# THE PERFECTION OF UM

## A MYSTERY OF LANGUAGE UNRAVELLED

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## a mystery of language unravelled

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## PRELUDE

this report continues from two previous in lingbuzz, the grid of language in mar 2010 and the amazing rule of four in feb 2016. latecomers and strangers to the tagalog grid should visit the latter at least to gain best from this following work. i take it up from where i left off there, from these conclusions in particular:

> the quadrisections, we find, are telling our mental world apart! the grid is like a coordinate system for our organism's information sources. and this final foursome obviously represents four separate but communicating circuitries of an organism that are together responsible for its continued survival. [fig. 0]

| | |
|---|---|
| senses | mind |
| memory | brain |

> to perfect descartes, it would be

> {i see, i know, i will, i think} therefore i am

> the seeing i is our senses tracking things, the knowing i is our memory retrieving things, the willing i is our mind driving things, and the thinking i is our brain computing things.

> and should you wonder what kind of actions each of the foursome contributes to our language making, then that is precisely what the tagalog grid is spelling out for us, affix set by affix set, quadrisection by quadrisection. what senses are at work? what memories are required? what actions are available? what conclusions are desirable? (46-47)

in which light i now revisit the two um affix sets, the volitional UM and non-volitional *UM* grids, that appear also in amazing (pp.31-32). the intention was to possibly perfect both grids according to the lines suggested by the surfaced ruling quadrisection above (what i now call q-zero, qθ) and to see what other eurekas might be in store in that direction. the results are frankly astonishing.

the um verbs are really the natural starting point for any differential study of tagalog verbs. non-um verbs all seem somehow to be derivatives or sundry complications of

them. they appear to me to be the simplest verbs in tagalog, from which all the other verbs might be said to evolve.

this simplicity of um verbs is semantic in nature: um verbs are simple in that they describe the most simple actions—easy, natural, spontaneous, sure—whether as observed event or performed action. trivially, we might say that actions are 'simple' that are um verbs in tagalog.

what actually sets um verbs apart from the other affix sets, a keen appreciation of the range of verbal actions embraced by their english keywords (pp. 7-8) may provide an inkling. but it would not be enough, a contrasting reading of at least the mag verbs is essential. later with the perfected um grids in hand i try to pin down again with new keywords the semantic contrasts that set the different verbal affixes apart from each other.

by the grid, there are sixteen distinct and well-defined affixes in the language. they are our access to the grid. without them it was impossible to start breaking down the infinities of language into manageable sizes. (fig.1)

| Q2Q3 | | | | |
|---|---|---|---|---|
| | *involuntary* | | voluntary | |
| doer focus | *MAG* | *MANG* | MAG | MANG |
| | *UM* | *MA* | UM | MA |
| object focus | *IN* | *AN* | IN | AN |
| | *I* | *MÅ* | I | MÅ |

according to q2q3, um verbs are doer-focused, and can be either volitional or non-volitional. in tagalog, a doer-focus(ed) verb points to a *doer in action*, as opposed to object-focus(ed) which points of an *object acted upon*. actions are *involuntary* that are autonomic or non-volitional, what are listed in *UM* (italicized); as opposed to *voluntary* which are deliberate or volitional actions, what are listed in UM.

see the two um grids as they now stand on pages 7 and 8.

## 1  EVIDENCE OF A GRID

it all started with um, of course. of the sixteen affix sets of the tagalog grid, the two of um were the first to intimate a quadrisection to me. and of the eight quadrisections q1-q8 of the grid, the first to surface was q5, again in a deeper study of um verbs. i date these beginnings to 1992. afterwards, testing the same q5 on the non-um verbs the foursome looked as if it could be of general application for all tagalog verbs across the board. i wrote then:

The four categories of events into which all tagalog verbs appear to divide are best expressed by the keywords *Projection, Acquisition, Motion,* and *Transformation* [or] the simpler *Give, Get, Do,* and *Become.* (*The Grid*, a discovery in the human brain by way of Tagalog verbs, desktop edition,1994, 93-94)

q5 is essentially unchanged today except re-arranged into {move, become, go. get} in the key verbs {happen, happen-to, do, do-to}. the um database is vastly larger now and the four kinds of verbs then are now each broken down into 64 semantic sets by virtue of three further successive quadrisections q6-q8 of the database.

q1 was the second foursome to emerge. here it was that the first obvious evidence of a 2x2 permutation at work in the language appeared, strongly suggesting an underlying mathematic behind the seemingly recurrent foursomes in the language. in fact, the permutation offered up two more strong candidates for semantic foursomes: in the doer focus affixes {um, mag, mang, ma} and object-focus affixes {i, in, an, må} of our verbs— what later would shape up to be q3 and q4.

q2 was the last quadrisection to make an appearance. and what a dramatic finish. for here would soon unravel, another undeniable 2x2 permutation to be found at the heart of the language, this time in the morphology of the tenses of tagalog's verbs (figs.2a-b)

| | Q1 | | | Q2 | |
|---|---|---|---|---|---|
| doer-focus | IT HAPPENS | I DO | repeat syllable | PRESENT | FUTURE |
| object focus | HAPPEN TO IT | DO TO IT | basic root | PAST | POSSIBLE |
| | non volition | volition | | inflected affix | basic affix |

in mathematics this sort of successive 2x2 permutations at the bottom of things mark the underpinnings of a combinatorial system at work. not only was it astounding to encounter them in a study of language, but also compelling that these mathematical objects were only a step away from the machine language and boolean logic of modern computers.

it was a shocking coincidence of maths and language. indeed, if language was reducible to a finite series of 2x2 quadrisections, i thought, perhaps computers could be taught to speak after all.

it was obvious that q5's four groups of um could still be deconstructed into smaller and finer semantics sets. and given the symmetries found in q1-q4, it seemed reasonable to imagine that the verbs of an affix set, in all their semantic variety, were subject also to four quadrisections, and reducible to exactly 256 (=4x4x4x4) semantic sets.

