A Study of Natural Language Phonetic Symbolism

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A STUDY OF NATURAL LANGUAGE PHONETIC SYMBOLISM

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This thesis submitted by David B. Tarr in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

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This thesis meets the standards for appearance and conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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ABSTRACT

The present investigation concerns itself with the phenomenon
of natural language phonetic symbolism. Proponents of phonetic sym-
bolism, or the hypothesis of phonetic universals, as it is sometimes
called, claim that human speech sounds have inherent meaning apart
from their learned association with referents in the world. Since
phonetic symbolism had been used to explain both success in guessing
the meanings of foreign words and also a consistent tendency to
attribute particular meanings to selected nonlinguistic verbaliza-
tions, it was hypothesized that phonetic symbols were part of an
underlying stratum of semantic invariance. Further, it was assumed
that such phonetic/semantic symbols should demonstrate their innate
and a priori character by being most readily accessible through men-
tal processes that are global, affective and pre-logical. Conse-
quently, it was decided to employ two research strategies which had
yielded promising results in an earlier study which examined a
related archaic linguistic phenomenon (Adair 1975).

The first of these strategies makes use of the Jungian typo-
logical notion that persons characterized as high in intuition tend
to gather data from inner mental processes for the conduct of their
daily lives. Because of this tendency toward inner consultation, it
was predicted that high intuiting persons should excel in decoding
phonetic/semantic units that can be found as archaic, pre-logical
deposits in all languages. Lesser performance was expected from

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persons who are nonintuitors, since such individuals are assumed to use data from immediate sensory experience rather than from inner rumination. Subjects were selected to represent both extremes of this Jungian sensation--intuition dimension on the basis of their performance on the Myers-Briggs Type Indicator (1962).

The other research strategy for discriminating logical from prelogical, intuitive processing involved making use of the fact that monaurally presented stimuli are differentially routed to the cerebral hemispheres. The opposite-side hemisphere processes the majority of the sound input to an ear. Since the right hemisphere has come to be associated with intuitive, aesthetic and global cognition, it was thought that stimulus material (i.e., foreign words) presented to this hemisphere via the opposite ear would elicit more archaic responses, which would have relatively higher congruence with the a priori semantic structure in foreign language words. It was also hypothesized that foreign words presented monaurally to the left hemisphere would elicit responses relatively less congruent with phonetic/semantic a prioris, since this hemisphere specializes in linear, logical and analytic processing. Monaural presentation of foreign word stimuli was accomplished by blocking one earphone of a headset with acoustically dense material.

Response choices were presented to subjects in booklets which contained four options per stimulus. These options were arranged such that two orthogonal polar opposite pairs would be presented in each option set. Randomization of order effects for response choices was achieved through application of an incomplete latin square method.

Although the data failed to support the hypotheses outlined above, a trend was noted for the intuition--sensation dimension. These results are discussed with respect to sex differences in the degree of hemisphere specialization and ineffectiveness of the dependent variable measure.

INTRODUCTION

Philosophical Precursors

The problem of meaning and the related problem of knowing have engendered lively debate in Western Civilization over the centuries. When modern linguists and psycholinguists investigate these problems within the domains of language and speech, they often cite the _Cratylus_ of Plato as the most appropriate document to illustrate the long-standing nature of the debate and the high degree of correspondence between twentieth century A.D. and fourth century B.C. articulations of the main issues.

The dialogue opens with Hermogenes offering Socrates an invitation to join in the discussion he and Cratylus are having over the correctness or uniqueness of names. Hermogenes stated that Cratylus believes there to be an inherent correctness in names that comes from the particular nature of the thing named. Hermogenes espouses the radically contrasting view that names are completely arbitrary and interchangeable, such that a new name is no less correct than the one it replaces ("just as we change the names of our servants"). Socrates is unwilling to adopt either extreme position. On one hand, the arbitrary view of Hermogenes fails to appreciate the importance of reflecting the invariance of a thing through an invariance of that which is used to represent the thing. On the other hand, Cratylus' impossibly high standard for the assignment of names causes him to confuse

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identity with representation. Socrates points this out to Cratylus when
he argues that the goal of the lawgiver is analogous to that of the por-
trait painter; the latter creates an image for the sense of sight, and
the former, through namegiving, makes an image for the sense of hearing.
In both instances, the arbitrariness of Hermogenes is absent because of
the presumed expertise of the image-making artisans. What is necessary
for Cratylus to grant, however, is that the artisan can be of lesser
skill at imitating the true nature of a thing without entirely losing
the representational quality of his production (Fowler 1926).

In another dialogue, The Gorgias, Plato showed how the skill of
the artisan is a necessary but yet insufficient condition for the
achievement of human understanding. Gorgias, a sophist rhetorician,
makes the statement that rhetoric is the queen of all the arts because
it gives the practitioner the power to enforce his will on society.
In effect, the clever rhetorician has the ability to sway an audience
of other laymen against the opinions of an expert. Socrates takes a
particularly low view of rhetoric, calling it no art at all but rather
a parasitic counterfeit of art. Specifically, it is the counterfeit
of the art of the judge, who corrects moral disorder and whose stan-
dard is the good. By taking the standard of the pleasant instead of
the good, the rhetorician can only be a panderer to the body politic
and never its helper (Lamb 1925).

In some respects Gorgias' crass opportunism and utilitarianism
are consequences of his disenchantment with metaphysics. In his essay,
On Nature and the Non-Existent, he argued that reality is inaccessible
and unknowable; or, if it is knowable, it is inexpressible and incom-
municable. He rejected the dialectician's method, citing the poor

reliability of the senses, which are at best restricted to their own spheres. To learn through dialectic is to expect speech to transcend itself and partake in another realm (Freeman 1953).

Clearly, Plato believed that dialectical discourse is the best available means by which to achieve greater precision in meaning and better understanding of the good. He shared with the Stoics a belief in the kinship between word and meaning. According to Cassirer, the Platonic notion is that pure meaning, while not contained in a word, is constantly suggested by the word. But because the boundaries of words are fluid and flexible, the fixed signification of the cognitive concept can only be achieved through dialectical opposition and struggle (Cassirer 1953, p. 75).

Plato attempted a more explicit description of the acquisition of meaning through the use of naming in his Seventh Epistle. In it he distinguished four stages of knowledge: (1) uttering of the name of an idea or concept, (2) explanation or definition of the concept, (3) creation of an image or model and (4) scientific cognition. Plato's contention was that language is the first beginning of knowledge but that it can be nothing more than this because its content is as ephemeral as sensory perception. Evidence for the inconstancy of words is drawn from the great variety in existing human languages and also from the evidence for change of a word's meaning within a given language. Plato seemed to be saying that because the phonetic form of the word is subject to the vagaries of being in the human situation it is destined to capture less of the true content of the idea (eidos) than does the image; schematically, the image can be regarded as holding an intermediate position between the word and the true concept. Cassirer noted that Platonic

idealism considers the things of common experience (i.e., sensuous, con-
crete objects) to be the images of the conceptual system, and it is the
concreteness of the images that contributes in a mediated fashion toward
an understanding of the ideal object (Cassirer 1953, p. 125). Given the
greater transience of words, it is interesting that Plato did want to
insist that an almost ethereal connection between word and idea exists.
It is this spiritual relationship, this core of meaning, that is unearthed
in the process of the dialectic. And it is through this agency that the
idealist philosopher endeavors to transcend time-binding existence.

In the modern era, philosophical idealism's commitment to the
exploration of essential, transcendent reality was reaffirmed by
Immanuel Kant. Writing at the end of the eighteenth century, a period
of scientific and intellectual upheaval, Kant felt pressed to demon-
strate the noninstantiate, a priori quality of human cognition. In
answer to skeptics who were abandoning philosophy in favor of solu-
tions from natural science, he asserted that it is fallacious to assume
that human knowledge is representational of what is real in any absolute
sense. Kant's corrective to this fallacy required a frank admission
that all known reality is only that which conforms to human ways of
knowing. By way of exaggerating this conviction, he wrote "understand-
ing makes nature." The making of nature is accomplished through the
ordered assimilation of contents from experience. And order is imposed
by a priori modes of human conceptualizing which channel the external
world into awareness. These a priori forms are Kant's chief postulates
for explaining how anything is intelligible or available to conscious-
ness; in effect, these forms are thought to be constitutive of our
whole experience. Kant used the term appearances to designate all

external contents of nature which are potential units of human perception. Kantian theory holds that appearances are susceptible to awareness simply because of the order and form that derive from the human mind (Muller 1922). Although he wished to lend credence to the inherent orderliness of human cognition, Kant also sought a revitalization of Continental philosophy which would take seriously humanity's sensuous experience of the world. He felt that empiricist philosophy's surrender to scientism and skepticism was premature, since it had not even attempted an investigation of a priori human knowledge. By contrast, Continental philosophy was to be faulted for its total emphasis on mental representations devoid of sensuous content. Kant described general logic as that traditional, formal inquiry that treats relations between cognitions without concern for the contents of experience. He proposed to supplement general logic with a transcendent logic, i.e., a logic which requires the application of a priori forms directly to the material content of experience (Fuller 1955).

