, and the basic words for birth and child begin with /r/ in Russian, and often contain a /b/ as well.

We have observed that, on the level of ***what the word is*** (i.e. its form, not what it refers to), Iconism is fundamental, and everything else is built up on it. But on the level of ***how the word is used***, the most basic sense of a word is fundamental, and all the other senses of the word are related back to it. For that reason, studies like McCune(1983) and Rhodes and Lawler(1981) place such emphasis on metaphor and the other semantic processes which interrelate word senses. From one perspective (that of langue), we might say that all word senses are equally important and all words are equally basic. A word either exists or it doesn't. A word either is used within the context of some Natural Class or it isn't. But from the perspective of a language user (parole), some words and some senses certainly are more basic than others. The most basic words and the most basic senses for words as we recognize them tend to have concrete reference.

5.4 Ramifications of Phonosemantics for Issues in Linguistic Theory

5.5.1 The Function of Language and Abstract Semantic Representations

The view of language I propose here in which only a part of semantics can be reduced to reference predisposes one to view language relativistically. From a non-relativistic perspective, the function of language is viewed in truth-theoretical or informational terms. From the relativistic perspective, the other functions of language are emphasized, beyond that of simply imparting information. To the extent that semantics is Iconic, it must be viewed not so much as a tool for stating facts but more as a medium within which speakers of a given language simply operate and interrelate without any particular purpose. To the extent that language is Iconic, semantics cannot be abstracted away from language itself and language as we know it cannot be abstracted away from man any more than music can be abstracted away from the notes which make it up. Therefore anyone who accepts that there is some element of language which is Iconic must accept that abstract semantic representations will never fully represent the meaning of a word. Some aspect of a language's meaning cannot be conceptualized or translated or abstracted away from.

5.5.2 Semantic Primitives

One of the interesting consequences of the Phonosemantic Hypothesis is that it provides us with one obvious set of what seem to me very logical semantic primitives -- the phonemes themselves. At least one set of primitives, in other words, seems to me rooted in the very form of language. But the Natural Classes also serve as primitives in a way which is much less tied into the form of language itself. The class 'animal' seems to me in English a primitive. There are many indications of this. For example, if a child asks me what a 'badger' is, I must answer, "It is an animal." I cannot answer, "It's a brown object," without being considered deceptive. The fact that the four criteria I have defined for a Natural Class do hold of some sets of words is another indication. Furthermore, it seems that at least some of these Natural Classes are part of a universal menu from which languages select. 'Animal' is a Natural Class in all the languages I know anything about, and probably is a Natural Class in most languages.

Much of the difficulty we have had in identifying semantic primitives, it seems to me, has lain in the fact that we have tried to analyze the entire semantics of a word like 'badger' in terms of Natural Class affiliation. Once we can think of phonemes as semantic primitives as well as Natural Classes, then we can analyze much more of the semantics of words satisfactorily.

5.5.3 Universals

Jakobson pointed out that most of Greenberg's universals have an Iconic quality about them. Iconism by its very nature must be universal. If two phonemes are pronounced identically in two different languages (which they of course rarely are), then they must have the same Iconic meaning. But to what degree does Phonosemantic Association also follow universal patterns? Several of the experiments presented herein suggest that the Clustering dynamic is at least in part universal.

In experiment 10, the string /s//t//r/ was shown to have very similar semantics cross-linguistically. It was, however, also true that the emphasis on the various phonesthemes varied from language to language. The word distribution in Experiment 10 came out as follows:

Albanian -- Struggle -- 5, Stretch/Spread -- 5, Strong -- 3, Stop -- 3, Straight -- 2, Start -- 1, Strange/Distant -- 1, Stroll -- 0, Strike -- 0

Catalan -- Stretch/Spread -- 16, Straight -- 14, Struggle -- 14, Strange/Distant -- 14, Stop -- 14, Strong -- 11, Strike/Tear -- 8, Stroll -- 6, Start -- 3