this is really what the gridding has been all about. the aim forever has been to surface from the deep somehow the perfection of these four quadrisections q5-q8, not only for the um verbs but theoretically as to apply to all the affix sets across the grid.

there was little to go on with. where in q1-q4 there were the affixes at play to mark the way, here were no surface markers to go by. from q5 on, it was sheer speculation, a leap into the deep. for the most part what it relied on was the *sprachgefuehl* of it—this speech-feeling. tagalog's affixes had a way of making our verbs *feel* alike or different, for some reason. list up verbs of the same affix, and some verbs naturally *felt* as if they belonged together, they not only meant alike in some way but also turned into similar kinds of sentences in our heads, forming what i called 'grammatical sets'.

surfacing all the 4,096 (=256x16) grammatical sets of the grid in all its glory is the work i call gridding. the work is twofold. firstly, to sort out the verbs of an affix set into distinct, well-defined grammatical sets, with the aim of arriving at 256 of them per affix set. secondly, to find a logical arrangement of these 256 grammatical sets in a 4x4x4x4 grid reflecting the effects of four successive quadrisections at work.

it was easy enough, as it turned out, to break down a thousand-verb sample of any affix set into 256 more-or-less semantic sets. that an affix set was so reducible was soon a given with me. but coming up with four neat quadrisections of the 256 according to some dependable algorithm was easier said than done.

it was a blind search for semantic patterns in a jungle of syntax. what drove the hours was the intrigue of it, of why these foursomes and quadrisections and 2x2 permutations? one wanted to see what it was all about, and what further and greater truths might be coaxed out of the databases by them.

for years, neither um nor mag—or their interactions with the object-focus i, in, and an— would yield any convincing lines of subdivision. although semantic foursomes were cropping up everywhere, always there was some fuzziness preventing the four quadrisections from clearly and unequivocally forming.

around 2004 it was that, finally, in the volitional IN affix set, there arose the first tentative configuration of four successive quadrisections and the semantic lines that the tagalog grid was drawing. in 2006 i wrote the in- grid: a mathematical order in language by way of tagalog verbs for the 10th international conference of austronesian languages; followed by the peer-reviewed the tagalog grid (2011) and its ebook version the secret grid of language: a deep structure surfaces in tagalog. all were about IN and the evolving lines of q5-q8.

i had hoped by these reports to attract tagalog speakers everywhere to the work of the grid, to help scour the language, for gridding it entire was clearly not a job for one. but it was not to be. i took it that the work was too eccentric, or, that in the end it was meant to be solitary work; that perhaps only solitary work could integrally unravel the grid in a single lifetime. it would all have to be based on my own personal deep structure. so alone i bore the excitement and wonder of it all, ever in waiting for the next eureka,

revelling in every next new find in the jungle, in quiet anticipation of some unbelievable finale.

using the IN grid as template, i went on to grid the non-volitional *IN*, then the UM and *UM* affix sets, so giving me a fully-gridded affix set for each of the quadrants of q2; the result of this effort i reported out in lingbuzz in 2014, in amazing.

it was there in amazing, towards the end, in the very writing of it, that the rule of four took flesh at last, what i now call qθ (q-zero), what appeared to be the ruling foursome responsible for all the others, the key to the logic of the quadrisections that had been unravelling everywhere. with qθ came the promise of things deeper than imagined hitherto.

finally the accumulated evidence speculated from the raw data of tagalog verbs was pointing to a possible basis in the natural order of things for the grid and its digital-friendly manifestations of mathematical order in the language. qθ was telling us that language was logically traceable to an interplay of four blocks of data relating to organic processes centering in the human brain. (fig. 3:)

| qθ | |
|---|---|
| senses | will |
| memory | thought |

the arrangement of the foursome in the quadrisection was dictated by the tenses of the affixes in q2. note how the keywords 'will' and 'thought' now take the place of 'mind' and 'brain' in fig. 0. what 2x2 permutation was responsible for the foursome i will essay a solution to at the very end.

until this qθ result, the grid had been a stupendous piece of guesswork, the fruit only of a deep conviction that these mathematically significant linguistic markers in tagalog were there for some good reason, and that it brought language clearly into the realm of logical and scientific curiosity and inquiry.

with a qθ, for the first time, a rational basis was manifested against which the alignments of verbs so far arrived at in amazing could be tested against.

## 2  THE PERFECTION OF UM

if qθ was the underlying logic behind the eight quadrisection of the grid and the natural source of its mathematical order, one wondered how well did the already gridded data match up to it? and would it make the work of gridding the rest of the grid any easier and surer?

hoping to quickly add to the four affix sets already in evidence in amazing (UM, UM, IN,

*IN*), i began work on the mag verbs, but i would only give it up after a year so. mag is a very busy affix in tagalog in both volitions. there are many complex forms with secondary prefixes like magpa- or magka- or magkangda- and the special bilateral sense of it (both-do-together), plus its ever-readiness to turn untranslatable foreign words into tagalog verbs (mag-kudeta, mag-online, mag-immigrate, mag-evaporate). i had been there before. despite qθ, the semantic range still proved too vast and layered to submit easily to a satisfactory, definitive gridding.

what was needed to guide the work was a hard and fast result from a smaller and simpler sample, but that nevertheless filled up all the 256 slots of an affix's grid of grammatical possibilities. i determined it was better to return to um.

the um database was much shorter and had the advantage of already being gridded in amazing into 512 grammatical sets to start with. moreover, because um verbs told the simplest actions, they bore the added promise of yielding something elementary and fundamental about the nature of language: the role of qθ, the logic of the grid, and the value of the informations generated. in a perfection of um by way of qθ, i was confident, some very basic things in language and communication would come to light. as they have.

fast forward to three years hence and see now how it has turned out with the um verbs. find in the following pages the UM and *UM* grids as they currently stand (tables 1-2).

at last word count, there were 2,185 root verbs in the um database, 1001 root actions for *UM* and 1184 for UM. i began these lists by culling from a tagalog dictionary all the rootwords that i thought turned into good um verbs. i have added to them along the way, sometimes subtracted. it represents as thoroughly as possible my own entire um vocabulary as a native speaker.