The <u>transcendental schema</u> was Kant's construct for the medium where a priori forms of understanding are joined to sensuous intuitions and then assimilated as experience. As the meeting place of sensuous content and formal category, the transcendental schema represent Kant's attempt to answer the empiricists with respect to the question of experimental method. It becomes possible to use the concrete schema as the touchstone against which to make comparisons of natural phenomena. The experimental application of a schema can lead to disconfirmation and an assertion of separateness from the comparison schema, or, alternatively, it can lead to incorporation of some new elements from the environment into the existing schema. The latter approach

engenders greater complexity and a higher level of articulation within the comparison schema. In offering this method as an alternative to radical empiricism, Kant operationalized his belief that experience is a compound of material sense perceptions and formal scientific categories. The human being is understood to experience actively and to form whole percepts out of raw, sensuous matter through application of innate formal templates. Kant's credo then is that one's natural inclination is to perceive wholes rather than associated fragments which have no intrinsic a priori significance.

The whole-making function of Kant's schema was what Cassirer emphasized in his description of the phenomenon of symbol formation. Cassirer adopted Kant's notion of a priori form and invested it with an intrinsic purposiveness which he saw as providing the impetus for schema structuring and restructuring. Cassirer saw science as undergoing a continual internal transformation which frequently requires the subsumption of inadequate laws into higher order modes of constraint. Using the example of biology, Cassirer stated that laws and facts which are misleadingly labeled absolute result from a false abstraction whereby elements are artifically divided from the organic whole of which they are functioning parts. In a more macroscopic orientation, each element of a system achieves objective reality in so far as one can grasp how it weaves itself into a whole. Moreover, that whole takes on meaning because it is a functioning, formal entity acting upon the environment in a unique fashion for the benefit of the total organism. Clearly, Cassirer saw biology as providing the metaphor par excellence of Kant's postulate of the constitutive property of forms (Cassirer 1953, p. 29). Addressing himself to expressions

of human culture, Cassirer saw the same sort of holistic order as exists in biological forms. Here again, a set of functional principles were seen as providing the constraints which give rise to organic wholes or types; these manifest themselves in a constant way in time and space. It should be emphasized that Cassirer regarded these types as functional rather than structural invariants; this suggests that they recur for the purpose of systematizing and explaining reality to humans. To this end, cultural forms and types are embodied in myth, religion, art and language.

In considering the primacy of cognition versus language, Cassirer came to the conclusion that cognition could not lay exclusive claim to primacy. In other words, Cassirer conceived language as capable of influencing or altering cognition. In his view, this becomes possible when the sensory impression of a sound becomes increasingly remote from its symbol, causing greater ambiguity but resulting in an enrichment of meaning in language. As Cassirer expressed it, "the more the sound resembles what it expresses, the more it continues to 'be' the other and the less it can signify that other" (Cassirer 1953, p. 189).

Cassirer charted a three-stage progression in the maturation of linguistic symbolization. The lowest level is the Mimetic stage, to which onomatopoeia and other forms of phonetic sign language belong. Here the speaker clings to the concrete sensory phenomenon and attempts to copy the sound impression as faithfully as possible. The second stage, the Analogical, suggests no direct material similarity between the meaning and the sound by which it is represented. Rather, a technical, formal analogy becomes established and is communicated by the context of the sound. Elementary examples of this stage might include languages that make use of musical tones to differentiate word meanings.

A more complex analogical example would be that of reduplication, where the repetition of a sound can signal a rather subtle change in the nuance of a word. In so far as reduplication does not require alteration of the sound, per se, for the communication of a new meaning, it represents a transitional phase to true Symbolic representation, the highest stage of linguistic development. It is in this final stage that abstract symbolization displaces designation and that mimetic and alalogic formulae cease to be helpful. Also, it is presumably at this stage that language becomes a self-generating symbolic entity because of the creative tension that results from the greater distance between sound and sense (Cassirer 1953, p. 196).

Cassirer regarded linguistic evolution as a progression away from particularism and toward increasing flexibility and modifiability. Along with this there is a greater tendency to desubjectivize reality and to see things as outside one's self. This occurs when the purely expressive, mimetic function of language has been supplanted by more analogical and relational functions. Illustrations of spatial particularism are drawn from Amerindian languages that have no general verb for _going_ but instead make use of a variety of terms which indicate _going_ _down_, _going_ _up_, etc. Languages exhibiting temporal particularity, such as Sotho or Shambala in Africa, do so by generating an enormous variety of tenses which serve more to distinguish the now from the not-now than to indicate temporality in the Western sense of past, present and future. Cassirer suggested that spatial and temporal particularity of a language community bespeaks an immediacy and concreteness of cognition that has close kinship to concrete, mimetic representation.

Desubjectivization is accomplished linguistically through the establishment of otherness or objectness in the reference environment. Cassirer pointed to the use of the definite article as a relatively recent innovation whose purpose is to designate the object as <u>outside</u> and spatially distinct from the <u>I</u> and <u>here</u>. Several African languages which have never evolved the use of the abstract article for distancing from the self further demonstrate a lack of desubjectivization through a tendency to adopt the human body as a model for relational or prepositional expression. Examples of literal translations of these prepositional concepts include: <u>back</u> or <u>rear end</u> for <u>behind</u>, <u>eye</u> for <u>in front of</u>, <u>belly</u> for <u>in</u>. Cassirer cited the development of the concept of number as yet another correlate of decentering from the subject. True numbering permits greater objectivization in the counting and assignment of things to classes. Counting and class usage is possible only when things lose enough uniqueness for the individual that he feels it appropriate to refer to them in a non-nominal, nonparticularistic fashion. Even greater objectivization can be realized when the person is released from seeing his own bodily digits as necessary references for enumeration. In African Sotho, body-bound counting is exemplified in the word for <u>five</u> which means literally <u>complete the hand</u> or the word for <u>six</u> which means <u>jump</u>, i.e., jump to the other hand. The numeric index of desubjectivization suggests that learning to go outside one's self is complete only when the physical self is acknowledged to be too finite an entity for numbering all but the most immediate things in the environment (Cassirer 1953, pp. 207-247). Perhaps internalized, abstract counting is resorted to as an accommodation to a life style that has long since ceased being one of scarcity

(e.g., hunter/gatherer subsistence) and has had to reckon with problems
of storage, accounting and even trade.

In general, then desubjectivization as evidenced in a self-
transcendent approach to space, time and number is highly desirable
because of its correlation with efficient mastery of the world. In
language, the higher level of abstraction that accures to looking out-
side one's self greatly increases the permissible permutations and com-
binations of expressible concepts. In this sense departicularized and
well differentiated linguistic equipment becomes the vehicle and, occa-
sionally, the motivation for greater concept articulation and delinea-
tion. To the extent that there is a felt need to describe a phenomenon
with greater precision and objectivity there is higher likelihood of
witnessing what Cassirer referred to as an interpenetration of forms,
where the cultural or linguistic forms achieve parity with the forms
of cognition and are capable of exerting influence over them (Cassirer
1953, p. 42). Conversely, it would be expected that such mutuality of
influence would be least manifest in more primitive cultures, in which
linguistic forms are greatly subordinated to the forms of subjective
consciousness and cognition.

Highly desubjectivized and differentiated linguistic cultures
experience a paradox in their attempts to gain verbal control over
their environment through the use of greater cognitive abstraction.
Since this abstraction brings with it the freedom to combine symbolic
forms in novel and highly complex ways, the essential, archaic meaning
of a word or idea becomes concealed under layers of more recently
acquired symbols. Cassirer described this phenomenon by reviving
Kant's distinction between two types of intellect. The <u>intellectus</u>

ectypus is that intellect which is totally dependent on images but is flexible and articulate in expression. The intellectus archetypus, by contrast, is the intuitive intelligence which is elemental and in direct contact with the essential idea that emanates from within the subject. It is this intuitive intelligence that remains unencumbered by extraneous images and symbols and is able to maintain its purity of content and transparency. Ironically, it is philosophy's and science's task to make use of intellectus ectypus, the discursive and richly symbolic form of expression, to work through to the elemental truths of human knowledge. So it is that Western philosophy frequently labors at cross purposes with itself by trying to illuminate an elemental truth (eidos) through use of the very complex symbolic language that tends to conceal that truth (Cassirer 1953, p. 113).

The intractable problem of refining elemental truth from enshrouding, enigmatic symbolism was addressed by Carl Jung in The Archetypes and the Collective Unconscious. Discussing what he saw as the growing impoverishment of the symbols of Christian culture, he counseled in favor of a forthright avowal of spiritual poverty or symbol-lessness rather than an endeavor to regain potency by adopting symbols belonging to alien cultures. This was not to deny the reality of the eidos or archetypes from which the Christian symbols had derived, however. For Jung, the archetypes are empirically verifiable through their appearance in primitive and modern societies in widely scattered locations. The notions of a priori form and invariance are reasserted in Jung's belief that interpretation itself is a resultant of the use of primitive and archetypal linguistic matrices. Presumably,

superfluous interpretive symbols are sloughed off when they prove to be
incompatible with the invariant, enduring core archetype (Jung 1971,
p. 32).

