

# BORROWING WITH INTEREST: ASPECT SEMANTICS VIEW OF LANGUAGE EXTENSION AND EXPANSION.

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**Abstract:** *Identifying aspect semantics as study of linguistic life of concepts, this paper describes various paths by which language extends and grows. At the center of this approach are such notions as “an aspect of a class of concepts” and a “spectrum of aspects of a concept”. Three different paths are described: Cognitive Modification, Cognitive Expansion and Cognitive Extension and rules formalizing these processes are introduced.*

**Keywords:** AI, aspect semantics, language development, meaning, shared reality

How does our language develop and grow? New technologies, demographic and ethnic shifts, generational slang, emerging professions, cultural and terminological coinage -- all of these trends transform our language and attract lexicographers and linguists. With focus on additions to lexicon and dialect separations not much attention is paid to other forms of language development. Word-forms acquire new meanings, fresh metaphors come into being, radical ideas are put forth, and new paradoxes appear. In fact, every new text, whether oral or written, has the potential of extending language usage into new territory. How does it happen? What kind of mechanisms are at work? A working model of these mechanisms may be useful in structuring a limited but dynamically expanding lexicon of an AI system.

From the standpoint of *aspect semantics*, language extends in a fairly simple and discernable manner. The purpose of this paper is to examine some of the paths of language extension/expansion and to suggest a crude cognitive model that may be AI text production and recognition friendly. Linguistic competence and language are too widespread to require complex, ornate theories.

An instance of the most popular path is found in the heading of this article. I took

the *word-form* “**semantics**”, added a *modifier* “**aspect**” and now we can talk about ‘new’ objects, concepts and ideas. If we were to choose another *modifier*, coining, for example, such combination as “a-sexual semantics”, a very different aspect of ‘*semantics*’ would come into play. We might be talking about the gender neutral speech, about “*wyman*” substitute for ‘woman’, the socio-political agendas and so on. There are works on ‘biological semantics’ where the subjects range from application of epidemiology to the spread of linguistic patterns to genetic foundations of speech. It cannot be said that the ‘*semantics*’ in all the above examples is the same concept, but it was illuminated from different angles, e.g. “theory”, “expose”, “approach”, “tool”, “term”, “suggestion”, “demand” “policy”, etc. When we add an adjective to a noun referencing a familiar concept, we choose a path which can be called *cognitive modification*. There are two other paths of language development which an aspect semanticist can label *cognitive extensions* and *cognitive expansions* to be examined in what follows.

A few words about *aspect semantics*. This term was introduced to describe a cognitive approach to the study of linguistic life of concepts. (Gorbis 2005) Its core proposition is that any concept can be viewed from

different points of view and that identifying one such **aspect** highlights only one of the boxes in which this concept lives and that starts the next step, where the box opens and out pours a small army of linguistic soldiers (predicative units) ready for their designated service. This follows Whorfian search for universal “connections” of ideas. (Whorf, 1927)

We also claim that many concepts that can be viewed from a particular **aspect** form a **class** with a shared **property** and that any concept that can be so examined would be said to have that property and thus a specific linguistic meaning. To follow our metaphor, any of the boxes in which a concept lives houses a great number of other concepts and they all control the same army of linguistic units. Next, it is important to mention that a single concept can be examined from a variety of points of view. Elsewhere we called this a “**spectrum of aspects**”, or “**the spectrum**.” (Gorbis, 2006). It was also suggested there that we find only a limited number of **aspects** for a given concept and that the **spectrum** of a given concept is essentially a finite set with well defined elements. (Id) Let us now examine carefully this last proposition and see if it applies to language growth.

Before this could be attempted, let’s illustrate some of these ideas by reference to a **class of concepts**: “*Things that go boom!*” which refers to any and all (usually hollow or large and flat) objects that can emit sound when hit or when they impact something such as *a tub, a pot, a tire, a metal dish, a gong, a brass instrument, a drum, a metal sheet* and anything else that can be viewed from the standpoint of “*going boom*.” The **property** to emit sound on impact is an **aspect** of that class of concepts and “*ability to go boom*” is thus a meaning of each of its elements. What else can be said about elements of this class? We ‘know’ that there are certain things that can be done by or happen to any of these elements. For example, any element of this class can “*fall,*” “*hit,*” “*resonate,*” “*emit,*” “*break,*” “*remain intact,*” “*sound*” etc. We can

“*hit,*” “*drop,*” “*strike*” and “*beat on*” these objects.

