STATISTICAL DEMONSTRATION OF A MEANING: THE SWAHILI
LOCATIVES IN EXISTENTIAL ASSERTIONS[1]

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Data involving the locative morphemes pa-, ku- and mu-
in Swahili, a Bantu language of East Africa, are discussed.
The existential use of these forms (as in the English
'there is/there are') is focused on. Locatives in Swahili
are semantically distinct whereas speakers of Swahili
claim no distinctiveness for the same forms when used
existentially. A statisticaly analysis of contextual
variables of existentials is presented and it is shown
that in fact the choice of pa-, ku- and mu- in ex-
istential contexts is not arbitrary as native speakers
suggest.

1.   Introduction

This paper will address the methodological problem of determining

whether a contrast in meaning between two forms is preserved even in

contexts where none is reported by native speakers on direct question-

ing. We will demonstrate the use of a statistical technique to estab-

lish that the forms are in fact being used contrastively even in these

contexts. The results of this method will also provide support for a

particular semantic analysis. We will conclude that where there are

differences in surface form it is profitable to look for differences

in meaning even if these are not immediately obvious.

2.   The Analytical Problem

In Swahili, forms that are regularly used to refer to place--that

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is, locatives--are also used where there is no apparent reference to place. For example:

(1) a. Aliweka kitabu <u>hu-KU</u>.
               this-LOC.

    'He kept the book <u>somewhere around here</u>.'[2]

  b. Na kama mchumba angali kigoli, basi <u>ha - KU - na</u>
                                      neg. LOC. 'associated
                                                          with'

    kizuizi cha kumwona kila mara. [Uz 103]
    obstacle

    'And if the fiancée is still a girl, then <u>there is not</u>
    [any] obstacle to seeing her every time [the young
    man goes to her home].'

(2) a. Aliweka kitabu <u>ha-PA</u>.
                this-LOC

    'He kept the book <u>right here</u>.'

  b. <u>Ha - PA - na</u>   haja hata kidogo ya kuona haya.
    neg. LOC. 'assoc.d with' need   [Kf 47]

(3) a. Aliweka kitabu <u>hu-MU</u>
                this-LOC

    'He kept the book <u>inside here</u>.'

  b. Ndani yake [chungu] <u>MU - na</u>   yai viza. [KG 58]
                    LOC. 'assoc.d with'   egg

    'Inside it [the pot] <u>there is</u> a rotten egg.'

The third pair of examples differs from the other two in that the locative notion of "insideness", associated with the spatial meaning of mu, appears in both examples. This pair thus bridges the semantic gap

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[2]Examples (1a), (2a) and (3a) and their translations are taken from Zawawi [1971:106] (underlining mine [ECM]). All other examples in the paper are from Swahili writings, identified by initials followed by page number. For fuller references, see bibliography.

between locative expressions and so-called "existential" expressions.[3]
Since there is no doubt that we have the same mu in (3a) and (3b),
the question naturally arises: do we not also have the same pa and ku
in the other pairs?[4]

On this point, native speaker intuition does not provide a clear
guide. Although pa and ku produce a difference in message when sub-
stituted for each other in locative expressions:

(4)   a. Aliweka kitabu hu-KU.

            'He kept the book somewhere around here.'

        b. Aliweka kitabu ha-PA.

            'He kept the book right here.'

Language consultants[5] report that they can be interchanged in ex-
istential expressions without appreciable effect:

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[3]Although there seems to be no empirical basis for claiming that
"existential" is a grammatical category of Swahili, I will continue to
use this term below to refer to the class of contexts in which a loca-
tive is prefixed to the associative particle na (in non-present tenses,
with the auxiliary verb kuwa 'be'), followed by a noun, where the English
translation is generally 'there is an X'.