English -- Strong/Stern -- 18, Straight -- 17, Stretch/Spread -- 13, Struggle -- 13, Stop -- 10, Strange/Distant -- 9, Stroll -- 7, Strike -- 5, Start -- 2
German -- Straight -- 33, Strong/Strict -- 15, Stop -- 14, Stretch/Spread -- 7, Struggle -- 5, Strike -- 5, Stroll -- 4, Strange/Distant -- 3, Start -- 3
Greek -- Strong -- 16, Stop -- 10, Struggle -- 9, Straight -- 7, Strike/Tear -- 7, Strange/Distant -- 5, Stroll -- 3, Stretch/Spread -- 3, Start -- 0
Hindi -- Stretch/Spread -- 5, Struggle -- 3, Straight -- 3, Strong -- 3, Start -- 1, Stop -- 1, Strange/Distant -- 1, Strike/Tear -- 1, Stroll -- 0
Indonesian -- Strong -- 10, Straight -- 4, Struggle -- 4, Stretch/Spread -- 4, Stop -- 2, Start -- 1, Strange/Distant -- 1, Strike/Tear -- 1, Stroll -- 0
Irish -- Struggle -- 30, Straight -- 27, Stop -- 23, Strong -- 23, Strange/Distant -- 17, Stretch/Spread -- 15, Strike/Tear -- 14, Stroll -- 5, Start -- 0
Lithuanian -- Straight -- 8, Struggle -- 2, Stop -- 2, Strong -- 2, Strike/Tear -- 1, Strange/Distant -- 1, Start -- 0, Stretch/Spread -- 0
Norwegian -- Straight -- 36, Strong -- 26, Struggle -- 13, Stretch/Spread -- 10, Strike -- 8, Stop -- 7, Start -- 6, Strange -- 6, Stroll -- 2
Russian -- Straight -- 23, Strange/Distant -- 11, Strong/Strict -- 8, Struggle -- 5, Stop -- 4, Strike -- 3, Start -- 3, Stroll -- 2, Stretch/Spread -- 2
Welsh -- Straight -- 8, Stop -- 5, Strange/Distant -- 4, Struggle -- 3, Stretch/Spread -- 3, Strike/Tear -- 1, Strong -- 2, Start -- 0

5.5.4 A Possible Mechanism by which Sound Shifts Interact with Phonosemantics

Let us now return to our paradox. How might a quite general productive and synchronic correlation between phonological form and semantics be reconciled with Grimm's Law, or for that matter assimilation, or for that matter, the existence of different languages? We might begin to uncover this by looking once again at data such as that presented in Experiment 10. Celtic has diverged so much from Germanic that it's probably safe to assume that most of the /s//t//r/ words in Irish are not cognate with those of English, and yet the fit in the same Phonosemantic Classification:

English

Straight -- stair, steer, straight, strait, strand, strap, straw, streak, stream, street, stretch, string, strip, stripe, strobe, stroke

Irish

Straight -- starr (tooth, tusk, jut, rough pull, fit of anger, round of boxing, sturdy), starran (projection), steotar (sugar stick), storn (straddle pin), strai-beir (lash), straic (strip of cloth, stroke of a cane, state, level, pride), straille (tall, lazy aimless person), straim-ead (tape, streamer, heavy stroke), strai-p (strap), stran (prominent tooth), strapa (strap), strat (stay between masts), streaclan (band, gaiter), strearac (tree creeper), strileaman (long, nervous person), strioc (stripe, repentance), striocail (making tracks, striving), striolla (girth, girdle), strior (impulse, gust, enthusiasm, stripe), strioradan (anything hanging, limp), striopan (strip, streamer), striopar (strip, tatter), stroc (iron keel band), stro-pa (strobe), struic (crest, ridge), strup (curved spout), sutrog (candle)

I am suggesting that the English and corresponding Irish /s//t//r/ words have a common element of Iconic meaning, but that the English and Irish words differ on the level of Classification and Reference. One of the English words 'street' falls in the class of 'roads and paths'. There are no similar Irish words in this class. One Irish word, however, fits in the class of 'people' and no corresponding English words fit in this class or have anything remotely resembling this referent. All these words share is a similar tension and stretchiness, which I have done my best to show probably arises from the internal tension implicit in the articulation of the phoneme combination /s//t//r/.

The phonosemantic evidence suggests that when a word changes its pronunciation during diachronic sound shifts, its Iconic meaning also must change. This might be analogous to replacing all the employees in a company with others. The company has the same structure, but the people are different, and two things happen. The new employees gradually take on slightly altered assignments which are related to their original assignment, but which are more to their taste, and the company reorganizes a bit in deference to the new blood. The whole system, in other words, takes a little time to settle in. I expect something very similar happens after a language undergoes a major sound shift.

The Concrete Nouns would remain relatively unaffected -- and it may be observed that almost all examples of regular sound change provided to beginning linguistic students are Concrete Nouns. The reason for this is that of the most basic roots in a language, only they have really identifiable correlates in other languages. One can fairly unequivocally translate 'goat' or 'candle' into French and Russian and Thai. But what is the one right translation of 'mad' or 'swift' or 'twist' or 'wring' or indeed 'have' and 'to' and 'up' into these same languages? That cannot be answered so readily. That is because the Iconic dimension of their meaning holds much greater sway in these words. Their function within the language is determined to a much greater extent by their phonological form. Because these large scale phonological changes can only be demonstrated by comparing words in one language with their equivalents in another, the words compared are Concrete Nouns. The remaining words undergo a semantic shift as well as a phonological one. That shift, however, probably rarely involves assignment to a new referent and therefore reclassification in a new Natural Class. I would predict that it affects not what the word is, but what it is like.