Thus, in the model of linguistic competence we are describing here, any word-form that “can go boom” is found under the **aspect** of “*emitting sound upon impact*” and by a corresponding tool-box which contains all the **linguistic units** which service the “going boom” **aspect** of any of these **word-forms**. Let us call ‘the going boom’ view of a tub, a drum or a gong and all else named above a **Normative Aspect**.

This is not the only aspect from which these objects can and are examined by speakers of any language. For example, this same class of objects can also be viewed from the **aspect** of ‘*Commercial Item*’ or as ‘*things that can be sold*.’ Thus viewed, any element of the class can be “*sold,*” “*priced,*” “*appraised,*” “*bought,*” “*afforded*” “*compared,*” “*reduced,*” “*sale-priced,*” “*found,*” “*displayed,*” “*catalogued,*” “*taxed*” and so on. These diverse objects will “*cost,*” “*sell for (how much?),*” “*remain available,*” “*be ordered,*” “*retail,*” “*lose value,*” “*appreciate*”, etc. They can also be seen as “*cheap,*” “*expensive*”, “*Chinese,*” “*pricey,*” “*imported,*” “*unique,*” “*antique,*” etc.

In our shared reality these objects have one language independent **universal property** if viewed from the **aspect** of “*Commercial Item*” and a language would provide means to actualize this **property**. This would be another **Normative Aspect** of gongs and tubs and metal plates and drums. Other **Normative Aspects** that come to mind would be “*Physical Objects*” and “*Man-made Objects*”. Let’s consider the last one, i.e. “*Man-made things*.” This aspect casts a wide net and catches every object that has been produced by human hands. As a result, each of these objects would have a meaning of *man-made-ness* and will be served by cognitive-linguistic **category** with such **Active Operators** as “*to manufacture,*” “*to produce,*” “*to price*” “*to design,*” “*to create,*” “*to polish*” “*to package,*” “*to assemble,*” “*to repair,*” “*to recondition*”

*“to break” “to shape”, “to sharpen,” “to test”* and, of course, *“to hand-make,”* etc.

Likewise, viewed in the *aspect* of a *“Physical Object”* (while ignoring its human origin) any concept from this *class* acquires *universal property* that is expressed through *operators* such as *“to see,” “to lift,” “to observe,” “to throw,” “to touch,” “to measure,” “to weigh,” “to destroy,” “to crush,” “to cut,” “to analyze,” “to test for (what?)”* etc. Each concepts of the class with *property* of *“Physical Object”* can *“consist of (what?)”* or *“be composed of (what?),” “break,”* or *“break into (what?)”* It can *“decompose,” “degrade,” “contain (what?)” “weigh (how much?)” “measure (how many units?)”, “occur in (what?)” “test for (what?),” “occupy (what?),” “rise (how many units?)”* or *“rise above (what?).”* It can *“crumble,” “lie,” “remain,” “fall,” “hit (what?)” “boil,” “evaporate”* and so on and so forth.

If you were patiently testing the above examples for correctness you would note a few *operators* that don't seem to fit all concepts of the class. Not every *“man made object”* can be *“sharpened”* or *“polished”*. Not every one can be *“re-conditioned”* or *“crushed”*. Similarly not every *“Physical Object”* can be broken. Liquids certainly won't easily yield to breaking. Not everything viewed from its *“Physical Object” aspect* can usually *“boil”* or *“evaporate”*. We have now uncovered an interesting phenomenon – the existence of *sub-aspects*. In the examples above they are *“man-made component objects”* or *“objects with surface”* or *“hard body objects”* and *“liquid objects.”* Actually they are not subordinated to the *“big”* or *“primary” aspects* we used above for illustration. Each *“sub-aspect”* would throw a different strobe light upon the concepts while marshalling unique *cognitive-semantic categories* with their own arrays of *operators* and *modifiers*. The *“sub”* is a reflection on taxonomy of the *global spectrum of aspects*, a sort of a table of all aspects from which all concepts can be viewed. However, the *“subs”* play an important role in language growth.

