THE -IN GRID:
A Mathematical Order in Language
by way of Tagalog Verb Phrases

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In papers and lectures since 1995 I have proposed, as a mathematician turned lexicographer, that there is an underlying mathematical order in Tagalog ruled by quadrisections.

The idea derives from not one but two instances of the same perfect 2 x 2 permutation—an elementary mathematical construction—manifesting in the play of roots and affixes of Tagalog verb phrases (VPs):

The mathematic surfaces morphologically, in the first case, in the way our verbs express exactly four different time aspects; and semantically in the other, in the way the seven affixes of Tagalog VPs actually subdivide our verbs into four basic verbal actions.

The two quadrisections suggest a repeating combinatorial structure underlying our verb-building. For years, I sought evidence of it: first in VPs of the -um- affix, and then in those of the mag-. But the results were inconclusive, failing to resolve the very large databases into well-defined, self-evident grammatical sets, which was my objective.

The evidence, as it turns out, was waiting elsewhere, but nearby: in the VPs of the -in affix. Shifting over, an order quickly emerges, matching all expectations. The quadrisections are surer and the resulting order unmistakable, evincing an underlying mathematical process.

This monograph reports the results for the first time.

It will be demonstrated how a large random sample of Tagalog verb phrases may be progressively quadrisected to reveal a well-defined and symmetrical network, what appears to be a grid, of cognitive and linguistic contrasts, lying at the core of our language-building.

The method used is empirical and distributional. I take a large set of Tagalog VPs and progressively quadrisect it into smaller and smaller subsets of similar verbs. At each stage a different similarity or dissimilarity is brought to light so distinguishing the VPs in ever increasing detail until they are resolved into distinct grammatical sets.

Seven quadrisections of the grid are laid out. A database of more than a thousand -in VPs with nuanced English translations is used from the fourth quadrisection on to demonstrate the method. Four successive quadrisections are performed on the database, systematically subdividing it into 128 distinct grammatical sets (= 4^3 x 2, only half of the fourth quadrisection is explored.

1. Permutations.

In mathematics, problems which involve the investigation at any stage of a discrete number of possibilities usually fall under the general designation of combinatorial problems.

Consider the simplest possible problem in permutations: What binary numbers of two figures each can be formed with the digits 0 and 1? We may obviously form a table as follows:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>00</td>
<td>01</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

The combinations are all distinct and are 2 x 2 = 4 in number. The same is true even if we are permuting two non-numerical objects, a and b, or if we permute two different pairs of objects (a,b) x (c,d):
In other words, the intersection of two sets of contrasting possibilities produces exactly four possibilities. We call this a \( 2 \times 2 \) permutation.

Conversely, given a set of four combinations exhibiting intersecting attributes of the kind described above, we are led to surmise that a \( 2 \times 2 \) permutation is at work.

Take the foursome \((R, s, T, u)\). Closer investigation reveals that each element is the result of two either-or attributes: uppercase or lowercase, italic or normal type?

Thus, a random set of objects may be shown to exhibit the fundamental mathematical order of a \( 2 \times 2 \) permutation if it divides perfectly into the four possible permutations of two either-or attributes.

**DEFINITION.** We call the division of any set into two distinct subsets a *bisection* and represent it by a quadrilateral divided by a line down or across its middle.

![Bisection Diagram]

We call a *quadrisection* the division of a set into four distinct subsets by the application of two simultaneous bisections and represent it by a quadrilateral divided by lines down and across its middle, as below:

![Quadrisection Diagram]

### 2. Tagalog verb phrases

The minimal or “basic” form of the Tagalog verb phrase (VP), combines a simple root with a “basic” affix:

\[
\text{VP} \rightarrow \text{basic affix} + \text{simple root}\]

There are seven basic affixes used in Tagalog verb-building:

- the infix *-um-
- the prefixes *i-, mag-, mang-, ma-
- the suffixes *-in, -an*
The simple root *pasok* (enter), for example, combines with all of the basic affixes to become the following basic VPs.

- **pumasok**: go-into, enter, go-to-school, report-for-work
- **magpasok**: put-in, bring-in
- **mangpasok**: break-and-enter
- **mapasok**: get-to-enter-it, get-entered-into
- **ipasok**: put-it-in, bring-it-in
- **pasukin**: enter-into-it, break-into-it, enter-into-the-business
- **pasukan**: enter-through-it, report-for-it, enter-the-agreement

3. **Time aspects: Q1 (the first quadriecion)**

Tagalog VPs manifest four distinct time aspects, the verbal actions being any of the following:

- **Tentative**: proposed, possible, but unforeseeable
- **Predicted**: planned, expected
- **Ongoing**: begun and unfinished
- **Completed**: finished

The Tentative time aspect is expressed by the basic VP. We use it when giving a direct command or when imagining an event in an unforeseeable future.

**command**

- Magbihis ka. Dress up.
- Sige, itapon mo. Okay, throw it.
- Mahiyâ ka namán. You should be ashamed.
- Tikimán mo. Taste it.

or when imagining an event in an unforeseeable future.

- Puede ka tamaan. You could get hit.
- Makabawi man siyá… Even if he recovers…
- Baká kaya ko siyá talunin. Maybe I can beat him.
- Sana umulán. Hopefully it rains.

From the basic Tentative verb form we generate the three other time aspects as follows:

(a) Tentative to Predicted: repeat the first syllable of the root, keep the affix unchanged;
(b) Tentative to Completed: keep the root unchanged, and inflect the affix—either turn “m” to “n” or introduce an infix -in- or -um-.
(c) Tentative to Ongoing: inflect the affix as in (b) and repeat the root’s first syllable as in (a).

The different time aspects of the *pasok* VPs above are as follows, with the affix changes (flections) in **bold** and repetitions of the root’s first syllable (reduplications) **underlined**:
VPs of the -um- infix are the only ones that seem to break the pattern: dropping the affix in the Predicted and retaining the same affix in the Completed. The discrepancy disappears when the minimal, primitive form of the -um- VP, i.e., the root alone minus the affix, is used as the basic form, as we do in Alis ka diyan! (Get out of there!), Kain tayo (Let’s eat), Tulog na (Sleep now).

Studied closely, the pattern of flections and reduplications above may be seen to be a 2 x 2 permutation at work. The morphology of the time aspects of Tagalog VPs, it would appear, derives from two intersecting either-or decisions. Inflect or not? Reduplicate or not?