Theory and Research in Twentieth Century Psychology

The notion that there exist innate, invariant core realities in
human perception is readily recognized as a tenet of the German school
of Gestalt Psychology. The doctrine of isomorphism, which was enunciated
by Wertheimer and Kohler, states that there is a point for point corre-
spondence between the spatial pattern underlying perception and the
spatial pattern underlying cortical excitation (Boring 1950). This
correspondence was specified to be topological rather than topographi-
cal, such that the only invariance that is presumed to survive through
the neural pathway is that of order. Apparently, Wertheimer felt that
an isomorphic principle stipulated as to process rather than structural
identity would be less prone to draw charges of simplistic reductionism.
Other Gestalt theorists seem to have taken a much more concrete view of
isomorphism and regarded the cortical representation of an event to be
a truer projection of perceptual experience. Still other Gestalters
theorized that isomorphism provided for an intercommunication among the
senses along a variety of descriptive dimensions, e.g., brightness and
volume. Hornbostel, for example, expounded a doctrine of the "unity of
the senses," for which he claimed empirical support in the matching of
brightness perception across the senses of smell, audition and vision.
Taking sound symbolism to be a special case of unity within the senses,
Hornbostel posited six categories (intensity and rhythm, duration,
pitch movement, pitch of voice, vowel brightness, and characteristics

of consonants) as relevant determinants for the creation of meaningful words. Hornbostel pointed to primitive African languages to justify his six category theory of linguistic evolution. That most of these languages were melodic or tonal in nature and made use of devices like tongue clicks was consistent with Hornbostel's radical position on isomorphic perception (Fox 1935).

A pioneering study on phonetic symbolism using meaningless sound complexes was done by Usnadze in 1924. He drew six nonsense figures and invited his subjects to select most appropriate matches for these from among 42 sound complexes. His results are somewhat unclear because his report is largely anecdotal and nonstatistical. He did report, however, that only 29 of the available 42 sounds were chosen as matches and that subject agreements as to matches ranged from 25 to 45 per cent among the six figures. Usnadze divided the kinds of responses given by his subjects into four classes: associative assimilation, where the sound complex is associated with a familiar word which suggests the object; configurational relationship, in which the subject experiences a congruence between the perceived form and the sound complex; affective relationship, where the subject experiences an agreement between the feeling aroused by the figure and the word chosen for its name; and relationship in mental substructure, where the subject reports a "general impression" as the guiding principle linking name and figure. The first of these, the associative responses, showed significantly less decay when tested on a recognition task. By contrast, the nonassociative responses seemed to show less decay on something more akin to a free recall task. Usnadze took these results to mean that the associative processes of memory are

largely superficial and substitutive in character and that this accounted

for more switching of sound assignments when the associative process was

invoked (Usnadze 1924).

Wolfgang Kohler gave his version of the principle of linguistic

isomorphism in a discussion of the correlation between sensory events

and verbal expression. He argued that the metaphoric and poetic use

of adjectives in contexts different from their ordinary denotative

usage is possible because there is a great deal more continuity of

phenomenal experience across sensory domains than psychology had here-

tofore admitted. Consequently, one is making an accurate subjective

report to describe a wine as "smooth," an opaque visual image as

"fuzzy," or an extremely negative emotion as "bitter." Kohler fur-

ther examined his hypothesis of sensory continuity in an anecdotally

reported experiment where he presented subjects two ambiguous figures,

one angular and the other rounded. He informed the subjects that one

of the figures should be assigned the name baluma and the other takete.

The results of this exercise showed a substantial majority of the sub-

jects choosing baluma for the rounded figure and takete for the angular

one. Kohler wanted to claim that a process analogous to poetic expres-

sion had been employed in the pairing of figure to nonsense word.

(Both words were Kohler's own creations.) But, whereas the appropri-

ateness of the figurative use of the standard adjective is generally

quite apparent, e.g., a smooth wine, sweet joy, etc.; explanations for

the consistent preference of a nonsense word are much more elusive.

It seems very likely that Kohler meant for metaphor to be classed as

a subset of synesthetic-like experiences that derive from an internal

unity of the senses. Consequently, baluma (or maluma as it appeared

in subsequent replications, in order to avoid association with balloon
in English) is so named because the correlation between visual and
physiognomic stimuli makes the name a good fit for a rounded figure
in some subjective sense (Kohler 1927). Several years later Davis
(1961) conducted a cross-cultural investigation of Kohler's nonsense
words and figures. He discovered that the word/figure matching behav-
ior of Tanganyikan school children was comparable to that of their
English counterparts.

Edward Sapir is given credit for initiating American research
into the metaphoric and semantic properties of nonlinguistic words and
also for coining the term phonetic symbolism to refer to the phenomenon
of intrinsic meaning in speech sound. His study was considerably more
systematic than Kohler's in that he varied only one vowel of the stim-
ulus items he presented to his subjects. Using an N of 500, he
instructed his subjects to assign the meaning of a common noun (e.g.,
table) to both members of a pair of CVC trigrams. In every case, pair
members differed from one another in vowel only, and the subject's
task was to determine whether a given trigram was a large or small
representative of the class of objects to which it had been assigned.
The results revealed a marked consistency to associate largeness with
the vowel sound a and smallness with i; in terms of Sapir's task, a
mal was a large table, and a mil was a small one. Different consonants
were used in other parts of the exercise, and the same vocalic size
assignment for a and i was obtained. Sapir noted that results were
much more equivocal in vocalic size assignment for certain vowel
pairs (e.g., e and i, o and u) than for others (e.g., i and o, e and
a), but he made no rigorous scalar prediction of the size assignment

based on his findings. Neither did he feel that his data justified any serious hypothesis regarding the causation of phonetic symbolism, although he did speculate as to the influence of acoustic and kinesthetic factors (Sapir 1929).

In a study using over 600 subjects, Newman did a thorough replication of Sapir's work and attempted to achieve greater precision in investigating the order of vowel magnitude symbolism through use of scaling techniques that had recently become available. Adopting a pair comparison method developed by Thurstone, Newman determined relative magnitude scale values for eight vowel sounds. He noted that magnitude symbolism seems to follow a mechanical sequence reflecting the receding position of the tongue from i (small) to o (large). Correlated with these kinesthetic stimuli are acoustic and visual stimuli which relate to vocalic resonance and the increase in the size of the oral cavity. Newman compared these results with those obtained when subjects were instructed to rate vocalic sounds according to a brightness/darkness dimension. He concluded that kinesthetic and vowel length stimuli are significantly less relevant determinants of brightness symbolism than they are in the case of magnitude symbolism (Newman 1933).

Bentley and Varon challenged the positive findings reported by Sapir and Newman in a study which featured free association instead of forced choice response. The investigation was intensive in that it involved the use of three highly trained observers rather than a large number of naive subjects. In their first experiment, Bentley and Varon reported that none of the observer responses to their 10 CVC stimuli could be construed as suggestive of magnitude symbolism. They implied that evidences of magnitude symbolism seen by Sapir and Newman were

artifacts of the forced choice experimental situation and, hence, were
not powerful enough to occur spontaneously. Two other experiments
reported by Bentley and Varon required the observer to answer whether
a given CVC stimulus had any relation to a particular category (e.g.,
size, angularity, endurance, etc.) that was announced at the time of
stimulus presentation. This procedure was meant to approximate Sapir's
but was thought to be an improvement in that participants were permitted
to respond that no relationship existed between a category and a CVC.
Under these conditions, roughly half of the observations yielded only
a "slight relationship" response for all the categories paired with
CVC's. Bentley and Varon offered this as additional disconfirmation
of the phonetic symbolism phenomenon (Bentley & Varon 1933).

Two years after Bentley and Varon's study Fox conducted a series
of experiments to check the anecdotal findings reported by Usnadze,
Kohler and others. His improvements lay in clear specification of
stimulus materials (figures and nonsense words) and in general stan-
dardization of experimental procedure. With the exception of one of
his ten experiments, however, he relied on the use of a small number of
observers for the collection of his data. His results were consistent
with previous findings reporting a high level of agreement among
observers in their matches of figures and sounds. But, whereas
Usnadze implied a high degree of certainty among observers in their
assignment of reasons for selection of figure/word matches, Fox found
no such certainty. Neither did he note the difference that Usnadze
reported with respect to recall versus recognition memory of associa-
tive and intrinsic matches. Whereas superiority of recognition memory
for items matched on the basis of intrinsic (nonassociative) cues was

cited by Usnadze as evidence for the deep cognitive structure of speech
sounds, no confirmation for this hypothesis is offered by Fox's data
(Fox 1935).