If this shift is only allophonic, as is the case with Mid-Western /str/ vs. Texan /Str/, then I would predict that the sound change would only affect the feeling-tone of the word, but not particularly its Clustering dynamic. But if the shift involved an actual reorganization of the phonemes -- some former allophones which gain phonemic status, for example -- then I would anticipate much more visible semantic effects. In either case, I would anticipate as always relatively little change in the Concrete Nouns.

To test this hypothesis, let's take as an example again /str/ and /Str/ in Texan. I might try to test whether there is a tendency in dialects that used /Str/ rather than /str/ to tend to prefer metaphorical and idiomatic extensions of the word which by Semantic Association favored the semantics of /S/ rather than /s/. For example, the flatness in /S/ might start to predominate over the linearity in /s/. We might roughly divide the linear /str/ words as follows:

Thin: straight, strand(hair), straw, string, strobe

Flat: strait, strand(shore), strap, stream, street, strip, stripe

Either: streak, stretch, stroke

To verify this hypothesis, we might look in dialects like Texan, that pronounce all these words /Str/ whether they prefer the flat words to the 'stringy' ones. Might they be more inclined to say 'go right home' much more frequently than the 'go straight home' since /S/ is flatter and 'straight' is not? Perhaps one would find that 'twine' was preferred over 'string' and 'laser' over 'strobe'?

The Concrete Nouns are anchored by their referents in any case, and those are the words which can most reliably be compared. It seems to me therefore possible that when a language undergoes a

diachronic sound change, the words other than the Concrete Nouns would gradually be replaced by synonyms which are more suited to the phonosemantics of the language and that the usage of those words that remained would also shift to accommodate the language's phonosemantics. The fact of a large scale sound change in a language seems to me a strange fact in itself. It's hard to imagine that one's mother tongue could undergo such major changes in a relatively short period of time, and yet it happens. Is it that much stranger to imagine that the semantics of words other than the Concrete Nouns shifts with it?

5.5.5 Resolution to the Cratelean Paradox

Let me now return to the original Cratylean dilemma and state explicitly what the data presented here has to say about it. Very briefly, Cratylus' position is that a word cannot in principle be unfitting to its function. The original name-maker could not have made a mistake. However, in the dialogue it is pointed out that Hermogenes himself is a poor man -- something analogous to a poor man being named 'Mr. Rich'. Furthermore, after some discussion, /r/ is determined to mean motion, yet the Greek root for 'motion' (kinesis) does not contain an /r/. Hermogenes' position is that the sign is arbitrary and should be arbitrary, for only then can it truly represent things rightly. And Socrates concludes that there is, after all, an underlying mimetic principle, but that the original 'name-giver' does indeed at times sadly make mistakes.

I think the data arrived at by the methods presented in this dissertation shows that all three men are correct -- they are only holding different parts of the elephant. Cratylus is right that the original name-giver cannot make a mistake, if we think of the name-giver not as a person who consciously invented language in the past, but as a natural Iconic force active in the present. Hermogenes is correct that reference is and must be arbitrary or conventional. If it were not, there would be no concreteness of reference, language would lose its grip on the world, and we would no longer be able to talk *about* anything. And Socrates is right that words are not always fitting... if we accept that the fittingness of words is a function of parole (speaking) rather than of langue (the grammar itself). Analogously we might say that no species is inherently superior to any other in any absolute way, but some species do fly better than others and some species do talk better than others. So some words are better suited to certain contexts than others. However, the iconic effect cannot in and of itself be wrong or right, because it is simply a natural force. It cannot make a mistake.

Put another way, there is no right or wrong referent for a particular string of sounds. Reference is arbitrary and all choices of referent are equally good, equally true. However, having first chosen a referent for a word, the sound will then necessarily affect the connotation of the word, and it will affect the clustering dynamic of the language. These processes are determined by natural law and are subconscious. They cannot in principle be wrong, any more than an object can wrongly reflect the natural law $F=ma$. Force just *does* equal mass times acceleration. Similarly, there's no point discussing whether it's right or wrong that words for light containing an /r/ be harsh, because it simply *is* that way whether we like it or not. These are the facts as I see them from the perspective of langue. There is no right or wrong about the arbitrary choices of referent, because they are truly arbitrary, and there is no right or wrong about the natural processes of clustering and true iconism, because there couldn't in principle be a choice. Therefore although sound does affect meaning, it does not in my view follow that there could be better or worse languages.

