THE AMAZING RULE OF FOUR

FROM THE WORDS WE SPEAK TO THE HIDDEN MEANING OF THINGS

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2015

praise for the grid

TO BABEL AND BEYOND

a very good piece of work

Antoine Culioli, 2013

a new perspective and a reminder I am never too old to learn… well written, compelling, and important.

Julie Linden-Pascal, 2013

a very thorough set of both syntactic and semantic features. Linguists often leave this kind of thing incompletely worked out, but for technological applications in Natural Language Processing it's often important to have a fuller set…

Kie Zuraw, 2013

very impressive… fascinating stuff. I like the idea of recursive nesting of the grid, which would make for great economy in underlying neural structure… I guess only a Tagalog speaker could tell, but it certainly persuades me.

Tim Warner, 2012

Wow! A great book!... I hope that your work with Tagalog will inspire someone to do the same thing with English (and other languages).

IsaganCruz, 2012

THE TAGALOG GRID

Great stuff, Louie! The creative juices haven't diminished in you at all.

Rolando Dizon, 2010

groundbreaking… Truly amazing!

Isagani Cruz, 2009

THE GRID

a genuine discovery…

Nicole Revel, 2008

intriguing… I don't think that linguists these days would find the formalism daunting; they are used to much more.

Noam Chomsky, 1996

PINOY TRANSLATOR

Like other brilliant breakthroughs, Stuart's idea is so simple it's a wonder no one thought of it before.

Isagani Cruz, 1992

THE AMAZING RULE OF FOUR:
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by luis umali stuart
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1 PRELUDE

it is generally believed across many disciplines that language is an infinity, in the sense of there being an infinitely large number of ways that sentences may be strung together to express an unpredictable range of informations.

though that may be true in every respect, yet a twenty year running study of the tagalog language now suggests that it is a very finite number of sentences that are being strung up in infinite ways. and that it is the same limited set of sentences for any language.

the result comes by way of a mathematically inspired study of tagalog verbs that appears to organize them all by their meanings into no more than 4,096 different sets of synonymous verbs, perfectly mapped onto a logical array of columns and rows, like a grid.

all in all, the tagalog grid makes available to us an unexpected body of evidence in tagalog, by way of english, that would seem to explain a great deal about the mysteries of language in general and how the brain probably does the work of it, producing and comprehending it in its great detail and variety.

edge scientists working today on language and the brain continue to wonder how it all works. in the neurosciences, in computational linguistics, in artificial intelligence, in back of mind of every theorist of the mind, it is the same question, how is the brain organized, and how do language and knowledge come out of it?

this study will suggest that the grid is the missing link, and that it has everything to offer in the way of this quest. it is empirical work all the way and the attentive lay reader may find himself turning into an expert along the way. to the experts, i daresay that if ever a serendipity was, or a deus ex machina, or a holy grail found, you might find the grid may be the real thing.

the grid does to language what has never been tried before. it has broken it down into its meanings until one actually gets to the bottom of things.

technically, what the tagalog grid presents is an actual systematic deconstruction of language into a digital array of countable semantic elements.

systematic because it is step by step; *deconstruction* because it takes the language apart, piece by piece; *digital array* because it arranges the pieces in rows and columns that identify them in strings of 0s and 1s; *countable* because the arrangement has a fixed number of these pieces one could point to them and enumerate them; *semantic elements* because what the grid takes apart are the meanings of our sentences, and not their structures.

in the past, this deconstruction of language has always been done by breaking sentences up into so many kinds of words (parsing), and then working out the way the words string up in predictable ways when we speak.

in such a deconstruction the theory is that language and languages are about the different parts of speech and how they form sentences together (syntax) to produce meaning (semantics).

we learn about nouns and verbs, adjectives and adverbs, and the rest of them; about subjects and predicates, actors and objects and such. but none of these really prepares us for what even the simplest sentence might mean.

"come!" may be a simple command, a verb, and a sentence but how do we go from there to what it means?

this is the dead end of current language work and the kind of problem that the grid cuts right into. the grid takes the language apart semantically until it can go no further, and we are left this fixed, logical semantic framework, this grid of meanings, that appears to work for both my tagalog and my english.

the grid goes behind the syntax of language, shifting gears as it were, and approaches the problem of meaning from an entirely new perspective, driven by a series of curiously mathematical linguistic markers in the tagalog language, hitherto unremarked.

following the arrows, as it were, a grid structure is revealed that breaks down the semantic content of our words, rooting out the vital information from one sentence to the next.

the very careful and deliberate deconstruction happens in a meeting of the tagalog and english languages that i speak, the two vocabularies and grammars intimately intertwined in the unraveling and explication of the grid.

incredibly, what emerges from the exercise, is that semantically, or from the point of view of their meanings, there are only basically 4,096 elementary verbs at work in the language, only so many things going on in our sentences!

as to the non-verbs, all are distributed among the 4,096 verbs, so giving each elementary verb its own linguistic arsenal of words and phrases that we string together helter skelter into language as we know it.

each elementary verb is surfaced by the grid in the form of a minimal sentence, which is a verb and a noun linked together in an action; e.g., it's working, he'll be surprised, i hid, stop it.

as of this report, my gridding has already dug up 1,024 of these elementary verbs and minimal sentences, a quarter of the whole. i will show you them in chapter 2, with something of how they are arrived at and the direction the work is taking.

there are 3,072 more elementary verbs to track down in the tagalog grid, work that awaits the next flank of gridders. it is principally for them i make this record. tagalog-english bilinguals will have the initial edge here and especially those with good heads for both language and numbers.

with this report, i trust there will be ample material and practical method now on record for determined explorers to pick up the grid's tracks just as soon as mainstream science is ready for the paradigm shift from syntax to semantics that is required.

i refer interested gridders to three prior reports found on the web.

"The IN grid: a mathematical order in language by way of tagalog verb phrases" (nickname ingrid) was the breakout paper presented at the 10th international conference on austronesian languages (ical-10) in palawan in 2006 which is found in the summer institute of linguistics site (here).

The Tagalog Grid: A discovery in language by way of Tagalog verbs (nickname tagrid) is an introduction to the grid, peer-reviewed and published by the De La Salle University in Manila in 2012, available in print (here) An early draft of the same material is an ebook *The Secret Grid of Language: A deep structure surfaces in Tagalog* (here), with excerpts archived here and here.

To Babel and Beyond: How language is digitally coded in the brain (nickname babel) is a 2013 ebook ([here](#)) and is an elaboration of tagrid above in the context of current scholarship, with a gridding exercise on a sample English text.

all three materials revolve around the first array of 256 verbs that would surface in the grid, those of the IN affix in tagalog. one will find much essayed there on the basic mathematics and logical environment that drive this work, and something of the evolving theory and practice of the grid that bring us the present results.

we will not review here any of the stuff that is already there, except for the little that may be necessary for this one to stand alone.

none of the earlier reports quite prepares one, myself included, for the ambitions of this one. the surfacing of three more arrays of 256 gives one a much better view of the semantic layout of the grid, and certain unexpected essential truths begin to come into focus, and one can speak with more confidence.

in chapter 3, i will aspire to show up some of the wonders of these results in respect of certain scientific and philosophical quests, perhaps advance a theory of the grid's origins. but first let me show you in chapter 2 how the gridding is done, and the evidence that has been unearthed so far.

2 GRIDDING

how is it even possible? one might ask, to take apart the meanings of our sentences, differentiate the intention of one sentence from another. where do we even begin to draw the line between these informations. there seems an infinity of possible sentences, in 7,000 languages!

beginnings

it was in 1992, i was studying a long list of tagalog um verbs, when it struck me.

i should explain, first, that tagalog verbs come with affixes. a verb is always a root word with an affix attached, whether a prefix, an infix, or a suffix. "um" is one of those affixes, a prefix when the root begins with a vowel (awit *sing*, turns into umawit), an infix when with a consonant (kain *eat*, kumain).

besides um, there are mag-, mang-, ma-, i-, -in, and -an, plus a slew of combinations of them. pagsumikapan, e.g., combines three affixes in a single verb: mag-, -um-, and -an.

in all cases, an affix change in a tagalog verb signals a change in meaning. sometimes the difference is so subtle as to defy explanation as in pumunta and magpunta (x goes to), sometimes quite obvious as in pumihit (x turns around) and magpihit (x turns something around).

on the other hand, neither kain nor awit lends itself to a mag verb; it is always kumain and umawit, never magawit or magkain for some reason. but we do say both bumago and magbago, lumagáy and maglagáy, tumahî and magtahî. sometimes the affix shift requires an accent shift, as from umi'sip to magisip', buma'sa to magbasa'; we never say magi'sip or magba'sa. and we really don't know why any of it, we just speak that way.

what was the rule? one wondered, that made this sort of thing consistent somehow, that even toddlers could learn it correctly?

it had always puzzled linguists, "the almost inexplicable difficulty of distinguishing when to use -um- and when mag-, the safest way, perhaps, being an appeal to the sprachgefuehl, the speech feeling," as cecilio lopez once put it.[*]

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[*] Cecilio Lopez, *Preliminary Study of Affixes in Tagalog*. Manila: Bureau of Printing, 1937:37-9

so there i was going through these um verbs — sorting them out, looking for patterns, seeing what also made good mag, mang, or ma verbs, listening to them in my head, for you have to *hear* these verbs to decide it — when it occurred to me.

it occurred to me that the um affix was essentially turning root words into four different actions. the um verb was always either a "doing" (umawit *i sing;* umikot i turn), a *"*making" (pumutî *it whitens*, tumigil *i stop*), a "going" (sumali i join-in*,* pumasok *it enters*), or a "taking" (kumain *i eat,* kumita *it earns*).

it was a discernible semantic line and it raised a string of questions. was it true for all um? if so, might it also be true for mag? could these affixes actually be useful semantic markers? what semantic changes were being wrought from one affix to the next? could language be deconstructed this way?

these were answerable questions, i thought, and without even thinking i decided to run with it.

overview

twenty years later, let us pick it up from this summation in babel:

it happens		I do	
MAG	*MANG*	MAG	MANG
UM	*MA*	UM	MA
happen to it		do to it	
IN	*AN*	IN	AN
I	*MÅ*	I	MÅ

Fig. 1

    Remember that the revealed IN grid represents only a sixteenth part of the grid, only one of sixteen well-defined affix sets of Tagalog verbs.
    If the grid be true, every one of the sixteen affix sets above grids down to its own array of 256 English keywords, with corresponding locations in the 16 arrays producing related semantic forms. In effect, it is the same root

action manifesting in as many ways as there are affixes in Tagalog.

Across the red vertical divide is the corresponding location of IN's non-volitional counterpart, the (*italicized*) *IN* verbs of the language Imagine verbs like "get rained out" (ulanín) or "contain all of it" (lamanín) or "catch cold" (siponin).

We saw in Babel how an "exchange" in IN turns into a "replace" in AN, or an "occupy" into a "dwell;" or how a "seek" in the volitional turns into a "find" in the non-volitional. None of these semantic shifts between affix sets are firmly predictable just from the IN results. It is clear that only by a complete and thorough exposition of the Tagalog grid, of all its affix sets, can linguistics forge ahead from here. (*Babel*, 2013:84-85)

so, the tagalog grid divides up language into 16 kinds of verbs, the verbs' affixes serving as our markers. the IN verbs for example are all the verbs in tagalog that use the volitional -in suffix in its basic form.

in tagrid and babel, it was demonstrated how a very large sample of these IN verbs may be broken down perfectly into 256 different verb sets by dividing them up by their meanings into four subgroups four successive times.

the result was table 1 (opposite page), a semantic grid of 256 english keywords (the white rows), each one representing a set of tagalog and english verbal expressions that convey pretty much the same action as the keyword.

remember, these english verbs are translations of tagalog IN verbs and, as such, used strictly in the *volitional* sense, each action a conscious, deliberate act of a mind on something — as opposed to an act of nature that happens unthinkingly, as in an *IN* verb.

furthermore, as IN verbs, all are used strictly in the transitive sense, i.e., with direct objects immediately following them.

as indicated by the lead foursome {work it, make it, address other, target it} we append an "it" or a "one" or "other" or a "him" or "her" to the key verb to get the precisely intended verbal action. speak it, reveal it, obey her, hit him.

this is important because if it were some other use of speak, e.g., like "speak to her" or "speak up," it would involve a different affix in tagalog and it would not belong to the IN grid.

it is well to familiarize yourself with the set up of table 1. let me run you through as quickly as i can:

Q5Q6Q7Q8 of IN							
work it				address other			
CONFIRM	**NEGATE**	**PROVIDE**	**DISPOSE**	**INVOLVE**	**CONTROL**	**ATTEND**	**OFFEND**
SAY	VOID	FURTHER	END	FOLLOW	ELIMINATE	JOIN	ATTACK
speak	retract	undertake	discontinue	engage	slaughter	couple	punish
reveal	annul	consummate	cancel	answer	slay	embrace	hurt
mention	omit	fulfill	quit	obey	kill	visit	hit
interpret	withhold	accomplish	abandon	imitate	exterminate	meet	fight
DECLARE	FAULT	BETTER	REMOVE	ACCORD	DENY	BENEFIT	VICTIMIZE
praise	criticize	improve	strip	compliment	discharge	provide	maltreat
proclaim	mock	supplement	excise	favor	disqualify	gift	oppress
affirm	oppose	maximize	clear	grant	evict	serve	deprive
approve	assail	intensify	detach	gratify	depose	train	rob
STUDY	REGULATE	HANDLE	EXPEND	INSTRUCT	PREVENT	AROUSE	DISTRESS
examine	suppress	touch	spend	deploy	foil	entertain	disturb
appraise	shut	move	deplete	prompt	fend	impress	shock
compute	limit	strike	exhaust	command	restrain	tease	confuse
analyze	conserve	force	waste	urge	reproach	incite	agitate
SEE	TREAT	CAUSE	FREE	ASK	MANAGE	ATTRACT	MISLEAD
discover	remedy	start	loosen	interview	calm	invite	daze
look	mend	trigger	unleash	dun	comfort	summon	dupe
determine	relieve	propel	dislodge	consult	nurse	woo	deceive
discern	cure	energize	extrude	quiz	heal	tempt	trick
make it				target it			
TRNSFORM	**REVERSE**	**PRODUCE**	**UNMAKE**	**ADOPT**	**EXCLUDE**	**ATTEMPT**	**OBTAIN**
RECREATE	NULL	ORGANIZE	SUNDER	REMEMBER	DISREGARD	TRANSIT	POSSESS
record	raze	assemble	dismantle	practice	violate	travel	claim
replicate	explode	construct	collapse	repeat	misdo	enter	get
copy	erase	arrange	disarrange	learn	ignore	cross	seize
render	neutralize	combine	disband	revive	forget	reach	catch
MARK	DAMAGE	SUPPLY	RID	ACCEPT	REFUSE	TRANSFER	SOURCE
distinguish	sever	furnish	clear	cherish	avoid	carry	derive
designate	injure	increase	trim	believe	snub	hold	deduct
certify	break	fill	empty	assume	deny	convey	extract
answer	ruin	soak	drain	endure	disappoint	rescue	profit
FORM	DEFORM	CONVERT	REDUCE	AVAIL	DETAIN	EXPLOIT	CONSUME
style	distort	concoct	crumble	try	capture	trade	drink
fold	crease	mix	divide	use	arrest	invest	swallow
level	deface	process	crush	absorb	restrict	develop	eat
shape	disfigure	mature	dissolve	savor	delay	grow	chew
FIX	CHANGE	CREATE	SEPARATE	WANT	WITHDRAW	PURSUE	ACQUIRE
stretch	exchange	invent	sort	pray	gather	chase	procure
straighten	replace	produce	part	demand	sweep	target	stock
restore	alter	plan	filter	aspire	fetch	hunt	contract
resolve	modify	contrive	segregate	await	retrieve	seek	earn