Irwin and Newland's contribution to this area of research was
a developmental investigation of the Usnadze matching task. They used
306 subjects ranging in age from 4 to 18 years and in grade level from
kindergarten to 12th grade. Irwin and Newland constructed four pairs
of nonsense figures and an equal number of nonlinguistic words to be
assigned to these figures. These stimulus items were presented in a
pilot study to adult subjects in order to determine empirically a stan-
dard (i.e., high frequency) match for each set of figures and words.
The results showed that the grade school subjects performed signifi-
cantly above chance in choosing standard word/figure matches. When
percentage of standard responses was graphed against either grade
level or age, a negatively accelerating function was obtained which
reached maximum at about age 12 or 7th grade. When their subjects
began to generate spontaneous rationales for their selections, Irwin
and Newland decided to collect categorical data relating to self-
reported reasons for word/figure matches. This enabled them to com-
pare their results with those of Fox and, to a lesser extent, Usnadze.
Interestingly, the percentage of responses falling in the three cate-
gories (association, attribution or general impression) differed radi-
cally from those given in the Fox study. Whereas Fox reported roughly
a third of his observations falling in the associative classification,
Irwin and Newland evaluated only five per cent of their selection rea-
sons as associative. The remainder of the observations in the Fox
study were divided evenly between those who could give no reason for

their choice and those who cited an intuitive feeling as to the intrinsic fitness of the name. By contrast, Irwin and Newland reported 95% of their subjects' choices being guided by intrinsic criteria; since subjects in this study generated their reasons spontaneously, there was no negative impression group to compare with the Fox study. Irwin and Newland indicated that associative responses begin to appear only after age nine for their subjects. Configurational or Gestalt theorists would find this consistent with their notions of innate patterning and correspondences among stimuli of various kinds (Irwin & Newland 1940).

Tsuru (1934) and Tsuru and Fries (1933) initiated a new technique for investigating phonetic symbolism by implementing words from a natural foreign language as stimulus items. It was felt that, while the older nonsense word methods developed by Gestalt psychologists had the presumed advantage of being acultural and therefore free of bias from one's own language, serious weaknesses lay in the very artificiality of the nonsense word situation. Today workers in the area of verbal learning realize that many of the assumptions underlying the use of CVC trigrams are questionable, e.g., that a random trigram is entirely free of meaning. During the infancy of research into phonetic universals there appears to have been less awareness of this problem of control, and more attention was addressed to the question of the relevance of this kind of research for making inferences about the origin and evolution of human language. The theoretical approach of Tsuru and others holds that phonetic symbolism might be revealed when subjects guess the meanings of words from languages which are historically unrelated

to their own spoken language. In such research it is, of course, vital that subjects not have any familiarity with the test language, or preferably, that they be monolingual. Tsuru's stimulus items were taken from Japanese and were rendered into Romanized spelling for visual presentation. His subjects, none of whom had any familiarity with Japanese, read the transliterated stimulus words and hear them pronounced simultaneously. Each stimulus item consisted of a Japanese antonym pair (e.g., hot--cold), and the response options were the English translations of these antonyms. Tsuru found that subjects could perform significantly above chance level in selecting antonym matches (Tsuru 1933).

In reviewing Tsuru's study, Brown raised a criticism regarding the possible introduction of experimenter bias, in that Tsuru, himself, took responsibility for choosing the Japanese and English antonyms. In cases where two or more different Japanese antonym pairs might have been acceptable, Brown suggested the possibility of an inadvertent choice of stimulus items based on sound similarity as well as translation equivalence (Brown 1958). Allport replicated the Tsuru study and made a methodological modification to rectify the potential bias in the original design. He had a native speaker of Hungarian translate Tsuru's list of English words into that language, which is not part of the Indo-European group to which English belongs. With experimenter bias thus removed from the choice of stimulus items, Allport still found subjects able to match antonyms beyond chance level (Allport 1935). Yet another replication of the Tsuru study was done by Rich for her undergraduate honors project. Her experiment made use of Allport's improvement in method by having native speakers do blind translations of her stimulus

words into Polish and Japanese. Her experimental results were significant at the .005 level for both languages (Rich 1953).

Apparently the common institutional affiliation shared by Tsuru, Allport, Rich and Brown bore at least partial responsibility for a moderate stimulation of interest in natural language phonetic symbolism during the mid 1950's and afterward. Before Brown, Black and Horowitz published their results in 1955, three of the four existing natural language studies were done as unpublished inhouse projects at Harvard. Brown et al. were sufficiently intrigued by this research that they designed and executed a replication of Tsuru using the improvements introduced by Allport and offering some refinements of their own. They employed native speakers to do blind translations of an English antonym list into the Czech, Chinese and Hindi languages. Subjects were exposed to both aural and visual (transliteration) presentations of the stimulus words. The investigators again noted overall significance in favor of the phonetic symbolism phenomenon (p <.01). They then did tests of significance on each foreign word pair individually and discovered that word pairs seemed to differ in their phonetic symbolism potential but that roughly half of the pairs reach the .01 level of significance for correct symbolism judgment. About one quarter of the judgments were significantly incorrect at that level. In another part of their study, Brown et al. attempted to control for the possibility that the expressive quality of speakers' voices and not phonetic symbolism influenced subjects' choices. This was done by limiting stimulus presentation to the visual mode and comparing these results with visual plus auditory presentation. Here the number of items for which there were significantly correct judgments dropped off markedly, but none of the items registered

significantly incorrect judgment. It should be mentioned that Brown
et al. used a great deal fewer subjects in their visual-only study
(N=16 vs. N=86 in visual plus aural), and this made a rather heavy
impact on the rigor required for significance.

Noting the generally successful performance of subjects guess-
ing word meanings in Indo-European and non-Indo-European languages,
these authors concluded that the phonetic universals hypothesis was
given moderate support. They stated, however, that associationist
processes taking place in the primordial past could equally well
account for the phenomenon dubbed phonetic symbolism (Brown et al.
1955).

Maltzman, Morrisett and Brooks (1956) replicated Brown et al.
and obtained similar results for their test languages, Japanese and
Croatian (p <.0001). In the second part of their experiment these
investigators introduced an innovation requiring subjects to match
two sets of foreign words rather than an English word to a foreign
equivalent. Maltzman et al. believed the latter condition to be a
more stringent test of the phonetic symbolism hypothesis because the
intersensory connections or physiognomic speech mechanisms postulated
by phonetic universals theorists should operate even if a subject were
ignorant of both languages used. Since performance on this task did
not exceed chance level, Maltzman et al. concluded that phonetic sym-
bolism was disconfirmed.

In an extremely well controlled study, Brackbill and Little
(1957) looked at different language pairings (English-foreign vs.
foreign-foreign) and also at differences in mode of presentation of
stimulus words (auditory alone, visual alone and auditory and visual

together). They also tried to assure unbiased translation by using naive native speakers to provide alternate translations for the stimulus words. The task that Brackbill and Little designed for their subjects differed from the antonym pair comparisons used by Brown et al. and Maltzman et al. in that it required subjects to compare two words and to state whether the words meant the same or different things. The results of this study seem to place it at odds with those reported by both Brown et al. and Maltzman et al. First, the comparisons which reached significance were not nearly as dramatic as either of the earlier studies. Also, whereas Maltzman et al. noted nonsignificant findings for a foreign-foreign (Japanese-Croatian) antonym pairing condition, Brackbill and Little reported some of their most significant findings in the foreign-foreign conditions (Chinese-Japanese and Hebrew-Japanese).

In an effort to reconcile these disparate results, Brown and Nuttall (1959) did a synthetic study comparing the methodologies employed by Brown et al., Maltzman et al., and Brackbill and Little. They again found extremely high significance for the English-foreign antonymic pairs task (p <.0001), lowest but still significant probability for the foreign-foreign antonym task (p <.05), and an intermediate significance on the same/different judgment task for the English-foreign condition (p <.01). Their conclusion was that the phonetic symbolism effect was sensitive to the method of stimulus presentation. Citing Sapir's and Newman's studies, both of which noted the consistent and seemingly rule-governed magnitude and brightness assignments made to certain vowels and consonants, they

suggested that a person is best able to apply dimensional rules in the English-foreign antonym pairs situation. This is because the E-f task first informs the subject of the relevant dimension in his native language and then permits him to apply the vocalic or consonantal rules to the foreign pair that are appropriate for that dimension. By contrast, the foreign-foreign antonym pairs situation does not explicitly inform the subject of the relevant dimension to decode in the response pair, so his judgment should be much less reliable. Brown and Nuttall did not expect f-f judgments to be entirely random, however, because substantial information is yielded in the two word pairs for the formation of tentative hypotheses (magnitude, brightness, etc.). The fact that subjects were able to perform at a significance level of .01 in the same/different task was a puzzlement to Brown and Nuttall, since there is no opportunity for hypothesis testing in this situation; there are no means by which to make relative markings along continua using vocalic and consonantal cues.

This slight embarrassment of their theory did not dissuade Brown and Nuttall from offering it as an explanation for the superiority of E-f antonym subjects over the f-f antonym group. They noted the high likelihood that the assignment of phonetic contrast to semantic contrast took on survival value for humans and therefore became part of the evolutionary history of all languages. Brown and Nuttall found the latter explanation preferable to what they regarded as mythic theories which relegate the origin of speech to physiognomic representation.

One of the most influential theories of the physiognomization of speech is that of Heinz Werner (1963). His understanding of how

an articulation expressed through the locus of the face begins to take on meaning involves a two-stage process. First, within the organismic/bodily matrix there is an initial fusion of the person's postural set with the verbal form he utters. Then, a differentiation occurs, such that the bodily set and the word-form cease to be experienced as a unity even though they maintain a correspondence.

This process of increasing differentiation bears a striking resemblance to Cassirer's charting of the transition from mimetic to symbolic expression. Here, too, one sees the word-form becoming increasingly objectified and free-standing outside the speaker. It is almost certain, however, that Werner arrived at his two-stage theory of language development through application of his more general Orthogenetic Principle, which states ". . . whenever development occurs it proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation and hierarchical integration" (Baldwin 1967).