<table>
<thead>
<tr>
<th>Tentative</th>
<th>Predicted</th>
<th>Ongoing</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>magpasok</td>
<td>magpapasok</td>
<td>nagpapasok</td>
<td>nangpapasok</td>
</tr>
<tr>
<td>mangpasok</td>
<td>mangpapasok</td>
<td>napapasok</td>
<td>napasok</td>
</tr>
<tr>
<td>mapasok</td>
<td>mapasok</td>
<td>pinapasok</td>
<td>pinasok</td>
</tr>
<tr>
<td>ipasok</td>
<td>ipasok</td>
<td>pinapasukn</td>
<td>pinasukan</td>
</tr>
<tr>
<td>pasukan</td>
<td>pasukan</td>
<td>pumasok</td>
<td>pumasok</td>
</tr>
</tbody>
</table>

The four time aspects are revealed to be the four subsets of a double bisection of the universe V of Tagalog VPs, giving us our first quadrisection (Q1):

4. Verbal actions: Q2 (the second quadrisection)

A Tagalog VP of any time aspect has a focus. It is either doer-focus or object-focus, depending on whether the VP is describing a reflexive action on the doer or a directed action on an object. It is the difference in English between “He ate” (Kumain siya), and “He ate it” (Kinain niya). or between “He grew tired” (Napagod siya) and “It tired him” (Pinagod siya).

A minimal Tagalog sentence (S) is a verb phrase (VP) of any time aspect immediately followed by a noun phrase (NP).

$$S \rightarrow VP – NP$$

The NP may be either a doer noun phrase dNP (Hinampas ko “I hit it”) or an object noun phrase oNP (Tinamaan ako “It hit me” or “I was hit”).
Tagalog naturally distinguishes between doer-focus and object-focus VPs by its use of functional markers in the noun phrase(s) following the VP. Doer-focus VPs use so-called $m_1$ markers for their dNP and $m_2$ markers for their oNP. The reverse is true for object-focus VPs.\(^1\)

As it turns out, VPs using the -um-, mag-, and mang- affixes are always doer-focus; while those using the i-, -in, and -an affixes are always object-focus.

VPs using the ma- prefix, however, go both ways.

Some are doer-focus: e.g. matulog (go to sleep), makipaglaban (compete-with), maupo (take a seat) makakuha (manage to get); some are object-focus: e.g. máabót (manage to reach it), máatakot (be frightened by), máulanan (get rained on), mábili (get to buy it). To distinguish the two, we use a marked má- (with an \(°\) over the \(a\)) from hereon for the object-focus affix and retain the unmarked ma- for the doer-focus.

Thus, all VPs whose basic affixes are -um-, mag-, mang-, and ma- are doer-focus; while all VPs with basic affixes i-, -in, -an, and má- are object-focus.\(^2\)

\[
\begin{array}{c|cccc}
\text{doer-focus} & \text{um-} & \text{mag-} & \text{mang-} & \text{ma-} \\
\hline
\text{object-focus} & i- & \text{-in} & \text{-an} & \text{má-}
\end{array}
\]

This serves to bisect the universe V of Tagalog VPs of all time aspects into two distinct subsets according to focus. It is the first bisection in our second quadrisection.

The second bisection is revealed when we take stock of a large sample of both doer-focus and object-focus VPs.

We soon note that Tagalog VPs of whatever affix or focus, will often conjure up two contrasting semantic values. Consider the VPs

- umikot: turn, whirl, spin
- magtagál: be a long time
- mangdiri: revolt at
- magalit: get angry
- ibuhos: pour it
- buhayin: make it live
- bagsakán: drop onto it
- mákuha: get taken

In every case, the semantic content of the VP is either of “someone acting on purpose” or of “something happening of itself.” Even in English translation these VPs are ambiguous in the same way.

Is it a dancer whirling or a top spinning?

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1. $m_1$ markers = \{articles ang (followed by common noun) and si (plural siná) followed by proper name(s); pronouns akó, ka, siyá (I, you, he/she/it), kamí, kayó, silá (we, you, they), itó, iyán, iyón (this one, that one with you, that one over there)\}.

2. $m_2$ markers = \{articles ng (followed by common noun) and ni (plural niná) followed by proper name(s); pronouns ko, mo, niyá (me, you, him/her/it), namín, ninyo, nilá (us, you, them), nitó, niyán, noón (this one, that one with you, that one over there)\}.

2. We use “doer-focus” and “object-focus” to describe the affixes as well as the resulting VPs.
Is it to stand-around or to last long?
Is it to retreat in disgust or to feel aversion?
Is it to act in anger or to become angry?
Is it poured water or pouring rain?
Is it doctoring or engendering?
Is it to send onto or to collapse onto?
Is it taken as planned or by mistake?

That is, is the described action “volitional”—deliberate, conscious, self-controlled, an act of man—or “non-volitional”—non-deliberate, unconscious, autonomic, an act of nature?

A Tagalog VP is not always ambivalent in this way. Verbs like maglutò (cook), aralin (study it), or isumpâ (swear it) are always volitional; while verbs like tumulò (drip) manganák (give birth) or tamadin (get lazy) are always non-volitional.

But, whether doer-focus or object focus, all the eight affixes of the first bisection above will combine with roots to create both volitional and non-volitional kinds of VPs.

Thus, we can draw a line down the middle of the first bisection above, bisecting the same VPs a second time, now into volitional and non-volitional VPs.

Using uppercase and lowercase fonts to distinguish volitional and non-volitional affixes, the first and second bisections combine to give us our second quadrisection (Q2):

<table>
<thead>
<tr>
<th>non-volitional</th>
<th>volitional</th>
</tr>
</thead>
<tbody>
<tr>
<td>doer-focus</td>
<td></td>
</tr>
<tr>
<td>-um- mag-</td>
<td>-UM- MAG-</td>
</tr>
<tr>
<td>mang- ma-</td>
<td>MANG- MA-</td>
</tr>
<tr>
<td>object-focus</td>
<td></td>
</tr>
<tr>
<td>i-</td>
<td>I-</td>
</tr>
<tr>
<td>-in</td>
<td>-IN</td>
</tr>
<tr>
<td>-an må-</td>
<td>-AN MÅ-</td>
</tr>
</tbody>
</table>

We discover that the universe V of Tagalog VPs is divisible into four distinct subsets according to the intentionality—focus and volition combined—of the described verbal actions. Like Q1, Q2 is a 2 x 2 permutation: two either-or choices resulting in four combinations:

- non-volitional doer-focus VPs
- volitional doer-focus VPs
- volitional object-focus VPs
- non-volitional object-focus VPs

Four basic predications are distinguished:

Volitional doer does. I do.
Volitional doer does to it. I do to it.
Non-volitional doer does. It happens
Non-volitional doer does to it. It happens to it

In Q2, we learn that all our sentences essentially describe only four basic verbal actions, as defined and exemplified by the four basic predications above.
All quadrants of Q1 being equally and simultaneously quadrisected by Q2, the first two quadrisections together (Q1Q2) now subdivide the universe V of Tagalog VPs into $4^2 = 16$ distinct subsets, representing four basic verbal actions in four time aspects.