The IN grid

there are 256 verb sets of IN (marked by the white boxes) which are divided up semantically into four groups, and each group into four again, four times altogether. "quadrisections" are what i call these subdivisions of verb lists into four, which is really all that gridding is about.

this IN grid represents four quadrisections of almost 1,800 tagalog IN verbs. of the eight quadrisections of the tagalog grid, this table represents the effects of the last four, q5 to q8, which when applied successively to the IN database produce this array of 256 IN verb sets.

the gray, green, yellow, and white boxes of keywords mark the successive quadrisections, in the same order.

q5 is marked by the keywords in gray dividing the IN verb sets evenly into four groups of 64 verb sets each. we write it up this way:

IN {work it, make it, address other, target it}

q6 is marked by the keywords in green dividing each of the four gray sections into four columns of 16 verb sets each. we see, e.g., that "work it," in the sense it is meant in q5, covers the four different actions in green:

work it {confirm it, negate it, provide it, dispose it}

q7 is marked by the 64 keywords in yellow dividing each green column into four levels of four verb sets each. "confirm it," e.g. is revealed to embrace four different meanings in IN:

confirm it {say it, declare it, study it, see it}

q8 is marked by the 256 keywords in white boxes dividing each yellow subset into four different verb sets. so that "say it" boils down to four possible elementary actions in IN:

say it {speak it, reveal it, mention it, interpret it}

if our table were interactive, click on any of these 256 white keywords and you find behind each one a collection of tagalog IN verbs and their english (and other) translations, all treated as semantic equivalents gridwise.

the verb set below of speak it, e.g., lists the roots and english translations, of six tagalog IN verbs; in english it would further include such synonyms as "enunciate it" or "utter it".

9

VOICE.
basa, *read.*out baybáy, *enumerate.* bigkás, *pronounce.* sabi, *say.* salitâ, *speak.* tawag, *call.*out

256 of this kind of verb sets make up the IN grid. you can see them all in the appendix but without the english translations.

all together 340 english verbs (4+16+64+256) are used as keywords to sum up the semantic uniqueness of tagalog's IN verbs in english.

according to the grid, these 340 english usages represent a particular class of english verbs distinguishable semantically from all others, what in tagalog are treated as the IN verbs. moreover, there are fifteen other such distinct and defineable semantic classes of english verbs, each one marked by a different verbal affix in tagalog,

the theory, of course, is that, like IN, each of those fifteen other affix sets reduces to its own 256 semantically distinct and well-defined verb sets (by way of its own 340 english keywords).

and the unavoidable implication is that all of tagalog verbdom is ultimately reducible to just 4,096 key english verbs, that's 256 verb sets times 16 affix sets.

of course, one is curious how these other affix sets will shape up and turn out. what range of english verbs might each cover? what semantic parameters set these affix sets apart? will this finally solve the lopez enigma? what other treasures might be in store? one wonders.

to the obsessively curious, these are irresistible questions and, since babel and IN in 2012, i have been digging away, and have come up with the grids of three more affix sets. in the process, unwittingly and happily, a kind of method to the gridding has developed and set in. let me update you.

the UM, *UM*, and *IN* affix sets

following in the steps of the IN grid, and using its semantic results as a template, i followed up with the also volitional UM affix set, then on to the

non-volitional *UM and IN* affix sets.

this gives us results now for each of q2's four basic semantic divisions of minimal sentences {it happens, it is happened to, i do, do it}. all together 1,024 verb sets are defined, a full quarter of the entire tagalog grid

it happens		I do	
MAG	*MANG*	MAG	MANG
UM	*MA*	UM	MA
happen to it		do to it	
IN	*AN*	IN	AN
I	*MÅ*	I	MÅ

q2q3

in the "I do", the UM verbs convey the simplest volitional acts of man; all are intransitive verbs with no object in mind, the action is of the doer on himself (called doer-focus in tagalog grammar). we sang, she is leaving, i will agree, you should try.

in the "it happens", the italicized *UM* verbs describe the simplest acts of nature among the verbs. as the nonvolitional counterpart of UM, they are also intransitive verbs (and doer-focus), but the action is of the doer on *it*self. it rained, she snores, it will grow, it may worsen.

in the "happen to it", the italicized *IN* verbs are the non-volitional counterpart of the IN verbs, also transitive and object-focus. however, they are actions on things by *natural* consequence. it was confirmed, it is being damaged, one will be impressed, it may be overcome.

in the "do to it" is where IN resides, with its 256 transitive volitional actions shown in the grid above. they are deliberately directed actions on objects (called object-focus in tagalog grammar).

study tables 1-4 (pp. 29-32) carefully. run through each one slowly, foursome by foursome, column by column. get a feel for the quadrisections. afterward, compare them with each other. check out how differently q5q6q7q8 affects each one. get a sense of the larger picture of the grid, and where the four

affix sets fit in.

if you have trouble with a keyword, remember that it is only as good as the lesser keywords it overheads. if it is a white key, you can actually check out the database and see what tagalog verbs the keyword represents (if you are a speaker).

note that all the english keywords are used as verbs — though many may sound like nouns (center, budget, face, profit...) or adjectives (ready, lower, correct, open). a rule i keep is that a key verb may not repeat in the same affix set, but may very well reappear in another, in the different sense offered by that affix set.

remember always about these keywords, it is not the verb alone that is gridded, but one with a doer noun or object noun attached, what i call the verb's "minimal sentence".

so that although a key verb may repeat in the grid, it is never the same verb, but always meant in the significantly different sense that the particular minimal sentence and location in the grid dictate.

be always aware that these keywords are not fixed entities, they are only my markers in a shifting environment. they may change with every sitting (and every gridder); they are only my own attempt to read and interpret and give shape to the semantic alignments that i am seeing.

the keywords are limited by my own english vocabulary, and i change them all the time. as it happens, the longer a keyword stays put, the surer one becomes of it. in the same way that the more affix sets are gridded, the surer we become of the true order of the grid.

<center>the way of the grid</center>

the work of gridding is basically one of sorting. at every stage it is no more than breaking up one list of verbs into four separate lists according to some aspect of their meanings.

my pet theory is that it is the same sort of sorting that happens when a child learns a language — tabula rasa, yes, but more like an empty and very large mathematical table (or crossword puzzle) waiting to be filled up.

in tagalog gridding, we begin with a very large sample of verbs of one affix set, i.e. of tagalog verbs that share the same affix, of which affixes there are apparently sixteen different in tagalog.

the affix tells us that the verbs it creates naturally form a well-defined class, a category unto themselves. so that sorting all our verbs into affix sets would be a good first step towards putting our verbs in order semantically. and after, we can study how the affix sets compare.

below, i break down the work of gridding into eight steps .

1. <u>build a list</u>.

you must speak tagalog well enough to do this correctly.

take a tagalog dictionary of your choice; the bigger it is the longer and more thorough your database will turn out. and the closer to the truth in the end.

choose an affix set, say UM, and run through the dictionary from end to end, a to z, listing up every root word that you think makes a good UM verb. to be sure, conjugate the verb to yourself, kain, kumain, kumakain, kakain. if it doesn't conjugate easily, exclude it.

if still uncertain, use it in a minimal sentence and imagine a circumstance when the sentence would be applicable. if you can imagine it, list the verb.

include roots of even the most obscure verbs that strike you as logically possible, explicable, and translateable.

if in UM, remember that the verbs you are collecting are of the volitional kind, that are done deliberately, by a consciousness and not by accidence. umawit qualifies (someone sang), umulan does not (it rained).

you need list only the root words in your sample, and each only once for now even if you can think of different meanings for the same verbal construction. name your working document after the affix set, to keep the affix in mind.

about 600 root words to an affix set is a minimum sample for a decent database, a thousand up is ideal. the larger the database, the more precise the reading of the final defining action for each verb set.

2. <u>group similar verbs together</u>

re-arrange the list by grouping together verbs of similar meaning. one can do this in big or small groupings to start.

begin here to distribute different meanings of the same verb into separate

groupings. for uncommon verb usages, you might provide quick english translations if only to remind yourself later.

ultimately, the idea is to come up with 256 distinct and well-defined verb groupings per affix set, like in IN, but you don't have to go directly for it.

go for 64 subgroupings to start, leaving absolutely no verb out. give every loner verb its own subgroup.

choose a keyword to remind you what each grouping of verbs is about. think of the most common english verb that comes closest to summing up the semantic unity of the verbs in the grouping.

in UM, e.g., a grouping of the verbs {i talk, i voice, i say, i declare} gets the keyword "i speak."

an english thesaurus may help dredge up from memory good alternative keywords, although thesauruses, you will discover, generally lump together what in the grid are largely disparate verbs.

it is good practice to mark somehow whether the keyword is a doer verb or an object verb. sometimes i use a colon (:) before or after for an "i" doer or "me" object; or a period (.) for an "it" doer or object. but i don't use them here to unclutter the presentation (although some may linger about).

keywords repeat throughout the grid and these simple markers tell us where we are in the scheme of things and remind us how these keywords are to be properly read.

you may also use your own markers. the point is that not the verbs form the group but their minimal sentences and it matters greatly if it is a doer or object involved, and if the action is happening of itself or being done deliberately. these are the effects of q2 and they carry throughout the grid.

3. <u>do a q5 on the sample</u>

take now your 64 (or more) subgroups and break them up semantically into four columns according to this foursome

DO	BE	GO	GET

this is q5, the fifth quadrisection in the grid. it affects all the affix sets differently; later we will see just how differently it turns out for four of them.

here are sixteen sample entries specific for UM. they represent actual verb groups of the affix set and may be used for a guide when gridding the UM verbs

DO	BE	GO	GET
:express	:show	:interact	:adopt
:protest	:retreat	:inflict	:dismiss
:exert	:adapt	:locate	:undertake
:dispose	:forsake	:transfer	:obtain

the four keywords {do, be, go, get} must not be understood individually but in contrast to each other. their purpose is to give the gridder a basic sense of the quadrisection, what lines of contrast are being drawn in a very general way. they are extrapolated from the four results as root verbs without nouns.

{do, be, go, get} is only the simplest expression of the foursome. if it doesn't work for you, try one or other of the alternative expressions of it below, not all of them verb forms, that may be useful also as keys.

minimal verb	DO	BE	GO	GET
simple verb	activate	transform	locate	achieve
verb phrase	act out	turn into	act on	turn out
verbal	doing	changing	placing	getting
verbal noun	activation	formation	direction	possession
adjective	active	descriptive	locative	objective

q5 alternatives

these are deepseated and quite subtle distinctions raised by the grid. they may take some getting used to. what happens, the gridder will find, is that it is the distinctions that define themselves finally as the verbs align, the four lists of verbs grow, and the columns take final form.

one by one, then, select the most likely column for each of the 64 subgroups of your sample

you will find some verb groupings easier to assign than others, some will be outright troublesome. but cutting through difficult semantic fixes is really what gridding is about. the single objective is to find the perfect foursomes that will take everything in, leaving absolutely no verb out.

for speakers, helpful markers in tagalog for q5 are these syntactic patterns:

DO	BE	GO	GET
doer verb + ng + instrumental object	doer verb + ng + material object	doer verb + sa + located object	doer verb + ng + end object

if you are very lucky your 64 subgroups will subdivide about evenly into the four columns. but do not aspire it. it is more likely you will be missing some key verbs, from either not having a deep enough sample or from having misplaced them with others.

when you've gone as far as you can with q5, leave it as is and proceed to q6. it will help tell you how far you are from where you want to go and where the gaps might be. then you can return here with that knowledge.