no um affixed root useful as a verb in a sentence has been ignored. as is the rule for everywhere in the grid, every semantic distinction of a verb is significant. in any case no odd verb may be cast out, its mere thinkableness as an um verb requires that it have a true place in the grid.

the difference between *UM* and UM is established in q1 as the difference between involuntary and voluntary actions. the semantic bisection is easily accomplished on the um database, with um verbs that have both volitional and nonvolitional values going into both affix sets.

in the perfected *UM* and UM grids shown the two verb samples are each gridded down by four quadrisections (q5-q8) into 256 grammatical sets of distinct semantic values logically arranged in a 4x4x4x4 (=16x16) matrix. english keywords are used to unravel the results at every stage.

altogether 512 grammatical sets are identified by the english keywords (the white bars). there being sixteen affix sets altogether in the tagalog grid, the two results represent an eighth picture of the whole and now offers us a template for the rest of it.

| Q5Q6Q7Q8 of *UM* | | | | | | | |
|---|---|---|---|---|---|---|---|
| *IT HAPPENS* | | | | *IT DOES* | | | |
| **arise** | **pass** | **move** | **quit** | **join** | **part** | **go** | **come** |
| OCCUR | ELAPSE | QUICKEN | SUCCUMB | AGREE | VARY | PROPEL | STAY |
| commence | expire | sway | crash | resemble | differ | flow | remain |
| originate | fleet | rock | tumble | conform | reverse | advance | halt |
| advent | transpire | liven | conk | mix | diverge | fly | rest |
| resume | lapse | trigger | flop | synchronize | avoid | fall | suspend |
| APPEAR | DISAPPEAR | OBVERT | REVERT | ATTACH | DETACH | RELEASE | HOLD |
| shine | vanish | stretch | sag | align | isolate | scatter | cling |
| flash | evanesce | open | close | adjoin | withdraw | dangle | catch |
| dawn | set | stand | tilt | connect | disconnect | overflow | bottom |
| glimmer | perish | orient | upend | stick | unstick | drain | clog |
| SOUND | REPERCUSS | UNLEASH | CEASE | CONFER | DISPLACE | TRACK | LAND |
| roar | snore | rain | discontinue | protect | shift | trail | enter |
| resound | squeal | pelt | stop | support | lift | meander | impact |
| reverberate | belch | blow | expend | boost | budge | pass | dock |
| resonate | gasp | fume | exhaust | prop | slip | bypass | destine |
| ENERGIZE | RUPTURE | INFLAME | SUBSIDE | INDUCE | REPEL | EJECT | PENETRATE |
| glow | crumble | swell | abate | tug | retract | spring | infiltrate |
| blaze | split | erupt | stanch | suck | bounce | spill | pierce |
| smoke | pop | secrete | recede | incite | recoil | protrude | embed |
| boil | curdle | flare | heal | attract | resist | surface | sink |
| *IT HAPPENS TO* | | | | *IT DOES TO* | | | |
| **become** | **alter** | **gain** | **lose** | **absorb** | **reject** | **deliver** | **obtain** |
| DEFINE | DIM | THRIVE | DECLINE | RECEIVE | BLOCK | PROVIDE | CONSUME |
| brighten | darken | endure | wither | experience | shield | cause | devour |
| color | pale | strengthen | weaken | witness | bar | fulfill | deplete |
| cleanse | dirty | prosper | wane | hear | hinder | supply | weardown |
| clarify | blur | peak | slack | breathe | arrest | furnish | waste |
| FORM | DEFORM | INCREASE | DECREASE | ACCEPT | REJECT | REPRESENT | TOTAL |
| shape | distort | multiply | diminish | abide | violate | reflect | measure |
| straighten | contort | enlarge | reduce | regard | defy | refer | count |
| refine | roughen | grow | shrink | like | dislike | denote | contain |
| upgrade | downgrade | rise | drop | trust | doubt | signify | sustain |
| MATURE | DEGRADE | OVERLOAD | EASE | DESIRE | WHELM | IMPART | REACH |
| toughen | soften | oppress | comfort | crave | ravage | cast | reach |
| thicken | dilute | unsettle | becalm | require | raze | taint | tie |
| ripen | spoil | complicate | lighten | lust | disable | imprint | catchup |
| scent-en | stink | ache | resolve | dream | exterminate | influence | overtake |
| DEVELOP | REGRESS | MATCH | MISMATCH | THINK | FORGET | GENERATE | BENEFIT |
| enliven | deject | exceed | need | remember | scrap | reproduce | reap |
| behave | debase | suffice | lack | recognize | delete | breed | earn |
| motivate | retreat | meet | miss | understand | skip | sprout | profit |
| learn | retard | qualify | flunk | imagine | lose | payout | win |