<table>
<thead>
<tr>
<th>TENTATIVE happen</th>
<th>TENTATIVE do</th>
<th>PREDICTED happen</th>
<th>PREDICTED do</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENTATIVE happen to it</td>
<td>TENTATIVE do to it</td>
<td>PREDICTED happen to it</td>
<td>PREDICTED do to it</td>
</tr>
<tr>
<td>COMPLETED happen</td>
<td>COMPLETED do</td>
<td>ONGOING happen</td>
<td>ONGOING do</td>
</tr>
<tr>
<td>COMPLETED happen to it</td>
<td>COMPLETED do to it</td>
<td>ONGOING happen to it</td>
<td>ONGOING do to it</td>
</tr>
</tbody>
</table>

5. Modalities of action: Q3 (the third quadrisection)

A third quadrisection is apparent from the distribution of the affix sets in Q2 above. Clearly, each of the four subsets produced by Q2 is divisible into four distinct affix sets.

**Definition.** An *affix set* is a set of Tagalog VPs with the same basic affix. In Q1 we noted that all the affix sets subdivided similarly into four different time aspects; in Q2 we subdivided the eight affix sets into four different intentionalities.

In Q3, we finally distinguish the affix sets according to their particular affixes. We affirm the obvious: All doer-focus VPs—volitional or non-volitional, of whatever time aspect—subdivide into the –*um-*-, *mag-*-, *mang-*-, and *ma-* affix sets. While all object-focus VPs subdivide into the –*i-*-, –*in-*-, –*an-*-, and –*må-* affix sets.

This is our third quadrisection (Q3).

<table>
<thead>
<tr>
<th>non-volitional</th>
<th>volitional</th>
</tr>
</thead>
<tbody>
<tr>
<td>doer-focus</td>
<td></td>
</tr>
<tr>
<td>-um-</td>
<td>UM-</td>
</tr>
<tr>
<td>-mag-</td>
<td>MAG-</td>
</tr>
<tr>
<td>ma-</td>
<td>MA-</td>
</tr>
<tr>
<td>mang-</td>
<td>MANG-</td>
</tr>
<tr>
<td>object-focus</td>
<td></td>
</tr>
<tr>
<td>-i-</td>
<td>I-</td>
</tr>
<tr>
<td>-in</td>
<td>-IN</td>
</tr>
<tr>
<td>-an</td>
<td>MA-</td>
</tr>
<tr>
<td>-må-</td>
<td>-AN</td>
</tr>
</tbody>
</table>

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3 Combining quadrisections: If Q1 and Q2 simultaneously quadrisect V such that $Q1(V) = A_1B_1+C_1+D_1$ and $Q2(V) = A_2B_2+C_2+D_2$ then the operation $Q1Q2$ is:

a) distributive such that $Q1Q2 = (A_1B_1+C_1+D_1)(A_2B_2+C_2+D_2) = A_1B_1 + A_1B_2 + ... + D_1C_2 + D_1D_2$, subdividing V into sixteen distinct subsets

b) commutative, i.e., $Q1Q2 = Q2Q1$; in general, $Q_xQ_y = Q_yQ_x$.

c) associative such that $Q_aQ_b ... Q_x(V)$, subdividing V into $4^n$ distinct subsets where $n$ is the total number of quadrisections combined.
According to Q3, Tagalog naturally recognizes four modalities of verbal actions, what manifest in our basic VPs as the four doer-focus affixes (-um-, mag-, mang-, ma-) and the four object-focus affixes (i-, -in, -an, mà-).

After three quadrisections thus (Q1Q2Q3) the universe V of Tagalog VPs is subdivided into $4^3 = 64$ distinct and well-defined subsets representing four modalities each of four verbal actions in four time aspects.

<table>
<thead>
<tr>
<th>TENTATIVE happen -um-</th>
<th>TENTATIVE happen mag-</th>
<th>TENTATIVE do -UM-</th>
<th>TENTATIVE do MAG-</th>
<th>PREDICTED happen -um-</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENTATIVE happen ma-</td>
<td>TENTATIVE happen mang-</td>
<td>TENTATIVE do MA-</td>
<td>TENTATIVE do MANG-</td>
<td>PREDICTED happen ma-</td>
</tr>
<tr>
<td>TENTATIVE happen to it i-</td>
<td>TENTATIVE happen to it -in</td>
<td>TENTATIVE do to it I-</td>
<td>TENTATIVE do to it -IN</td>
<td>PREDICTED happen to it i-</td>
</tr>
<tr>
<td>TENTATIVE happen to it mà-</td>
<td>TENTATIVE happen to it -an</td>
<td>TENTATIVE do to it MÀ-</td>
<td>TENTATIVE do to it -AN</td>
<td>PREDICTED happen to it mà-</td>
</tr>
<tr>
<td>COMPLETED happen -um-</td>
<td>COMPLETED happen mag-</td>
<td>COMPLETED do -UM-</td>
<td>COMPLETED do MAG-</td>
<td>ONGOING happen -um-</td>
</tr>
</tbody>
</table>

5.1 The difference between -um- and mag-

Q3 above is well-defined morphologically, but what 2 x 2 permutation accounts for this quadrisection is not easily established.

The correct use of these verbal affixes is the most difficult for the non-native speaker to master in Tagalog. No dependable grammatical rules are discernible. Compare a long list of UM- and MAG- VPs and no clear semantic contrast emerges, however strong the intimation of an underlying order. Consider the following:

*Pumások* (enter) and *magpasok* (bring in) are very different verbs while *pumaroón* and *magparoón* are almost synonyms (go there). We say *umawit* (sing) and *magbihis* (dress-up) but never *magawit* or *bumihis*. In the case of *bumasa* (read out), *umisip* (think up), or *lumakad* (walk) there is an odd shift in stress from middle to last syllable in *magbasá* (read through) *magisip* (think about), *maglakád* (go by foot).

In his *Preliminary Study of Affixes in Tagalog* (Manila: Bureau of Printing., 1937) Cecilio Lopez tells of “the almost inexplicable difficulty of distinguishing when to use -um- and when mag-, the safest way, perhaps, being an appeal to the Sprachgefühl, the speech feeling.”

Similar difficulties are encountered among the other affixes.