4. <u>do a q6 on the q5 columns</u>

for q6, you basically return to your original 64 or more verb groups and subdivide them into four again, but according instead to this second foursome:

BEGIN	END	START	FINISH
:express :show :interact :adopt	:dislike :retreat :inflict :dismiss	:propel :adapt :locate :undertake	:dispose :forsake :transfer :obtain

this is q6, the sixth quadrisection in the grid. and it appears to divide up all verbs of an affix set into four verbal 'points of reference" as it were. (the 16 examples given are the same used from UM in q5, but subdivided now by q6.)

according to this, all verbs, of whatever affix set, be they DO, BE, GO, or GET verbs, may be seen to mark either an *on or off* action, whether *in place* or *in motion*.

	in place	in motion
on	BEGIN	START
off	END	FINISH

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the distinctions here are even more subtle than in q5 and the english keys try their best to give it shape. this is where apparently our sense for positive and negative things is drawn that gives us the yin-yang effect. here are some alternative foursomes to work with.

minimal verb	BEGIN	END	START	FINISH
noun	movement	reversal	progress	conclusion
adverb	yes	no	more	less
adjective	affirmative	negative	additive	subtractive

q6 alternatives

the best way to do q6 is on the columns of q5 a column at a time. this way shows the combined effects of q5 and q6 as you go along, creating a grid like below, which turns the columns of q5 into rows of four columns each in q6

	BEGIN	END	START	FINISH
DO	BEGIN DOING	END DOING	START DOING	FINISH DOING
BE	BEGIN BEING	END BEING	START BEING	FINISH BEING
GO	BEGIN GOING	END GOING	START GOING	FINISH GOING
GET	BEGIN GETTING	END GETTING	START GETTING	FINISH GETTING

q5q6

this is q5q6, where the two foursomes are combined to produce sixteen generically distinct and well defined semantic subgroups out of an affix set. applying q5q6 to the sixteen examples from UM, one will find below that each falls into a different semantic subgroup. they are in fact UM's *key verbs* for the sixteen verbal combinations of q5q6.

		q6					
		BEGIN	END	START	FINISH		
q5	DO	:express	:protest	:impel	:release	:CAUSE	UM
	BE	:show	:retreat	:adapt	:refrain	:EFFECT	
	GO	:interact	:aggress	:locate	:depart	:DIRECT	
	GET	:choose	:reject	:undertake	:obtain	:DECIDE	

q5q6 of UM

compare those with the corresponding key verbs in IN and see how different the semantic effect of q5q6 can be on different affix sets, though one can glean there the subtle relationships.

		q6					
		BEGIN	END	START	FINISH		
q5	DO	confirm.	negate.	provide.	dispose.	WORK.	IN
	BE	transform.	reverse.	produce.	reduce.	MAKE.	
	GO	motivate:	control:	attend:	offend:	ENGAGE:	
	GET	adopt.	exclude.	attempt.	secure.	TARGET.	

q5q6 of IN

see how "i express" in UM turns into a "confirm it" in IN, "i depart" to an "offend him." remember always to read the periods and colons along or provide for them if they are not there, they make a ton of difference.

keep a sharp eye on the semantic oppositions (that yinyang effect) formed between columns 1 and 2 and between columns 3 and 4. as you grid further, these will unfold in greater detail. get as good a fix on them as you can. they are a big help in guessing what verbs might go into problematical or empty slots.

continue to add verbs to your sample as new ones occur to you. the larger the database, the sharper the final verb sets will come into focus later.

now is the time to exhaust all the possible uses of the same affixed root, and see how they spread out across the grid. distinguish them in english using the most precise verbal expressions you can find for what you have in mind. have a good selection of tagalog-english dictionaries around to help decide difficult translations.

the objective in q6 is to reduce the columns of q5 into four subgroups each. all the verb groups of your original sample, to the last verb of it, must find a place within what shape up as your sixteen key groups of q5q6.

just as soon as you feel you have your sixteen, go on to q7 and q8.

5. <u>regroup for q7 and q8</u>

in q7 and q8 the gridding continues in much the same vein. the way q5q6 reduced the affix set to sixteen key verbs, q7q8 in turn reduces each of those sixteen key verbs into sixteen specific kinds of actions.

in preparation, revisit now your verb lists for each key verb of q5q6, and do your best to sort them out into precisely sixteen semantic sets each with its own unique english key. all told, you will be looking to come up with 256 (=16x16) semantic sets and keywords for the entire affix set.

if you get stuck at less than 256, fret not. one is likely to come up with a number of null groupings at this stage. there are fuzzy corners in the grid that don't shape up properly until the very end, their verbs lost in other places, or else outright absent from your sample.

eventually, q7 and q8 will ferret out these stow away verbs, and likely remind you of other verbs and usage you had forgotten.

6. <u>do q7 on the q5q6 verb groups</u>

take now the sixteen key verbs of q5q6, and one key verb at a time, sort its sixteen semantic sets into four subsets according to this third foursome

DELIVER
APPLY
IMPOSE
ENFORCE

this is q7 and it appears to divide up all verbs of an affix set, whatever key verb they may fall under, according to their "intention" or purpose. one might say that q7 picks up on the "how" of the verbal action, its method, its program of action.

this quadrisection is so subtle i have no alternative foursomes to offer for it, though i have toyed with many.

below, sixteen generic species of DO verbs, expressed as unique combinations of q5q6q7, sets the pattern for the rest of the affix set.

		q6					
		BEGIN	END	START	FINISH		
		begin doing	end doing	start doing	finish doing		
q5	DO	deliver a begin doing	deliver an end doing	deliver a start doing	deliver a finish doing	DELIVER	q7
		apply a begin doing	apply an end doing	apply a start doing	apply a finish doing	APPLY	
		impose a begin doing	impose an end doing	impose a start doing	impose a finish doing	IMPOSE	
		enforce a begin doing	enforce an end doing	enforce a start doing	enforce a finish doing	ENFORCE	

generic q5q6q7 of DO

similarly expand the BE, GO, and GET keys of q5q6, and 64 unique species of verbs are defined for the entire affix set.

the way to do q7 on q5q6 is a row at a time, column by column. in UM, e.g., take on "i express" first, sorting its semantic sets into four subsets, and then do "i protest" and so forth. my result for UM's DO verbs are the sixteen semantic subsets in yellow below.

q5		q6				q7	
		BEGIN	END	START	FINISH		
	DO	:EXPRESS	:PROTEST	:ACTIVATE	:DISCHARGE		
		:SPEAK	:CRY	:PERFORM	:RELEASE	DELIVER	q7
		:ASSENT	:OPPOSE	:MOVE	:DISPOSE	APPLY	
		:INFORM	:CRITICIZE	:PROPEL	:DISPENSE	IMPOSE	
		:APPROVE	:FAULT	:EXERT	:EXPEND	ENFORCE	
	BE	:SET	:RESET	:ADAPT	:REFRAIN		
	GO	:ENGAGE	:AGGRESS	:LOCATE	:DEPART		
	GET	:CHOOSE	:REJECT	:UNDRTAKE	:OBTAIN		

q5q6q7 of UM

in effect, it is the sixteen key verbs of q5q6 each going four different ways. we see, for instance, how "i express" is used here to embrace four meanings of it as a tagalog UM verb — {i speak, i assent, i inform, i approve}.

7. q7 to q8

as your 64 semantic subsets take shape and build up in number, be constantly aware that, gridwise, each subset should end up with precisely four verb sets in it, there being 256 to go around as the theory goes.

tentatively identify these four verb sets as you go along. if you are coming up with more than four, you know that all is not right with your subset. some verb(s) will need to join up, or move to another subset.

the idea now is to perfect what semantic sets already have the makings of a q8 and use those to pivot the more troublesome ones around.

as more of these q8 foursomes take shape, you begin to sense why the quadrisections must finally end with q8. either the verbs of a verb set are already too similar in meaning or simply too few in number to suggest any further semantic quadrisection across the board in tagalog.

when you have your 64 semantic subsets of q5q6q7 set up, however tentatively, move on to q8.

8. <u>do a q8 on q5q6q7 semantic sets.</u>

with what you have of the 64 semantic subsets of q5q6q7 reduce each one to precisely four verb sets each, arranged according to this last foursome

perform
execute
cause
obtain

this is q8 and it appears to subdivide all verbs of an affix set, finally, into four "objectives" of doing, four different ways that verbs have of accomplishing the intentions of q7. one might say that q8 picks up on the "why" of the verbal action, its motivation, its marching orders, so to speak.

here are other candidate foursomes for the quadrisection. it is the verb and noun together that create the best effect {perform activity, execute action...}.

verb	perform	execute	cause	obtain
noun	activity	action	effect	result
adjective	continuing	immediate	consequent	eventual
adverb	during	now	after	later
verb2	actuate	enact	activate	actualize

q8 alternatives

the four generic species of DO-DELIVER-perform verbs below, expressed as unique combinations of q5q6q7q8, sets the pattern for the affix set.

		q6						
		BEGIN	END	START	FINISH			
		begin doing	end doing	start doing	finish doing			
q5	DO	deliver a begin-doing	deliver a end-doing	deliver a start-doing	deliver a finish-doing	DELIVER		
		deliver a begin-doing performance	deliver an end-doing performance	deliver a start-doing performance	deliver a finish-doing performance	perform	q8	q7

generic q5q6q7q8

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in UM, the four yellow DO DELIVER semantic sets of q5q6q7 give rise in q8 to the sixteen white verb sets:

q6					
BEGIN	END	START	FINISH		
:EXPRESS	:PROTEST	:EXERT	:DISCHARGE		
:SPEAK	:CRY	:PERFORM	:RELEASE	DELIVER	
talk	bawl	emote	exhale	perform	
voice	yowl	act	emit	execute	q8
say	weep	prance	induce	cause	
declare	whine	pretend	evoke	obtain	
:ASSENT	:OPPOSE	:MOVE	:DISPOSE	APPLY	
:INFORM	:CRITICIZE	:PROPEL	:DISPENSE	DIRECT	
:APPROVE	:FAULT	:ACTIVATE	:EXPEND	ENFORCE	
:POSITION	:RETREAT	:ADAPT	:REFRAIN		
:INTERACT	:AGGRESS	:LOCATE	:DEPART		
:CHOOSE	:REJECT	:UNDRTAKE	:OBTAIN		

(q5 labels the rows: DO, BE, GO, GET; q7 labels the right block)

similar expansions of the rest of the yellow keys, and then the green, finally result in a grid of 256 verb sets altogether for the affix set. in effect, it is the 16 green key verbs of q5q6 each going 16 different ways semantically.

and that completes the grid of an affix set. by way of four successive quadrisections, we semantically distinguish 256 unique verbal actions per affix set, all perfectly arrayed behind a grid of english keywords.

it is by this method of deconstruction that i have arrived at the UM, *UM,* IN, and *IN* grids in tables 1 to 4 (*pp* 29-32), each re-arranged somewhat to fit all in a page, like this:

DO	GO
BE	GET

gridder notes

if you try gridding an affix set from the above descriptions and actually get this far, then you will have already gained a good appreciation of the inherent deconstructive power of quadrisections, as well as of the kind and amount of work that gridding these affix sets entail — how troublesome some verbs can be, how subtle some foursomes, how your mind can change from one sitting to the next.

with some verbs the semantic divides shape up early and never shift, some others don't give in till the end. one imagines differences where there are none, or see none where there are. you are sure of something in q5 or other, then it is trounced by something surer later in q8.

expect uncertainty and turns of mind. expect to be moving verbs around to the very end, cutting and pasting, constantly re-arranging things, as you re-appraise and re-adjust your thinking to the emerging design of the grid.

to be sure, at every quadrisection there is always one of the four subsets that will be the most clearly defined, whose verbs are the easiest to recognize and gather up. work to perfect this quadrant first and use it as a pivot for the other three. save the shortest lists for last.

keep the faith. sooner or later, the 64 semantic subsets of q5q6q7 will firm up their positions, and one is left to mull q8's foursomes of verb sets. this quadrisection is most difficult; though the verb sets are well-defined, their places in the foursome are easy to mix up, and never seem to settle.

just perhaps because q8 is the baseline of the grid, at the ground level of the database, where the verbs are happening in real time, that it is a constantly moving field and fuzzy is perhaps the normal.

at some point in q8, the thing to do is move on to the next affix set and hope that something there will help decide the difficult cases.

about now, you may want to translate the tagalog verbs in their verb sets into the language you are gridding. but for our purposes it is not required; the english keywords will do for now.

i did translations for IN in tagrid and babel, but have dropped it since. i will only need to redo them later anyhow to clean it up in wake of accumulated small changes. i think now it is downstream work that can be passed on and better accomplished in light of all 16 affix sets when completed.

the road we follow

to sum up the presentation so far, what is proposed is that:

1. all of tagalog's verbs are morphologically divisible into 16 affix sets
2. each affix set is semantically divisible into 256 minimal sentences
3. the 256 are the result of four semantic quadrisections of the affix set
4. and tables 1-4 are evidence of it.

the evidence is arrived at by gridding each affix set separately, the work being accomplished in four steps:

1. find and name the 256 verb sets of an affix set.
2. arrange the verb sets into a grid, essentially a 4x4x4x4 family tree.
3. name each grouping of four that emerges from the gridding.
4. compare and reconcile the results with other affix sets.

on the evidence of the four affix sets, the 256 is an actual limit, and as variegated semantically as any affix set can get; it is at least as far as the quadrisections will take us, as deep as the tagalog grid goes.

1,024 verb sets are identified for the four affix sets in tables 1 to 4. there are twelve more affix sets to go to complete the entire 4,096 of the tagalog grid.

once we get there, in theory, all the semantic elements shall be in place for the language to churn out its sentences, with all the parts of speech, the idioms, the syntactic forms, etc. all lined up behind their own verbs.

we take the cue here from tagalog where every verb is easily turned into a noun or other. ang ulan (the rain, how rainy), umulan (it rains), maulán (rainy), úlanin (rain-prone), kaúulan (just after the rain), paulán (a showering of, about to rain), káuulan (owing to persistent raining), etc.

in a manner of speaking, behind each key verb is the entire language of that verb, with all the semantic and syntactic pieces that enable it to link up grammatically with other verbs of the language.

what this means, down the line, is that with just 4,096 tagalog-english verb sets on file, a logically precise and comprehensive tagalog-english translator is guaranteed, all set up in a 4^8 digital array for easy computering.

the natural question is, will it work the other way? will it be as good an english-tagalog translator? will tagalog's grid of verbs also exhaust all english verb forms? or will there prove to be uniquely english verbs inexpressible in terms of the perceptive field of tagalog's 4,096 verb sets?

considering it, let me just say that even in the tagalog gridding, verbs are often left out in the cold, unable to find their places in the emerging foursomes. these are set aside for the time being.

each one is a reminder that everything is not yet right in the gridding, one's notion of the foursome maybe still off the mark, that an error needs fixing

somewhere. and not until every single odd verb is found its rightful place among the 256 verb sets can the grid of the affix set be considered solved.

i should expect it will be the same with recalcitrant english verbs. they will only trigger the same kind of corrective gridding across the board, as when we naturally shift things around to accommodate new stuff or replace old information with new, to make things fit, to make better sense of things, to understand better.

my strong inkling, after four affix sets, is that the tagalog grid will eventually prove to be a grid shared by all languages. and for all the scientific implications, it makes exploring the affix sets immensely exciting.

the english connection

the thing about q5 to q8 is that none of the revealed foursomes are obvious on the surface. they only show up when you are faced with a collection of verbs for quadrisection. and if you set your mind to distinguishing them into exactly four kinds of verbs, these foursomes emerge.