However, on the level of 'parole', there is such a thing as 'the right word' for a context. For one

thing, there is such a thing as lying. Lying is a consciously chosen inappropriate *referent* made with the intention to deceive. But there are also other forms of failure to choose 'the right word'. One can, for example, choose a word whose referent is fitting, but which is phonosemantically not appropriate to the context. Then one is not lying. One is not stating something counterfactual. The facts are perhaps true. The referents are perhaps all viable, and the sentences all have positive truth value. But the hearer's subconscious is manipulated into buying a product or accepting a particular point of view by skewing the phonosemantics. This is done in propaganda and advertising all the time.

Notice that my proposed resolution to the Cratylean paradox could not be arrived at without having established certain theoretical preliminaries. For example, Socrates, Hermogenes and Cratylus all assume that the way we name things is by consciously constructing a grammar. To some extent it is true that we consciously choose the referents for words. But part of the process is also unconscious. For the most part, the grammar of a language is built up through using it, through parole. Specifically, reference is largely conscious; classification is semi-conscious; clustering is subconscious, but can be brought to consciousness with some effort; and true iconism is subconscious and takes some real work to see clearly. So as prerequisite to my solution to the Cratylean paradoxes, I had to have the notion, most fully expounded upon in the generative tradition, of language as a natural process which is largely unconscious and whose structures have to be brought to consciousness by empirical methods.

Furthermore, the above resolution to the paradoxes could not have been formulated without reference to the Saussurian notion of *langue* vs. *parole*. Hermogenes and Cratylus are both correct from the perspective of langue, and Socrates is correct from the perspective of parole.

Is it coincidence that perhaps the two greatest promoters of the notion of 'arbitrariness of the sign' among linguists also provided fundamental theoretical constructs required to formulate my proposed resolution to the Cratylean paradox? I think not. It's very common in the history of science that both extremes of an issue have to be taken on fully and explored on their own terms before they can be resolved into a sensible whole.

5.6 Future Research

There are, of course, many other experiments one could devise to test for the Phonosemantic Hypothesis, Clustering, Iconism and the tendency of reference to obscure the phonosemantic effects. Hopefully future research will lead us to conduct similar experiments for an ever wider variety of languages and to compare the results cross-linguistically. This study has also concerned itself primarily consonants rather than vowels, monosyllables rather than polysyllables and with English much more than with other languages. Much research remains to be conducted on the relationship between morphology or syntax and phonosemantics. English idioms are a very fruitful domain for phonosemantic research. The treatment of the semantics of phonetic features in this work could be expanded on greatly. Furthermore, this field bears an obvious relationship to the fields of etymology and language origins, not to mention lexicography, cybernetic processing of language, language teaching and any number of other practical applications.

I find that phonosemantics in no way differs from other deep areas of human inquiry -- the more deeply one investigates it, the wider its horizons prove to be. I have come out of these investigations with a firm conviction that investigations into phonosemantics have been given very short shrift over the centuries for reasons that have nothing to do with the field's importance to our understanding of basic human concerns.

There is also a vast amount of research yet to be done into the nature and structure of Natural Classes. 'Grammaticality' can clearly be applied to classification schemes, since some classifications are grammatical and others are not. Reference is also related to at least Functional Natural Classes in the sense that all elements in a Functional Class have a common element of reference. But the members of the phonesthemes are not always related by a common referent. If one does define a class such that all the elements have a common referent, then one can see Iconism functioning. But there is much more to this structure than I have discerned. There is clearly a complex relationship between the Semantic Relations (antonymy, meronymy, hyponymy, etc.) and the Natural Classes, but much of that remains fuzzy. The nature and structure of Natural Classes and their relationship with the Semantic Relations serves as the primary subject of my current research.

In order to understand many of the phenomena brought up by these phonosemantic experiments, one has to distinguish Phonosemantic Association from Iconism. Some aspects of Iconism are clearly blind to reference and some aspects of it are not. In this I disagree with Von Humboldt who saw these two aspects of Iconism as completely unrelated. If they were unrelated, then a Phonosemantic Classification for given phoneme would, for example, not resemble its articulation. But the exact nature of the relationship between Phonosemantic Association and Iconism still requires further work.

5.7 Concluding Remarks

There has been a rising tide of interest in linguistic Iconism in recent years. The first sound symbolism conference ever was held in 1993. In 1998, the Linguistic Iconism Association was formed, and it now has nearly 300 members, many of whom have become interested in the phenomenon only recently. The Internet has also made sound symbolism much more visible. Many articles which could not previously find publication are now generally available.