Even native speakers are not agreed—should it be *isulat* or *sulatín* (write it), *itulak* or *tulakin* (push it)? *Subukin* or *subukan* (try it), *pakuluin* or *pakuluan* (boil it), *butasin* or *butasan*
(bore it), *isu* or *susian* (lock it)? Is it *matulog* or *tumulog* (sleep), *malig* or *lumig* (bathe)? *Magpahingá* or *mamahingá* (rest)?

In a way, this entire work has been propelled by the desire to solve these difficulties: by a series of logical quadrisections to deconstruct the morphosemantic system of Tagalog and perhaps arrive at the sources of the -um-/mag- opposition and other troublesome constructions.

Having arrived at a seventh quadrisection below, I am able in retrospect to offer without further comment the following solution

<table>
<thead>
<tr>
<th>non-volitional</th>
<th>volitional</th>
</tr>
</thead>
<tbody>
<tr>
<td>-um-</td>
<td>make self happen</td>
</tr>
<tr>
<td>-mag-</td>
<td>make self do</td>
</tr>
<tr>
<td>-mang-</td>
<td>make self do-to</td>
</tr>
<tr>
<td>-ma-</td>
<td>make self happen-to</td>
</tr>
<tr>
<td>i-</td>
<td>make it happen</td>
</tr>
<tr>
<td>-in</td>
<td>make it done</td>
</tr>
<tr>
<td>-an</td>
<td>make it done-to</td>
</tr>
<tr>
<td>mâ-</td>
<td>make it happen-to</td>
</tr>
</tbody>
</table>

6. Basic movements: Q4 (the fourth quadrissection)

Examine a large sample of any of the affix sets of Q3 and two semantic contrasts soon present themselves, bisecting the sample twice along well-defined lines.

The more obvious of the two bisections has to do with the range or “location“ of the verbal action—

Does the described action all transpire in the same place or does it move between places? In other words, is the doer-agent of the action stationary or transient?

The case of the construction *hila*-IN (pull it)—pronounced and spelled *hilahin*—is instructive. Many different actions are signalled by this single VP. To tell them apart we depend largely in Tagalog on the object nouns given; in English the postpositions are critical:

- *hilahin ang karitón* pull the cart along
- *hilahin ang lubid* pull on the rope
- *hilahin ang salubsób* pull the splinter out
- *hilahin ang kaibigan* pull the friend over
- *hilahin ang tiradór* pull back the slingshot
- *hilahin ang sako* pull the sack across
- *hilahin ang drawer* pull open the drawer
- *hilahin ang buhók* pull by the hair
- *hilahin ang ancla* pull the anchor in
- *hilahin ang batà* pull the child back
- *hilahin ang bangkâ* pull the boat out

We can clearly distinguish between actions where the doer “stays in place” and where the doer “moves between places”.
The second, less obvious but more compelling, bisection has to do with the stages or "progress" of a verbal action. Does the VP describe an action being put "into motion" or being brought "to a conclusion"? In other words, is it an "effort" or an "effect"?

Note in the *hilahin* VPs above how certain actions seem to signal the beginning of something new, while others seem to describe the end of something before.

<table>
<thead>
<tr>
<th>action in place</th>
<th>action between places</th>
</tr>
</thead>
<tbody>
<tr>
<td>pull on the rope</td>
<td>pull the cart along</td>
</tr>
<tr>
<td>pull back the slingshot</td>
<td>pull the friend over</td>
</tr>
<tr>
<td>pull by the hair</td>
<td>pull the boat out</td>
</tr>
<tr>
<td>pull the drawer open</td>
<td>pull the sack across</td>
</tr>
<tr>
<td>pull the splinter out</td>
<td></td>
</tr>
<tr>
<td>pull the anchor in</td>
<td></td>
</tr>
<tr>
<td>pull the child back</td>
<td></td>
</tr>
</tbody>
</table>

The first bisection tells us that every verbal action has a spatial component, it occupies space, and that language naturally bisects that space into a "here" and a "there".

The second bisection, in turn, tells that verbal actions have a temporal component, i.e., they are temporary, they begin and end, and that language naturally distinguishes actions into beginnings and endings.

The two bisections together serve to subdivide Tagalog VP into four basic movements

<table>
<thead>
<tr>
<th>motion in place</th>
<th>conclusion in place</th>
<th>motion between places</th>
<th>conclusion between places</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEGIN to do</td>
<td>END doing</td>
<td>GO to do</td>
<td>COME from doing</td>
</tr>
</tbody>
</table>

This is our fourth quadrisection (Q4) It is a 2 x 2 permutation appearing to define the basic spatio-temporal boundaries of a verbal action. All the affix sets of Q3 submit to this manner of double-bisection.

After four quadrisections (Q1Q2Q3Q4), thus, the universe V of Tagalog VPs is subdivided into $4^4 = 256$ distinct and well-defined subsets representing four basic movements, four modalities each of four basic verbal actions, and four time aspects.
7. The –IN grid: Q4 to Q7 (the fourth to the seventh quadrisections)

To the mathematically-inclined four successive quadrisections of the kind described above tell strongly of a repeating combinatorial structure underlying our verb-building.

Seeking conclusive proof of it, I proceeded to examine large samples of -UM- and, later, MAG- VPs to see if they would submit to further such quadrisections. The results although always encouraging were never conclusive, failing to resolve the very large databases into well-defined, self-evident grammatical sets, which was my objective.

**Definition.** I call a grammatical set any distinct and well-defined subset of V, arrived at after a series of quadrisections, whose elements are morphologically alike, semantically similar and syntactically equivalent. In a grammatical set, in other words, VPs of the same basic affix would share some common meaning and turn into the same kinds of sentences. The evidence that I sought, it would turn out, lay elsewhere but nearby—in the VPs of the -IN affix. Shifting over, an order quickly emerges, matching all expectations. After Q4, three more quadrisections are manifested. The resulting order is unmistakable, evincing an underlying mathematical process.

We do not attempt in this paper to delineate the 2x2 permutations that account for these next three quadrisections. From Q5 to Q7 we are content merely to establish the subdivisions-into-four that would appear to produce our objective grammatical sets.

For the purpose, we focus our attention on the –IN affix set of Q3—the theory being that whatever order might manifest here, in a large sample of one affix set, should be similarly applicable to all the other affix sets.

In the Tables that follow we demonstrate how a large random sample of –IN VPs may be successively quadrisected into distinct grammatical sets, revealing a well-defined and symmetrical network, what appears to be a grid, of cognitive and linguistic contrasts, lying at the core of our language-building.

**Table 1: The –IN database** (p. 19)

Table 1 serves us our database. It is a Tagalog-English dictionary of close to 1,100 –IN VPs. Only the Tagalog rootwords are listed but they must be read with the basic affix -in to become the Tentative actions (Q1) described in the English translation.