Table 2. The *UM* grid

| Q5Q6Q7Q8 of UM | | | | | | | |
|---|---|---|---|---|---|---|---|
| **I HAPPEN** | | | | **I DO** | | | |
| **express** | **oppose** | **exert** | **relieve** | **interact** | **counteract** | **dispatch** | **situate** |
| VOICE | CRY | MOVE | REST | ASSOCIATE | DISSOCIATE | TRAVEL | SETTLE |
| recite | bawl | frisk | rest | attune | desert | wander | stay |
| utter | yowl | rouse | bestill | ally | defect | startout | halt |
| sing | weep | act | sleep | participate | withdraw | launch | shelter |
| talk | whine | feign | relax | coordinate | dodge | dive | immerse |
| DECLARE | REFUSE | POSE | REPOSE | LINKUP | UNLINK | VACATE | LODGE |
| confess | deny | extend | bend | accompany | disengage | drop | hang |
| consent | decline | stand | sit | join | backoff | unhand | hold |
| answer | object | arise | recline | mate | escape | descend | climb |
| decide | complain | lift | kneel | meet | evade | alight | ride |
| CONVEY | CRITICIZE | PROJECT | VOID | ASSIST | SUBJUGATE | TRANSIT | LOCATE |
| relay | fault | thrust | discharge | care | abuse | wend | approach |
| mention | unmask | slam | expel | contribute | deceive | transfer | enter |
| cheer | discredit | throw | excrete | help | obstruct | traverse | touchdown |
| praise | reproach | impel | exhale | rescue | prevent | detour | head |
| SIGNAL | WARN | APPLY | DISPEL | ADDRESS | AGGRESS | DEPART | ARRIVE |
| address | growl | play | scratch | invite | fight | evacuate | gather |
| greet | rebuke | wield | swipe | prompt | hurt | exit | appear |
| call | admonish | press | soothe | ask | attack | disperse | visit |
| notify | caution | pull | remedy | woo | shoot | embark | return |
| **I HAPPEN TO** | | | | **I DO TO** | | | |
| **confront** | **retreat** | **reinforce** | **regulate** | **undertake** | **eliminate** | **commit** | **source** |
| EXPOSE | HIDE | ENHANCE | LIMIT | IMBIBE | DISMISS | ATTEND | PARTAKE |
| peek | screen | prolong | shorten | view | rebuff | serve | chew |
| disclose | cover | harden | lighten | observe | shutoff | observe | feed |
| emerge | conceal. | maximize | minimize | study | disregard | tend | taste |
| surface | submerge | enhance | underplay | learn | discount | further | inhale |
| OPEN | SHUT | GREATEN | LESSEN | FAVOR | DISFAVOR | ASSUME | GRAB |
| gape | clamp | frequent | restrict | obey | disobey | use | claim |
| openeye | shuteye | add | subtract | honor | sneer | keep | snatch |
| spread | twist | accelerate | decelerate | prefer | refuse | carry | seize |
| smile | frown | raise | lower | endear | challenge | underwrite | steal |
| ORIENT | TURN | ARRANGE | REARRANGE | SEEK | DESTROY | WORK | FETCH |
| face | aboutface | leadoff | fallback | wish | ruin | farm | get |
| turnup | facedown | position | interpose | search | remove | plant | deduct |
| look | turnabout | cue-up | sidestep | chase | kill | make | draw |
| point | overturn | align | deviate | aim | eradicate | invent | catch |
| PREPARE | BEWARE | ASSIGN | RESIGN | PONDER | NULLIFY | INVEST | ACQUIRE |
| ready | cower | head | relinquish | recall | discard | stake | harvest |
| brace | prostrate | sit | abscond | identify | erase | spend | procure |
| await | ward | stand | surrender | discover | omit | venture | collect |
| lookout | fend | oversee | quit | solve | suppress | sneak | select |

Table 2. The UM grid

here is how the two grid are both laid out—follow the colours: (fig. 4:)

| q5a | q5d |
|-----|-----|
| q5b | q5c |

| q6a | q6b | q6c | q6d |
|-----|-----|-----|-----|

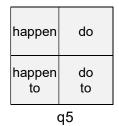| q7a |
|-----|
| q7b |
| q7c |
| q7d |

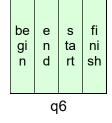| q8a |
|-----|
| q8b |
| q8c |
| q8d |

i have labelled the quadrants of every quadrisection {a, b, c, d}. note that the location of every grammatical set in its grid, may be pinpointed by which quadrant it belongs to at every quadrisection. the key verb at location aaaa, e.g., is "commence" in *UM* and "recite" in UM, and at dddd "win" and "select" respectively.

every grammatical set is thus reduced to a combination of four semantic values, one from each quadrisection, and every possible combination results in different, distinctive keywords.

in perfecting um, the immediate objective was to finalize the 512 grammatical sets with qθ in mind, re-arrange UM and *UM* both into some comparable semantic order, and to derive therefrom the best expression of the semantic values that differentiated the separate parts played by the four quadrisections.

in the end, the string of semantic foursomes that seemed to work best, for both *UM* and UM, at setting the four quadrisections apart were the following foursomes of english keywords: (fig. 5)

| happen | do |
|--------|----|
| happen to | do to |

q5

| begin | end | start | finish |
|-------|-----|-------|--------|

q6

| activate |
|----------|
| enable |
| mobilize |
| operate |

q7

| implement |
|-----------|
| execute |
| accomplish |
| achieve |

q8

q5. here is the {do, become, give, get} of the big bang of the grid 1992, essentially unchanged. q5b is where it all starts, where are gathered all the "descriptive" roots in *UM*, the most easily distinguished *UM* roots semantically for their usefulness also as adjectives, often (but not always) with the help of an adjectival ma- prefix, t*uma*mis (turn-sweet) into *ma*tamis (sweet), b*um*ilis (go-faster) into *ma*bilis (fast), or pumangit (turn-ugly) into simply pangit (ugly). with the descriptives in q5b as a pivot, the other quadrants divide up the rest of the roots into actives in q5a, interactives in q5c, and decisives in q5d.

q6. the business of this quadrisection are the semantic contrasts in our verbs between positive and negative, plus and minus, forward and back, for and against, in and out, on and off, yes and no, etc. the keywords i use above are deeply accurate but rather subtle on the surface so that q6 of all the quadrisections was the last to submit to a clear

arrangement of the columns. it was the perfection of this quadrisection in fact that signalled the perfection of um itself.

q7. this quadrisection appears to distinguish four modes of doing or doer actions, with varying shades of involvement, according as it is a kind of {activation, enactment, agency, or application}. it all seems to do with four different ways that we perceive an action originating and progressing in our consciousness.

q8. in this final quadrisection the same 256 grammatical sets are distinguished into four different kinds of doing-to or object actions. these are actions left behind by q7's doing and seem to do with four different ways that we perceive an action coming to a resolutiion or conclusion in our consciousness.
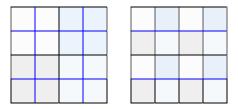
the perfecting of um went quadrant by quadrant, affix set by affix set, first *UM* then UM then back and forth between the two to reconcile them maximally, always with an eye to evidencing the rule and role of a qθ. compared to how they presented in amazing, both um grids are much revamped. although much also have kept constant, there are many realignments, many difficult and uncertain assignments in the past that have now found their true places in their grids.