Werner believed that he witnessed this tendency toward increasing differentiation in a study which superficially appears to be more oriented to perception than language development. Werner discovered that subjects were able to respond within a general sphere of meaning to tachistoscopically presented words even though the precise word meanings remained outside awareness. He interpreted this to be an example of microgenesis, where there is a gradual unfolding of the feeling significance of the word prior to actual recognition.

Further elaborating his notion of spheres of meaning in words, Werner attempted to explain how it is possible that meanings shift from one seemingly similar phoneme set to another. Phonetic patterns--

and especially physiognomic patterns--constantly arouse a whole array
of dynamic features from which one can select certain qualities that
are pertinent to the representation of a referent. This flexibility
of phoneme forms is a function of the holistic, organizing property of
the sound complexes of words in which they are found. Hence, the let-
ter o takes on a feeling significance of "roundness" in a word like
swollen but a feeling of "hollowness" in a word like dome. Werner
tried to capture the multiplicity of phoneme-derived meanings by
referring to it as plurisignificant, that is, capable of signifying
a great many referents. The primary determinants or constraints which
limit the signifying potential of a phoneme are provided by the word-
form.

Werner suggested that the failure of phonetic symbolism research
to discover the lawful relationships between phoneme and meaning resulted
from a lack of appreciation of plurisignificance. Werner held that those
who sought to establish a one for one correspondence between a particular
phoneme and an attribute were committing an error known as "the fallacy
of constant elements." This fallacious assumption guided researchers to
look for a set of fixed units from which verbal forms are built for the
conveying of meanings. Newman, for example, pored over a thesaurus in
hopes of finding some justification for lining up all English words sig-
nifying largeness on the a, o, u side of the oral cavity continuum and
all words for smallness on the i and e side. Because all words make
different semantic requirements of particular phonemes, it would be
extremely difficult to predict the weighting of a phoneme for magnitude,
brightness, etc. in a given word. One would need a multivariate proce-
dure and an enormous backlog of empirical data to accomplish this.

Werner cited the work of his student, Iritani, as an exemplary effort to probe the plurisignificance of vehicular material (phonemes). Iritani constructed 35 nonlinguistic sound patterns and instructed his subjects to give free association responses to each pattern in much the same manner as Bentley and Varon and others. In contrast to Bentley and Varon, however, Iritani discovered great potential in his sound complexes for evoking referents from his subjects. Yet, although many associations were generated, few, if any, of these were identical between two subjects. Iritani then decided to see whether this superficial diversity concealed a set of underlying expressive factors which would be susceptible to higher order analysis. To accomplish this, he compared responses across subjects using six dimensional criteria (e.g., size, shape, brightness, etc.). His findings from this analysis strongly suggested consistency of expressive properties in many of his stimulus items. With this encouragement, Iritani did another experiment using these same items, but this time he restricted subjects' responses to the six dimensional continua he had used in the first experiment. He found overwhelming agreement among subjects as to the expressive quality of sound patterns according to this continuum marking procedure; in general, consensual choices were evoked along more than one dimension. In fact, in some cases a sufficient number of similar dimensional fixes were evoked to suggest synonymity and antonymity among the sound complexes. For example, it was found that ZECA and TAKI elicited the expressive values of smallness, angularity, brightness, motion and happiness; whereas, SALO, VOAG and HULO were linked to largeness, roundness, darkness, stasis and sadness (Iritani 1962).

Other students and associates of Werner became interested in the implications of Iritani's findings for further research into nonverbal representation of verbal referents. Langer and Rosenberg (1964) required subjects drawn from a student population at Clark University to produce sounds which could serve as new names for specified spatial or color concepts. A random sample of these sound patterns were selected and shown to subjects at the University of California at Berkeley. The latter group of subjects made matches between sound patterns and spatial or color concepts that were in significant agreement with those produced by the Clark University subjects.

Langer, Sampson and Rosenberg (1966) made use of these empirically verified phonetic symbols to examine Brown's (1958) critique that experiments supporting theories of natural, nonassociative reference (phonetic universals) fail to produce behavioral consequences that are readily generalizable. Essentially, this criticism asserts that phonetic symbols are little more than experimental artifacts if they do not influence other parts of the behaving organism's repertory. Langer, Sampson and Rosenberg felt that an adequate test of the natural reference versus associationist positions could be made in a paired-associates design. Pairs were defined to be congruent if subjects from the previous study had consistently designated the symbol-referent pairs as matches (e.g., ZAH-RED, NERD-GREEN). Noncongruent pairs were those in which a phonetic symbol had not been matched with the referent but which was still of the same dimension as the referent. Unrelated pairs were those in which the symbol had previously evoked an equiproportional distribution of choices within the color dimension (of four possibilities) and hence a random assignment of referent to symbol was made. These authors hypothesized

that: (a) pairs of phonetic symbols and congruent referents would be learned more easily than phonetic symbols paired with noncongruent or unrelated referents, (b) more errors would be made with noncongruent pairs and that these errors would tend to be congruency errors, i.e., response referents chosen previously by the normative group, and (c) congruent and noncongruent pairs would be learned more easily than unrelated pairs. All of these experimental hypotheses were confirmed.

In an effort to press the issue of behavioral consequences, another study was designed by Langer and Rosenberg (1966) which adapted the Word Color Interference Test (WCIT) (Stroop 1935) to phonetic symbols. The original WCIT demonstrated that ordinary verbal symbolic activity can interfere with task orientation when two modes of symbolic processing are discrepant with one another. Discrepancy was induced when subjects were presented a list of color names printed in ink colors differing from the printed name; longer latency in naming the ink colors was noted in this condition. Langer and Rosenberg's innovation was a simple substitution of the phonetic symbol for the color name to which it had maximum equivalence. Thus ZAH was used for red, NERD for green, etc. The investigators predicted that the phonetic symbols appearing in print color discrepant with their associated color should evoke the same interference effects as do the noncongruent color names. This prediction was borne out by the data. In another part of this experiment a replication was done using French subjects and a translated form of the Color Phonetic Symbol Test (CPST), as it became called; again, the hypothesized effects appeared.

Langer, Stein and Rosenberg (1969) attempted yet a further demonstration of the behavioral consequences of phonetic symbolism by comparing

results of the two types of color interference tests when administered
to schizophrenic subjects. It had been noted by Wapner and Krus (1960)
that schizophrenics evidenced greater interference than normals on the
WCIT; the interpretation of the differential effects offered by these
authors suggests lesser competence in schizophrenics for keeping sym-
bols separate from their referents. Langer, Stein and Rosenberg pre-
dicted and obtained parallel differences in interference effects for
schizophrenics and normals on the CPST.

Two studies by Weiss (1963, 1964) that were carried out prior
to the work of Langer and his associates offer some perspective to the
CPST research. Initially, Weiss (1964) asked subjects to attribute
meanings to phonetically contrasted nonsense syllables by assigning
them to physically contrasted nonsense pictures. This portion of the
study yielded matching agreements that did not exceed chance level.
When, however, subjects were asked to match these stimulus pairs with
physically meaningful referents, there was significant agreement among
subjects as to referent assignment. Weiss' other study (1963) involved
a comparison between antonymic and nonantonymic foreign word pairs in a
matching task with English equivalents. Here he was challenging Brown's
assertion that performance on phonetic symbolism tasks will be best
where antonymic pairs are present. His results are equally significant
for antonyms and nonantonyms. Weiss' interpretation of the data was
that meaningfulness, per se, rather than the mechanical use of vowel
or consonant cues à la Brown, was responsible for orienting the subject
to the appropriate phonetic elements. Langer et al. would argue that it
is these same critical elements that orient the subject to greater or
lesser interference in the CPST.

In the late 1950's Osgood, Suci and Tannenbaum developed a device
to assess the meaningfulness of words and concepts along several attribute
dimensions. These investigators discovered a high degree of consistency
in subjects' assignments of concepts to scale values across a wide and
varied set of dimension continua. In the course of developing this
omnibus measure of meaning, Osgood and his coworkers became increasingly
aware that the chief value of the instrument lay in its capability to
map out connotative meanings of concepts. Some of these connotative,
or metaphorical, associations were readily recognizable through their
continual use in poetry and song, e.g., the greeness of envy or the
heaviness of sorrow. Other associations had not achieved the familiar-
ity of cliché, and still others would be judged by most people to be
rather bizarre, e.g., the sweetness of a boulder.

Osgood et al., themselves, engaged in metaphor by conceiving
meaning to be a three dimensional reality which could be mapped or
fixed in "semantic space." This model permitted the clustering of
bipolar dimensions (e.g., hot--cold, nice--awful) into factors for
higher order analysis of meaning patterns. When this was accomplished,
Osgood et al. discovered that approximately 70% of the semantic vari-
ance was accounted for by three main factors, those of evaluation,
potency and activity (Osgood, Suci and Tannenbaum 1957).