Different values of the same –IN VP are listed separately.

By definition all the VPs listed are volitional and object-focus (Q2) and use the –in affix (Q3). For purposes of this study, the list is limited to the “stationary” –IN VPs that describe actions “in place” (Q4) – on the theory (again) that whatever order manifests here shall prove to be a useful template for an ordering of the “transient” –IN VPs that move between places.

Some of the Tagalog rootwords are led by secondary affixes—pa-, pag-, pang-, ka-, or the adjectival ma-. To set them apart from the primary roots they are presented, respectively, as p-, p^, p~, k-, and m-. A p^^ is used for the pag- prefix in –IN VPs that involve paired objects. Sometimes these secondary affixes double up, as in pp^ or pp~ (papag, papang-).

Rootwords or syllables that are underlined are meant to be pronounced twice.

The English translations include a subscript triangle ∆ specifying where the object noun belongs in the translation; when a specific object-type is indicated by the usage an example
Table 2: Grammatical sets (p. 25)

Table 2 presents the results after the seventh quadrisection, effectively subdividing a dictionary of 1,140 –IN VPs into a thesaurus of 128 grammatical sets.

The table divides into two parts under the headings {BEGIN, END} representing the "stationary" half of Q4.

Both parts are divided into four columns, representing Q5, each under an English keyword (all-CAPS and centered)

Each column is then divided into four subsets, representing Q6, each subset headed by an English keyword (all-CAPS and flushed right)

Finally each of the four subsets of a column is divided into four grammatical sets, representing Q7, each grammatical set under its own English keyword (all-CAPS and flushed left).

Table 3: The English keywords (p. 33)

Table 3 collects all the English keywords of Table II into a single table representing the -IN grid.

All of the English keywords, like the –IN VPs themselves, are used as transitive verbs, with direct objects understood to be following them. Read "MAKE it", "DO it", etc.

An English keyword applies only in the particular sense offered by the range of VPs it overheads. Each is carefully selected but is not be taken at face value. As in Tagalog, many of these English verbs are polysemous and, given the relevant postpositions and object nouns, could easily belong elsewhere in the grid.

In some cases, the keywords may have been better served by English noun-forms, but we have decided to stay with the verbs throughout.
Table 1. The –IN database

<table>
<thead>
<tr>
<th>Affix an –in to the Tagalog rootword to obtain the English meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>An example of each affix is given.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Affix</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>aral, study₃</td>
<td>aral, study₃(problem)</td>
</tr>
<tr>
<td>aral, study₃</td>
<td>aral, study₃(theory)</td>
</tr>
<tr>
<td>aresto</td>
<td>aresto, arrest₃</td>
</tr>
<tr>
<td>arreglo, settle₃</td>
<td>arreglo, settle₃(dispute)</td>
</tr>
<tr>
<td>aruga</td>
<td>aruga, nurture₃</td>
</tr>
<tr>
<td>asawa</td>
<td>asawa, keep₃(love)</td>
</tr>
<tr>
<td>asikaso</td>
<td>asikaso, attend-to₃</td>
</tr>
<tr>
<td>ating</td>
<td>ating, sight₃</td>
</tr>
<tr>
<td>ating</td>
<td>ating, target₃</td>
</tr>
<tr>
<td>assemble</td>
<td>assemble, assemble₃(car)</td>
</tr>
<tr>
<td>assembly</td>
<td>assembly, assemble₃(facts)</td>
</tr>
<tr>
<td>ataque</td>
<td>attack₃</td>
</tr>
<tr>
<td>atsara, pickle₃</td>
<td>atsara, pickle₃(attack)</td>
</tr>
<tr>
<td>atupag, prosecute₃</td>
<td>atupag, prosecute₃(plan)</td>
</tr>
<tr>
<td>awat</td>
<td>awat, quench₃(fire)</td>
</tr>
<tr>
<td>awat, separate₃</td>
<td>awat, separate₃(fighters)</td>
</tr>
<tr>
<td>away</td>
<td>away, provoke₃</td>
</tr>
<tr>
<td>awit</td>
<td>awit, reveal₃</td>
</tr>
<tr>
<td>ayos</td>
<td>ayos, arrange₃</td>
</tr>
<tr>
<td>ayos</td>
<td>ayos, fix₃</td>
</tr>
<tr>
<td>ayos, straighten₃</td>
<td>ayos, straighten₃(fix)</td>
</tr>
<tr>
<td>baak, split₃(in-two)</td>
<td>baak, split₃(in-two)</td>
</tr>
<tr>
<td>baboy, slobber₃</td>
<td>baboy, slobber₃(attack)</td>
</tr>
<tr>
<td>bago</td>
<td>bago, change₃(around)</td>
</tr>
<tr>
<td>bogo, discard₃</td>
<td>bogo, discard₃(for-the-new)</td>
</tr>
<tr>
<td>bahá</td>
<td>bahá, flood₃</td>
</tr>
<tr>
<td>bahagi, take₃</td>
<td>bahagi, take₃/share-of</td>