Having said all this we now turn to the proper subject of our discussion: the different ways in which language development can occur. The first one is when a change occurs in our shared reality so that the changed concept requires (and acquires) a new Normative Aspect. Before the advent of computers the concept *‘memory’* had only a few *aspects*, from which it could have been used and understood, i.e. a defined *spectrum* which includes *aspects* such as *Container, Space, Event, Content, Activity* and *Emotion*. Each aspect would open a *category* with such *operators* as to *(use, examine, burden, overburden, trust, develop, erase, expand, restore)* memory etc. Memory could *fail, dim, contain, bother, save, preserve, remain (what kind?), serve, haunt, leave, hurt, serve (how), return,* etc. But in a span of a few years everyone learned that there is a storage device called *‘memory’* that can be *‘sold’ ‘bought’ ‘installed’, ‘shipped’, ‘removed’ ‘lost’ ‘restored’ ‘erased’ ‘wiped out’, ‘refurbished’, ‘expanded’, ‘added, ‘priced’, ‘manufactured’,* and so on. We learned that this *‘memory’* comes as *‘internal’, ‘external’ ‘random accessed, ‘permanent’ and ‘cheap’*. How did this happen from our perspective? Our shared reality primed us that if any thing is seen as a *physical object, a man made object, an object of commerce* or *a part of another object*, all the linguistic operations appropriate to these aspects (those above and others) will be proper and available to service the new aspect of that object regardless of the language of the user. If a particular language had no such means available it had to invent or borrow them.

Another form of language growth occurs when someone wants us to examine an unchanging concept from a previously unused perspective. By now, the entire world has heard the Beatles singing *“Can't Buy My Love”* or Tina Turner belching *“Love for Sale”*. We accepted without grumbling that *‘love’* concept has acquired an *aspect* of *‘Commercial Item’* but without adding a new aspect to its already existing spectrum which included aspects *“Emotion”* and *“Sex”*. Because *“sex”* as a concept already had a *“Commercial Item”* aspect,

this borrowing worked well and ‘love’ easily acquired a few operators from the “Commercial Item” **category**. Now, picture an adventurous person discussing “taxing love” or “discounting love” and thereby extending some of the remaining arsenal of the **category** with **universal** ‘Commercial Item’ **property** to serve the concept of ‘love’. Well, it was just done above and reader should have no problem processing this new combination and even visualizing the reality behind it. How was it possible? By virtue of acceptance that ‘love’ is an element of the class of concepts “Commercial Object” we allowed **operators** which serve the corresponding **cognitive-linguistic category** to begin to make sense. Once you open the box, be prepared to meet its contents and accept not only that ‘love’ can be ‘bought and sold’ but also ‘displayed’, ‘inventoried’, ‘exported’, ‘priced’ and ‘catalogued’. This is the path of language growth through concept borrowing new vantage points from their own sub-aspects and aspects. It may be a single instance of its use but because the path exists, the recognition follows.

The next path to review is ‘cognitive expansion’ It occurs when a concept which shares an **aspect** with other concepts (other elements of the class) borrows other **aspects** (and their **operators**) from its neighbors. This is how metaphors are often born. “Cars” and “bicycles” share an aspect “Moving Object” with anything else that moves, such as ‘birds’, and ‘pedestrians’. These last two have a sub-aspect ‘Moving Living Being’ and thus can *fly, jump, crawl, lumber, follow* and so on. Is it fair then to say that ‘cars’ or ‘bicycles’ can have a Normative Aspect of ‘moving living being’?

What allows us to examine any object that moves from the point of view that assimilates it to a life form is the cognitive existence of Metaphorical and Occasional Aspects. This type of borrowing typically occurs across the **spectrum of aspects** and **sub-aspects**. Let us review a random set of examples that deal with abstract notions as opposed to persons or concrete objects:

*Love conquers all*

*It is such a sin to stamp out young love but parents always see it as their duty.  
Love for his son burned in his heart.  
I ask you again: “How do you show love to this creature?”  
No, my dear! This is my love singing.  
Love is gone. It vanished, disappeared without a trace.  
Love does not exist. There is only a matter of hormonal imbalance.  
Skip love, darling. Let’s talk about tomorrow.  
Skip love, darling. Read me again the count’s last words.  
Skip love, darling. I have my period,  
His love was hardened by patience and hammered by every day of his jail term.  
Talk to me my love, sing to me, and give me your lips, my love.  
I have no love left.  
To seek love is the greatest task. To find love is the greatest pleasure. Neither have anything to do with freedom.  
He never before experienced such longing, such love.  
Love bursting out of her like a flame.  
Love deceives, love conspires, love excites, love inspires!*

Several observations can be made from this odd assortment of ‘love’ text strings without actually going thorough a full blown aspect analysis. First, most of the **predicate units** above do not usually service the concept ‘love’ in its Normative Aspects. Second, ‘love’ is examined from the viewpoint of **Metaphorical Aspects** such as “Living Being,” “Human Being,” “Physical Object,” “Moving Object,” “Commercial Item,” “Vegetation” and so on. Third, the property/meaning of ‘love’ is thus extended to include properties/meaning found in **categories** that serve these borrowed **aspects**. Furthermore, some of the **predicate units (operators)** used are normative because through repeated use they have become a cliché. Some combinations were minted for occasional use yet seem reasonably descriptive, and well understood.