[4]It will be recognized that a similar analytical problem arises in
English, as well as in other languages: English there appears in both
locative and existential expressions. The question whether English
existential there is (a replacement for) a locative expression (as
argued in e.g. Fillmore [1968], Juno [1971], Kimball [1973] and others)
or something else (Jespersen [1949], Perlmutter [1967], Allan [1971],
Bach [1974] and others) continues to generate controversy. It has
also been argued that there is a "universal" relationship between
locatives and existential expressions (e.g. Lyons [1967]). The purpose
of this paper is not to take a stand on these issues, but rather to
deal directly with the analytical problem which occurs in Swahili, i.e.
the semantic relationship between the forms used in the a. examples
and those used in the b. examples above, and that between the locatives
pa and ku in existential contexts.

[5]Three first speakers of Swahili from Zanzibar, one second speaker
from Moshi.

(5)   a. Ha-$\begin{cases}\text{PA}\\\text{KU}\end{cases}$na   haja hata kidogo ya kuona haya.

'<u>There is not</u> any need at all to feel embarrassed.'

b. Na kama mchumba angali kigoli, basi ha-$\begin{cases}\text{KU}\\\text{PA}\end{cases}$na   kizuizi

cha kumwona kila mara.

'And if the fiancee is still a girl, then <u>there is not</u>

[any] obstacle to seeing her every time.'

If "intuitive" judgments were the only data on which to base
semantic analysis, we would have to conclude that pa and ku do not
contrast in meaning in existential expressions. Since they clearly do
contrast in locative expressions, the formal similarity between the
locatives in the a. examples and those in the b. examples would have
to be a coincidence, i.e. we would have to set up the homonyms pa_1
(locative) and pa_2 (existential); ku_1 (locative) and ku_2 (exis-
tential). This is essentially the position taken by Perrott [1972:147]
and Ruzicka [1960:211], who feel that the use of locatives in existen-
tial expressions is "idiomatic", having no semantic relation to the
original spatial meanings of the locatives.[6]

Authors who affirm that the forms used in the a. examples are "the
same as" those used in the b. examples (Meinhof [1948], Ashton [1944],
Gregersen [1967], Christie [1970]) do not confront the problem of the
apparent lack of semantic contrast between pa and ku in example
(5).

In summary, although there is a formal (morphological) similarity
between the forms used in locative and those used in existential ex-
pressions in Swahili, the question of their semantic relationship needs
closer examination because (a) reference to a literal place may not be
apparent in the message; (b) language consultants do not report a con-
trast between pa and ku in existential expressions, although they do
in locative expressions.

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[6]Neither of these authors comments on the difference, if any, be-
tween "idiomatic" (existential) pa and "idiomatic" ku.

3. Methodology

The kind of distribution we will examine is the tendency for a form to occur in semantically compatible contexts.

Language is a device of communication. For effective communication it is desirable that utterances have semantic coherence. We therefore expect that when a particular form is used, there will often be something else in the linguistic context whose presence can be explained by its semantic compatibility with that form.[7]

In what follows we will isolate variables in the linguistic context which are semantically compatible with one or the other of the forms under study, and will show that the distribution of ku and pa with respect to these variables can be explained by their respective locative meanings. The general procedure is as follows:

(6) a. Make a hypothesis about the meaning of a form.

b. Choose one or more contextual variables suggested by their semantic association with the meaning being tested.

c. On the basis of the hypothesized meaning, predict the direction of statistical skewing of the form with respect to the chosen variable(s).

d. Count the frequency of co-occurrence of that form with the variable(s).

If we find that the distribution of the form is consistently skewed in the expected fashion, we have found support for the hypothesized meaning.

Note that the variables are chosen only on the basis of their semantic relevance to the hypothesized meaning. The meaning leads both to the choice of pertinent variables and to predictions about now the form will skew with respect to these variables. For example, suppose that the contrast in meaning between $\emptyset$ and suffixed -s on English nouns (e.g. bird/birds) were not intuitively obvious, and that we had adopted the hypothesis that they mean 'one' and 'more than one' respectively. Quantitative expressions such as five, many would would be a semantically relevant variable to correlate with -s and $\emptyset$,

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[7]See also Garcia [1975:44] for discussion of this point.

because there is an apparent semantic association between this variable
and the hypothesized meanings. On the other hand verb tenses would
not be a semantically relevant variable: there is no apparent semantic
association between e.g. the meaning 'one' and past tense.[8] There-
fore the statistical method outlined above cannot be used as a dis-
covery procedure for a meaning, but only as a test of a hypothesis.