The Semantic Differential, as it became known, generated con-
siderable research examining the merits of cultural univeralist versus
cultural relativist explanations of semantic origin. A few of these
studies employed nonlinguistic sound patterns and achieved results
which offered some corroboration to Weiss' speculations about per-
ceived meaningfulness in nonsense syllables (Birch and Erickson 1958;

Miron, 1961). Most, however, attempted to use the Differential to test
the Whorfian hypothesis that cognitive structures result from the con-
straints posed by the syntactic peculiarities of the various languages.
In general, results were moderately supportive of the alternate view,
namely that cross-cultural universals of affective and connotative mean-
ing exist. For example, comparisons of American English with Japanese
and Navajo showed general agreement among these language groups that
the concept _loose_ connoted hazy, rounded and blunt; _light_ was seen as
clear and angular; _bad_ was heterogeneous, colorless, thick, dark and
crooked. Osgood also discovered notable differences in assignment of
connotative meanings, however. Whereas Anglos regarded _blue_ as thick,
dark and straight, Japanese subjects found blue to be thin, and Navajos
tended to associate blue with lightness and crookedness (Osgood 1959).

These nonobvious dimensional consistencies, which Osgood chose
to see as synaesthetic tendencies, may be part of a semantic domain of
a higher order than that occupied by the more restrictive denotative
definition. In this connection, McMurray (1960) noted that percentages
of agreement among his subjects were no higher--and often lower--when
the actual denotative meaning was offered in an option pair. McMurray's
study was an attempt to adapt antonym word pairs used by Brown, Black
and Horowitz (1955) to analysis through the semantic differential
method. It will be recalled that Brown et al. was a phonetic symbol-
ism study whose stimulus items were antonym pairs drawn from Czech,
Chinese and Hindi. McMurray simply required his subjects to choose
which pair member of a number of bipolar opposites corresponded most
closely with each pair member belonging to the foreign word stimulus
list. He again demonstrated the phonetic symbolism effect far beyond

chance level, but his finding of generally superior subject agreement
for connotative matches is rather intriguing.

In a more recent study Koriat (1975) built on findings from
memory research to highlight another theoretical perspective on pho-
netic symbolism. Implicit in many of the previously cited studies is
the assumption that the cognitive processes employed in phonetic sym-
bolism operate below the level of awareness. Typically, subjects who
demonstrated either accuracy or consensuality in their matches of
English to foreign words (McMurray 1960), or in their placement of
nonsense words on bipolar continua (Weiss 1964) were unable to offer
rationales for these choices. When reasons were given, there was
little agreement among persons as to why a particular selection was
made. Noting that research in recall and recognition memory (Blake
1973; Murdock 1966; Tulving and Thomson 1971) suggested the existence
of a phenomenon whereby subjects could predict their performance suc-
cess, Koriat examined the possibility of an analog phenomenon in pho-
netic symbolism. Feeling of knowing (FOK), as it had been called, was
hypothesized by Koriat to be predictive of one's accuracy in assigning
foreign equivalents to English stimulus pairs.

When his results confirmed this hypothesized relationship,
Koriat suggested that both of the divergent camps in phonetic symbol-
ism research would be able to incorporate the finding into their
respective theories. Nativists in the tradition of Kohler would find
the notion of intuition-based FOK ratings particularly consonant with
their view of the innate origins of language. On the other hand,
Koriat felt that researchers with an associationist orientation (e.g.,
Brown) would be comfortable explaining the correlation between FOK and

accuracy as a possible indication of how symbolic--but not innate--
sounds are stored in memory. Presumably, recourse would have to be
made to a number of mediating memory processes, since it is not imme-
diately apparent how FOK observed in laboratory recognition and recall
tasks is similar to FOK noted in the matching of foreign words that
had never been seen before.

Another attempt to probe the nativist position in semantics
was made by Adair in a dissertation study presented in 1974. His
chief interest was to test whether archaic, psychodynamically loaded
meanings of common words would be differentially perceived by subjects
according to their ability to gain access to cognitive material that
is ordinarily below awareness. Adair used two separate theoretical
bases from which to generate hypotheses relating to individual differ-
ences in accessing material that usually is not part of waking con-
sciousness. First, he made use of the Jungian typological expectation
that persons whose intuitive function predominates in their ordering
of reality will have more direct contact with the unconscious than will
persons who interpret the world through their senses. Secondly, he
cited the work of Kimura (1967), who noted that the cerebral hemi-
spheres in man appear to process cognitive material in different fash-
ions, the left imposing linear, logical and sequential order on input
but the right employing more global, pre-logical and instinctual
processing. Accordingly, Adair operationalized differential access
to below-awareness material in two ways: (1) he hypothesized that
subjects rated as high intuitors on the Myers-Briggs Type Indicator
(Myers 1962) would generate more archaic contents than subjects rated

as low intuitors and (2) he predicted that stimulus words presented monaurally to the nondominant cerebral hemisphere (via the opposite ear) would elicit free association responses of a significantly more archaic nature than would stimulus material presented to the dominant hemisphere. Both of these manipulations were seen as means to circumvent repressive censoring processes that tend to lock human beings into the semantic present and thereby block access to the more primitive meanings of words in our lexicon. Each subject's free associations were judged by three independent, blind raters according to the degree of archaic content manifested in response to each of the stimulus items.

The analysis of the results supported Adair's hypotheses. Responses of high intuitors were judged to be significantly more primitive than those of low intuitors (p <.001); also, responses to stimuli introduced to the nondominant hemisphere were rated as more archaic in character (p <.05).

The Present Study

There is evidence in the foregoing literature to suggest that phonetic symbolism: (1) is a property of the inherent meaningfulness of a stimulus array and not primarily the function of a set of contiguity rules, (2) that it is more sensitive to the connotative than the denotative aspects of words and word complexes and (3) that subjects associate differing levels of confidence with their choices of foreign word matches in phonetic symbolism experiments.

The study done by Adair is meant to explore phenomena different from those associated with phonetic universals; yet some elements seem to be shared. For example, there is similar use of intuition for

the purpose of accessing cognitive material that is not in immediate awareness. In addition, the Adair paper makes use of an evolutionist perspective that is fundamental to nativist phonetic symbolism theorists. In effect, it is possible to conceive of Adair's experiment as a special case of phonetic universals research if one is willing to regard the archaic meanings for which he was probing as part of a foreign language, namely English as it was spoken prior to, say, the sixteenth century.

Following this assumption, a study is proposed here using the variables of intuition level and hemispheric presentation to investigate the facility of subjects in a word guessing exercise. It is hypothesized that: (1) the combined sample of subjects will give correct responses at a level significantly higher than chance, (2) subjects rated as high intuitors will be significantly more correct in their choices than will low intuitors and (3) subjects presented stimulus words to their nondominant (right) cerebral hemisphere will be more correct in their choices than subjects presented stimuli to their dominant hemisphere.

METHOD

Subjects

The Intuition-Sensation (N-S) Scale of the Myers-Briggs Type Indicator was completed by 176 right-handed female undergraduates drawn from recitation sections of introductory psychology at the University of North Dakota. From this subject pool, 52 persons were designated to represent the extremes on this dimension; the 26 high intuitors who were selected achieved continuous N-S scores of 120 or greater, and the 26 low intuitors were those who scored at or below 70 on the continuous scale. Of these screened subjects, 25 high intuitors and 24 low intuitors completed participation in the study.

Rationale

The decision was made to center on natural language phonetic symbolism in this investigation. This decision was guided mainly by a desire to assess the cross-linguistic, connotative potency of in vivo phonemes, i.e., phonemes currently used by a language community.

As has been mentioned, natural language investigations of the phonetic universals hypothesis require that the stimulus language be one that shares minimal historical basis with the language of the research participants. In the present study, it was also thought desirable to choose a stimulus language whose etymological derivation was well documented and available to the lay (i.e., nonlinguist) investigator. Hebrew seemed to meet these two main criteria. Strong's

Exhaustive Concordance to the Bible is a standard work which charts
the usage context of a myriad of Hebrew words over the millenia. It
permits the nonspeaker of Hebrew to discriminate archaic word roots
from more recent compounds. In addition, owing to the cultural homo-
geneity of the study population, Hebrew was believed to provide a
sufficiently foreign set of stimuli so as to minimize the likelihood
that subjects' responses could be based on cognate association.

Procedure

Sixteen stimulus words were chosen from a list of nouns employed
by Osgood, Miron and May as "qualifier elicitors" in their study, Cross
Cultural Universals of Affective Meanings (1975). All qualifier elic-
itors were translated into over twenty languages and presented to native
speakers who were then asked to generate free associates to each of the
elicitors. In many instances, there was a clear consistency across cul-
tures for certain nouns to call forth a definite, limited group of
qualifier/adjectives. For example, the word girl elicited pretty from
40% of the American subjects, beautiful from 27% of the Dari subjects,
lovely from 38% of the Mexican subjects, etc. Wherever a stimulus noun
demonstrated this kind of pancultural agreement, the modal adjective
which it elicited (e.g., pretty, or some variant, for girl) was paired
with its polar opposite, and this adjective pair was then identified
with one of the several pancultural factors on which it tended to load
heavily. In the case of girl, the pretty-ugly dichotomy loads very
heavily on the evaluative factor, which also includes dimensions like
good-bad, nice-awful, and magnificent-horrible, etc., across cultures.
Another inspection of the list of pancultural qualifiers associated

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with <u>girl</u> yields the discovery that almost none of these adjectives could be subsumed under Osgood's third major Semantic Differential factor, that of activity. To this extent, Osgood's description of the factors of the Differential as orthogonal is borne out empirically.