</tr>
<tr>
<td>balabal, use₃</td>
<td>balabal, use₃/as-a-shawl</td>
</tr>
<tr>
<td>balak</td>
<td>balak, intend₃</td>
</tr>
<tr>
<td>balangkás</td>
<td>balangkás, chart₃(out)</td>
</tr>
<tr>
<td>balangkás, outline₃</td>
<td>balangkás, outline₃(facts)</td>
</tr>
<tr>
<td>balewala</td>
<td>balewala, disregard₃</td>
</tr>
<tr>
<td>bálewala</td>
<td>bálewala, ignore₃</td>
</tr>
<tr>
<td>bali</td>
<td>bali, bend₃(apart)</td>
</tr>
<tr>
<td>bali</td>
<td>bali, bend₃</td>
</tr>
</tbody>
</table>
iyót, make-love-to
kabig, pull-back-on
kabig, scoop-back
kagát, bite
kain, eat
kalabit, flick-switch
kalabit, twitch-fingertip
kalabit, pluck-strings
kalabit, trigger
kalamay, kalamay
kalás, detach
kalas, unbind
kalaykáy, rake-up
kalbó, make
kaniyá, claim
kilala, kilala
kilabít, kilabít
kilabít, kilabít
kawit, kuha
kuha, kuha
kontra, kita
kilaw, cook
kikil, katok, call
kathá, compose
kaskás, shock
kamkám, shake
kaliwâ, cheat-on
kalaykáy, pull-back
kalas, pull-back
kalás, pull-back
kaló, shake (rattle)
kalong, sit-on-lap
kaltas, deduct
kamkám, appropriate
kamot, scratch-itch
kaniyá, claim-for-his-own
kasáw, whisk
kaskás, shave-ice
katám, plane-away
katás, extract-juice
katay, slaughter
kathá, compose
katok, call-by-knocking
kawit, hook
kayod, grate
kikil, file-away
kilala, acknowledge
kilala, identify
kilala, recognize
kilala, decipher
kilatis, appraise
kilaw, cook-vinegar
kiliit, tickle
kipkip, clutch
kita, ear
kontra, oppose
kuha, get
kuha, purchase
kuha, take (course-of-study)
kulam, bewitch
kulit, coax
kulit, curl
kumot, use-as-a-blanket
kumustá, ask-how-are-you
kumustá, ask-after
kunwari, deceive
kupit, filch
kupkóp, take-under-wing
kurót, pinch-to-constrict
kurót, pinch-to-hurt
kuryente, disinform
kuskós, scrub
kusó, handwash-fabrics
kuttingting, troubleshoot
kutkót, scrape-off
kuwarta, exchange-for-cash
kuwarta, profit
lampaso, mop
langháp, breathe
lansag, overthrow
lapastangan, maltreat
laró, divert
laró, fondle
laró, play-with(toy)
lásáp, savor
lasing, intoxicate
lason, poison
látigo, lash
layon, aspire
lechón, roast
lente, flashlight
libáng, divert
ligalig, harass
ligáw, constrict
liha, sand-away
likaw, coil
likhá, create
likhá, originate
likom, accumulate(a sum)
likom, roll(sheetc)
lító, touch-with permission
llók, sculpt(clay)
lilok, sculpt-statue
limás, boil(water)out
limás, dredge(pond)of
limás, dredge-up
limáng, publish
limós, beg
limot, forget
linaw, clarify
lingóng, look-back-at
linis, clean
linláng, deprive
lipol, move-down
litis, litigate
lító, befuddle
livanag, bring-to-light
livanag, elucidate
loko, dupe
locó, tease
lubid, twine-into-rope
lugi, deprive-of-profit
lukot, crumple
lulón, swallow
luma, age
lunók, swallow
lunok, swallow(pride)
lusaw, melt
lustáy, splurge
lutas, solve(problem)
lutó, cook-food
lutó, cook-meal
makinilya, type
manejo, steer-wheel
martillo, hammer-in
masa, knead
masahé, massage
hilot, massage-away
masilla, caulk
massacre, massacre
meeting, hold-a-meeting
memoria, memorize
mithi, wish
multó, haunt
munog, gargle
mura, curse
m-dali, hurry-up
m-liit, belittle
m-liit, think-little-of
nakaw, steal
ngalót, munch
ngatá, champ
ngutngút, gnaw
nguyá, chew
operá, operate-on
operá, remove-by surgery
organiza, organize(pieces)
organiza, organize-event
organiza, organize-unit
paét, chisel-away
pagod, tire
páppág, shake-sheetc(clean
pahí, erase
pakyáw, buy-wholesale
pala, shovel
paló, bat-throw
paló, spank
paná, shoot-with-arrow
panayám, interview
panády, smith-knife
pandáy, smith-metal
panot, close-crop(pate)
sipat, sight
sipit, clamp
sipol, whistle
sipsip, sip, with straw
sirá, break(order)
sirá, break(open)
siri, ruin
sisi, accuse
siyasat, research
slob, slob
sponsor, sponsor
subok, spy-on
suka, ferment into-vinegar
sukat, measure
suklát, comb into-place
sulat, write out
sumbit, shoot, blowgun
sundó, poke
sundó, prod
sungkit, pick, with-a-poke
sunód, obey
sunog, burn
sunog, burn(capital)
sunong, carry on head
suntók, punch
supísop, suck
suri, diagnose
suwáy, disobey
suyó, woo
tabás, move down
tabas, trim(cloth) to-shape
tabas, trim away
tablá, slice into-planks
tabó, fetch, with-a-dipcan
tadtád, mince
tagá, slash
tagá, loosen
timplá, mix(recipe)
 táhi, sew, (dress)
táhi, sew, together
takal, measure(volume)
takot, scare, into-doing	
takták, tap(containter), clean
talakay, discuss
talíma, abide
taló, challenge
taló, contradict
tamasa, enjoy
tambol, play, like-a drum
tampisáw, splash
tanáw, view
tanggál, eliminate	
tanggál, remove