It will be apparent from the results of this statistical method
that ku and pa are used in existential expressions in conformity
with their locative meanings.

4. Meanings of the Locatives

We have assigned the following meanings to the Swahili locatives:[9]

(7)   mu: a space differentiated with respect to insideness
       pa: a space viewed as simple and homogeneous, i.e. an
           undifferentiated spot
       ku: any kind of space, i.e. one whose structure is
           left unspecified

It is suggested in (7) that the Swahili locative system classifies
spaces according to degree of spatial differentiation--that is, the
meanings refer to spaces which are defined with increasing precision.
On a scale of increasing differentiation, the locatives fall in the
order ku, pa, mu. This relationship has an effect on their distribu-
tion. In general, the more precise a meaning is, the more restricted
are the contexts to which it is appropriate. Given that in existential
contexts considerations of a specific, literal place may not be of
primary importance, we would expect the relative frequency of the loca-

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[8]I am not claiming that there could not possibly be such a relation-
ship. Conceivably, entities which are individuated might correlate
with tenses denoting relative importance, or present relevance, of an
action. However this connection would be extremely indirect and
thus not especially appropriate for testing the meaning 'one.'

[9]For a detailed justification of this analysis, the reader is
referred to Contini [1974].

tives in this context to be in inverse proportion to their relative
degree of spatial precision. And in fact the distribution of locatives
in the existential sample used for this study is 59% ku, 36% pa,
and 5% mu.

The meaning of ku both includes and exceeds those of pa and
mu: on the one hand spaces which can be referred to by pa or mu
can also be referred to by ku:[10]

(8)   a. Uani   KU-a   bwana Ali   KU-likuwa   kama ua wowote
        yard-   LOC-of   LOC(subject) like   etc.
        place   -past-/be/

        tu wa shamba.   [MWK 10]

        'The yard of Mr. Ali KU(subject)-was like any [ordinary] yard
        of a farm.'

Cf: b. PA-le   chini ya mti PA-likuwa   PA-kitumika
        LOC-that   under of tree LOC(subject)   LOC(subject)-
                                -past-'be'   'being used'

        kama marikiti ya watu wa Giningi.   [KG 69]

        'That place under the tree PA(subject)-was being used
        as a market by the people of Giningi.'

        c. Tulipokuwa tukicheza KU-le   ndani   nikastuka na
                           LOC-that   inside

        kusema 'Jamani tumekwisha fungiwa!' [RS 4]

        'While we were playing <u>there</u> [that-KU] <u>inside</u>, I
        started and said, "Friends we've been closed in!"'

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[10]This is something of an oversimplification: the substitution
of ku for pa or mu leads to a loss of information, which in
some cases produces a difference in message (as in example (4) above).
However with sufficient redundancy in the context ku can refer to
spaces which are indistinguishable from those referred to by pa or
mu, as in example (8).

Cf: d.   Wakati sisi tulipokuwa tukicheza MU-le   ndani,
                                        LOC-that inside

        yule bwana mwenye shamba alikuja akamkuta kaka yangu

        amesimama karibu ya pango.   [RS 2]

        'At the time when we were playing <u>there</u> [that-MU]

        <u>inside</u>, the man who owned the farm came and found

        my brother standing near the cave.'

on the other hand, ku may refer to spaces for which neither pa   nor
mu would be appropriate:

(9)   Kunako vifundo vya mikono yake kafunga singa za mikia

        ya ng'ombe zilizokuwa zikining'inia mpaka viganjani
                                            palms-place
    ⎰ KU-ake.   [KG 45]
    ⎱ ?PA his
      ?MU

        'Around his wrists he had tied cow tail hairs which waved

        [down] <u>to/around his palms</u>.'[11]

    The question we will address below is in what ways the more
precise spatial meaning of pa and the less precise meaning of ku
affect their distribution in existential sentences.