once in a while i still return to these tables and change a keyword or two, or flip their positions. very rarely an odd um verb or usage shows up in conversation that i cannot locate properly in the grids and i must rethink my reading of some grammatical sets, and sometimes have needed to combine two to make way for something new.

the database is ever fixing the grid in this way. so that it is easy to imagine that there is, theoretically, a perfect um grid to be reached when the entire universe of um verbs is captured and 100% represented in the two grids, every conceivable um verb unerringly at home in its proper and correct grammatical set. we are very close to it now i think.

what fuzzy edges remain have mostly to do with either too small a grammatical set of only one or two verbs, too short to really tell its real scope, or with the ones too large as to arouse suspicion of unlawful mergers. what these await are results from the other affix sets to help pin things down better. often in the work on UM and *UM*, a difficulty in one would later be solved by results in the other.

perhaps the most significant change wrought by qθ since amazing is a reversal in the order of q1 and q2, i.e., what was q2 in amazing is now q1 and vice-versa—it is focus first before tense, we are told. the flip was practically dictated by the need to keep the two grids' columns-and-rows intact when the old q1q2 sequence was threatening to flip things into a checkerboard effect during the work on q5 and q6. (fig. 6)

also there is a major shift in q3 and q4 with the ma affix sets of both moving from quadrant d to b. these switches effectively obviated any changes in tables 1 and 2, affecting only the lay of the keywords in q5 and q6 below, in conceivably another case of the grid self-correcting.

## q1-q8

here is how the eight quadrisection q1-q8 of the tagalog grid presently add up: (fig. 7)

| q1 | q2 | q3 | q4 | q5 | q6 | q7 | q8 |
|------|---------|------|--------|----------|--------|----------|------------|
| FOCUS | TENSE | DOER | OBJECT | | | | |
| nv-d | present | um | i | happen | begin | activate | implement |
| nv-o | past | ma | ma | happen to | end | enable | execute |
| v-d | future | mag | an | do | start | mobilize | accomplish |
| v-o | possible | mang | in | do to | finish | operate | achieve |

in q1: n=non-, v=volitional, d=doer, o=object

the first four q1-q4 are clearly marked in the language, deriving directly from the variety and habits of affixes in the verbs of our sentences, and appearing to evidence an elementary mathematical order underlying the surface structure of the language. it is as it were the syntax part of the grid—each quadrisection giving rise to a separate feature of the basic tagalog sentence

the second four q5-q8 have no surface markers in the language (except perhaps for q5b above), and entirely the result of a long and determined search for the four semantic quadrisections of an affix set that might logically mirror the syntactic quadrisections of. q1-q4. it is the semantic part of the grid—each quadrisection giving rise to a separate component of the verb's meaning—revealing the same mathematical order underlying the deep semantic structure of the language.

thus, we are told by the grid, that every sentence that we comprehend or produce may be seen to be the intersection of four elementary syntactic elements {q1-q4} and four semantic elements (q5-q8) in a single unit of meaningful information. one may declare, trivially perhaps, that separate things in consciousness turn into a unit of information by turning into a sentence.

in the um grids, we are looking at two examples of the 256 different ways per affix that q5-q8 can combine (permute) to bring us the distinctive verbal actions that turn into a grid's grammatical sets. whatever affix set it is, the same q5-q8 applies, and in each case a different set of 256 distinct grammatical sets is generated. it can happen in sixteen different affixes (see fig. 1) so that all together 4,096 grammatical sets make up the language.

it is in q3 that the difference between um and mag arises. and to the different pairings of doer and object that q3q4 generate we can trace the semantic difference, e.g., between a 'tumayo sa tayuan" (stand in place) and "magtayo sa tayuan" (erect in place), or

'sumama sa samahan' (go with other) and 'magsama sa samahan' (include with other). or bumuhay ng buhayin (bring it to life) and magbuhay ng buhayin (turn it on).

what is the difference between um and mag? to decide it once and for all, we wil need to grid mag down to its own 512 grammatical sets and compare with um. we are halfway there with the um results. but already there is a good glimpse of it that forms in the course of the continuing hunt for the 2x2 permutation behind qθ which i describe next.


# 3  THE NATURE OF LANGUAGE

where is qθ in it all? one might ask. and the answer it seems is, all over the place.

turning q1-q4's foursomes above (fig. 7) into nounal keywords, qθ looks a perfect fit, first, for q2 itself. and then again right across the four quadrisections. (fig. 8)

| | q1 | q2 | q3 | q4 |
|---|---|---|---|---|
| | senses | memory | will | thought |
| | FOCUS | TENSE | DOER | OBJECT |
| a | event | senses | engine | input |
| b | outcome | memory | mechanism | output |
| c | intention | will | driver | effect |
| d | objective | thought | processor | result |

each of q1-q4 appears to reflect in its own fashion some different aspect of qθ:

> in its sensitivities, qθ is q1, each of the four {senses, memory, will, thought} only perceiving and transmitting its own kind of information.

> in its physical functions qθ is q2, each responding to the information and triggering its own memories of similar events and the reactions indicated,

> in its mechanisms qθ is q3, each having its own powers of movement and direction for the advancement of desirable intentions.