This dissertation is a contribution to this dialogue, my attempt to help give voice to a perspective on linguistic science has not held sway in the mainstream for many years. I anticipate that the reader may not agree with all the thoughts I offer, but whatever position the reader may hold, I believe I have presented quite strong evidence that the phonosemantic perspective on language deserves continued consideration.

Endnotes

1. p. 7 The field is known to the French as 'mimologique' and to most English-speaking researchers as 'sound symbolism' or 'phonetic symbolism'. Wescott talks of 'phonosemics'. The syntacticians speak more generally of 'linguistic iconism', and the Africans talk of 'ideophones' without mentioning any of the above terms associated with the field as a whole. In this text, I will refer to the field as 'phonosemantics', following Stanislav Voronin's usage as a sub-field of linguistic iconism -- phonologic as opposed to syntactic iconism. As Jakobson points out, the term 'sound symbolism' is really concerned with C.S. Peirce's 'icon' rather than his 'symbol', and that is why I too find the term 'sound symbolism' confusing.

2. p.32 Those not discussed at greater length in this introduction include J. Reinius (German and English, 1908), Edward Sapir (Wishram, 1911), Diedrich Westermann (Ewe, 1930), Charleton Maxwell (Malay, 1932), Stanley Newman (Bella Coola, 1933), G. Allport (Hungarian, 1935), Otto Dempwolff (Austronesian, 1938), F. I. Deed (Swahili, 1939), Margarete Eberhardt (the deaf, 1940), J. Orr (English, 1944), Gladys Reichard (Couer d'Alene, 1945), Jan Gonda (Indonesian, 1948), E. M. Uhlenbeck (Javanese, 1950), Karl Hoffmann (Old Indian, 1952), Hans Marchand (Turkish, 1952), Edward Dimock (Bengali, 1957), M. Durand (Vietnamese, 1961), R. Davis (Tanganyikan languages, 1961), Murray Miron (cross-linguistic, 1962), Fred Householder (Azerbaijani, 1962), Samuel Elmo Martin (Korean, 1962), Nils Thun (English, 1963), G. Atzet and H.B. Gerard (Navajo, 1965), Denzel Carr (Malay, 1966), David Heise (English, 1966), Bob Blust (Austronesian, 1969), M.B. Emeneau (Indian languages, 1969), S. Voronin (English, 1969), M. Tsien-Lee (Chinese, 1969), Henri Frei (Japanese, 1970), Mary Haas (Northwestern California, 1970), G. H. Matthews (Proto-Siouxan, 1970), R. Ultan (Konkow, 1971), Robert Ostwalt (Pomo, 1971), Margaret Langdon (Yuman, 1971), Marshall Durbin (Mayan, 1973), V. V. Levitskij (Ukrainian, 1973), John Wolff (Austronesian, 1974), A. P. Zhuravlev (Russian, 1974), R. D. Tarte (Czech, 1974), Gérard Diffloth (Semai, 1976), Kong-On Kim (Korean, 1977), Asher Koriat and I. Levy (Hindi and Japanese, 1977), S. Greenberg and J. D. Sapir (Kujamutay, 1978), Richard Rhodes (Ojibwa, 1980), Brent Berlin and J O'Neill (Jivaroan, 1981), Ira Schloss (English, 1981), Marianne Mithun (English, 1982), Brian Joseph (Greek, 1984), Wayne Leman (Cheyenne, 1984), H. Ono (Japanese, 1984), Ancho Gerganov and Taseva Krasimira (Bulgarian, 1985), Martha Ratcliff (White Hmong, 1986), Johanna Nichols (Chechan, Ingush, 1987), Julie Nemer (Temne, 1987), Anthony Woodbury (Yupik Eskimo, 1987), Bruce Mannheim (Quechua, 1988), John Lawler (English, 1989), Eva-Marie Ernst (German, French, Italian, 1990), Robin Allott (English, 1990's), Anatoly Liberman (Germanic, 1990), William Herlovsky (Japanese, 1991), Hans Kaesmann (English, 1992), H. Fukuda (Japanese, 1993), Shoko Hamano (Japanese, 1994), Murray Elias Denofsky (English, 1994), Caitlin Hines (English, 1994), Terrence Kaufmann (Haustec, 1994), Margaret Langdon (Guarani, 1994), Randy Lapolla (Mandarin, 1994), James Matisoff (Lahu, 1994), W. McGregor (Kuniyanti, 1996), Janice Nuckolls (Quechua, 1996)

3. p.37 Ernst Cassirer also draws a correlation between Peirce's three levels and various linguistic expressions. But whereas Cassirer sees some expressions as mimetic, others as indexical and others as symbolic, I will propose here that all expressions are all of these at the same time.