5.   Statistical Evidence

    A count was made of all the ku and pa existentials in six
short novels by different Swahili authors[12] and in two issues of the

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[11]This meaning relationship is similar to that described in Harries
[1965]: "The locative affix of Class 17, -ku- or ku-, can be said
to include within its wider range of meaning the particular location
expressed by either class 16 [pa] or class 18 [mu] affix". However
Harries does not specify what the range of meaning is nor what kinds
of locations are expressed by pa and mu. Certainly the traditional
definitions as given in e.g. Ashton [1944] do not point to an includ-
ing relationship.

[12]For references, see bibliography.

weekly magazine <u>Nchi Yetu</u> (in all, 550 pages of running text), a total of 281 examples of which the total number of ku-existentials was 173, and of pa-existentials 108.

Semantically relevant variables were chosen based on the hypothesized meanings for pa and ku given in (7) above. The first is as follows:

(10)   Contextual variable I: concrete vs. abstract entities
       Prediction I:
       Pa should favor contexts where a <u>concrete</u>, or readily
       localizeable, entity is said to exist, while ku should
       favor entities which are <u>abstract</u>, or not readily localizeable.

Pa designates a "spot". The kind of entity most likely to occupy a spot is a concrete entity. On the other hand, ku refers to a structurally undefined space. An abstract entity is more likely to be associated with this type of space than with a particular spot.

Note that pa and ku do not themselves mean "concrete" and "abstract" respectively.[13] These are attributes of the entity whose existence is being predicated. The classification of entities as concrete or abstract is being used as a convenient measure of relative localizeability and thus of relative compatibility with the spatial meanings of pa and ku.

To illustrate, here are examples of each type of noun:

(11)   a. Zaidi ya vitu hivyo palikuwa na <u>msahafu mkuukuu</u>. [KG 25]
           'Besides these things there was <u>a worn Koran</u>.'

       b. Katika Kufikirika kuna <u>maradhi</u> na <u>mauti</u>, lakini
           katika Pepo uko uzima na maisha ya milele.   [Kf. Intro.]
           'In [the country of] Kufikirika there is <u>disease</u> and
           <u>death</u>, but in [the country of] Pepo there is health and
           eternal life.'

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[13]In particular, the use of these terms should not be confused with their use by Christie [1970], who makes a distinction between "abstract" and "concrete" locations (attributed to Lyons [1968]) as an argument for a relationship between locatives and possessives.

In example a., the word msahafu 'Koran' would be counted as refer-
ring to a concrete entity. In the second example the words maradhi
'disease' and mauti 'death' would be counted as abstract. I also
included under the general category of "abstract" such nouns as wind,
darkness, which are not localizeable although it could be disputed
whether they were abstract. The results of the count are as follows:

(12)   Clearly   Clearly   Indeterminate[14]   Total
       Abstract   Concrete   Cases

	Clearly Abstract	Clearly Concrete	Indeterminate Cases	Total
PA	36% (39)[15]	53% (57)	11% (12)	100% (108)
KU	52% (89)	35% (61)	13% (23)	100% (173)

   (total abstr. 128) (total concr. 118) (total indet. 35) (total 281)

   $p < .005$

The table in (12) can be read in two ways: first of all, if we look
at the overall distribution of pa-existentials, we find that the
majority (or 53%) are used to predicate the existence of concrete
entities, while only 36% predicate the existence of abstract entities.
We also find the distribution of ku to be almost the mirror image
of that of pa: while 52% co-occur with abstract nouns, only 35% co-
occur with concrete. This skewing conforms with the prediction.