> in its capabilities qθ is q4, each exercising its own manner of intervention towards the attainment of objectives (fig. 8:)

the identification of the tenses with qθ was already raised in amazing (when 'will' and 'thought' were still 'mind' and 'brain'):

> it would now appear that what we think of as separate locations in time are merely four separate activities of our organism communicating together in a single language, creating by their different and separate informations the illusion of time. . . .the past are the files in memory. the present is the information of the senses. the future are the actions of the mind. and the possible are the calculations of the brain. four different givens, one reality. (47-48)

in q3, i intentionally defer to computer-friendly keywords to reflect the connects that i am seeing with the technology, which will prove useful later below.

the serious gridder is encouraged to study fig.8 above very closely before moving on. one must grasp how these nouns are derivable from the sixteen syntactic markers of q1-q4 in fig.7. only when you are satisfied that you have got it, only then turn your attention to q5-q8 below.

in q5-q8, the keywords are already all elementary *verbs* instead. here one is called on to appreciate how each verb might be seen to apply semantically to the corresponding noun in q1-q4 above (fig. 9:)

|   | q5 | q6 | q7 | q8 |
|---|----|----|----|----|
|   | senses | memory | will | thought |
|   | MONITOR | TRIGGER | DIRECT | DECIDE |
| a | happen | begin | activate | implement |
| b | happen-to | end | enable | execute |
| c | do | start | mobilize | accomplish |
| d | do-to | finish | operate | achieve |

the suggestion is that each key verb above is defining the sort of verbal actions that each of qθ is functionally {sensitive to, triggered by, equipped for, and capable of}. and that it is the coincident interactions of the four at every given moment that generate the singular mental images that turn into the sentences we speak.

by these key nouns and verbs of fig. 8 and 9, we are told, all the basic elements and possibilities of a sentence are represented. thus, one might read any eight-string code of abcd's (or of digital bytes) as a distinctive generic sentence. what 'brands' the sentence, what makes every sentence different, are the nouns and verbs that are applied to particularize the information.

take the random string aabddcab, e.g. aabd (q1-q4) tells us that this is a present nonvolitional *UMxIN* event. in the *UM* grid, we see that dcab (q5-q8) is the verb "it fulfills". the generic sentence is 'it fulfills (or is fulfilling) it.' a particular usage might be "the apology fulfills his promise".

be mindful that while all the sixteen elementary verbs of fig. 9 are meant to apply to all the affix sets, the keywords appearing in the *UM* and UM grids are specific to um verbs and their grammatical sets. indeed, the same english keys may serve also in other affix sets but it would always be in some different semantic sense. as a rule, i avoid repeating keywords whenever possible, in hope of maximally contrasting the differences of the grammatical sets within and between affix sets.

keep in mind also that all these keywords for q1-q8 are meant to have both volitional and non-volitional semantic values as per q1. although we may normally think of 'will' and 'thought' as exclusively volitional affairs or 'happen' and 'happen-to' as non-

volitional, this is principally a difficulty in finding better keywords that will work across the volitional divide.

what does it mean to 'will' and 'think' nonvolitionally or to 'happen' and 'happen-to' volitionally? to capture my true intentions for these keywords, one needs to pore over tables 1 and 2 and take one's own measure of what grammatical sets are encompassed by each keyword. be guided by fig. 4 to the correct quadrant(s) and grammatical sets indicated by a keyword in fig. 9.

pay special attention in *UM* to what is being told of the non-volitional face of qθ. the important takeaway is that although we naturally associate the elements of qθ with our own mental functions, yet the grid is telling us that phenomenal nature also has its own brand of qθ, of {senses, memory, will, and thought} and the 256 grammatical sets of *UM* are their combined work, at their most elementary.

as one grows more familiar with the semantic layout of the two grids one is surprised at some of the semantic contrasts appearing between corresponding locations of *UM* and UM. in about half of the grammatical sets there are almost perfect matches as it were, volitional and non-volitional keys often similar enough to be synonyms in english.

but elsewhere are many striking semantic leaps that take some deep thinking and imagination to recognize as the result of the same affix on the same intersection of four elementary verbs. what did 'it commence' at aaaa in *UM* have in common with 'i recite' in UM, *e.g.*, or 'it elapses' with 'i bawl' at aaab?

this was a remaining perplexity and i was determined, if indeed i had everything right with the um grids, that there must be extractable from the gridded data some more elemental notions and keywords that could explain the empirical congruence of such as 'commence' and 'recite' in the natural scheme of things.

the ultimate hope, of course, was to discover with these keywords just what 2x2 permutation was actually responsible for qθ in the real, scientific terms that i felt the work demanded, for it was only this that would finally lock the grid and everything with it into place.

so it went: a still closer look at the two um grids, back and forth, in a hunt for the better keywords, always in the foursomes of a possible 2x2 permutation. slowly but dependably over time a useful line of thinking took form, following which on a forward course, eureka after eureka, a logical trail would finally clear that would take us all the way to the deepest sources of the grid and our human language. below is the quickest way there that i have found.

<center>behind qθ</center>

if we link the nouns of q1-q4 and the verbs of q5-q8 above into minimal sentences, we arrive at the sixteen logical statements in the white boxes below: (fig. 10)

<center>14</center>

| q1q5 | q2q6 | q3q7 | q4q8 |
|---|---|---|---|
| senses | memory | will | thought |
| MONITOR | TRIGGER | DIRECT | DECIDE |
| event happens | senses begin | engine activates | input implements |
| outcomw happens-to | memory ends | mechanism enables | output executes |
| intention does | will starts | driver mobilizes | effect accomplishs |
| objective does-to | thought finishes | processor operates | result achieves |

like we did in amazing to arrive at qθ, we might also turn the above table, first by columns, into these four logical sentences:

the senses monitor {events that happen, outcomes that happen-to, intentions that do, and objectives that do-to}

memory triggers {senses that begin, memories that end, wills that start, and thoughts that finish}.

will directs {engines that activate, mechanisms that enable, drivers that mobilize, and processors that operate}.

thought decides on {inputs that implement, outputs that execute, effects that accomplish, results that achieve}.

put this way, the four sentences appear to be actually defining the functions of each of qθ in the very life system of an organism. taken in order, they may be seen to follow the actual progress of a moment of organic activity—the senses monitor something, a memory triggers a response, will puts it into motion, and thought brings it to a finish.

read the same table by rows instead, and we come up with the four statements below. this time the four sentences appear to describe the actual elementary operation of each of qθ in relation to each other:

when an event happens, a sense begins and an engine activates to implement an input.

when an outcome happens-to, a memory ends and a mechanism enables to execute an output.

when an intention does, a will starts and a driver mobilizes to accomplish an effect.

when an objective does-to, a thought finishes and a processor operates to achieve a result.

