Endurant vs Perdurant:
Ontological Motivation for Language Variations

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Abstract

Modern ontology focuses on the shared structure of knowledge representation and sheds light on underling motivations of human conceptual structure. This paper addresses the issue of whether ontological structures are linguistically represented, and whether such conceptual underpinning of linguistic representation may motivate language variations. Integrating our recent work showing that the most fundamental endurant vs. perdurant ontological dichotomy is grammaticalized in Chinese and on comparable corpus based studies of variations of Chinese, I will explore the possibility that this basic conceptual dichotomy may in fact provide the motivation of changes of perspectives that underlies language variations. I will also discuss possible implication this approach has in accounting for other language changes and variations such as light verb's argument taking, incorporation, loss of case/agreement, and English –er/-ee asymmetry. In the process, the will resolve three linguistic puzzles and eventually show that the endurant/perdurant dichotomy may in fact be the conceptual basis of the hitherto undefined +N (i.e. nouny) vs. +V (i.e. verby) features prevalent in linguistics. Based on this proposal, the variations involving various types of denominalization and deverbalization can be accounted for.

1. Motivation: Three Linguistic Puzzles

This paper starts with three seemingly unrelated linguistic puzzles and will end in proposing a common solution to these puzzles, in spite of the fact that these puzzles are very different in nature and varies greatly at the linguistic levels where they occur. By showing that the perdurant/endurant ontological dichotomy offers common solution to these puzzles, I will further demonstrate that the same dichotomy can motivate a range of well-known facts in language changes and variations.

1.1. Three Linguistic Puzzles
The three puzzles belong to different domains. The first puzzle involves a common cross-linguistic phenomenon, the second puzzle is language specific, while the last is a meta-linguistic one.

(1) Why do we refer to a flight that did take off at 10:10 the 10:10 flight?

(2) Why 醫院病人 *yi1yuan4 bing4ren2* 'hospital patient' is not an acceptable expression in Mandarin Chinese?

(3) What does linguists mean by 'nouny' and 'verby'?; or
What does +N, +V stand for when linguistic theories claim that nouns are [+N, -V], and adjectives are [+N, +V]?

These puzzles are explicated further below:
Why 1 A flight that is scheduled for10:10 typically takes off earlier or later, and rarely takes off at exactly 10:10. For instance, it could be delayed and took off at 10:28. However, in any language, it is simply not possible to inquire about information related to this flight, such as the arrival time, by referring to the flight with it factually true 10:28 taking off time? Why are we linguistically obliged to refer it the 10:10 flight while we know that it is not true that it took off at 10:10 (and in fact a different flight might have taken off at 10:10)?

Why 2 NN compound are common and productive in Mandarin Chinese and a wide range of NN compounds are attested, such as 'school teacher' 學校老師 *xue2xiao4 lao3shi1*, 'hotel chef' 酒店廚師 *jiu3diao4 cu1shi*, or 'primary school student' 小

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學學生 *xiao3xue1 xue1sheng*. Mandarin speakers, however, balk at and strongly dis-prefer 'hospital patient' 醫院病人 *yi1yuan4 bing4ren2*, and would prefer 醫院的病人 *yi1yuan4 de bing4ren2*. But why not and why does the addition of 的 *de* make the expression acceptable even though the semantic relations of between two component nouns seem to be similar.

Why 3 A fundamental architecture shared by a few linguistic theories is the use of +/- N, and +/-V features, often referred to as being nouny or verby. These are supposed to be more fundamental than grammatical categories as nouns are defined as a [+N, -V] category, adjectives as [+N, +V], verbs as [-N, +V], and adverbs as [-N, -V]. However, what does +N mean? A paraphrase of nouns have noun-like properties is a tautology. Since the definition of nouns depends on the +N features, yet the definition of the +N feature requires that we know what a noun is. Furthermore, deverbal nouns and denominal verbs, among other categorical shifts, are common in all languages. It is not unreasonable to expect that they retain some features of their original category, but does this make them nounier or verbier? Can they be both +N and +V (but this by definition means they are adjectives, which they clearly are not)? And most of all, is there any theoretical, empirical or cognitive ramification of this seemingly tautological stipulation?

1.2. Outline of the paper
After introducing the three linguistic puzzles, I will introduce the ontological dichotomy of endurant vs. perdurant (aka continuant vs. occurrent) and suggest why this dichotomy may be relevant for the three puzzles. In section three, following Huang (2015), I will show how this dichotomy is grammaticalized in Chinese. In particular, I argue that in Mandarin Chinese, sortal classifiers denote endurant properties, while measure words denote perdurant properties; and that 的 *de0* has a main function to mark perdurant relations. In section four, I explore some possible accounts of language variations based on this ontological dichotomy, including light verb selection variations in World Chineses, emergence of classifiers in Chinese, (verbal) incorporation involving VO and SO compounds in Chinese, and lose of gender and case in Middle English; as well as the lexical gaps

in -ernominalization in English. I propose answers to the three puzzles in section 5. And section 6 will be the conclusion.