There were two primary criteria for the choice of stimulus words. The first of these was a subjective appraisal of the functional primitiveness of the word; it was thought desirable to select words for which there would be a high likelihood of regular use, even in communities of the distant past. Hence, words like <u>seed</u>, <u>mother</u>, <u>fire</u>, <u>death</u>, etc. were selected, and words like <u>policeman</u> were excluded. The second criterion was a demonstrated constancy of the word form in Hebrew over the millenia; comparisons were made between current phonetic representations of the stimulus words and word transliterations found in the Strong's Concordance. Only those stimulus words showing relative invariance of form over time were kept, and special preference was shown for those words with the notation, "primitive root," appearing in the Concordance entry.

Each subject's task was to select the most correct English response (or match) to a monaurally presented Hebrew stimulus word. For all stimulus items, the correct response was to be drawn from a four option set. In each four option set, there appeared a relevant bipolar pair, one member of which was the correct choice, and an irrelevant bipolar pair. The irrelevant pair was selected through empirical determination of low loading on factors associated with the stimulus word. For example, <u>girl</u> seems to show pancultural relevance for the evaluative factor (pretty-ugly) and pancultural irrelevance for the activity factor (fast-slow). Hence, an option set for the word

girl might include these four adjectives: (1) pretty, (2) ugly, (3) fast, (4) slow. See appendix A for a listing of stimulus words in transliterated form and their English equivalents.

Subjects listened to the stimulus material in the language laboratory at the University of North Dakota. A casette tape of the Hebrew words was prepared with the assistance of a volunteer native speaker. A paragraph of instructions preceded the stimulus items on the tape and informed the subjects of the general purpose of the experiment; they were also told that they would have two opportunities to hear the stimulus word before making a selection. Monaural presentation was accomplished by physically blocking sound in the right or left earphone with acoustically dense material; thus, half of the subjects experienced right-ear (or predominantly left hemi-sphere)presentation, and the other half received left-ear, right hemisphere stimuli. For every item, the option set was presented on an individual page of the response booklet in order to minimize the effects of previous and subsequent responses. The booklet appeared in four forms, and an incomplete latin square method of randomization was used to control for order effects for options. The contents of the booklets appear in appendix B. Appendix C contains the paragraph of instructions which preceded the stimulus words.

The data was collected during group administrations of the taped material on two days, a Monday and a Wednesday. Unfortunately, the original tape was misplaced on the Tuesday intervening, and it was necessary for the investigator to create a new tape of the stimulus items himself. The hazards of experimenter bias were fully recognized,

and attempts were made to correct for these potential differences

through covariate adjustment.

RESULTS

A regression analysis of covariance was performed in which dif-
ferences in the voice of the announcer of the stimulus items was used
as the covariate. Although main effects under consideration in this
analysis include the variable, response choice order, this variable
has no theoretical relevance to the study and was included primarily
for the purpose of control; an incomplete latin square method of ran-
domization yielded four separate response choice orders. The cell
means, adjusted cell means and cell n's for the other main effects
are presented in table 1 (hi/lo intuition and right/left hemisphere).

TABLE 1

CELL MEANS AND ADJUSTED CELL MEANS FOR HI/LO INTUITION AND
RIGHT/LEFT HEMISPHERE INTERACTION

		Hi Intuitors			Lo Intuitors	
	N	Unadjusted	Adjusted	N	Unadjusted	Adjusted
Right Hemisphere	11	3.364	3.351	13	2.692	2.367
Left Hemisphere	12	3.500	3.512	14	2.857	2.853

A cursory inspection of this table suggests disconfirmation of
the first hypothesis relating to overall phonetic symbolism performance,
since in no condition did the observed or adjusted mean exceed the
chance expected value of 4.0.

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Table 2 shows a summary of the regression analysis of the data using covariate adjustment to correct for voice differences.

TABLE 2

REGRESSION ANALYSIS OF COVARIANCE OF SCORES ON PHONETIC SYMBOL TASK

Source	Proportion of Variance	SS	df	MS	F	P
Covariate						
voice	.081	7.885	1	7.885	4.357	<.05
Treatments						
intuition	.047	4.582	1	4.582	2.532	.123
hemisphere	.001	.116	1	.116	<1	--
response choice order	.057	5.546	3	1.849	1.022	--
Interactions						
Covariate						
v x i	.005	.488	1	.488	<1	--
v x h	.001	.098	1	.098	<1	--
v x r.c.o.	.047	4.591	3	1.530	<1	--
Treatments						
i x h	.003	.293	1	.293	<1	--
i x r.c.o.	.210	20.513	3	6.838	3.776	<.05
h x r.c.o.	.010	.977	3	.326	<1	--
i x h x r.c.o.	.013	1.270	3	.423	<1	--
Error	.519	50.696	28	1.811		

As can be seen from the summary table, neither the intuition nor the hemisphere treatment F-ratios reached significance. Consequently, the experimental hypotheses related to these variables receive no support from the data. It will be noted, however, that the intuition

effect did reach the level of a marginal trend ($p = .123$). The covariate of voice difference did account for a significant proportion of variance in the data ($p < .05$).

The significant interaction formed between response choice order and intuition is difficult to interpret, since the r.c.o. variable was included to provide control over order effects. Although no post hoc comparisons of means for order groupings were made, an informal inspection showed that hi intuitors tended to perform best where polar opposite response choices were either adjacent or separated by a polar opposite pair (e.g., a. rounded, b. same, c. different, d. angular). On the other hand, lo intuitors tended to do better where response choices alternated (e.g., a. angular, b. different, c. rounded, d. same). It is possible that predisposing personality and cognitive factors within lo intuiting (or hi sensing) persons cause them to perform best in situations of relative symmetry and balance; whereas, hi intuiting persons may function better in choice situations of lesser symmetry. But even if this is the case, it is of dubious worth to speculate on the meaning of such a generality for the present study.

DISCUSSION

Previous research in phonetic symbolism has supported the nativist notion that sounds of human speech carry meaning before any associationist process is introduced for the purpose of teaching specific languages (Iritani 1962; Langer and Rosenberg 1966; Weiss 1963; Koriat 1975). It was felt that many of the Kantian assumptions of semantic a priori implicit in this research were shared by Adair's (1975) study of archaic word meanings. Adair believed that common English words contained a core of psychodynamically loaded meaning (e.g., sexual or aggressive) which had become repressed over the centuries. The word, necessity, for example, was hypothesized to have considerable hostile/anal contents for subjects naive as to the word's etymological derivation. Adair's results provided confirmation for his general hypothesis regarding archaic meanings and suggested a methodology that might be fruitful in disclosing a priori meaningfulness in words from a language totally unknown to experimental subjects. It was reasoned that phonetic symbols which are outside one's immediate awareness should be most easily retrieved by subjects who have better access to more primitive mental processes. In a sense, the present study's goal was to demonstrate that Adair's archaic meanings for English words constitute a special case of phonetic symbol, namely one that is relatively close to conscious awareness because of its position within the language spoken by the research subject.

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Some readers may wish to question the legitimacy of assuming
that the mechanism of repression which is assumed to operate in Adair's
psychoanalytic conceptualization is the same as the long range evolution-
ary process posited by phonetic symbolism researchers, in which semantic
universals and a prioris are concealed under centuries of culture over-
lay. It will be recalled that Cassirer's belief was that languages lost
their elementary symbolic (a priori) quality as they become more prone
to manipulate abstract ideas and function as the vehicles of cognitive
novelty. This explanation accounts equally well for the progression of
the word necessity from earthiness to neutral descriptiveness. In addi-
tion to increasing flexibility in verbal expression, Cassirer would argue
that this advanced stage of linguistic development offers greater survival
value to complex modern cultures because the highly subjective and affec-
tive quality of words becomes attenuated. Complex cultures do not use
prepositions that make reference to the position of the speaker's own
body. They have replaced nominal with numerical representation and have
greatly increased their efficiency and commercial potential.

Cassirer would cite enormous differences between primitive and
complex linguistic communities with respect to their conception of the
self in relation to significant others (i.e., family, tribe). The per-
son who speaks the language of a complex culture is more likely to see
himself as a separate being and can therefore approach others as objects
in their own right rather than extentions of the self. When this is
achieved, the danger of splitting and viewing the world according to
the equation, us:them=good:bad, becomes less pronounced as one comes
to understand persons as possessing positive and negative attributes
simultaneously. When this level of sophistication is reached,

boundaries between tribes become more penetrable, providing for greater cross-fertilization of ideas and a generally increased awareness of reality. Cassirer would maintain that these cultural gains, which result in part from the attenuation of the subjective aspect of language, are constitutive of western technological society. However, the cost that is paid for the advance of linguistic civilization is the loss or obscuring of semantic/phonetic deep structure and its component a prioris.