4. p 50 These include Abelin (1998, 1999) , Adi and Ewell (1987), Allott (1974), Allport (1935), André (1966, 1967), Anisfeld (1968), Arzhevskaya and Voronin (1986), Austerlitz (1994), Barry and Harper (1995), Bartens (2000), Berlin (1994), Berlin and O'Neill (1981), Bernard-Thierry (1961), Bloomfield (1909-1910), Bolinger (1950), Bradley (1977), Carnoy (1917), Carr (1966), Cassidy, Kelly and Sharoni (2000), Chang (1990), Deed (1939), deLisle (1981), Dempwolff (1938), Denofsky (1994), Diffloth (1976, 1979), Dimock, (1957), Dolinina, (1988), Durand (1961), Durbin (1973), Emeneau (1938, 1969), Emerson (1995, 1996), Ernst (1990), Ertel (1972), Ertel and Dorst (1965), Feld (1982), Fónagy (1963), Frei (1970), Fujita, et. al. (1984), Fukuda (1993), Gamble (1975), Gomi (1989), Gonda (1949-1950), Greenberg and Sapir (1978), Grew (1998), Haas (1970), Hamano (1986, 1994, 1998), Heise (1966), Herlofsky (1981), Hill (1987), Hines (1994), Hoffman (1952), Hough (2000), Householder (1946, 1962), Jacobsen (1994), Jin (1995), Joseph (1984), Kaesmann (1992), Kakehi (1983), Kakehi, Mito, Hayase, Tzuzuki and Young (1981), Kakehi, Schourup and Tamori (1998), Karlgren (1934, 1962), Katkevich (1999), Kaufman (1994), Key

(1997), Kim (1977), Kinkade (1976), Langdon (1971, 1994), Lawler (1990), Lee (1992), Leman (1984), Leslau (1961), Levitckij (1973b), Liberman (1990), Lihomanova (1999), Marchand (1952, 1957, 1959a, 1969), Markel and Hamp (1961), Martin (1962), Matisoff (1994), McCune (1983), McGregor (1996), Miles (1848), Mito, et. al. (1981), Morin (1972), Morito (1973), Nemer (1987), Nichols (1986), Nishihari (1980), Nodier (1808), Nuckolls (1996), O'Boyle, Miller and Rahmani (1987), Ono (1984), Oswald (1971), Philips (1997), Poldervaart (1984, 1989), Pyle (1949), Ratliff (1986), Reichard (1945), Reinius (1908), Rhodes (1994), Sadasivam (1966), Salisbury (1992), Sapir (1911), Schuchardt (1897), Shulepova (1991), Smithers (1954), Tanz (1971), Thorndike (1944, 1945a, 1945b), Thun (1963), Traunmüller (1996), Tsien-Lee (1969), Uhlenbeck (1971), Ultan (1971, 1978), Veldi (1988a, 1989, 1990, 1994a), Voronin (1969), Wescott (1971a, 1973, 1975c, 1975d, 1977, 1978), Westermann (1937), Wilkinson (1936).

5. p. 63 After spending some time at this, one of course is tempted to ask oneself why something which is so readily verifiable is so universally denied. One possible answer is that few linguists actually conduct these experiments themselves; some apparently consider it so unlikely at first glance that it's not worth testing for.

Another reason that the Phonosemantic Hypothesis is still not generally accepted perhaps lies in the enormous influence of proponents of the Conventionalist position -- notably Ferdinand de Saussure, the Junggrammatiker and Noam Chomsky. It certainly hasn't helped matters that proponents of the Naturalist position have often denied that word meaning is in any sense arbitrary or have claimed that certain languages were more iconic and therefore more perfect than others. (My friend Rollin Williams used to joke that in the beginning all people had the perfect name 'Rollin Williams', but whenever they did something wrong, their name changed a little. It's sad but true that many very smart people, having apprehended a smidgin of iconism in their native language, have in all haste and seriousness drawn precisely the same conclusion.) In part, I think the reason for the failure to acknowledge the existence of linguistic iconism probably lies in the relative inaccessibility of the data. That some aspect of word meaning is arbitrary is completely obvious to anyone. The acceptance of the Phonosemantic Hypothesis, however, rests on the acceptance of a Phonosemantic Classificational system. They are somewhat tedious to devise.