   If we now look at the category "concrete" taken by itself, it
appears that the total number of examples (reading down, a total of
118 concretes) is split fairly evenly between pa and ku: there
are 57 examples with pa and 61 with ku. That is, while it is true
that pa admits mostly concretes, the reverse is not the case. Here
we must of course take into consideration the higher overall frequency

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[14]The indeterminate category represents existentials of a certain
type, fairly common in Swahili, which has no word for "no one". The
established way of expressing the message "no one came", for example,
is hakuna/hapana aliyekuja 'there-is-not one-who-came'. In these
cases I was uncertain whether to consider the noun involved as "con-
crete" or "abstract".

[15]Raw figures are given in parentheses.

of ku in the sample, but this statistic still deserves a comment.

As mentioned above, ku is the including member of the locative system. In other words, the meaning of ku makes no claim about what type of space is being referred to. While this makes ku the most compatible of the locatives with abstract entities, it does not make it _incompatible_ with concrete entities. Pa, on the other hand, does have a meaning which is _less compatible_ with entities which are not intrinsically localizeable. Therefore we find the skewing much more extreme in the Abstract column, where ku exceeds pa by more than two to one (89 to 39).

We conclude that the distribution of pa and ku with respect to abstract and concrete entities is skewed in a way which is consistent with their locative meanings.

Let us now move on to the next variable:

(13)   Contextual variable II: particular location mentioned vs.
                                 not mentioned

        Prediction II:
        Pa should be relatively favored and ku relatively dis-
        favored in existential contexts where a particular loca-
        tion is specified.

As mentioned above and as illustrated in examples (1b) and (2b), in existential assertions consideration of the literal place where something exists is not always of primary importance. However when a place is explicitly identified in the context as the location where something exists, given a choice between a more precise spatial meaning (pa) and a less precise one (ku), we expect the more precise meaning to be chosen. We therefore predict that pa and ku will skew with respect to explicit reference to a place in the context. Here is an example:

(14)   Katikati mbele ya mlango wa nyumba, baina ya sehemu mbili
        za bustani, PA-likuwa na muasmini mkubwa uliozaa sana. [KG 12]

'In the middle in front of the door of the house, between
the two sides of the garden, there was a jasmine tree
in full bloom.'

Here 'in the middle in front of the door of the house' and 'between
the two sides of the garden' are counted as specific places. The
results of this count are as follows:

(15)   Place mentioned   Place not mentioned   Total

   PA   44% (48)   56% (60)   100% (108)
   KU   18% (30)   82% (143)   100% (173)

   (total men. 78)   (total not men. 203)   (total 281)

   p <.005

Here again, the figures represent percentage of the total sample.
For example, of all pa-existentials, 44% co-occurred with a specific
place-referent, but only 18% of the ku examples did. That is, pa
is more than twice as likely as ku to co-occur with an explicit
place-referent.

This table can also be read in another way: in the context of an
explicit place referent (reading down, a total of 78 examples), pa is
used 62% of the time, ku 38%, in spite of the higher overall fre-
quency of ku in the sample. Where no place is mentioned, pa is
used only 30% of the time, ku 70%.

We conclude that the locative meanings hypothesized for pa and
ku correctly predict their relative skewing with respect to the
variable of explicit mention of place.

Next variable:

(16)   Variable III: plural vs. singular nouns
        Prediction III:
        Pa-existentials should be used less often than ku to assert
        the existence of plural entities.

A homogeneous space by definition has no internal structure: no par-
ticular points falling within this space, nor any subdivision of the

space may be singled out without losing homogeneity. The kind of entity
which is most properly associated with such a space is an individual
entity, which itself defines the space. A plurality of entities is made
up of several individuals, each of which may be expected to define its
own spot: "no two things can occupy the same place at the same time".
A plurality of entities thus conflicts with a homogeneous spatial
interpretation, and we therefore expect that pa-existentials will be
less frequent than ku-existentials in contexts where reference is
made to a plurality of entities.

The results of this count are as follows:

(17)

	Plural[16]	Singular	Total
PA	13% (14)	87% (94)	100% (108)
KU	32% (56)	68% (117)	100% (173)

(total pl. 70)   (total sg. 211)   (total 281)

p <.005

As can be seen from the plural column, the probability that ku   will
co-occur with a plural noun is nearly three times as great as that
for pa. Further, in the context of plural nouns pa is used only
20% of the time (14 examples), ku 80% (56 examples).