and when they do, the first thing we need to do is to to tell them apart, to name them. we use english keywords to name them here. but i can imagine a german trilingual reading this could come up instead with german keywords on the way to a german grid. or a chinese with chinese for a chinese.

as a bilingual, my turning to english verbs for keywords happened without thinking, drawn perhaps by a natural inclination to validate what i was seeing in tagalog in the other language i could speak, to immediately submit the evidence of tagalog to the logic of english.

it never occurred to me to give tagalog names (keywords) to these verb sets. from the get go, it was english verbs, as if i sensed from the start that the grid was for translation, and that there was nothing to be gained if the grid only made sense in tagalog.

as a result all that we now know of the grid we know only in terms of these english keywords and the semantic order they themselves turn out in translating the tagalog evidence.

in every way, it is these english keywords that finally give shape and meaning to the tagalog grid and, in the end, it will be a grid of 4,096 english keywords that will complete the picture.

each keyword is like a filename. it is basically to remind us what a bunch of verbs is about that has come up in our gridding, to uniquely identify it for matching up against other bunches of verbs, for sorting.

as a sorting job, gridding relies heavily on these keywords; first, to name the verb sets that are emerged (the white keys) and then to name the foursomes that set them apart from each other (the yellow, green, and gray keys).

in the first instance, at the verb set level, we look at a collection of verbs very similar in meaning. we run through them and look for the english verb that would embrace all of them, and this becomes the keyword for the verb set. it is little more than mental translation at this initial level and deciding which english verb in our vocabulary is of more general application than the others.

in effect, the verbs of a verb set are "synonyms" in the sense offered by the selected english keyword. theoretically the keyword may serve for any of these tagalog verbs in an english sentence without loss of meaning.

those are the white keywords and we need to come up with 256 of them per affix set. they are the action keys, the baseline of the grid, that divide up the verb sample into 256 different verb sets.

the 64 yellow, 16 green, and 4 gray keywords of the array are progressively harder to pin down. these are the structural keys that organize the 256 verb sets into a grid, by virtue of which we see the underlying semantic order.

by these keywords the tagalog sample is turned into a hierarchy of *english* verbs, from the most specific actions of a verb set to the most general in meaning that divide and define the affix set.

keywording is hard work because these verb sets have never been identified before, by linguistics or lexicography. there is no formal vocabulary for any of these alignments of verbs, no prior inkling that there were distinct semantic units there to point to. only now as the tagalog grid unravels them does the occasion for naming them arise.

what is amazing is how well english rises to the task. not only how every subtle turn of meaning in tagalog can be found an almost equivalent expression in it. but also how, in the process, the english succeeds so well in surfacing the deep logic of the tagalog groupings.

we input raw and ill defined tagalog verb sets at one end and out come these perfectly ordered semantic arrays of english verb forms in the other.

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to the tagalog gridder in english, gridding soon turns into an an incredible journey into the english we speak.

one is everywhere struck by how finely the tagalog verb sets cut through the semantic content of english verbs, turning many tiny untold differences into major divisions.

verbs we think of as english synonyms, used to define each other in dictionaries, and bunched together in thesauruses, are revealed to be uniquely different verbs gridwise, never to be found in a verb set together — in UM, e.g., fulfill, complete, accomplish, and achieve, all turn up in separate verb sets.

on the other hand, we are all the time surprised how a long list of seemingly very diverse things can be just four things after all. who would have thought, for example, that all of feeding could be reduced to just the four verb sets of {i eat, i drink, i inhale, i swallow}, or all of informing to {i report, i betray, i signal, i notify}?

in q6, one discovers how deeply the yinyang effect imbues the language from one affix set to another (follow the yellow keywords). yet also how familiar oppositions or antonyms in english — like move and stop, give or take, make or break, put and remove, question and answer — turn up distantly located in the grid, often in separate affix sets.

within an affix set the oppositions are often quite unexpected even if always logical from the affix's standpoint. UM starts it off with i speak and i cry:

:SPEAK	:CRY
:talk	:bawl
:voice	:yowl
:say	:weep
:declare	:whine

:MOVE	:DISPOSE
:sway	:eject
:turn	:disgorge
:rouse	:expel
:stir	:excrete

in i move and i dispose, the contrasts seem so distant at first, but the situation is saved when i dispose turns up an i excrete, famously validating the notion of voiding ones bowels as a kind of negative movement. tables 1-4 are full of these unexpected logical contrasts.

the more of these foursomes the gridder unravels, disentangling the fine lines of meaning in english, the greater the sensation that these foursomes of tagalog must also hold true for the english language.

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to the extent that the logic of the tagalog contrasts shines through the translations, and then raises in us no instant objections in english, one is led to think that subconsciously our english verbs are also submitting internally to the same logical divisions.

we sympathize with these foursomes, they also make perfect sense in english, and we grow in the conviction that the grids of english keywords that result, as in tables 1-4, are more than just english guides to a tagalog grid of verbs, but that they also present to us the keys to its english counterpart.

translate a tagalog verb set into english, and you will see how its english keyword also works for the english translations. so that by extension these keywords serve also to organize english verbs into corresponding english verb sets, precisely like the tagalog, so building up an english grid equivalent in every way to the tagalog.

which would suggest that the same eight quadrisections must also apply in english. and from there, it is only a step away to the proposition that what we have here is more than just a shared tagalog-english grid, but an actual grid of language, a deep semantic structure that potentially links all languages together.

in the next chapter, i pursue this thinking to one of its logical ends, and happily reach the end of my own quest, my long hunt for the rule of four.

Q5Q6Q7Q8 of UM							
it comes				it occurs			
APPEAR	**DISAPPEAR**	**ARISE**	**LAPSE**	**COMBINE**	**SEPARATE**	**TRANSFER**	**LOCATE**
SHOW	VANISH	COMMENCE	PASS	AGREE	DISAGREE	TRAVEL	STAY
shine	set	continue	transpire	imitate	deviate	flow	remain
flash	evanesce	proceed	fleet	resemble	violate	advance	occupy
glow	fade	arrive	elapse	accord	counter	spread	ride
spark	perish	recur	expire	coincide	abandon	exit	rest
UNFOLD	FOLD	UNLEASH	FALL	SUPPLY	REMOVE	TRANSIT	HOLD
open	close	rain	pour	cover	detach	enter	cling
upturn	invert	pelt	crash	add	fling	shift	anchor
stand	contract	blow	slide	supply	spill	head	catch
stretch	sag	waft	tumble	support	slip	reach	suspend
MOVE	STOP	TRIGGER	BREAK	JOIN	PART	ARRIVE	IMPACT
sway	cease	start	crumble	synch	retreat	descend	graze
shift	halt	ignite	crack	align	distance	land	hit
rock	quit	activate	disperse	mix	dissociate	approach	bump
yield	drop	consummate	disintegrste	connect	disconnect	appear	ram
REACT	RECOVER	RESOUND	FALTER	SUCCEED	FAIL	EMERGE	SINK
swell	subside	roar	snore	sell	flop	surface	submerge
discharge	stanch	blast	squeak	score	flunk	protrude	embed
inflame	restore	report	gasp	rank	miss	spring	insert
ache	heal	resonate	hiccup	qualify	miscarry	eject	impale
it becomes				it results			
BETTER	**WORSEN**	**GAIN**	**LOSE**	**RESPOND**	**REFUSE**	**PRODUCE**	**OUTPUT**
REVEAL	OBSCURE	PROSPER	DECLINE	THINK	FORGET	SIGNIFY	COMPLETE
brighten	dim	endure	age	muse	disregard	reflect	circuit
color	darken	steady	wither	recall	neglect	denote	traverse
clarify	pale	thrive	erode	imagine	ignore	serve	wend
define	blur	intensify	wane	suspect	omit	represent	cross
TRANSFORM	DEFORM	INCREASE	DECREASE	LIKE	AVOID	REPLCATE	EQUAL
improve	degenerate	greaten	lessen	admire	evade	portray	count
renew	tarnish	expand	shrink	favor	veer	mark	total
shape	distort	enlarge	reduce	trust	retreat	stain	contain
refine	roughen	heighten	lower	endear	dodge	impart	bear
UPGRADE	DEGRADE	PROGRESS	REGRESS	ABSORB	OBSTRUCT	GENERATE	DISPOSE
cook	overcook	adapt	rebel	experience	block	fruit	secrete
strengthen	dilute	respond	despond	imbibe	bar	sprout	excrete
ripen	ferment	learn	refuse	observe	restrict	reproduce	disgorge
mature	spoil	acquire	beware	endure	prevent	cause	expel
STABILIZE	DESTABILIZE	MATCH	MISMATCH	WANT	REVERT	BENEFIT	EXPEND
relax	oppress	fit	lack	hunger	bounce	reap	spend
becalm	disturb	equal	err	need	recoil	receive	consume
normalize	threaten	suffice	exceed	push	return	earn	deplete
ease	challenge	surpass	overreach	pull	reverse	win	exhaust

Table 1. The *UM* grid

Q5Q6Q7Q8 of IN							
it is subjected				one is affected			
PROMOTE	COUNTER	SUSTAIN	OVERWHELM	INDUCE	AFFLICT	STIMULATE	UNSETTLE
AFFIRM	DEROGATE	MAINTAIN	OCCUPY	SPUR	HURT	DELIGHT	AGITATE
recognize	dispute	prolong	overgrow	seep	wound	captivate	worry
embrace	denounce	extend	litter	leak	prick	entertain	disturb
establish	criticize	retain	inhabit	bleed	sting	excite	anger
depict	ridicule	detain	infest	suppurate	jolt	impress	bore
ENDORSE	AFFRONT	PROVIDE	ENVELOP	PROVOKE	HIT	ROUSE	DISMAY
honor	abuse	give	wrap	erupt	assault	awaken	bother
elevate	mock	show	shade	spurt	strike	prod	deject
approve	insult	send	cloudy	shed	collide	train	frighten
abet	scorn	inform	foggy	flush	graze	interest	discourage
DISCUSS	OPPOSE	PROPEL	INVADE	TROUBLE	AIL	AROUSE	DISABLE
mention	challenge	stir	plague	upset	infect	appetize	strain
reveal	taunt	shift	raid	pain	inflame	excite	impair
note	contradict	push	swarm	irritate	sicken	drive	tire
clarify	question	pull	infiltrate	torment	disease	motivate	starve
EXAMINE	ACCUSE	FURTHER	ENGULF	DISTRESS	COLLAPSE	ENTICE	BEFOOL
measure	blame	fulfill	penetrate	shiver	sprawl	persuade	stupefy
compute	cite	complete	bury	chill	drop	invite	entrance
analyze	unmask	realize	immerse	numb	sink	tempt	derange
appraise	indict	solve	swamp	cramp	convulse	challenge	dupe
it is changed				it is included			
TRANSFORM	REDUCE	BENEFIT	DISPOSSESS	ENTERTAIN	REJECT	ACCOMPLSH	OBTAIN
GENERATE	DESTROY	ENHANCE	DEGRADE	THINK	FORGET	TRACK	PULL
grow	ruin	heighten	sour	regret	disregard	survey	tow
sprout	damage	increase	stale	remember	cancel	follow	pluck
swell	obliterate	expand	spoil	imagine	omit	cross	drag
mature	devoid	secure	corrupt	dream	violate	reach	fetch
STRAIGHTEN	DEFORM	AUGMENT	DEPRIVE	ADOPT	REMOVE	MANAGE	CLAIM
align	bend	multiply	limit	endear	detach	carry	seize
unfold	crumple	exceed	undersupply	adore	subtract	contain	snare
stretch	flatten	fill	drain	obey	dislodge	budge	assume
level	crush	complete	disable	espouse	oust	bear	recover
CONVERT	BREAK	INSPIRE	DISPIRIT	ALLOW	PREVENT	ABSORB	CONSUME
toughen	divide	motivate	dishearten	enjoy	impede	witness	eat
solidify	cut	enliven	depress	accept	halt	hear	bite
emulsify	crumble	embolden	intimidate	appreciate	hinder	undergo	suck
distill	rend	encourage	discourage	tolerate	deny	record	sap
REMEDY	DEFACE	ENDOW	DENY	DESIRE	DISPOSE	PRODUCE	OBTAIN
cleanse	blemish	reward	defeat	wish	extinguish	collect	acquire
clear	dirty	gift	disappoint	crave	kill	replicate	inherit
cure	dry	soothe	distress	endeavor	expend	assemble	reap
heal	disfigure	ease	entangle	hope	waste	create	earn

Table 2. The *IN* grid

Q5Q6Q7Q8 of UM							
i cause				i direct			
EXPRESS	**PROTEST**	**PERFORM**	**DISCHARGE**	**ENGAGE**	**AGGRESS**	**LOCATE**	**DEPART**
SPEAK	CRY	ENACT	RELEASE	ADDRESS	VICTIMIZE	TRAVEL	LEAVE
talk	bawl	emote	exhale	salute	oppress	climb	desert
voice	yowl	intone	emit	hail	hurt	leap	abandon
say	weep	display	induce	greet	abuse	survey	flee
declare	whine	pretend	evoke	converse	trick	traverse	escape
ASSENT	OPPOSE	MOVE	DISPOSE	CONJOIN	INFLICT	INSTALL	TRANSFER
reply	complain	sway	eject	embrace	thrash	occupy	relocate
agree	object	turn	disgorge	hold	hit	settle	shift
admit	deny	rouse	expel	touch	attack	enter	descend
affirm	refuse	stir	excrete	mount	shoot	dive	return
INFORM	CRITICIZE	PROPEL	DISPENSE	COOPERATE	CONTROL	ATTEND	WITHDRAW
report	mock	launch	budget	associate	discipline	participate	separate
betray	debunk	jump	pay	adjoin	punish	come	quit
signal	disfavor	throw	contribute	match	hinder	visit	distance
notify	reproach	impel	sacrifice	meet	thwart	betake	retreat
APPROVE	FAULT	EXERT	EXPEND	ASK	CHALLENGE	PROCEED	AVOID
praise	regret	play	consume	invite	fight	advance	bypass
remark	moan	work	spend	summon	retaliate	embark	shun
rave	resent	push	exhaust	consult	taunt	conduct	dodge
applaud	doubt	pull	waste	woo	dare	orient	evade
i effect				i decide			
SET	**RESET**	**ADAPT**	**REFRAIN**	**LIKE**	**DISLIKE**	**UNDRTAKE**	**OBTAIN**
EXPOSE	CONCEAL	HEIGHTEN	DOWNPLAY	MIND	DISMISS	DEVOTE	FETCH
surface	hide	adjust	dilute	learn	forget	work	subtract
emerge	seclude	correct	blur	recall	cancel	report	get
dIsclose	shield	strengthen	soften	look	ignore	serve	retrieve
confront	avert	intensify	ease	study	skip	tend	receive
EXTEND	CONTORT	INCREASE	DECREASE	CHOOSE	REJECT	ASSUME	SEIZE
stretch	pose	frequent	space	honor	revolt	carry	claim
stand	sit	raise	lower	favor	refuse	hold	grab
open	bend	greaten	lessen	obey	violate	support	capture
grin	grimace	heighten	reduce	adopt	defy	attach	steal
ORIENT	TURN	ALIGN	DIVERT	PURSUE	TERMINATE	PRODUCE	FEED
stare	invert	arrange	defect	search	destroy	fulfill	drink
look	upend	straighten	switch	grope	eliminate	complete	inhale
face	reverse	position	swing	target	kill	accomplish	eat
point	turnaway	center	deviate	chase	eradicate	achieve	swallow
POISE	REST	POST	STOP	WANT	PREVENT	TRY	ACQUIRE
prepare	recline	manage	stay	pray	block	venture	harvest
ready	repose	rule	halt	wish	fend	test	profit
feint	nap	oversee	pause	wait	impede	risk	purchase
warn	sleep	lead	cease	prey	deter	chance	contract