One more observation is in order. It is an important one and to a certain degree it seems to upset much of what was said

before. The *spectrum of aspects* of a given concept appears to be not a finite but an open set. In fact, it is not even a homogeneous set. As we saw above, it can consist of different groups: (a) Normative Aspects, (b) Occasional Aspects and (c) Metaphorical Aspects. What do we make of it?

A concept and its (spectrum of) aspects are cognitive phenomena, whereas a word-form and its meanings are linguistic events. A word exists simultaneously as a cognitive potentiality and as a semantic object (wave-particle similarity) and even the most primitive of speakers have no problem in actualizing the latter from the former. To allow this to happen, linguistic competence must be very simply built. (\*) We assume that its basic feature is to 'borrow by experience'. If "love" can be viewed as a "Moving Object" then any concept (or most concepts) in class "Emotions" such as *fear*, *hate*, *fright*, *passion*, *envy*, *jealousy*, *feeling*, and so on can also "move," "flee," "disappear," "catch up (with whom?)," etc., i.e. if these concepts can be frequently viewed under this aspect then "Moving Object" aspect would be considered Normative for them and for 'love' and we can "chase,"

(\*) This knowledge must (and does) find its proper psychological and linguistic corollary. Linguistically, this corollary exists in the form of predicative units, italicized above -- the simple V+N and N+V Indo-European combinations that we termed "Active Operators" and "Passive Operators." Once a Normative Aspect is identified it opens up a 'Cognitive-Linguistic Category', a data base of predicates that actualize this particular cognitive direction. As a general proposition each property/meaning of *tubs* and *pots* and *gongs* and *plates* and *love* is defined by virtue of a shared Normative Aspect and thus presupposes the existence of a cognitive-linguistic category that "services" that aspect.

We can only speculate how this knowledge is represented psychologically. It may be that the embedded psychology of the verb is very different from the psychology of a

noun. It may be that words are not remembered as 'words' but as predicate phrases with verb as a bush root sprouting hundreds or even thousands of noun flowers. "avoid," "pursue" love, just as we would chase, avoid or pursue a moving vehicle or person.

In other words, not all Metaphorical Aspects are to be excluded as Occasional. Indeed the opposite is true: one of the meanings of such concepts as "love" "passion" "fright", etc would be a 'Moving Object' even if it sounds silly in traditional (logical) lexicography.

One more detour and we should be ready to wind up. Because 'love' (and other emotions) possesses the "Moving Object" aspect, it can freely borrow from the entire repertoire of *operators* and *modifiers* that come with that aspect. If a moving object can *swing*, so can *love*. If a moving object can *disappear*, so can *love*. If one can *stop* a moving object, *love* can be *stopped*. If an object can *flee*, so can *love*. This is how writers craft their narrative and this is how languages grow. The essence of poetry and humor is in the crossover borrowing of new *operators* and fresh *modifiers* which happens when a new aspect highlights an old concept, when a neighboring aspect is added to the spectrum or when new operators are borrowed from an existing category

Here are some illustrations of these comments involving the word-form 'tsar':

(1) *The tsar ruled Russian Empire with an iron fist. Then the revolutionaries staged a coup and tsar was overthrown. He was later killed with his family in Siberia.*

#### Normative Aspects:

Living Being  
Person  
Male

Authority  
Human Authority Figure  
Head of State

So far, all aspects of the 'tsar' are Normative and meaningful. Let's consider the

following text from the diary of an 8 year-old as it presents Occasional Aspects of the concept:

(2) *“Grandpa and I went to the wax museum in L.A. and I saw a tsar. It was hot and tsar was melting. I mean wax was dripping from his nose. So they came and replaced the tsar with a brand new tsar and we were allowed to watch. I asked if I could have him and take the old tsar home because my Grandma loves him but they said “No!” So I asked them if I could buy him and they said they will ask...”*

**Normative Aspects:**

Human Authority Figure  
Male

**Occasional Aspects:**

Physical Object  
Objects of Collection  
Objects of Exhibit  
Movable Object  
Man-made Object  
Destructible object  
Replica Object  
Commercial Object.

Because it requires text for its disambiguation, nothing in the *spectrum of aspects* of ‘tsar’ requires us to accept ‘tsar’ as ‘an *Object of Collection*’ unless we have seen enough people who “collect Napoleon” or “buy Nicholas IId”.