tanggáp, accept/applicant

tanggáp, accept/charge

tanggáp, accept/logic

tanggáp, accept/delivery

tanghal, proclaim
tanóng, interview
tanóng, invite
tanteá, estimate
tapá, smoke
tapát, tell/honestly
tapid, trip(runner)
tapik, pat(pain) away
tapik, tap on-shoulder
tapos, end

tapos, finish/course

tarantá, fluster
tastas, unstick

tastás, unstick

tawad, ask-for/as-discount

tawad, take/as-discount

tawag, call/meeting

tawag, call/name out
tawag, call/name

tawag, call/over

tawag, call-to

tibá, harvest(bananas)
tis, endure

tilád, slice, end-to-end

timbáng, weigh

timplá, concoct

tina, cook in-dyebath

tinidór, fork

tipá, strum

tipák, chip

tipid, stint

tipon, compile(a sampling)
tira, shoot

tiyagá, suffer

tiyák, assure

tiyák, confirm

tiyák, inspect

tiyák, verify

tomado, advance, on-wages

tomado, take, as-advance

totoo, actualize

trabajo, work-on

ubó, profits

túbos, redeem

tugtóg, play/instrument

tugtóg, play/music

tuká, peck

tukláp, peel off

tuklás, discover/true

tuklás, explore

tukóy, pinpoint/(which)
tukso, tease

tukso, tempt

tuktók, knock

tulá, declaim(poem)
tuli, circumcise

tuligsá, assail

tumlpó, heap

tunaw, dissolve

tunggá, imbibe

tunton, track

tuós, compute

tupád, fulfill

tusok, impale

tusok, pierce

tuwid, straighten

tuyó, pat dry

ubos, exhaust

ubos, exterminate

ubos, finish, all-up

ugali, make, a habit

ugóy, rock, cradle

ukit, carve/design

ukit, carve/figure

ukit, carve/wood

ukit, carve/away

ulit, repeat/activity

ulit, repeat/song

ulit, repeat/information

ulól, fool

umpóg, headbutt

unat, stretch, out

unawa, understand

usap, recruit

usig, impeach

usig, persecute
<table>
<thead>
<tr>
<th>BEGIN</th>
<th>MAKE</th>
<th>PRODUCE</th>
<th>ADVANCE</th>
<th>EXECUTE</th>
<th>ADDRESS</th>
<th>AROUSE</th>
<th>ADOPT</th>
<th>FOLLOW</th>
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</thead>
<tbody>
<tr>
<td>GREET</td>
<td>grep_α</td>
<td>tawag, call-to_α</td>
<td>tapik, tap_α on-shoulder</td>
<td>kalabit, twitch_α w-shoulder</td>
<td>k-usap, speak-to_α</td>
<td>TOUCH</td>
<td>REVIVE</td>
<td>buhay, revive_α</td>
</tr>
<tr>
<td>TOUCH</td>
<td>hip_α, touch_α</td>
<td>haplós, stroke_α</td>
<td>himas, caress_α</td>
<td>pisil, squeeze_to_tenderly</td>
<td>laró, fonde_α</td>
<td>lambing, cuddle_α</td>
<td>COPY</td>
<td>cópia, copy_α</td>
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<tr>
<td>AROUSE</td>
<td>iyót, make-love-to_α</td>
<td>ENTERTAIN</td>
<td>láró, divert_α</td>
<td>libáng, divert_α</td>
<td>aliw, entertain_α</td>
<td>p-tawa, make_2 laugh</td>
<td>OBEDY</td>
<td>sunó, obey_α</td>
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<td>MAKE</td>
<td>GREET</td>
<td>tawag, call-to_α</td>
<td>tapik, tap_α on-shoulder</td>
<td>kalabit, twitch_α w-shoulder</td>
<td>k-usap, speak-to_α</td>
<td>TOUCH</td>
<td>REVIVE</td>
<td>buhay, revive_α</td>
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<td>PRODUCE</td>
<td>MAKE</td>
<td>PRODUCE</td>
<td>ADVANCE</td>
<td>EXECUTE</td>
<td>ADDRESS</td>
<td>AROUSE</td>
<td>ADOPT</td>
<td>FOLLOW</td>
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<tr>
<td>CREATE</td>
<td>likhā, create_α</td>
<td>gawá, make_α</td>
<td>yari, assemble_α</td>
<td>buó, bring_α (whole) together</td>
<td>organiza, organize_α (unit)</td>
<td>pandáy, smith_α (knife)</td>
<td>lîlok, sculpt_α (statue)</td>
<td>ukit, carve_α (figure)</td>
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<td>UNMAKE</td>
<td>COUNTER</td>
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<td>OBTAIN</td>
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<td>DELETE</td>
<td>ERASE CANCEL</td>
<td>ABANDON</td>
<td>ATTACK</td>
<td>LEARN</td>
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<tr>
<td>burá, erase_</td>
<td>bawi, rescind_</td>
<td>TARGET</td>
<td>bomba, bombard_</td>
<td>VERIFY</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>pawi, erase_</td>
<td>cancel, cancel_</td>
<td>bató, stone_</td>
<td>baril, shoot_w gun</td>
<td>piho, ascertain_</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>pahi, erase_</td>
<td>annul, annul_</td>
<td>paná, shoot_w with-arrow</td>
<td>tira, shoot_</td>
<td>segurado, ascertain_</td>
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<td></td>
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<tr>
<td>delete, delete_</td>
<td>REPLACE</td>
<td>sibát, shoot_w with-spear</td>
<td>p-tawad, forgive_</td>
<td>tiyák, verify_</td>
<td></td>
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</tr>
<tr>
<td>limot, forget_</td>
<td>bago, discard_for-the-new</td>
<td>sumpit, shoot_w_with-blowgun</td>
<td>p-tawad, forgive_</td>
<td>liwanag, bring_to-light</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-tawad, forgive_(debt)</td>
<td>iba, change_for-another</td>
<td>silaw, blind_w_with-light</td>
<td>p-tawad, forgive_</td>
<td>DISCOVER</td>
<td></td>
<td></td>
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<tr>
<td>DESTROY</td>
<td>CONCLUDE tapos, end_</td>
<td>PUNISH</td>
<td>buntál, punch_</td>
<td>tuklás, discover_(truth)</td>
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<tr>
<td>wasak, destroy_</td>
<td>putol, cut_(action)_short</td>
<td>sundag, strike_</td>
<td>hampás, strike_</td>
<td>alám, learn_(truth)</td>
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<tr>
<td>gibá, demolish_</td>
<td>DISOBEY labág, violate_(a law)</td>
<td>suntók, punch_</td>
<td>ubos, punch_</td>
<td>batíd, find_out</td>
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<td></td>
<td></td>
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<tr>
<td>basag, shatter_</td>
<td>salungát, disobey_</td>
<td>sampál, slap_(cheek)</td>
<td>eksayá, lustáy</td>
<td>MEMORIZE</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>sirá, ruin_</td>
<td>suwáy, disobey_</td>
<td>birá, hit_</td>
<td>gastá, violate_(a law)</td>
<td>dinig, hear_</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>punit, tear_up</td>
<td>sírá, break_(promise)</td>
<td>salpók, bang_</td>
<td>aksayá, waste_</td>
<td>huli, catch_(words)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>gutay, tear_to-pieces</td>
<td>balewala, disregard_</td>
<td>sipá, kick_to-hurt</td>
<td>ubos, exhaust_</td>
<td>intindi, comprehend</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>sunog, burn_</td>
<td>CONTROL STOP</td>
<td>siko, elbow_</td>
<td>said, exhaust_</td>
<td>unwá understand_</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>putók, burst_</td>
<td>pigil, prevent_</td>
<td>umpóg, headbutt_</td>
<td>sunog, burn_(capital)</td>
<td>hagip, catch_(meaning)</td>
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<td>p-sabog, explode_</td>
<td>awat, quench_(fire)</td>
<td>batutá, club_</td>
<td>pera, exchange_for-money</td>
<td>p-tood, watch_</td>
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<td>hagupit, batter_</td>
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<td>bugbog, pommel_</td>
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<td>ipít, clamp_</td>
<td>pingot, twist_the-ears-of_</td>
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<td>p-tigil, make_(motion)_stop</td>
<td>pitik, flick_on-knuckles</td>
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<td>ubos, exhaust_</td>
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<td>paló, spank_</td>
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<td>himás, rub_(pain)_away</td>
<td>latigo, lash_</td>
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<td>KILL</td>
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<td>p-babá, m_(pulse)_subside</td>
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<td>bitay, hang_by-the-neck</td>
<td>MODULATE patay, turn_off</td>
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<td>control, control_</td>
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<td>salvage, execute_ex-judicio</td>
<td>p-labó, make_dimmer</td>
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<td>massacre, massacre_</td>
<td>p-dilím, make_darker</td>
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<td>ubos, exterminate_</td>
<td>p-bagal, make_slower</td>
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<td>said, eradicate_</td>
<td>lansag, overthrow_</td>
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<td>lipol, mow_down</td>
<td>tabás, mow_down</td>
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<td>putol, cut_down</td>
<td>buwál, fell_</td>
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<td>GUARD</td>
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<td>平安</td>
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dale, kill
powersaw, chainsaw down
p-bagsák, collapse
p-tumbá, fell