Table 3. The UM grid

Q5Q6Q7Q8 of IN							
work it				address other			
CONFIRM	**NEGATE**	**PROVIDE**	**DISPOSE**	**INVOLVE**	**CONTROL**	**ATTEND**	**OFFEND**
SAY	VOID	FURTHER	END	FOLLOW	ELIMINATE	JOIN	ATTACK
speak	retract	undertake	discontinue	engage	slaughter	couple	punish
reveal	annul	consummate	cancel	answer	slay	embrace	hurt
mention	omit	fulfill	quit	obey	kill	visit	hit
interpret	withhold	accomplish	abandon	imitate	exterminate	meet	fight
DECLARE	FAULT	BETTER	REMOVE	ACCORD	DENY	BENEFIT	VICTIMIZE
praise	criticize	improve	strip	compliment	discharge	provide	maltreat
proclaim	mock	supplement	excise	favor	disqualify	gift	oppress
affirm	oppose	maximize	clear	grant	evict	serve	deprive
approve	assail	intensify	detach	gratify	depose	train	rob
STUDY	REGULATE	HANDLE	EXPEND	INSTRUCT	PREVENT	AROUSE	DISTRESS
examine	suppress	touch	spend	deploy	foil	entertain	disturb
appraise	shut	move	deplete	prompt	fend	impress	shock
compute	limit	strike	exhaust	command	restrain	tease	confuse
analyze	conserve	force	waste	urge	reproach	incite	agitate
SEE	TREAT	CAUSE	FREE	ASK	MANAGE	ATTRACT	MISLEAD
discover	remedy	start	loosen	interview	calm	invite	daze
look	mend	trigger	unleash	dun	comfort	summon	dupe
determine	relieve	propel	dislodge	consult	nurse	woo	deceive
discern	cure	energize	extrude	quiz	heal	tempt	trick
make it				target it			
TRNSFORM	**REVERSE**	**PRODUCE**	**UNMAKE**	**ADOPT**	**EXCLUDE**	**ATTEMPT**	**OBTAIN**
RECREATE	NULL	ORGANIZE	SUNDER	REMEMBER	DISREGARD	TRANSIT	POSSESS
record	raze	assemble	dismantle	practice	violate	travel	claim
replicate	explode	construct	collapse	repeat	misdo	enter	get
copy	erase	arrange	disarrange	learn	ignore	cross	seize
render	neutralize	combine	disband	revive	forget	reach	catch
MARK	DAMAGE	SUPPLY	RID	ACCEPT	REFUSE	TRANSFER	SOURCE
distinguish	sever	furnish	clear	cherish	avoid	carry	derive
designate	injure	increase	trim	believe	snub	hold	deduct
certify	break	fill	empty	assume	deny	convey	extract
detail	ruin	soak	drain	endure	disappoint	rescue	profit
FORM	DEFORM	CONVERT	REDUCE	AVAIL	DETAIN	EXPLOIT	CONSUME
style	distort	concoct	crumble	try	capture	trade	drink
fold	crease	mix	divide	use	arrest	invest	swallow
level	deface	process	crush	absorb	restrict	develop	eat
shape	disfigure	mature	dissolve	savor	delay	grow	chew
FIX	CHANGE	CREATE	SEPARATE	WANT	WITHDRAW	PURSUE	ACQUIRE
stretch	exchange	invent	sort	pray	gather	chase	procure
straighten	replace	produce	part	demand	sweep	target	stock
restore	alter	plan	filter	aspire	fetch	hunt	contract
resolve	modify	contrive	segregate	await	retrieve	seek	earn

Table 4. The IN grid

3 THE RULE OF FOUR

it is incredible, obviously, that all that humankind has ever said or written — all of history and literature, religion and philosophy, science and mathematics, all human conversation ever — has been performed with no more than 4,096 elementary verbs at work. but that is exactly what the grid is telling us.

of course, 4,096 is not that small a number, for keys to a language. consider that it only takes an alphabet of 26 letters to write out all of english. indeed, 4,096 verbs to construct a language from can make for a very great number of possible things to say. but let us begin with the letters of an alphabet

note that each letter of an alphabet doesn't really mean anything, it just stands for a unit of sound (a phoneme), until it becomes a word, a unit of meaning.

the meaning of a word is the particular thing it points to. a word *names* something that we mean to point out in the course of a sentence.

the sum of all the words we know to use is our vocabulary, what we collect per language and arrange alphabetically in dictionaries and according to their meanings in thesauruses.

as a unit of meaning, a word doesn't really *say* anything — it is just the name of something whether a verb or a noun or a whatever — until it is used in a sentence, and becomes a unit of information, a datum, that says something.

it is these units of information in the form of minimal sentences that are collected in the tagalog grid, where soon they are all revealed to fit into a very finite number of semantic slots in a very orderly fashion.

in this, the grid is something of a thesaurus, a classification system of meanings but by way of the language's verbs, and the results are immensely different from those achieved by dr. roget in the famous english variety.

the tagalog grid uses the verbs of the language as its entry point and working from telltale markers in tagalog sentences, discovers that all verbs, theoretically, can be traced by their minimal sentences to just 4,096 key informations.

in the chapter preceding, we have described a method for arriving at these key verbs and their minimal sentences, and have shown the results for a fourth of them.

of course there are many more than just 4,096 natural verbs to a language but the grid shows them all up to be synonyms to one or other of these key verbs. in the four affix sets so far, the average is at about 5 tagalog verbs per verb set, some with just one or two, a few with as many as twenty.

the infinity of language

there is a natural resistance, understandably, to the very idea of a limit to what we are saying, seeing as we obviously think up new things to say all the time, and every day hear and read of things we didn't know about before.

yet, in fact, none of the creative and infinite possibilities of language are lost on the grid. the grid only shows up the design of the language, it doesn't dictate the things spoken and stories told.

consider this: the way the grid is structured, the 4,096 elementary verbs come by way of minimal sentences which, when tensed and strung up in pairs (after two more quadrisections), turn into 65,536 tensed simple sentences.

stringing up just two of these simple sentences together, two tensed verbs following each other when we speak, there are close to 4.3 billion possible ways it can turn out. a third sentence would raise it to close to 300 trillion possible combinations, for just three simple sentences in succession!

one gets the feeling here that our sense of the infinitude of language, perhaps of infinity itself, must be the effect of these greatly multiplying possibilities; that it is an outcome, not an original state. it is an infinity of possibilities from a finite set of elements. so that rather than negate infinity, the finite grid is infinity's point of origin.

which is all to say that a fixed base of 4,096 verbs does not make language less fluid or its creative possibilities less infinite. it only tells us that there is a well-defined and mathematically sound structure that underlies our human ability to produce language and create information in all its variety.

it is this co-incidence of language and numbers that is most startling about the grid. that there is order to language is nothing new; what is grammar or logic after all? but that the foundations of language could be the same boolean logic that we build our numbers and mathematics on, this is amazing.

what is doubly amazing is that what emerges in the grid as the mathematic of language should turn out to be no more than arithmetic, no more than 2x2=4 (at worst ½x½ =¼) done eight times. it's so simple a child could do it.

it is nothing like a double helix or an e=mc^2 or an acetylsalicylic acid that obviously takes an awful lot of science to finally get to.

yet despite the natural simplicity of it, what is most mystifying about the grid has been the perfect hiddenness of it — that it could be so well disguised in every language it has escaped discovery all this time. the grid had been as if content just sitting there, waiting for science to catch up to tagalog!

but there it is. according to the grid it all just boils down to this:

	0	1
0	00	01
1	10	11

essentially, this says that if we can distinguish between two things, then we can distinguish between four. (the rest of it is just coding.)

from there the stage is set. if we can distinguish between four we can distinguish between 16. and if we can distinguish between 16 we can distinguish between 256. and that's how a tagalog affix set divides up and organizes semantically.

in mathematics it is called a 2x2 permutation and it lies at the very heart of the science of numbers and all combinatorial systems.

in the above configuration it is at its most elemental: a 0 and a 1 producing the first four binary numbers {00,01,10,11} — what are 0,1,2,3 in decimals — the four bytes (as in gigabytes) that are the building blocks of all that we are able to do with computers.

in the simplest way, we are being told by this permutation that with just a something and a nothing, four things can happen, and from there infinity.

in tagalog, it is the affixes of the verbs that finally give it away, these

35

mysterious affixes that have ever riddled all explorers and students of the language. as it turns out, if one took a long hard look with a mathematical eye at these affixes and their behavior in our natural sentences, what we find, one after the other, are 2x2 permutations of the kind described above, repeatedly telling our verbs apart into four things at a time.

as if that were not astonishing enough, if we tracked all these semantic quadrisections down in our sentences, it turns out that there are only eight (8) of them behind all the babel of our human babble.

how it works, the quadrisections reveal, is that every simple sentence contains just eight elements of information, and each element can only go four different ways. all together, there are just exactly 65,536 ways it can turn out, only that many sentences that can be formed meaningfully, and everything we ever mean to say is traceable to one of them.

in the grid, we actually have a picture of how the 65,536 line up *in formation* and lock together into a digital alphabet of semantic keys.

in the last chapter we have seen how six of the these quadrisections work, serving us up the 16 affix sets in q2q3 and then the 4,096 minimal sentences in q5q6q7q8. two other quadrisections are unaccounted for, q1 and q4:

in q1 the 4,096 minimal sentences of q2q3q5q6q7q8 take on four possible tenses (not three), giving us 16,386 tensed minimal sentences. and in q4, two of these tensed minimal sentences combine in one of four possible ways to form a single simple sentence, bringing us up to exactly 65,536 tensed simple sentences in the tagalog language grid.

all told the whole thing boils down to this:

		00	01	10	11
Q1	**tense**	present	past	future	possible
Q2	**focus**	it doer	it object	i doer	i object
Q3	**event**	display	exhibit	give	submit
Q4	**outcome**	motion	movement	direction	conclusion
Q5	**operation**	do	be	go	get
Q6	**function**	begin	end	start	finish
Q7	**intention**	deliver	apply	impose	enforce
Q8	**objective**	perform	execute	cause	obtain

table 5. the eight quadrisections of the grid

this table finally took shape in babel, but i have made critical changes in it here in view of lessons learned from gridding three more affix sets. here is how it all adds up so far:

the minimal sentence is defined in q2, as a verb with a focus noun attached, this noun being either a doer or an object of the verb. meanwhile, in q4, the simple sentence is defined as the outcome of a doer and object linked together by a verb.

all together, embedded in every simple sentence are eight pieces of meaningful information, as per q1 to q8. each piece may have four possible semantic values, which are the options told apart above by the bytes {00,01,10,11}. any string of eight of these bytes, therefore, say 1011000011100101, would give us eight pieces of information that could be read as a sentence.

at every byte a particular semantic element of the sentence is decided. and from 0000000000000000 to 1111111111111111 there are just exactly 65,536 ways it can turn out after eight quadrisections. by the grid, thus, any eight-string code in four variables — 12344321, CGTACGAA — may be read as a well-formed sentence.

an eight-string code identifies a simple sentence completely, but not uniquely. any number of simple sentences may share the same eight-string code, and these would be equivalent sentences, synonymous in the way of sentences, that can include idiomatic forms, sarcasms, and even translations into other languages.

that the grid might be cross-lingual in this way is one very first exciting thing about it. and from what we have seen, i think it safe to say that the grid does cross language barriers. one logical thread i follow is this:

1. given that tagalog's grid is able to logically reduce the language to 65,536 tensed simple sentences,
2. then directly translating those simple sentences into english naturally gives us 65,536 logically differentiated english sentences, by which english sentences, theoretically, anything expressible in tagalog is translatable into english;
3. vice versa, for any english to be translatable into tagalog, it must have to be reduced to one or other of the same 65,536 english sentences.
4. so that, to the extent that tagalog and english are *naturally* translatable into each other, it would have to be by virtue of this shared and common grid.

with results in for a fourth of the whole, i would even propose that, statistically, the tagalog grid is as good as proven. the 2x2 permutations of q1 and q2 are definitive and the eight quadrisections fairly established by their sheer ability to reduce all of this completely rich and wanton vocabulary of verbs of four affix sets into these perfectly beautiful digital grids.

the 65,536 is a very tight fit, one would be hard put to find another way of organizing such a number of discrete variables in as efficient a filing system as this, just perfectly befitting a mystery and marvel of nature like language. above all, the elemental convergence of language and numbers exhibited is impossible to dismiss as mere coincidence.

it may be that tagalog's affixes are language's last remaining intact markers for the grid, the only complete set that survived babel, escaping extinction since by being thus cloaked in their curious ways. but i doubt it. now we know what to look for, i rather expect the grid to shine through in still many native tongues, particularly the isolates. perhaps we will find a language with only the keywords and no synonyms — like the language before babel perhaps.

if it all sounds a bit fantastic, yes, but that's not even the best of it yet.

the greatest wonder of the grid

here again is our solution table.