Metaphorical Aspects of the word-form ‘tsar’ become keys to understanding and visualizing the surrealistic text below:

(3) *“As Nikitin was watching in sheer amazement, the tsar whizzed by as if sprouting wings. His eyes were bulging, his mouth opened. “No shit!” thought Nikitin preparing to either voice his amazement or to make the sign of the cross, when the tsar flew back followed by two hounds. The dogs were sleek and silent but Nikitin later swore on the icon of Saint Nicodius that the tsar was skipping and floating about two or three centimeters off the floor which Nikitin kept showing to his disbelieving audience as a distance trembling between his two hands.”*

**Normative Aspects:**

Human Being  
Human Authority Figure  
Moving Being

**Occasional Aspects:**

Flying Being

**Metaphorical Aspects:**

Mythological Being  
Growing Part  
Live Vegetation

Obviously, none of these *aspects* (actually, their corresponding *properties*) would become a *meaning* of “tsar” in any logical dictionary. Yet they are a part of recognized speech and a hint that ‘logical’ does not always represent ‘cognitive’.

**Summary and Conclusion.**

Culturally we are fixated on the author of the new and attach great importance to individual’s power to forge new relations, allusions and associations. These relations are not hidden and visible to any observer and most speakers and readers are astute language observers. Every language user knows that concepts are potentialities ready to expand, extend, or contract.

A “*thought*” may be “chased away” as a single mental act. Yet “*thought*” has within it a “plan”, “book”, “design”, “structure”, and “argument.” These and other notions are umbilically tied to *aspects*, the points of view from which we can talk about “*all things debatable*” or “*all things printable*”. Because of this connectivity, “*thought*” can be *published interpreted, enjoyed, noticed, developed further* like “*a proposal*”, “*rejected*” like “*an idea*” and so on. It could be in fact an entire “*theory*” and thereby cross-pollinated by all the **operators** of “*theory*”. As far as “*thought*” goes, the language growth occurs because what we normally see as an intimate, singular and hidden mental act can borrow from acts spoken and written. This way it can become public and “*spread*” or “*circulate*” like a “*rumor*” or borrow a direct precision of an “*instruction*”. It could be *protected and*

*saved, bought and sold* as any “*property*” and thus allows future extensions into the “*Commercial Item*” territory once we determine that the shared reality manifests the **property** of “salability” when it comes to “*thought*”.

Aspect semantics may show us how to analyze language development as it occurs in three different ways: **cognitive modification**, **cognitive expansion** and **cognitive extension**.

**Cognitive modification** involves an application of a modifier, usually an adjective, which identifies the aspect under which the concept appears and thus (re)defines the concept as the object of thought. For example, understanding of which “N slipped between (which?) lines” would hinge on whether “enemy lines”, (*Pursuit* aspect) or “defense lines” (*Sport Activity* aspect) are specified by a **Modifier**.

**Cognitive expansion** occurs whenever a new aspect is normatively added to the **spectrum** of a concept. Thus, the concept “*associates*” acquired a new aspect of “*Employees*” when law and professional firms appeared which made it possible “to hire or fire an associate” whereas before one could only “choose” or “disassociate from” them.

**Cognitive extension** is a **property** borrowing process and typically, one based on proximity. It can occur at any level: Aspect to Aspect, Category to Category, and Operator Unit to Unit. Borrowing can occur ‘occasionally’ or ‘metaphorically’.

The following rules can help us explain and formalize this approach:

- i. If concepts X and Y share an Aspect, then either X or Y may occasionally borrow other aspects from each other.
- ii. If concepts X and Y share an aspect, then either X or Y may borrow operators from categories which service shared and unshared aspects.

- iii. If concepts X and Y share a Unit which previously belonged to an aspect of either X or Y, both X and Y would occasionally share that aspect.
- iv. If concepts X and Y share Aspect I and concept Y has a sub-aspect A, X may occasionally borrow sub-aspect A (and its operators) from Y.

Unfortunately, the scope of this paper prevents expanding on the above rules or providing further examples. Those who wish to explore applicability of the above rules may wish to turn to *Clifford Simak’s “A Choice of Gods”* or any other sci-fi classics where trees *talk*, clouds are *ordered to form*, and sabers *light* with powers of the dark side.

It seems reasonable to suggest the applicability of this model and its rules to an AI system. Operative description of a word-form as a sum total of its aspects and a separate data base of operators servicing each aspect category may enhance not only adequate text recognition but a gradual expansion of system vernacular. To the extent that aspect properties are universal and thus metalingual, a global spectrum of aspects would provide a common basis for machine translation. This protocol however must await completion of “The COG”, a cognitive data base presently under development.

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