REDUCE
CRACK
bayó, pound, heavily
dídkik, pound, slightly
ginger, grind
durog, crumble
kaskás, shave (ice)
Kayod, grate
Pino, refine
pulbós, pulverize
basag, crack
bungkál, till
DIVIDE
hati, divide
biák, crack in two
baak, split in two
punit, tear in two
bali, break length in two
patid, cut into lengths
putol, cut in two
lagari, saw in two
gupít, snap in two
sibák, chop

EXCLUDE
p-bábá, make (pitch) lower
p-liit, make (flame) smaller
p-bába, make, descend
WITHHOLD
ipit, withhold
tipid, stint
p-tagál, make (supply) last
p^kasya, make, suffice
p^hustó, make, suffice

ELIMINATE
alis, eliminate
pili, exclude
hirang, exclude
cesante, terminate (worker)
sipá, kick (member) out
p-talík, fire (worker)
p-alis, send, packing
REMOVE
alis, remove
panggál, remove
p-talík, fire
p-talík, fire (worker)
p-talík, fire, (worker)
p-alis, send, packing
p^hustó, make, suffice

PREVENT
ARREST
aresto, arrest
Fukó, nab
huli, nab
bihag, take captive
CONFINE
harang, block
ipit, constrain
antala, delay
detená, detain
DISCOURAGE
await, separate, fighters
sawáy, reproach
diciplina, discipline
bará, cut (clothes) off
hubó, take (pants) off
said, remove all
limás, bail (water) out
hukay, dig (earth) out
hawan, clear (weeds) out
SUBTRACT
bawas, subtract away
p^híwaláy, separate (foes)
p^layó, break (foes) apart

GRAB
pulot, pick up, w-hand
dampót, pick up, w-fingers
dákit, pick up, dustpan
ipon, gather
walis, sweep
kalaykáy, rake up
imis, clear (mess) up
pala, spade

ACQUIRE
WITHDRAW
hila, pull out
higit, yank out
bunot, draw out
hango, lift (pot) out of fire
hugot, pull out
dákit, fetch out of hole
HARVEST
ani, harvest
dukot, fetch out of hole

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<th><strong>RID</strong></th>
<th><strong>CLEAN</strong></th>
<th><strong>p-iyák, leave, in-tears</strong></th>
<th><strong>EXPEL</strong></th>
<th><strong>dazzle, to-shape</strong></th>
<th><strong>silk, dazle</strong></th>
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<tr>
<td><strong>cepillo, toothbrush</strong></td>
<td><strong>p-putú, clean, to-a-white</strong></td>
<td><strong>p-iyák, leave, in-tears</strong></td>
<td><strong>bugaw, drive, away</strong></td>
<td><strong>baliw, to-shape</strong></td>
<td><strong>bulag, blind, to-the-truth</strong></td>
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<tr>
<td><strong>kuskós, scrub</strong></td>
<td><strong>p-kintáb, clean, to-a-shine</strong></td>
<td><strong>p-putú, clean, to-a-white</strong></td>
<td><strong>pitik, flick, away</strong></td>
<td><strong>boycott, boycott</strong></td>
<td><strong>p-lalim, to-shape</strong></td>
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<tr>
<td><strong>kusót, handwash</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-kintáb, clean, to-a-shine</strong></td>
<td><strong>hampás, swat, away</strong></td>
<td><strong>snob, snob</strong></td>
<td><strong>alipustá, mock</strong></td>
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<td><strong>lampaso, mop</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>paspás, swat, away</strong></td>
<td><strong>p-lalim, to-shape</strong></td>
<td><strong>hamak, mock</strong></td>
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<td><strong>brush, brush</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>sipa, kick, away</strong></td>
<td><strong>m-liit, think, little, of</strong></td>
<td><strong>p-liit, reduce, (size)</strong></td>
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<td><strong>sabón, soap</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-talsik, slap, away</strong></td>
<td><strong>m-liit, think, little, of</strong></td>
<td><strong>p-liit, reduce, (size)</strong></td>
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<td><strong>linis, clean</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
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<td><strong>p-alis, send, away</strong></td>
<td><strong>assail, batikos, harangue</strong></td>
<td><strong>p-baba, lower, (height)</strong></td>
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<td><strong>hilod, scrub, (skin) of-stone</strong></td>
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<td><strong>p-talsik, slap, away</strong></td>
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<td><strong>tuyó, patdry</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
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<td><strong>mock, hamak, mock</strong></td>
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<td><strong>p-lalim, to-shape</strong></td>
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<td><strong>p-kintáb, clean, to-a-shine</strong></td>
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<td><strong>p-talasik, slap, away</strong></td>
<td><strong>m-liit, think, little, of</strong></td>
<td><strong>p-baba, lower, (height)</strong></td>
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<td><strong>kálbó, denude</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
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<td><strong>p-putú, clean, to-a-white</strong></td>
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<td><strong>hawan, clear, of</strong></td>
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<td><strong>snob, snob</strong></td>
<td><strong>p-liit, reduce, (size)</strong></td>
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<td><strong>patag, level, by-scraping</strong></td>
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<td><strong>alipustá, mock</strong></td>
<td><strong>hamak, mock</strong></td>
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<td><strong>p-lalim, deepen</strong></td>
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<td><strong>pantay, cut, evenly</strong></td>
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<td><strong>prune, prune</strong></td>
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<td><strong>oppose, oppose</strong></td>
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<td><strong>p-bábá, lower, (height)</strong></td>
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<td><strong>p-palí, shorten</strong></td>
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<td><strong>p-gáán, lighten, (weight)</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
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<td><strong>assail, batikos, harangue</strong></td>
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<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>pipí, squash</strong></td>
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<td><strong>p-iblá, leave, to-dry</strong></td>
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<td><strong>p-iblá, leave, to-dry</strong></td>
<td><strong>p-talasik, slap, away</strong></td>
<td><strong>p-talasik, slap, away</strong></td>
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<td><strong>DEFORM</strong></td>
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<td><strong>p-talasik, slap, away</strong></td>
<td><strong>p-talasik, slap, away</strong></td>
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<td><strong>p-iblá, leave, to-dry</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
<td><strong>p-limás, dredge, (pond) of</strong></td>
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BIBLIOGRAPHY


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