		00	01	10	11
Q1	**tense**	present	past	future	possible
Q2	**focus**	it doer	it object	i doer	i object
Q3	**event**	display	exhibit	give	submit
Q4	**outcome**	motion	movement	direction	conclusion
Q5	**function**	do	be	go	get
Q6	**setting**	begin	end	start	finish
Q7	**intention**	deliver	apply	impose	enforce
Q8	**objective**	perform	execute	cause	obtain

table 5. the eight quadrisections of the grid

the quadrisections are now cut across the middle, into the first four and last four.

in q1 to q4 we read that "a simple sentence has a tense, a focus, an event and an outcome." this is the sentence building part, the arena of syntax and surface structure.

in q5 to q8, it reads that "a minimal sentence has a function, a setting, an intention, and an objective." this is the meaning part of the sentence, the arena of semantics and deep structure.

from the syntactic four we are able to say very general things like "she is exhibiting motion" or 'it may give a result." from the semantic four we are able to say more specifically that "she is singing my song" or "it may benefit you."

if one takes the time to appreciate the details of the table, quadrisection by quadrisection, one comes away understanding why the grid has remained secret for so long — the categories of meaning that it shows up are simply too subtle to appreciate directly. no wonder that on the surface we have managed to see very little despite our best efforts.

in q1, we all know the three tenses of a verb but have totally missed out on the possible tense, calling verbs in this tense either the basic or command form, and sometimes simply untensed.

in q2, we know doer-focus and object-focus verbs in tagalog, and active and passive voices in english. but have equally failed to appreciate the crucial volitional divide, whether the verb is an act of nature or an act of man.

in q3 is where the various roles of doers (subject, actor, agent, etc) and objects (direct, indirect, of the preposition) are played out. and here below is how they actually divide up behind the q3 foursome. (the lowercase affixes are used generically to include both volitional and non-volitional meanings)

q3	**event**	display	exhibit	give	submit
	DOER	**mag-** actor	**-um-** instrument	**mang-** agent	**ma-** receiver
	OBJECT	**-in** material	**i-** placement	**-an** location	**må-** achievement

this then is our solution to the lopez conundrum of 1937, our sprachgefuehl (speech feeling) for the affixes turning out to be a deep semantic eye. here are what the affixes signify.

the table reads: "the doer in an event is either an actor, an instrument, an

agent, or a receiver of the action" and "the object in an event is either a material, a placement, a location, or an achievement of the action." in every case we use a different affix in tagalog.

in q4, finally, the sentence that we know of as subject and predicate are seen instead to be the combination of two minimal sentences of the same volition, one doer focus the other object focus, with the two intersecting at the same root verb.

the rest of it (q5-q8) is what we plodded through in chapter 2.

given all that, let us pick it up now from where i left off in babel, and then see what we have gained since, and how far we can forge ahead before we sign off.

> **The rule of four**
> Though the world seems finally coming around to a grid, yet we have no idea why these quadrisections work the way they do, or why they should stop at 4x2 of them, why not 4x4 for example.
> Digging up and getting behind this emergent rule of four is the even deeper challenge of the grid. What is it that drives this permutation and its repetitions, each time establishing a unit of something linguistic as it were? A serious attempt to reduce all the quadrisections to their underlying 2×2 permutations would be the first step, but it will need a completed Tagalog grid to do convincingly. (*Babel*, 2013: 94-5)

if there is anything ultimately that has driven this work it is curiosity about this rule of four. what is it that drives these foursomes, what generates for us this perfect grid of information? is there like a chip in our brains? but where? how? what kind of co-ordinate system is involved? why four? why not three or five or seven or 22?

okay, so it's a 2x2 permutation. is 2x2 therefore some natural design, a given, a universal structural base? what is behind this permutation? might we actually get behind it and find there something familiar and knowable?

could there be within reach something that would naturally explain the phenomenon of the grid and its quadrisections, with the inherent power to serve us up both language and mathematics in the same breath?

all of which, of course, are ludicrously big questions. but these are what we find ourselves pushing our heads against here at the endrun to this work.

the question from babel stands: "what is it that drives this permutation and its repetitions, each time establishing a unit of something linguistic as it were?" with the four affix sets now in full view, i daresay we may not need to wait for all sixteen to get a handle on things.

there are essentially two questions to tackle. why eight? and why four? we will do the eight first.

<u>why eight?</u>

on the surface, we certainly come to a grid by way of eight quadrisections, eight consecutive subdivisions into four of the verb base. the arithmetic is

$$4\text{x}4\text{x}4\text{x}4\text{x}4\text{x}4\text{x}4 = 4^8 = 65{,}536 \text{ simple sentences}$$

but why does it end there? why a power of eight? when we cut it into the two parts above the arithmetic turns into 4^4 x $4^4 = 4^8 = 256$ x $256 = 65{,}536$. still why does it end after the two 4^4s? should not two things lead to four?

either way, the numbers feel somehow arbitrary and open ended. though they are surprising enough, they are mathematically disconcerting for failing to capture in numbers the natural elegance and closure of the repeating 2x2 structure of the grid.

what a relief when recently i came across something that would cast the whole thing in an unexpected different light. this by way of an old paperback i found in a friend's box of discards. rudy rucker's *infinity and the mind*[*] from 1982 surveys some very edgy stuff even now in mathematics, and holds out some surprising gems to us, this first one especially:

developing a section on transfinite numbers — really only mathspeak for all the counting numbers from 0 to infinity — professor rucker instructs us on the matter of "tetrations." he writes;

> Suppose that ^ab is defined to mean "an exponentiated stack of a many b's. ^ab is pronounced "b tetrated to the a." The name tetration is used since *tetra* is the Latin root for *four,* and tetration occurs in fourth place in the logical progression: addition, multiplication, exponentiation, tetration. You don't ordinarily hear much about tetration because it is so powerful an operation that tetrating even very small numbers produces inordinately large numbers. A tetration is worked out below.

_____

[*] Rucker, Rudy. *Infinity and the Mind: The Science and Philosophy of the Infinite.* New York: Bantam Books, 1983 by arrangement (Boston: Birkhauser, 1982).

$$^{4}2 = 2^{2^{2^{2}}}$$
$$= 2^{2^{4}}$$
$$= 2^{16}$$
$$= 65{,}536$$

Note that we associate from the top down, rather than from the bottom up. As further examples, $^{3}3$ is $3^{3^{3}} = 3^{27}$ which is just under eight trillion. $^{3}10$ is $10^{10^{10}} = 10^{10\,\text{billion}}$ which is a one and then *ten billion* zeros. (74)

although trained in mathematics, i had never heard of such a thing as tetration. that rucker would mention it, and choose $^{4}2$ for an example, is rather fortuitous if not uncanny.

here we have a mathematical operation that begins with a 2 and ends with 65,536 after a tetration of 2x2. it is like a little closed system of somethings and nothings resulting in 65,536 things.

i am inclined to believe that this must be the deep underlying mathematic of the grid, the 4^{8} being only its surface appearance. not only is $^{4}2$ so perfectly elegant a mathematical rendition of the grid's numbers, it also practically seems to tell us just why the grid must end at 65,536!

why? because if what we are seeing is the tetration of information, then the next tetration, 2 tertrated to 5, would be so inordinately large a number for even our enormous brains to handle, the grid going there would be unproductive, like going mad. language would soon run out of ways to distinguish one thing from another.

for those who like the numbers, the arithmetic of it looks like this

$$^{5}2 = 2^{65536} = (2^{256})^{256} \sim (1.15 \times 10^{77})^{256} \sim (1.15)^{256} \times (10^{77})^{256} \sim 2 \times 10^{19728}$$

that is a 2 followed by 19,728 zeroes, which is a multiplication of billions exactly 2,192 times, a field too humongously large for words.

one gets the impression that this incredibly large next tetration of 2 is where our sense of the unknown begins, marking the very limits of knowing that our minds are designed for, a measure of the overwhelming chaos of things that organisms naturally face and that the grid is precisely tasked to find patterns in to transform into useful information for the work of life, work that in humans happens to enjoy the benefits of speech.

it is the kind of thinking that brings us, finally, to why four.

why four?

let us to our solution table again, divided now into four pairs of consecutive quadrisections; the columns are also renamed simply {1,2,3,4} for purposes of discussion.

		1	2	3	4
q1	**tense**	present	past	future	possible
q2	**focus**	it doer	it object	i doer	i object
q3	**event**	display	exhibit	give	submit
q4	**outcome**	motion	movement	direction	conclusion
q5	**function**	do	be	go	get
q6	**setting**	begin	end	start	finish
q7	**intention**	deliver	apply	impose	enforce
q8	**objective**	perform	execute	cause	obtain

besides the four pairs being more suggestive of a $^4 2$, the quadrisections do seem to work in pairs. in q1q2, the tensed minimal sentence is set up. in q3q4, the simple sentence is constructed. in q5q6, the action of the sentence is described. and in q7q8, the particular meaning of the sentence is defined.

on the trail of the rule of four, we look everywhere for clues, and can do only what we know best by now. the way of the grid is the same throughout: subdivide into four, see what turn up, and clearly name them apart. that's how our solution table comes about. and that is how i mean us to get to the bottom of these foursomes.

already we have reduced all simple sentences to the work of eight sets of foursomes, and those eight finally into the four pairings named above. only one foursome remains now to be named, the four columns {1,2,3,4}. this is the final four, the foursome that effectively starts it all and rules over all, the four that combine to give us language in its astounding permutations, and this grid of it, in eight logical steps.

what common thread runs through the eight keywords of each column. what four threads of language do they reveal?

with only a fourth of the grid behind us, we are on thin ground here, but we have gotten this far and may as well make a run for it, but very quickly, lest we get bogged down in the details and lose sight of the very fine thread we are following.

without waiting for a completed grid, let me suggest from the evidence so far that the underlying 2x2 permutation that courses through all the eight quadrisections is this:

	apply	supply
input	1	3
output	2	4

the permutation proposes that everything in language is a matter of inputs and outputs being applied and supplied, a whole $^{4}2$ tetration of it in fact. if we lay out the 2x2 in columns to match our solution table we get

1	2	3	4
apply input	apply output	supply input	supply output

seen this way, the four as if represent commands, or else ongoing stages, in some operation. in this vein, we take a long patient look at the eight keys under each one and see if we might flesh the matter out a little more.

present	past	future	possible
it doer	it object	i doer	i object
display	exhibit	give	submit
motion	movement	direction	conclusion
do	be	go	get
begin	end	start	finish
deliver	apply	impose	enforce
perform	execute	cause	obtain

a good trick here to arrive at some notion of the uniqueness of a column is to turn its eight given elements into a single sentence. the idea would be to transform the four columns into four sentences of similar construction that would show up their commonalities while maximally contrasting their differences, like these:

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1. a present it doer displays motions that either do, begin, deliver, or perform things.
2. a past it object exhibits movements that either become, end, apply, or execute things.
3. a future i doer gives directions that either further, start, impose, or cause things.
4. a possible i object submits conclusions that either get, finish, enforce, or obtain things.

by these four sentences i propose that we have somehow come to within range of our goal, and the alert reader may be catching a whiff of it himself. still, one needs a eureka to get there, one of those amazing blasts of understanding that one tends to expect in gridding, when disparate and stubbornly discrepant things suddenly lock together into a single piece.

to get to this one, one must think of the four sentences above from the point of view of our speaking selves, the i doer in (q2, 3), from whom all language flows. now imagine the four statements being made in answer to the query, "how do you know what you're talking about?" and one among us vaguely pointing to these four unnamed informants and their separate departments.

keeping our 2x2 permutation above in mind, let me formulate these four questions now and propose my four answers:

Q. what applies input that is an it doer displaying motions to us in the present? A. our senses.

Q. what applies output that is an it object exhibiting movements to us from the past? A. our memory.

Q. what supplies input that is an i doer giving directions to us toward the future? A. our mind

Q. and what supplies output that is an i object submitting conclusions to us about the possible? A. our brain.

in this case, it dawned on me by way of the second question, about the past, naturally associating it with memory. this set off a search for parallel answers to the other columns. the four had to be "parallel" in the sense that they had to clearly constitute a foursome of something semantically. and what locked in were these four:

senses	mind
memory	brain

if the it object informing us of past things is our memory, then the it doer informing us of present things is probably our senses. the i doer that informs us of future things must be our mind — in the sense of it minding things for us. and the i object that informs us of the possible can be nought else but our brain.

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.

THE SENSES ARE THE MONITORS, THEY ARE GLUED TO THE PRESENT. HERE IS CONSCIOUSNESS.

MEMORY IS THE SCRIPT, IT IS GLUED TO THE PAST. HERE IS KNOWING.

MIND IS THE DIRECTOR , IT IS GLUED TO THE FUTURE. HERE IS WILL.

THE BRAIN IS THE THINKER, IT IS GLUED TO THE POSSIBLE. HERE IS THOUGHT.

the picture it paints is of a natural and continual exchange of information between these four faculties of life being turned uniquely by man into spoken language, as a result or perhaps even requirement of our unique evolution.

the four faculties {senses, memory, mind, brain} interweave informations in and and out of our sentences and we are able to make sense of things because all four communicate with each other organically by the same grid structure by which the mind reads things to us.

it seems likely that all living things depend upon this rule of four. though only in man, as it still appears, has it found expression in spoken language, in all the detail required by us to communicate with our fellows for our survival.

it is a perfect and elegant foursome to find at the core of the grid, keeping us squarely (!) in the realm of the empirical, where we began with tagalog's affixes and end now with its organic sources, without needing to sortie into unknowable and unnameable territories.

recalling descartes, one might rightly ask, what then of i? what does the rule of four make of the personal i, of me, the i of language? i would say simply that the i is the name that the mind gives to its own organism, the working unit of life that the mind is driving and speaking for. 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?

it is in this light that one ought to revisit and closely scrutinize tables 1 to 4 and their verb samples in the appendix.

before we go, what of time? rationally, the most stunning effect of the rule of four is in q1 and on our sense of time. how startling how mundanely the grid ends it for time for all the mystery time weaves into our lives.

it would now appear that what we think of as separate locations in time are only four separate activities of our organism communicating together in a single language, creating by their different informations the illusion of time.

apropos this, rucker tells a story of his last phone conversation in 1977 with kurt godel, mathematician of mathematicians, to whom he had once put the question of time.