these quite logical statements make enormous sense when applied to the two um grids, showing each up as a simple 'action tree' that tracks the information and performance of a bit (byte?) of action as it moves in whatever order through each of the four 'gates' of activity that are qθ. ever at play are one of four monitors sensing something, a memory triggering one of four set reactions, a driver directing one of four devices, and a processor running one of four possible applications.

what was most stunning about these results, arrived at in a study of language, was that it was beginning to sound a lot like science. so reaching for my trusty old biology [textbook](#), i find in the unit on 'biology of man, chapter on 'body controls', this incredible opening statement about our nervous system:

> your nervous system receives impressions from your surroundings, stores them in the brain, originates activity, and carries impulses to all parts of the body. it coordinates the activities of several millions of cells in a single functioning unit—the control center for body activities. (625)

for here was qθ, lo and behold, in the simple prose of science. the matchups were unmistakable. one could actually stick qθ into that passage without missing a beat—

> [in] your nervous system, [the senses] receive impressions. . .[memory] stores them, [will] originates activity and carries impulses…[thought] coordinates—the control center

reading on, one could sense ever stronger the intersections with qθ and the widespread references to particular grammatical sets and groupings in *UM* (especially) and UM both. in the extracts below, all is about doers and objects and the verbs they carry, much of it non-volitional: [*brackets* and *abridges* mine]

[senses, will]
Impulses are carried along nerves in a two way communication system travelling along nerve fibers in one direction only. fibers of sensory neurons carry impulses to the brain, of motor neurons from the brain to the tissues and organs.
[will, volition]
Some areas of the cerebral cortex are *motor areas*. They are centers that control voluntary movement of the muscles.
[senses]
Some areas of the cerebral cortex are *sensory areas*. Senses such as seeing, hearing, touching, tasting and smelling are interpreted here. The vision center is in the occipital lobes.
[q1-q4]
The things we see, hear, and feel are registered as impressions in the sensory areas of the cerebral cortex. The things we do are controlled by the motor areas. The two areas are connected by a vast number of association areas.
[thought, will]
The frontal lobes are centers of emotion, judgment, will power, and self control.
[non-volition, thought]
The medulla oblongata controls the activity of the internal organs. Respiration. heart action, muscular action of walls of the digestive organs, secretion in the glands, and other automatic activities are controlled here.

<center>[non-volition, will]</center>

The cerebellum coordinates the muscular activities of the body, without its help impulses from the cerebrum would produce uncoordinated motions. nervous impulses do not originate from it nor can one control its activities

<center>[non-volition, will]</center>

The autonomic nervous system is entirely involuntary and automatic. It is composed of two parts: the sympathetic system regulates activity of internal organs—heart action, secretion of glands, blood supply to arteries, action of smooth muscles of digestion. . .

<center>[nonvolition, thought]</center>

The parasympathetic system opposes the sympathetic and maintains a system of checks and balances; e.g., if the sympathetic system acts to speed up heart action, the parasympathetic vagus nerve slows it down. [625-629]

the book is silent on memory, the hippocampus and hypothalamus etc. but it was enough there i thought to strongly recommend to one's logic and learning that qθ and the grid of verbs it generates in tagalog are all intimately related to our nervous system's processes.

for memory, i turn to t. z. young who has much to say about it in [programs of the brain](1978). in the chapter on 'controlling, coding and communicating', section on 'encoding in the nervous system', he has this to say:

> Just as each nerve fibre carries only one sort of signal so, with some simplification, we can say that each cell of the brain usually represents one word of information indicating the presence of certain limited features, say a blue rectangle with a given slope. Similarly a motor nerve may provide the command for one small action of a muscle. (50)

it reminds us not to limit our thinking of the work of qθ to the physical phenomena that we are consciously aware of. even thought itself, we are being told, is not going on only in our heads but in every living cell of an organism, each in its own fashion possessed of {monitors, storage, drivers, and processors} for its own purposes and survival. in our own autonomic nervous system many things transpire that do not need not to go to the central brain for instructions.

piecing it all together into a most probable 2x2 permutation, here is how it appears to all fall into place: (fig. 11)

|  | sensory system | motor system |
|---|---|---|
| activity | SENSES | WILL |
| action | MEMORY | THOUGHT |

<center>17</center>

i propose that the 'senses' and 'memory' are the two ends of the sensory system, where informations begin and end so to speak. while 'will' and 'thought' are two parts of the motor system, where performances 'start' and 'finish' as it were. the senses and will both are 'activities' in motion, in the foreground, while 'memory' and 'thought' are actions in place, in the background as it were.

to turn it into verbs, i look especially for familiar logical verb pairs, and finally decide on the 2x2 permutation below as the core qθ of the tagalog verb grid: (fig. 12)

|  | inform | perform |
|---|---|---|
| empower | stimulate | command |
| enforce | respond | control |

imagine now the organic processes of qθ {senses, memory, will, and thought} each given its share of these powers to {stimulate, respond, command, and control}, and we see where the 16 english keywords for q5-q8 (in fig. 9) have sprung from: (fig.13)

|  | q5 | q6 | q7 | q8 |
|---|---|---|---|---|
|  | senses | memory | will | thought |
| stiumulate | happen | begin | activate | implement |
| respond | happen-to | end | enable | execute |
| command | do | start | mobilize | accomplish |
| control | do-to | finish | operate | achieve |

we have reached the end of our trail. in fig 12 we have what all the evidence of the tagalog grid will have us believe is the wellspring from which all things in language are come to us. one can glean the effects of the permutation at work throughout the two um grids in every way that the four elements that make up our verbs may logically string up.

it is a q.e.d. for me, the end of a long lone journey into the meaning of this grid of verbs stumbled into that long ago.

i had suspected that the end of the grid would prove to be something also self-evident, logical, and axiomatic as the 2x2 permutation of its beginnings, and the $^42$ tetration that set its limits in amazing. and indeed it is the same, but deeper, 2x2 permutation that presents itself at the heart of the whole affair, with its vast complexity of organic possibilities suggestive of the same rule of progressive tetration.

we have reached, without a doubt, the firm ground of the grid upon which we can begin to build a new edifice of knowledge more in keeping with the true and mathematical nature of things, now perhaps made a little less mysterious in its wonders with a grid we now possess.

three things before i go: an answer to a perplexity, a conjecture about language, and a proposal for science.