In this count we have presented data bearing directly on the
geometric meaning assigned to pa. This geometric meaning--namely,
homogeneous, undifferentiated space--leads to the inference that only
a single space, and therefore a single entity, is being referred to.
Pa is therefore avoided in contexts where reference is made to a
plurality of entities. Other meanings assigned to pa such as
'definite place, position' [Ashton 1944:126], 'place near some object'
[Myachina 1960:23] would not predict the skewing with respect to
singular/plural nouns.

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[16] For this count, abstract nouns which are pluralia tantum such
as mauti 'death' were counted as singular, because they do not refer
to aggregates of bodies.

6. On Randomness

It might be argued (despite the Chi square) that all forms are skewed in their distributions and that the skewings reported above could be the result of chance. To test whether any arbitrarily chosen contextual factor will show a skewing, I also made a count of the ku/pa contrast with respect to nouns containing the letter d:

(18) Variable IV: nouns containing d vs. nouns not containing d

Prediction IV:

Neither pa nor ku will show a significant skewing with respect to nouns containing the letter d.

Here are the results of this count:

(19)

		Contain d	Do not contain d	Total
PA		11.1% (12)	88.9% (96)	100% (108)
KU		11.5% (20)	88.5% (153)	100% (173)

$p > .995$

The purpose of (19) is to show that distributions can be random. The meanings hypothesized for pa and ku did not lead me to predict any kind of skewing with respect to the letter d. And in fact, there is none.

A further point: even if the results of one test were due to chance, the likelihood that random factors would lead ku and pa to skew in the predicted manner in all tests is extremely low, i.e. if one were to claim that forms will always show some skewing or other (or that non-randomness is itself random), there would still be no explanation for the fact that the skewings all point in the same direction.

We conclude that observed skewings do in fact correlate with semantic characteristics of the forms being used.

7. Apparent Counterexamples

The statistical method corrects for idiosyncratic local variables affecting the use of forms in particular examples. We will now discuss

these cases, i.e. instances where the forms were used contrary to the
predictions.

One may ask why pa is ever used with plurals or abstract nouns.
Let us first discuss plurals: although it was argued above that a
plurality of entities would lead to a de facto differentiation of
space (each individual defining its own spot), nevertheless it is not
impossible to imagine several entities occupying the same place,
especially if it is known that the place being referred to is extensive.
And in fact "existential" pa does occasionally occur with plural nouns.
For example:

(20) "Unamjua mtu ye yote aliyekuona ukiua?" Hatibu akajibu,
      "La, labda palikuwa na watu pale nje lakini wakati
      nilipotoka nje hapakuwa na mtu hai ndani wala nje." [SH 22]

      '"Do you know anyone who saw you [in the act of] killing?"
      Hatibu answered, "No, maybe there were people there
      outside [of the house], but by the time I went out
      there was not a person alive inside or out."'

Here the place itself is mentioned, pale nje or 'there outside'.
Since an area thus defined, while homogeneous, is nevertheless exten-
sive enough to accomodate several people, there is no contradiction in
using pa.

However, if the plurality of entities in question is reinforced by
additional lexical specification (such as numerals, words like 'several',
'various', conjoined noun phrases, etc.), then the implication that
they all occupy the same space is that much less likely. For example:

(21) Kwa juu ya daraja hizo kulikuwa na milango miwili
      iliyokaa mmoja mbali kidogo na mwenziwe.   [KG 85]

      'Over these steps there were two doors which were
      situated one a slight distance from the other.'

Indeed, we find that such reinforced plurals occur much more frequently
with ku than with pa. Of the total number of examples of reinforced
plurals in my sample (27 in all), only four were associated with pa,
while 23 occurred with ku.