In addition, some linguists don't see the data in the same way as others. I have been told, for example, by a linguist reader of Appendix I that he sees no semantic similarity between these words 'bulge' and 'bloat' on the one hand and 'ball' on the other. Probably the 'nouniness' and concreteness of 'ball' obscures the 'bulging' implicit in the word more to some than to others. And it's very common for people to feel that words like 'gleam', 'glimmer', 'glitter' and 'shine' are completely identical in every way. One colleague objected that the phonestheme listed above for walking verbs containing /r/ was missing, for example, the verb 'roar', as in 'to roar down the street'. This usage of 'roar', he pointed out, did not have to refer only to vehicular motion. A child running very fast or running down the street and making a noise like a vehicle could be said to be 'roaring down the street'. Since I felt this was true, I added 'roar' to the phonestheme, and then another colleague objected that 'roar' seemed to her to apply only to vehicles. Of course, what is happening is that the basic 'sense' of 'roar' is not a verb of motion at all, but a verb of sound. It is only metaphorically extended to motion with a prototypically vehicular subject. The motional verb 'roar' with a subject who is on foot is derived a second time from the verb with a vehicular subject. To some people it seems more 'complete' to include 'roar' as a verb of running. To others, it seems like 'pushing it'. And I feel both at the same time, so I have not included or excluded verbs like 'roar' from the phonesthemes in any principled way. Be that as it may, it clear that to the extent that people don't see the data the same, they obviously won't draw the same conclusions about it. But despite concerns like this if I ask myself whether there is any doubt in my mind whether there are indeed significant disproportions between the forms of words and their meanings, then there is none.

6. p. 70 There are a couple other types of words besides the Concrete Nouns which the Phonosemantic Classifications don't work for as well as others. In both cases, I believe the reason for the relative failure is not that the sound-meaning is weaker, but rather that it is much stronger than in the case of most words. In both cases, I think that Phonosemantic Association is weak, because the referent is unclear, but Iconism proper is exerting an unusually powerful effect. One of these

classes is the function words, especially the prepositions. These tend to have a very broad meaning, which I believe can be shown to be very strongly rooted in the sound-meaning. That discussion requires the reader accept so many premises that I am still debating here, however, that I've not brought up the function words in this dissertation. The function words, like the Concrete Nouns also in general have no perfect synonyms, despite the fact that the referent in all but the most basic sense in these words is not at all clear. (What does the 'up' in 'look up a word' and 'walk up to' and 'stop up' *refer to*?) They therefore don't easily fall into the phonesthemes, not because sound-meaning is weak, but because the word is so unique and bears such a huge functional load in the language. It was mentioned that basic words in a language often form the focus around which other words cluster by Phonosemantic Association. This is in general not the case of the *most* basic words in the language -- the function words. Phonosemantic Association is a process whereby *referents* cluster toward a sound. Probably since these words have unclear *referents*, they do not work well as focal points for Phonosemantic Association.

The other class of words which resist the phonesthemes because Iconism is so strong and reference is non-concrete is slang. New slang words tend to be invented more readily than other types of words, and their effect is so 'touchy-feely', that we avail ourselves of all the sounds in a language in order to produce them. Slang words typically fall in a limited set of Natural Classes, such as insulting words for people (dweeb, geek, nerd, jerk, twit, etc.) and words for something very appealing (cool, snazzy, sharp, groovy, (g)narly?, etc.).

7. p. 76 Just briefly by way of example, clumsiness is expressed in word initial English phonemes as follows:

/b/ (forceful -- boorish, brutish, buffalo, bull in a china shop,...)
 /d/ (stupid -- dumb, dunce, dodo, dippy, daft,...)
 /g/ (grotesque -- gross, gaudy, ghoulish, garish, garbage, gunk, goo)
 /p/ -- no examples
 /tr/ (one verb -- trip up)
 /kl/ (dysfunctional -- clod, clunker, clumsy, klutz)
 /kr/, /kl/, /kw/ (socially inept -- crass, coarse, crazy, clown, queer)
 /v/, /D/, /Z/ -- no examples
 /z/ -- (crazy -- zoned, zoo)
 /fl/ -- (failures and flaws -- fall, flag, flinch, flop, foul)
 /s/ -- (dirty -- smirch, smudge, scuff, soil, spot, slop, slobber, slurp, scraggy, scruffy, slovenly)
 /sl/ -- (slouch -- slip, slack, slump)
 /S/ -- no examples
 /h/ -- (hobble -- halt, hock, hop, hulk)
 /J/ -- no examples
 /C-k/ -- (sudden dysfunction in an ongoing process -- check, choke, chink, chicken out)
 /m/ (destructive -- mess, miss, muck, mince, mush)
 /n/ (brainless -- nut, ninny, knucklehead)
 /l/ (loss, looseness, lame -- lack, lapse, leak, lose, lurch, limbo, limp, lumber)
 /r/ (raw, raucus -- rough, rank, runt, rude, rabble, rowdy), (error -- wrong)
 /w/ (weird, unstable -- wacky, whoops, wobble, weave, waddle)
 /j/ (naive -- young, yellow)

8. p. 103 We might ask ourselves this: What is the simplest account we can offer of this little subset of data -- the monosyllabic verbs in English which concern motion on foot?