Freud (1961) attributed the growth of civilization to the mechanism of sublimation, whereby libidinal energy is seen as being detoured from its object and channeled into acts of artistic or scientific creation. It would seem that the repressive process that Adair proposed has relatively more in common conceptually with Cassirer's notion in that both understand the growth of meaning as progressing from specific and subjective/affective reference to more general and neutral reference. It is conceivable that sublimation through artistic creation and repression of archaic meaning through evolution of the objective attitude are both operative in cultural development. But since the present study addressed itself to linguistic phenomena of which Adair's archaic meanings are subsets, it was thought appropriate to adapt his research strategy to this more general problem.

It was hoped that Jung's Sensation-Intuition dimension as operationalized on the Myers-Briggs Type Indicator (1962) would discriminate persons able to access semantic a priori (i.e., primitive meanings) that are contained in unfamiliar foreign words. It was assumed that persons identified as high intuitors should do well at this task since they are thought to be oriented towards internal and unconscious processes. By

contrast, high sensing persons were hypothesized to perform significantly below the level of intuiting subjects because high sensation presumes that the individual depends on external reality via the five senses for information to use in daily cognitive processing.

The Intuition-Sensation Scale of the Myers-Briggs Type Indicator was used to screen subjects from a pool of 176 female introductory psychology students. A group of between 50 and 60 potential subjects met the inclusion criteria which required a separation of roughly two standard deviations on the Intuition-Sensation Scale. Because of the exploratory nature of this research it was difficult to decide on an optimal sample size for the study, but, since the number of subjects generated by this screening closely approximated that used by Adair in his study of archaic meanings, there was reason to have some confidence in its adequacy. In retrospect, it seems possible that, given the more obscure quality of the present study's stimulus materials, a substantially larger N may have been needed for the intuition effect to achieve significance.

In keeping with the theoretical approach espoused by Adair, it was hypothesized that persons processing monaurally presented stimulus words in the right cerebral hemisphere (predominantly) will evidence more facility in decoding natural language phonetic symbols than persons processing these stimuli in the left hemisphere. This expectation was based on a body of research (Kimura 1973; Kimura, 1967, Ornstein 1972) which suggests that asymmetry of cognitive function exists between the two hemispheres. Further, it has been demonstrated that the right hemisphere specializes in global, diffuse, metaphorical thinking that is most typically employed in the creation of art or music and is also

important when making intuitive or synthetic judgments. By contrast,
the left hemisphere seems to specialize in analytical and logical
thinking; it is particularly active in quantitative reasoning and
sequential, step-by-step problem solving. Consequently, it was
assumed that stimuli introduced into the right hemisphere would
elicit responses most likely to contain primitive phonetic symbols
or semantic a prioris.

Some research points to the possibility that sex differences
may have been partly responsible for the failure of the hemisphere
effect to appear. Tucker (1975), for example, noted that males
appeared to show greater right hemisphere specialization than females
for synthetic visuospatial tasks. If there is a corresponding tend-
ency toward more specialized hemisphere processing in males for audi-
tory stimuli, then the weakness of the effect shown by the female sub-
jects could be explained. Adair used all female Ss in his study and
he did get significant results favoring right hemisphere processing.
It is interesting to note, however, that the level of significance for
his hemisphere dimension (p <.05) was much lower than that obtained for
the intuition variable (p <.001).

The response measure in the present study made use of Osgood,
Miron and May's (1975) work which attempted to derive pancultural fac-
tors of affective meaning by extensive canvassing of some 26 diverse
cultures. These researchers asked respondents to make associations to
a long list of nouns which they called qualifier elicitors. The fact
that many of these nouns tended to elicit the same adjectives across
the polled cultures suggested that the orthogonality of meaning

dimensions already demonstrated for an American sample was robust and universal. It was reasoned that the present study might make use of these pancultural factors by presenting factor polarities to subjects as response options. In this way it was hoped that Ss more in touch with archaic contents and meaning a prioris would have a greater "feeling" for the appropriate dichotomy member in a four-cption set, i.e., that the Hebrew word for fire would elicit hot from the set that would also include cold, good and bad.

In retrospect, it appears doubtful that true orthogonality of factors can be maintained across cultures with sufficient precision and consistency to warrant the assumption that two sets of polar opposites selected from two orthogonal factors will themselves be orthogonal across cultures. Although it may be the case that Osgood and his associates have begun to probe deep semantic structure with their pancultural factors, these factors may still be too crude and unrepresentative of that underlying structure to be used in the manner they were here. The fact that several of the loadings for bipolar pairs were rather low (.50's and .60's) lends credence to this criticism.

Ironically, the present study endeavored to improve upon the Adair study by adopting a method independent of subjective judgment. However, given the difficulties inherent in using an unjustifiably reified standard, a system of raters similar to that used by Adair may still provide a better source of data for natural language phonetic symbolism research. In future research, it might be desirable to augment this data set with a performance measure on a task using Langer's (1964, 1966) empirically derived color phonetic symbols.

If performance on the natural language task correlates highly with that on the color phonetic symbol task, then support would be given to the hypothesis of semantic/phonetic universals.

SUMMARY

The foregoing study attempted to determine whether natural language phonetic symbols would be accessible to the general population and, further, whether facility at decoding these symbols would be differentially determined by one's ability to engage in intuitive or archaic modes of thinking. The phonetic symbolism hypothesis maintains that meaningful units of sound exist in human speech—both in actual extant languages and in spoken nonlinguistic words—and that these meaningful a prioris constitute a linguistic substrate to which associationist processes will subsequently contribute. It was reasoned that phonetic/semantic a prioris should feed into a rather primitive part of human cognitive apparatus, since they are not assumed to be governed by logical or syntactic processes. Accordingly, means were sought to tap this primitive, nonlinear portion of human mentation.

Jungian psychological typology provided one point of departure for identifying persons having higher likelihood of accessing primitive phonetic/semantic material. Following an approach from a similar research problem (Adair 1974), it was hypothesized that persons known to have intuition as their predominating function would be most informed via unconscious and internal processes and would therefore most readily retrieve phonetic symbols as meaningful units. Persons with a predominating sensing function were thought least able to decode the meaning of phonetic symbols, since such individuals are presumed to be informed primarily through their immediate senses.

Another means of discriminating logical from pre-logical, intuitive cognition was suggested in research which discloses an asymmetry of function between the two cerebral hemispheres. This research identifies the right hemisphere with global, intuitive and aesthetic processes and the left with linear, analytic and syntactic cognition. Consequently, it was hypothesized that persons receiving auditory input primarily to their right hemisphere would demonstrate superiority in decoding primitive phonetic symbols.

None of these experimental hypotheses was confirmed by the data. Possible explanations for this are discussed with respect to sex differences in the degree of hemisphere specialization and ineffectiveness of the dependent variable measure.

APPENDICES

APPENDIX A

TRANSLITERATED HEBREW STIMULUS WORDS AND THEIR

ENGLISH EQUIVALENTS

TRANSLITERATED HEBREW STIMULUS WORDS AND THEIR

ENGLISH EQUIVALENTS

imma	mother
zera	seed
shemesh	sun
lashon	tongue
mayeem	water
beitza	egg
etz	wood
yareach	moon
raam	thunder
lechem	bread
esh	fire
pri	fruit
maveth	death
ba-it	house
ruach	wind
nachash	snake

APPENDIX B

CONTENTS OF STIMULUS BOOKLETS

CONTENTS OF STIMULUS BOOKLETS

1. i   a. angular   b. different   c. rounded   d. same
   ii   a. different   b. angular   c. same   d. rounded
   iii a. same   b. rounded   c. angular   d. different
   iv   a. rounded   b. same   c. different   d. angular

For items 2 through 16, alternate forms were generated in a similar fashion.

2. i   a. abundant   b. easy   c. scarce   d. difficult

3. i   a. burning   b. calm   c. frozen   d. rough

4. i   a. bad   b. quick   c. good   d. slow

5. i   a. dry   b. big   c. wet   d. little

6. i   a. open   b. black   c. shut   d. white

7. i   a. weak   b. artificial   c. strong   d. natural

8. i   a. rounded   b. short   c. square   d. tall

9. i   a. fresh   b. quiet   c. old   d. noisy

10. i   a. indespensable b. shallow   c. unnecessary   d. deep

11. i   a. cold   b. ugly   c. hot   d. beautiful

12. i   a. fast   b. sweet   c. slow   d. sour

13. i   a. slow   b. numerous   c. fast   d. scarce

14. i   a. comfortable   b. fat   c. uncomfortable d. lean

15. i   a. clumsy   b. fresh   c. agile   d. suffocating

16. i   a. naive   b. many   c. shrewd   d. one

APPENDIX C

INSTRUCTIONS TO SUBJECTS

INSTRUCTIONS TO SUBJECTS

The exercise in which you are about to participate involves listening to words in an unfamiliar foreign language. For each of these words you will be asked to try and select a word in English that matches the foreign word best. Prior research has shown that people can make fairly accurate guesses of foreign word meanings under certain conditions.

You will be making your selections in the response booklet that has been provided. Note that each page number in your booklet corresponds to an item or word number in the exercise. The number for each word will be announced in English by a speaker who will then pronounce the word itself. A pause will follow during which you should try and consider each of the four options appearing on the page of the booklet. The speaker will then repeat the word to assist you in making your choice. When you have made your choice, circle it and turn the page to the next set of options.

Try and base your choice on what "feels" like the most correct option to you.

Are there any questions?

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