<div align="center">1</div>

the perplexity is from p. 14 and it asks: what does 'it commence' at aaaa in *UM* have in common with 'i recite' at the same location in UM, or 'it elapses' with 'i bawl' at abaa? let me show you all of it—these are the upper left corners of both grids, where the most elementary of the um verbs, non-volitional and volitional, are found: (fig. 14a, 14b)

| *UMq1q2ab* | |
|:---:|:---:|
| **IT INFORMS** | |
| **arise** | **pass** |
| OCCUR | ELAPSE |
| commence | expire |
| originate | fleet |
| advent | transpire |
| resume | lapse |
| APPEAR | DISAPPEAR |
| shine | vanish |
| flash | evanesce |
| dawn | set |
| glimmer | perish |
| SOUND | REPERCUSS |
| roar | rasp |
| resound | squeal |
| reverberate | belch |
| resonate | gasp |
| ENERGIZE | RUPTURE |
| glow | crumble |
| blaze | split |
| smoke | pop |
| boil | curdle |

| UMq1q2ab | |
|:---:|:---:|
| **I INFORM** | |
| **express** | **oppose** |
| VOICE | CRY |
| recite | bawl |
| utter | yowl |
| sing | weep |
| talk | whine |
| DECLARE | REFUSE |
| confess | deny |
| consent | decline |
| answer | object |
| decide | complain |
| CONVEY | CRITICIZE |
| relay | fault |
| mention | unmask |
| cheer | discredit |
| praise | reproach |
| SIGNAL | WARN |
| address | growl |
| greet | rebuke |
| call | admonish |
| notify | caution |

in answer, what all these key verbs have in common and distinguish them from the rest of their grids is that they are all 'informative' actions. in the nonvolitional *UM* the semantic is "it informs (of itself)". in the volitional UM it is "i inform (of myself)". in either case, column 'a' is of 'beginning' actions that inform and column 'b' of 'ending' actions that inform.

there are seven times more of these 'informative' actions in the language, but in the other affix sets, with every different affix producing a different variant or complication of them. only when all the affix sets are fully gridded, only then will we see the true range and variety of these informative verbs in a language.

<div align="center">2</div>

by rows, the yellow keywords tell us something else besides. um verbs, remember, tell

the 'simplest' actions in tagalog. and running down the columns, we see how q3 (the yellow bars) divides the most elementary of *UM* actions into verbs of {motion, light, sound, and energy} and the corresponding UM actions into verbs of language, that {express, reveal, transmit, and communicate}.

indeed it may be said that {motion expresses, light reveals, sound transmits, and energy communicates}, but perhaps not as metaphorically as the semantic distances may suggest.

a very deep implication is that spoken language must be an evolution of the same information structure and data exchange that is behind organic life. all language, it might be said, is nature embarked on the larger project of a greater unity of communicating organisms (as in a hive or a clan for example).

in which case what all these verbs in a grid amount to is not only a vocabulary of human language but, in its non-volitional aspect, a vocabulary of nature itself, for they are parts of the same story. from the words that our cells speak to the words out of our mouths it is the same q$\theta$ in concert, in the ever increasing complexities of nature's triumphs.

as i opined once in babel, in a cut of occam's razor:

> Why indeed should communication between organic cells operate differently from that between sentient organisms? Reasonably, they must both originate from the same organic principles and operate by the same algorithms.

but deeper still might we go and logically surmise, that the words that our cells speak must be rooted in their turn on the same language that communicates the atoms and molecules of our cells, and especially in its greatest successful complexity, the coding system of the dna and rna molecules that make all life possible.

3

an article in the financial times in june 2019 tells about evolution 2.0, an enormous prize being offered for cracking the mystery of dna, challenging scientists to chemically recreate the molecule. oxford biologist dennis noble, one of the judges, is quoted:

> The biggest problems in science today are: how life got going in the first place and what is the origin of the genetic code. We want to know whether the way information is encoded in DNA is the result of chance or whether there are good chemical reasons why the code should be the way it is. We don't even know whether it can be won at all—whether anyone can come up with a self-creating system for transmitting information.

i propose that artificial dna can come later. better first, to crack the mystery of the original, is to take the perfection of um and go for all the 4,096 grammatical sets and key verbs of the tagalog-english grid. the result will amount to a language genome and it is my suspicion that it will lead us to understand exactly what all those {a, c, t, g}s of dna and {a, c, u, g}s of rna are saying to each other. and then only for science to attempt to recreate each word and sentence chemically. ∎

A famous dictum of Galileo's, which has guided the sciences since their modern origins {was]: nature is simple, and it is the task of the scientist to demonstrate this, from the motion of the planets, to an eagle's flight, to the inner workings of a cell, to the growth of language in the mind of a child. . .

Linguistics has an additional motive of its own for seeking the simplest theory: It must face the problem of evolvability. Not a great deal is known about evolution of modern humans, but the few facts that are well established, and others that have recently been coming to light, are rather suggestive and conform well to the conclusion that the language faculty is near optimal for a computational system, the goal we should seek on purely methodological grounds. . .

The Galilean challenge has to be reformulated to distinguish language from speech, and to distinguish production from internal knowledge—the latter an internal computational system that yields a language of thought, a system that might be remarkably simple, conforming to what the evolutionary record suggests. Secondary processes map the structures of language to one or another sensory-motor system for externalization. These processes appear to be the locus of the complexity and variety of linguistic behavior, and its mutability over time. . .

There are suggestive recent ideas about the neural basis for the operations of the computational system, and about its possible evolutionary origins. The origin of the atoms of computation, however, remains a complete mystery.

<div align="center">

noam chomsky, 2016
on-the-evolution-of-language—a-biolinguistic-perspective

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