> We talked a little set theory, and then I asked him my last question: what causes the illusion of the passage of time?
> Godel spoke not directly to this question, but to the question of what my question meant — that is, why anyone would even believe that there is perceived passage of time at all.

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> He [related] getting rid of belief in the passage of time to the struggle to experience the One Mind of mysticism. Finally he said this: "The illusion of the passage of time arises from the confusing of the given with the real. Passage of time arises because we think of occupying different realities. In fact, we occupy only different givens. There is only one reality." (Rucker, 183)

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.

and that is as far as the grid will take us.

the grid does not make known to us what is *really* out there beyond our organism. we are still left with the true and unknowable mystery of it: wherefore this life we live? what is this space we inhabit? where are we? when are we? these are questions of logic that the grid naturally raises in us, but are arguably not in our nature to know.

all we can do is guess at them with our arsenal of 4,096 verbs and 65,536 simple sentences. and if it cannot be expressed convincingly in terms of these then it is illogical or inexplicable, and remains the mystery it is, unavailable to us and inaccessible to language.

science, of course, has made great strides in unraveling many an old mystery, but always also by submitting the matter successfully to the logic of our sentences, to bring it to within the reach of our organism's cognitive and interventive powers.

in sum, it is language itself by its very nature that limits what we know, only to what is logically expressible in terms of the 65,536 simple sentences of the grid. just enough information, we might suppose, to keep us alive.

language may indeed be infinite and unpredictable on the outside, but it is very finite and organized within, with the numbers and order suggestive of a a tetrated 2 to the 4 (^{4}2) combinatorial grid at work.

let me end with that and this final gem from rucker, this time a paradox of numbers, which may or may not be relevant. you need only remember from algebra, about negative numbers, that $1−1$ is the same as $1+(−1)$. it is about the grandi series.

> The Grandi series is the series $1−1+1−1+1−1+...$ Looked at one way this is $(1−1)+(1−1)+...=0$; but looked at another way, we have $1+(−1+1)+(−1+1)+...=1$.

Grandi discovered this series in 1703; he claimed that God must have used a technique based on this series in order to create Something from Nothing, and thus get the cosmos going. This is not really as insane as it sounds — a more sophisticated way of saying something similar would be to claim that the cosmos is a moiré, an interference pattern produced by a wave function out of phase with itself. (Rucker, 126)

just perhaps the grid is an interference pattern produced by four data functions out of phase with each other, and the outcome is language bearing witness at every moment to the ongoing phenomenon.
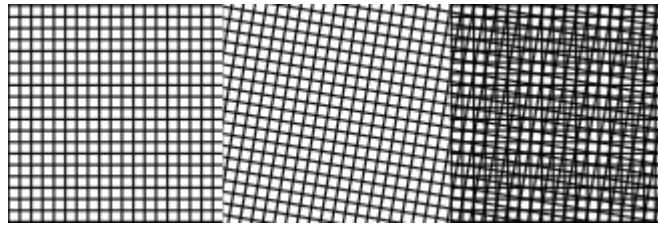
POSTSCRIPT

i must declare I am no expert in any of these disciplines i touch upon, only a very interested observer for the obvious reasons. i am only an expert on the grid, and for now the only one, which i hope this work will help correct.

i studied mathematics, but the grid is born, besides, of an obsessive curiosity by nature interdiciplinary and extracurricular. it is amateur work in the classic sense, a work of love. what luck that i could indulge it, to be led by the nose, eureka by eureka, to where we are now. the grid is like finding a teacher.

no telling what the experts will make of this, and where they will take the grid once they come around to it (not if). one can only pray that whatever the grid may wreak that it shall ever be to the greater life and success of the species, empowering to the many different over the few.

even as i wrote it, i thought of sitting on this material, wondering if we were better off not knowing, worrying (with hawking etal.) about superintelligent machines and losing our edge. but thinking also what a shame to let all this accomplishment in human sleuthing go to waste, what rightly belongs to humanity's future.

now it is done it takes a life of its own, and moves uneasily into the realm of the possible. to those who may actually have the pleasure of gridding in the

future, i can only say welcome to the grid. it is a "work of transmission," to borrow from rucker, "dedicated with love and respect to everyone in the channel."

in the last, my very deepest thanks to nicole revel, director emeritus of research at france's national center for scientific research (cnrs) whom i had the good fortune of meeting in 2000, in the childhood of the grid, and whose keen understanding and expert interest frankly kept me at work and the grid alive.

a semanticist and anthropologist, an authority on philippine oral traditions, and a tagalog speaker, nicole understood at once what i was up to, and steered me along until i found my footing. to her, especially, i dedicate these results.

i end with her own closing words in the foreword to tagrid (which she wrote for a much earlier unpublished manuscript), addressing the experts, beckoning them to the grid.

> This is a work in Cognitive Semantics but it avoids a complex metalanguage; however, its very economy and minimal formulation should be a source of enlightenment to linguists and neurophysiologists. I am sure it cannot but please the mathematicians. I can only hope it will also be of interest to philosophers, for it points to our embodied condition. (*The Tagalog Grid,* 2012:12)

october 2015

appendix

THE DATABASE

table	affix set	sample size	minimal sentence	go to page
1	*UM*	1,028	it verbs	51
2	*IN*	925	it is verbed	62
3	UM	1,152	i verb	72
4	IN	1,783	verb it	85

the following pages contain my working samples of verbs for the *UM*, *IN*, UM,and IN affix sets of tagalog, in their evolved grids. these are all the data behind Tables 1-4 on *pp* 29-32.

they are in various stages of progress. it doesn't really make sense to try and finalize anything until we get all the 4,096 key verbs in, as work in the later affix sets invariably bring about changes in the earlier. these are how the samples stand as of december, 2015.

a word count tells us that the entire database now contains 4,888 tagalog verbs gridded into 1,024 verb sets, involving 1,360 english keywords (340 per affix set). *UM* has 64 extra to amplify the contrasts in the yellow.

the 1,024 verb sets are pretty much established, and their arrangements at perhaps 95%, but the english keywords are all still subject to change.

in any conflicts between Tables 1-4 and the arrangements or keywords of these samples or older records, the information of the first may be more dependable as a more recent effort to reconcile and perfect the four results.

be sure to read the english keywords as minimal sentences with a doer it/i/one or an object it/him/her/other for the correct semantic effects.

only the tagalog verb roots are listed in their verb sets but one must always read-in the indicated affix to properly identify the actual verb intended for that location in the grid.

some roots come with prefixes of their own which are abbreviated in the sample: *pa-* (into p-), *ma-* (m-), *ka-* (k-), *pang-* (p~), *pag-* (p^ or bilateral p^^). sometimes they double up: papang (pp~), (pagpa- (p^p-).

THE UM GRID

I CAUSE			
express	protest	perform	discharge
SPEAK	CRY	ENACT	RELEASE
TALK	BAWL	EMOTE	EXHALE
discurso	iyák	banat	hingá
talumpatì	uhâ	hataw	buntónghiningá
satsát	YOWL	dale	EMIT
daldál	aráy	INTONE	digháy, *burp*
ngakngák	atungal	awit	utót, *fart*
VOICE	sigáw	cantá	bugá
basa	WEEP	himig	INDUCE
bilang	hikbî	?sipol	anák, give birth
baybáy	hagulhól	tulâ	EVOKE
spell	haluyhóy	DISPLAY	luhà, *tear*
bigkás	taghóy	kaykáy	
salitâ	WHINE	kembot	
SAY	daíng	kirî	
habilin	hinaíng	PRETEND	
utos		arte	
panukalà		ganáp	
ulit		kunwâ	
banggít			
ungkát			
DECLARE			
hatol			
boto			
turing			
binyág			
takdâ			
hirang			
pilì			
ANSWER	OPPOSE	MOVE	DISPOSE
REPLY	COMPLAIN	SWAY	EJECT
imík	angal	yugyóg	durâ
sagót	reklamo	kuyakoy	luwâ
tugón	REFUSE	sayáw	lurâ
AGREE	hindî	TURN	DISGORGE
hayà	ilíng	ikot	duwál
oo	ayáw	balikwás	suka
tangô	tanggí	pihit	EXPEL
bigáy	DENY	ROUSE	dahák
payag	tanggí	kilos	ubó
sangayon	OBJECT	gising	singá

UM

ADMIT	almá	STIR	EXCRETE
kumpisál	tutol	galáw	dumí
tugâ		ibô	ihì
amin		kuráp	
lantád		kamot	
hayág			
confirmá			
AFFIRM			
pirmá			
lagdâ			
sumpa			
pangako			

INFORM	CRITICIZE	PROPEL	DISPENSE
REPORT	DEBUNK	LAUNCH	ALLOT
liham	batikos	lipád	lagak
sulat	dale	takbó	gastos
radio	MOCK	gapang	gugol
tawag	insulto	gulong	gastá
BETRAY	durò	slide	PAY
turò	REPROACH	langóy	bayad
bukíng	banat	JUMP	buwís
bisto	sumbát	luksó	hulog
sumbóng	imík	lundàg	multá
SIGNAL	DISFAVOR	talón	matrículá
hudyát	puná	THROW	CONTRIBUTE
kumpás	batì	sipà	abuloy
senyas	pansín	tadyák	abono
tambulì		pitík	ambág
busina		hampás	SACRIFICE
kililíng		itsá	alay
katók		tapon	
timbre		hagis	
tuktók		hasík	
NOTIFY		tira	
hiyáw		hihip	
sigáw		IMPEL	
hoy		duyan	
sutsót		pihit	
tawag		padyák	
ngiyáw		paypáy	
ungâ		pedál	
kahól		wasiwas	
huni		sagwán	
sipol			

UM

APPROVE	FAULT	EXERT	EXPEND
PRAISE	REGRET	PLAY	CONSUME
bunyî	hinayang	tamból	gamit
dakilà	MOAN	tugtóg	SPEND
mabuti	ngitngít	gitara	gastá
magalíng	hinanakít	tipa	EXHAUST
purì	tampó	kalabít	ubos
REMARK	RESENT	kalóg	lustáy
pansín	masamâ	WORK	WASTE
banggít	SUSPECT	bayó	aksayá
batì	hinalà	dikdík	
ulit		pukpók	
RAVE		batì	
tilî		giling	
hiyáw		hasà	
APPLAUD		sulat	
palakpák		gawâ	
		PUSH	
		pisíl	
		pindót	
		diín	
		tulak	
		dagán	
		tuón	
		haplós	
		hilot	
		iré	
		PULL	
		batak	
		hila	
		higit	

UM 2xxx

I EFFECT			
set	reset	adapt	refrain
EXPOSE	CONCEAL	MODIFY	DOWNPLAY
SURFACE	HIDE	ADJUST	DILUTE
lutang	tagò	talas	tabáng
EMERGE	kublí	listo	lamíg
labás	SECLUDE	tapang	BLUR
DISCLOSE	pasok	liksî	labò
lantád	SHIELD	CORRECT	SOFTEN
CONFRONT	talukbóng	ayos	lambót
haráp	AVERT	igi	lumanay
	talikód	tuwìd	EASE
	yukô	aga	luwág

		linaw	gaán
		gandá	dalî
		STRENGTHN	
		tibay	
		tigás	
		lakás	
		tindí	
		init	
		INTENSIFY	
		lupít	
		kulít	
		hirap	
		bigàt	

EXTEND	CONTORT	INCREASE	DECREASE
STRETCH	POSE	FREQUENT	SPACE
unat	halukipkíp	limit	dalang
derecho	cuadro?	dami	luwág
tingkayád	SIT	dalás	LOWER
angát	upô	*regulár*	kupad
liyád	ungkót	*p-lagì*	babâ
dipá?	luhód	RAISE	bagal
STAND	BEND	bilís	hinà
bangon	yukô	lakás	LESSEN
tayô	tuwád	taàs	iklî
tindíg	FROWN	tagál	igsî
OPEN	ngibit	habà	DIVIDE
bukakà	simangot	GREATEN	kalahatì
kaang	kimî	laki	
ngangá	kunót	habà	
mulat		taas	
dilat		lalim	
GRIN		MULTIPLY	
bungisngís		doble	
ngisì			
ngitî			

ORIENT	TURN	ALIGN	REALIGN
STARE	INVERT	ARRANGE	DEFECT
tangá	taób	hilera	baligtád
titig	dapâ	linea	balimbíng
LOOK	UPEND	pila	tiwalág
tingalâ	baligtád	hanay	SWITCH
lingón	tiwarik	STRAIGHTEN	bago
FACE	REVERSE	pantày	ibá
haráp	pihit	derecho	SWING

UM

tihayà	vuelta	POSITION	hilís
POINT	TURNAWAY	una	kaliwâ
turò	talikód	sunód	DEVIATE
sipat		p-gitan	lihís
tapát		hulí	sala
asintá		CENTER	
		exacto	
		centro	
		tapát	

POISE	REST	POSITION	STOP
PREPARE	RECLINE	MANAGE	STAY
gayák	higâ	hawak	pirmé
handâ	himláy	tangan	lagáy
READY	REPOSE	RULE	tahán
kasá	handusay	upô	HALT
astá	tumbá	tayô	himpíl
FEINT	bulagtâ	OVERSEE	hintô
akmâ	lupagì	tanod	tigil
ambá	SHUTEYE	timón	HOLD
umang	pikít	haligi	hinay
WARN	SLEEP	LEAD	humpáy
durò	idlíp	pangulo	menór
	tulog	patnugot	CEASE
		panganay	tahán
		gabáy	tahimik

UM 3xxx

I DIRECT			
engage	aggress	locate	depart
ADDRESS	VICTIMIZE	TRAVEL	LEAVE
SALUTE	OPPRESS	SURVEY	EXIT
saludo	abá	galà	alís
luhód	gipít	ulì	kalás
yukô	sakál	ronda	lipád
tuwád	takot	libot	layas
dipá	bigô	ikot	luwás
HAIL	HURT	lakbáy	labás
kawáy	saksák	CLIMB	awàs
kindát	tagâ	panhík	UNHITCH
tangô	gasgás	ahon	bitàw
GREET	basâ	adyó	walay
batì	pasò	akyát	ligaw
halík	silaw	TRAVERSE	layaw
kamáy	ABUSE	tawíd	laboy
amén	gamit	tuláy	FLEE

salubong	baboy	tahak	puga
CONVERSE	gahasà	baybáy	takas
kumustá	molestia	LEAP	takbó
k-usap	salbahe	libán	likas
	alipin	laktáw	tagò
	trato ~*pangit*	luksó	lisan
	TRICK	talón	ESCAPE
	linláng	lundág	piglás
	traidor		alpás
	bola		kalág
	gayuma		ligtás
	kulam		escapó
	loko		layà