As to the occurrence of pa with abstract nouns, which are non-localizeable, the difference between it and ku is more difficult to pin down quantitatively. There may be other factors affecting the use of pa in these cases. For example, although a noun may be considered "abstract" on the basis of its dictionary definition, in some contexts an abstract noun may be viewed as localizeable in a precise spot. For example:

(22)   Hili jembe langu, siliachi hapa, lazima liende pale
        nyumbani, la sivyo patakuwa na mambo.   [SH 25]

        'This hoe of mine, I won't leave it here, it must go there
        to the house, otherwise there will be trouble.'

Here it is clear that the "trouble" will occur at the (homogeneous) spot where the speaker is located. However in order not to prejudice the results I kept strictly to a context free categorization of nouns for Prediction I.

Another variable possibly affecting the use of pa with abstracts is emphasis. A pa-existential may convey a slightly more emphatic flavor than a ku-existential, even when no specific place is intended, or when reference is made to an object which is not intrinsically locali-zeable. By indicating that something is associated with a homogeneous place, even if this is not literally true--perhaps because of this fact-- the speaker is able to convey a certain emphasis on the existence (or non-existence) of that entity. The use of metaphor generally has such an effect: if we say 'John is a dog' it is more emphatic than saying 'John is a man' (if John is in fact a man). Indeed, almost half of the abstract sample for pa (16 out of 39) consists of such emphatic ex-pressions as hapana shaka 'there is no doubt' and hapana ila ... 'there is no [alternative] but...' (as in hapana ila yeye ndiye aliyekwiba 'there is no alternative but that he is the one who stole [it]' [KG 82]), which inflated the abstract figures to some extent.

Note that the predictions made above should not be construed as "rules of government": LOC → pa / ___ $\begin{bmatrix} +N \\ +singular \\ +concrete \\ \vdots \end{bmatrix}$. Such a rule

would make these features part of the meaning of   pə, which would
clearly be false, since we do have cases of pə   being used with
abstract nouns, plurals, etc. The predictions state the nature of a
coherence relationship, which is necessarily relative. The skewings
give a measure of this relationship, but it may not be possible to isolate
all the factors relevant to the use of a form in every individual case.[17]

8. Conclusion

   To recapitulate: our statistical analysis of contextual variables
has revealed that:
1. Pə existentials are relatively skewed toward contexts where the
entity whose existence is predicated is concrete, while ku existen-
tials are skewed toward abstract entities.
2. Pə more than ku existentials favor contexts where a particular
location is explicitly mentioned.
3. Pə more than ku existentials avoid plural nouns.

   If ku and pə were in fact freely interchangeable in existential
contexts, as our language consultants appeared to suggest, we would
have expected the choice between them to be arbitrary, and their dis-
tribution to be random. We find that not only is this not the case,
but the departures from randomness in all cases lend support to the
spatial meanings hypothesized for the locatives. We therefore conclude
that the same forms are being used in both locative and existential
contexts.

   Underlying the analysis presented above are the following assump-
tions about language:
(a) that grammatical forms have constant meanings;
(b) that differences in form should lead one to check for differences
in meaning;[18]
(c) that meanings can be tested by means of statistical analysis of
semantically relevant contextual variables;

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[17]See also Garcia [1975:495 ff] for a discussion of this subject.

[18]Bolinger [1968] argues similarly with reference to English com-
plementizers.

(d) that speakers may not be consciously aware of the meanings they are manipulating; therefore, "intuitive" judgments about meaning contrasts may not accurately reflect usage.[19]

Semantic hypotheses must be validated by observation of actual language use, not on the basis of intuitions.

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[19]These assumptions derive from the theoretical framework known as "form-content" grammar, an approach to the semantics of grammatical systems being developed at Columbia by Professor William Diver and his students. For a general introduction to the theory, see Diver [1975], introduction; Garcia [1975:Ch. 2]. For a detailed application of the theory, cf. Garcia [1975]. Other studies of Swahili within this framework are Leonard [1973], Port [1972] and Contini [1974]. For additional application of quantitative analysis of context, cf. Zubin [1974].

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