In looking at a semantic class of this type one observes patterns in the relationship between the pronunciation and meaning of words. But one does not in general find a straightforward relationship between phonemes and Natural Classes. For example, it's not the case that all running verbs begin with /r/ or that all verbs implying forward motion end in /t/. Instead, there seems to be some kind of dynamic interplay between the consonants that results in the patterning one observes. For example, dynamic motion occurs in one of several contexts... /p/[+liquid] or verbs which don't contain /p/. It's almost as if the default for /p/ were to keep things in place, and that only the dynamism of the most mobile of consonants -- the liquids -- has the power to dislodge the /p/. This

description is, of course, more poetic than scientific, and if there is any truth in it, it would have to be translated into a scientific metaphor and quantified in physical terms.

Without going into it in detail at this point, I suggest one method that could be employed for quantifying observations of this sort. Numerical weights could be assigned to various consonants for stasis vs. dynamism, verticality vs. horizontality, and so forth. These weightings would also be dependent on the position at which the consonant finds itself within the word. The dynamics between /b/ and /l/ is different depending on whether the /b/ precedes the /l/ or the /l/ precedes the /b/, for example. Furthermore, each consonant could be assigned a direction in which its energy is applied. This might be represented as a vector. The stops point back into the mouth, whereas /r/ points out of the mouth. The phoneme /l/ acts like a body of water whose direction sloshes around depending on the environment that it finds itself in. When /l/ is preceded by /g/, it frequently gets 'glued' from behind. This could be described using this notation as a vector assigned to /g/ pointing back into the mouth pulling on the /l/, which is articulated out in front of it. Similarly, when /l/ is preceded by /b/, it is physically and often semantically blocked or blinded from in front. The force of the /l/ on the /b/ is generally sufficient to produce a 'bulge', but the more directed energy of the /r/ is required to 'break' the barrier of the /b/. Hence many verbs of breakage and branching contain /b/ and /r/. These descriptions are, of course, merely descriptions of the physics of articulation. If the Phonosemantic Hypothesis is correct and if there is an Iconic dimension in phoneme semantics, then Iconism will insure that word semantics is reflected in part in the physics of the mouth during articulation.

If we limit ourselves just to this set of data and try to describe it in the terms just outlined, we might say that /p/ seems to default to stasis, but that liquids have the power to override this stasis and impart dynamism to the word. Whether or not there is any universality to this description remains open to debate. In fact, there is evidence in Appendix V to suggest that this single-pointed stasis in /p/ holds not only of walking verbs. The phoneme /p/ in general strongly emphasizes the 'point'. There are a preponderance of words containing /p/ which refer to small pea-shaped objects, as well as a great many objects like spikes and pins which have points. When the /p/ is followed by an /l/, however, the point tends to spread out into a 'plane' (plate, plateau, platter, plank, plot, etc.). Similarly, verbs of 'pulling' from a specific place usually contain an /l/: peel, plow, plumb, plunge, etc. and similar verbs involving separation tend to contain an /r/: pare, parse, part, prune, pry, etc.

This type of analysis will not be worked out in this dissertation at any length. Since the entire foundation on such a descriptive apparatus would be based is still very much in debate, only the barest outlines of it are proposed.

9. (p157) I calculate the chances that there will be no pairs as $n!/((n-p)!(n**p))$ where n is 50,000 and p is (349-24)/4=81. The first formula -- $n!/((n-p)!(n**p))$ -- can be thought of this way. If there is 1 word, then there is a probability of 1 or a 100% chance that there will be no matches. If there are two words, there is a probability of:

$$50,000/50,000 * 49,999/50,000$$

that there will be no matches. If there are 3 responses, the probability of no matches is decreased to:

$$1 * 49,999/50,000 * 49,998/50,000$$

And so on for as many responses as one gets -- hence, $n!/((n-p)!(n**p))$. This can be simplified as $(n-0)/n * (n-1)/n * (n-2)/n * ... * (n-(p-1))/n$

which is what I actually use to calculate.

Then I subtract this result from 1 to get the probability that there **will** be a pair (as opposed to the probability of no pairs), and then take the reciprocal to get the answer in the form '1 chance in X'.

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