CONJOIN	INFLICT	LOCATE	RELOCATE
EMBRACE	THRASH	OCCUPY	TRANSFER
yakap	golpé	bitin	kabilâ
yapós	hagupít	lambitin	lipat
HOLD	batutà	yapós	salin
hawak	dale	sabit	libán
tangan	HIT	tangan	likô
salabay	kalmót	hawak	tawíd~*linea*
TOUCH	suwág	sandál	SHIFT
haplós	sipà	tuón	isod
hipò	suntók	sakáy	ipod
halík	birá	tapak	taás
MOUNT	ATTACK	tuntóng	angát
babá	dagit	apak	DESCEND
hindót	sugod	hapon	panaog
patong	ataque	patong	lusong
	banggâ	kalong	ibabâ
	lusob	kandong	labák
	tabig	SETTLE	lapág
	digmâ	angkla	RETURN
	himagsík	talagá	balík
	SHOOT	tirik	uwî
	baríl	lagáy	
	bató	park	
	tira	lugár	
	sumpít	puesto	
	sibát	lagì	
	panà	tirá	
		garahe	
		limlím	
		yupYóp	
		ENTER	

		singit	
		gitnâ	
		siksík	
		salít	
		silong	
		sukob	
		SUBMERGE	
		lublób	
		lubòg	
		sisid	
		ligo	
		p-ilalim	
		dive	
ALLY	**CONTROL**	**ATTEND**	**WITHDRAW**
ASSOCIATE	DISCIPLINE	PARTICIPATE	SEPARATE
anib	pingot	simbá	hiwaláy
bakas	palò	lamay	bukód
kampí	PUNISH	daló	QUIT
lahók	tampál	ecsena	bitíw
salo	sampál	COME	sukò
sama	HINDER	datíng	tiwalág
dikít	sawáy	sipót	DISTANCE
ugnáy	awat	haráp	agwát
kabít	pigil	apir, *appear*	distancia
barkada	THWART	VISIT	layô
halò	tapid	bisita	tabí
sakáy	patid	dayo	puwàng
sapì		pasyál	RETREAT
damay		saglít	atrás
tulong		dapò	urong
halili		daán	
tuwáng		silip	
sangkót		BETAKE	
ADJOIN		puntá	
abáy		tungo	
angkás		bandá	
haráp		dakò	
sunód		gawî	
dikít		padpád	
buntót		sugod	
pares		dumog	
sunong		kuyog	
tapát		aligid	
tabí			
datig			

MATCH ayon akmâ bagay gaya, *imitate* sabáy, *synch* tono tulad pareho patas MEET salubong tagpô salô sambót haráp			
ASK	**CHALLENGE**	**PROCEED**	**AVOID**
INVITE usap yakag akit anyaya halina imbitá kumbidá suyò hamon alók SUMMON kaón hali sundô kalabít tawag tapík CONSULT consulta dulog lapit sangguni ?tanóng WOO lambíng cariño sipsíp	FIGHT alsá ambá laban RETALIATE gantí bawì TAUNT sulyáp irap dilà DARE patol kasá	ADVANCE sulong abante usad gapang ragasâ sagitsít paririt karera takbó EMBARK lipád luwás layag viaje lakbáy CONDUCT derecho kaliwâ kanan pasok suot daan hawì tulóy ibabaw ilalim ORIENT	BYPASS lampás liwás iwas ikot SHUN talikód labás DODGE ilag tabí EVADE salisí

UM

ligaw amò ulok papél		lapít daóng daís tabí sagád lapat daít sadsád	

UM 4xxx

I DECIDE			
choose	reject	undertake	obtain
MIND	DISMISS	DEVOTE	FETCH
LEARN subok espia alám tiktík talastás confirmá usisà RECALL alaala gunitâ tandâ LOOK dungaw silip tanaw tingín STUDY kilala examen spellng kilatis repaso suyod salát sukat timbáng balangkás intindí litis	FORGET limot CANCEL cancel IGNORE tulóy lampás SKIP lakdáw liban	WORK tindá lakô extra lakad trabaho REPORT pasok repórt larô esquiról SERVE sugò katawán destino abogado saksî testigo ganáp TEND papél gampán upô tutok haráp	SUBTRACT bilang bawas bale bahagi bulos kaltás menos pilas punit tapyás hiwà tipák piraso putol dukál dukit gayat gupít guntíng baak GET tinidór tusok cuchara dakót takal tabò salok sandók kuha pilì RETRIEVE

			kaón
			hakot
			hukay
			pala
			kalaykáy
			pulot
			simót
			bunot
			dukot
			sundo
			igíb
			tunggâ
			RECEIVE
			sahod
			suweldo
			salô
			sambót
			colecta
			tanggáp
			abót
LIKE	**REJECT**	**ASSUME**	**SEIZE**
HONOR	REVOLT	CARRY	CLAIM
sambá	almá	hawak	angkín
kilala	palág	tangan	bawì
turing	REFUSE	balikat	tangáy
bilang	ayáw	bitbít	may-arì
FAVOR	VIOLATE	atang	sakop
kiling	suwáy	cargá	GRAB
baling	labág	buhát	tukâ
favór	DEFY	HOLD	dakmâ
OBEY	taliwás	hawak	abót
sunód	salungát	tangan	sunggàb
galang		gamit	kaykáy
haràp		ASSIST	kahig
ADOPT		hawak	kabig
pulot		tangan	singhot
copia		akay	CAPTURE
gaya		alalay	bihag
sambót		saklolo	huli
mana		gabáy	aresto
		agapay	dukot
		tulong	dampót
		halili	STEAL
		tuwáng	ipit
		ATTACH	nakaw

		akò garantia sagót sambót salô arugâ ampón akáy	dukot kupit kurót
PURSUE	**TERMINATE**	**PRODUCE**	**FEED**
SEARCH halungkát hanap kapkàp kapâ hukay GROPE abót bunot dukot TARGET asintá sipat CHASE habol	DESTROY wasak gibâ sirà tampalasan pipî durog ELIMINATE sunog tukláp pugot tagpás tikláp suyod kutkót hawan limás kayod salà suyod KILL lason kitíl lapà ligpít pasláng sample sakàl saksàk patày ERADICATE ubos lipol sugpô burá	FULFILL tupád pp~yari totoo gawâ binyág kumpíl kasál COMPLETE trabajo asikaso bunô lakad kaingin saca laba punla taním tudlìng imprenta tistís giling kaskas salà suyod dikdík bayó tapos ACCOMPLISH akdâ kathâ sulat drawing guhit hubog hulmá	DRINK suso sipsíp supsóp inóm tagay higop barik INHALE hithít singhót tabako amóy langháp lasáp EAT nguyâ kagát lamon kain sapá SWALLOW lulón lunók

		lilok	
		ukit	
		gawâ	
		yarì	
		buô	
		habi	
		tahî	
		timplá	
		lala	
		hakà	
		hulà	
		tantiyá	
		tayà	
		imbento	
		isip	
		likhâ	
		laláng	
		ACHIEVE	
		lutás	
		ayos	
		gamót	
		tahi	
		lakad	
		areglo	
WANT	**PREVENT**	**TRY**	**ACQUIRE**
PRAY	BLOCK	VENTURE	HARVEST
dalangin	harang	pasok	karit
dasál	bará	sali	pitás
pakiusap	hadláng	rehistro	tibâ
hingî	FEND	dawdáw	gatas
hirám	salág	sabak	gapas
tawad	salô	takbó	ani
usap	IMPEDE	candidato	kumpáy
hirit	ipit	sawsáw	kawit
habol	pigil	sisid	PROFIT
WISH	DETER	subok	kita
asám	sanggá	ecsena	tubo
hangád	taklób	TEST	limás
layon		sample	kuwarta
mithî		tikím	PURCHASE
nais		dilà	angkát
nasà		lasa	bilí
pangarap		subok	pakyáw
pita		RISK	tubós
ibig		pustá	CONTRACT

gustó WAIT abáng subaybáy tambay asa PREY tambáng bakay tiempo		sugál larô salang subò tayâ CHANCE simple tiempo libre singit puslít una salít ?salisí	contrata arquilá upa utang iwì tawad hingî diligencia

web links

news and information of interest on topics of language, brain, mathematics, and computational linguistics in the period from october 2014 to november 2015 when this book was being written.

141003
http://time.com/3453841/the-secret-to-learning-a-foreign-language-as-an-adult/
http://www.theguardian.com/science/2014/oct/02/curiosity-memory-brain-reward-system-dopamine
While grades may have their place in motivating students, stimulating their natural curiosity could help them even more. Chara Ranganath, neuroscientist at the University of California, Davis, said curiosity seemed to be piqued when people had some knowledge of a subject but were then faced with a gap in their understanding. "We think curiosity is the drive to fill that gap. It's like an itch you just have to scratch," he said... The scans revealed that when people were more curious, brain activity rose in regions that transmit dopamine signals. The neurotransmitter is intimately linked to the brain's reward circuitry, suggesting that curiosity taps into the same neural pathways that make people yearn for chocolate, nicotine and a win at the races. Ranganath said the findings are in line with theories that give dopamine a key role in stabilising or consolidating memories.
141004
http://news.nationalgeographic.com/space/voyager/
Astronomy's patron sain, Galileo Galilei, first wrote in 1610 about his discovery of moons orbiting Jupiter. "Infinite thanks to God," he wrote, "for being so kind as to make me alone the first observer of marvels kept hidden in obscurity for all previous centuries."
http://gcn.com/blogs/pulse/2014/10/darpa-lorelei.aspx
According to a notice in FedBizOpps, DARPA wants to develop language technology that leverages universal language principles instead of relying on huge, manually-translated, transcribed or annotated texts. The overall goal is not to be translating foreign languages into English but to provide situational awareness by identifying elements of information in foreign language and English sources, such as topics, names, events, sentiment and relationships.
http://www.wired.com/2014/10/magic-mushroom-brain/
"The big question in neuroscience is where consciousness comes from," Petri said. For now, he said, "We don't know."
http://www.wired.com/2014/11/neuro-revolution-public-find-brain-science-irrelevant-anxiety-provoking/
Concluding their study, O'Connor and Joffe said "It seems that despite neuroscience's prominence within public institutions such as the mass media, contemporary brain research has yet to seriously penetrate the conceptual repertoires of lay citizens." The theory the researchers have for this disengagement is that people prefer not to think about the workings of their brains.
141112
http://www.nytimes.com/2014/11/11/science/learning-how-little-we-know-about-the-brain.html?_r=0
The fish has two sensing systems. One is passive, picking up electric fields of other fish or prey. Another is active, sending out a pulse, for communication or as an electrical version of sonar. They wired the brain of a weakly electric fish and found that a surprising group of neurons, called unipolar brush cells, were sending out a delayed copy of the command to its electric organ straight to the passive sensing system to cancel out the information from the electric pulse. "The brain has to compute what's self-generated versus what's external," said Dr. Sawtell. This may not sound like a grand advance, but, Dr. Abbott said, "I think it's pretty deep," adding that it helps illuminate how a creature begins to draw a distinction between itself and the world. It

is the very beginning of how a brain sorts a flood of data coming in from the outside world, and gives it meaning. That is part of the brain's job, after all -- to build an image of the world from photons and electrons, light and dark, molecules and motion, and to connect it with what the fish, or the person, remembers, needs and wants.

141117

http://en.wikipedia.org/wiki/Algorithm

12. *Algorithmic theories*... In setting up a complete algorithmic theory, what we do is to describe a procedure, performable for each set of values of the independent variables, which procedure necessarily terminates and in such manner that from the outcome we can read a definite answer, "yes" or "no," to the question, "is the predicate value true?" (Kleene 1943:273)

141121

http://www.theguardian.com/british-academy-partner-zone/2014/nov/21/what-is-computational-linguistics

In its engineering aspect, computational linguistics (CL) focuses on natural language processing (NLP). It seeks to develop systems that facilitate human-computer interaction, and to automate a range of practical linguistic tasks, including machine translation, text summarisation, speech recognition and generation, information extraction and retrieval, and sentiment analysis of text. The second face of CL is scientific. Looking in this direction, CL seeks to model natural languages as formal combinatorial systems, to understand the procedures through which humans are able learn and to represent these systems, given the processing resources of the human brain, and the linguistic data available to human learners. In this, CL shares many of the research objectives of theoretical linguistics and cognitive science.

141202

http://www.technologyreview.com/view/532886/how-google-translates-pictures-into-words-using-vector-space-mathematics/

141210

http://www.wired.com/2014/12/10-ways-brain-myths-harming-us/

http://blog.seattlepi.com/bigscience/2014/12/09/uw-science-the-rediscovery-of-a-forgotten-brain-pathway/

Scientists have rediscovered a century-old missing brain pathway involved in processing visual information like reading and understanding faces.

141211

http://www.huffingtonpost.com/paul-anthony-jones/100-random-language-facts_b_6272224.html

zenzizenzizenzic [is] a 16th century word for a number raised to its eighth power. The words *a*, *and*, *be*, *have*, *he*, *I*, *in*, *of*, *that*, *the* and *to* make up 25% of all written English.

141215

http://www.washingtonpost.com/blogs/worldviews/wp/2014/12/12/why-turkeys-president-wants-to-revive-the-language-of-the-ottoman-empire/

In October 1932 the word collecting began. Every provincial Governor presided over a collection committee, with the duty of organizing the collecting of words in use among the people. Within a year, over 35,000 such words were recorded.

http://boingboing.net/2014/12/12/the-beauty-and-wisdom-of-mathe.html

Going beyond inspiration, the *usefulness* of mathematics allows us to build spaceships and investigate the geometry of our universe. Numbers may be our first means of communication with intelligent alien races. Today, mathematics has permeated every field of scientific endeavor and plays an invaluable role in biology, physics, chemistry, economics, sociology, and engineering...

141217

http://www.huffingtonpost.com/sandra-bond-chapman/flex-your-cortex-7-secret_b_6358056.html

Truly, some of the most fascinating scientific discoveries today have to do with the world within us: our brains. With all due respect to Star Trek, outer space is not the only "final frontier."