2. Endurant/Perdurant in Ontology
2.1 Endurant vs. Perdurant
Ontology in the application of information science and knowledge engineering is the shared system of knowledge representation (e.g. Gruber 1995). This shared system is often represented in terms of conceptual atoms and relations. One of the most fundamental issues in ontology construction the first binary bifurcation of all conceptual atoms. This seemingly simple decision will dictate the fundamental design of the knowledge system, as it entails the underlying conceptual or informational criteria for creating different branches in the knowledge system. We can find in the literature on ontology extensive discussion in philosophical, logical, linguistic, and cognitive theories before making commitment to this first bifurcation (e.g. Guarino 1998, and Gurino and Welty 2002 for DOLCE, Niles and Pease 2001 for SUMO, and Sminth and Grenon 2004 for Basis Formal Ontology (BFO)). Hence the fact that many upper ontologies adopt the endurant/perdurant dichotomy for this primary classification is significant. This dichotomy in fact relies crucially on relevance of time: a concept which can be defined independent of time is endurant; and a concept which must be defined dependent of time is perdurant. In terms of referring to entities, they correspond to what is called continuant and occurrent in philosophy. Hence the implication is that it is NOT the shape or other perceivable physical properties, but rather the entity's continuity of existence in time that plays a central role in conceptual classification of our knowledge systems. Although the logic primacy and cognitive necessity of such a stipulation seems well-motivated, one may wonder if such an abstract concept may play a role in the daily usage of language.

Before exploring their link to linguistic data, it is important to note that the time (in)dependency can be judged from pure physical/logical necessity (as in formal ontology) or based on (human) conceptualization (as in linguistic ontology). BFO, for instance, allows two types of ontologies to describe the same information content: three-dimensional SNAP ontologies without temporal dimension, which are therefore like snapshots; and

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four-dimensional SPAN ontologies incorporating spatiotemporal information (Grenon and Smith 2004). DOLCE, on the other hand, apply the endurant/perdurant dichotomy to entities only (Gangemi et al. 2003). This design feature can be illustrated by the DOLCE upper ontology (adapted from Gangemi et al 2003, and 2010) and given Figure 1 below. A different way to realize the edurant/perdurant dichotomy is BFO's basic bifurcation of continuant/occurrent, as illustrated Figure 2 (adapted from Smith 2012).

2.2 Interim Summary: Endurant/Perdurant

I summarize in three different ways the endurant vs. perdurant dichotomy as the foundation for the account to be proposed in this paper.

First, in intuitive and somewhat simplistic terms, referring entities are typically considered to be endurants; and processes are typically perdurants Endurants are hence noun-like and perdurants more verb-like.

Second, in terms of conceptual atoms, an endurant is "(the concept of) an entity which has spatial components but is not dependent on a specific time frame of occurrence." e.g. Hilary Clinton in 2008 and in 2016 are the save person. A perdurant is "(the concept of) an entity which has a time element crucially associated with its meaning." E.g. Clinton's 2008 and 2016 campaigns are two different campaigns.

Third, from conceptualization (or ontological representation) perspectives, and largely following Gernon and Smith (2004), an endurant ontology is SNAP ontology, where objects requires three-dimensional representation but can be described independent of time. And a perdurant ontology is SPAN ontology, where objects are given four (or higher) dimensional representation, and possible variations at different temporal point is integral part of the object being described.

2.3 Towards an Answer to Puzzle 1

Given the endurant vs. perdurant dichotomy, we are now able to differentiate the two different temporal references involved in the first puzzle, the 10:10 flight that took off at 10:28:

The 10:28 taking off time is the **perdurant** property of the event. Its relevance and validity is dependent on a specific timeframe of the occurrence of the event (e.g. 6 October, 2016). Hence to use this temporal reference, the speaker must both specify explicitly the particular the timeframe of the event as well as have specific knowledge of the parochial time reference. S/he also needs to establish that the listeners have the same reference and the same knowledge. It is easy to see that such level of shared reference and knowledge is not easy to establish.

The temporal reference of 10:10, as in 'a 10:10 flight', is the **endurant** property shared by all events belonging to this type. A 10:10 flight is 'the same' today, tomorrow, and the day after; regardless of when the flight actually take off each day as long as it is scheduled as such. Being a 10:10 flights is the shared endurant property of all such event episodes. More importantly, this 'enduring' property is conceptually robust for people to establish and share without further explication. This similarly applies to rigid designators. We refer to Hilary Clinton as a endurant even though we know that Clinton in 2008 and in 2016 have many different properties exactly because the reference is enduring and easy to establish for human conceptualization; while any other time-dependent reference can be easily lost track of by different participants in conceptualization, e.g. perdurant.

3. The Chinese classifier system: Linguistically encodes Endurant/Perdurant contrast

In this section, we follow the ontological account of Huang (2015), which adopts the generalizations of the linguistics system of Chinese classifiers presented in Ahrens and Huang (2016), as in Figure 3.

3.1 Sortal Classifier Denotes Endurant Properties

Ahrens and Huang (2016) identify two different sub-types in the syntactic classifier system of Chinese and call the first type 'sortal classifiers'. These are the prototypical Chinese classifiers Chinese, and individual classifiers in (4) are in turn the most prototypical sortal classifiers.

(4) a. 一張破破爛爛的紙
yi1_zhang1_po4po4lan4lan4_de_zhi3
one_CL_tattered_DE_paper
'one piece of tattered paper'

b. 那張缺腿的椅子
na4_zhang1_que1tui3_de_yi3zhi
that_CL_leg-missing_DE_chair
'that chair with a missing leg'

It is important to note that previous literature on classifiers in Chinese typically assumes that they establish different noun classes according to the physical properties, such as shapes, of the referents (e.g. Tai 1994). Huang (2015) showed that this is not the necessary conceptual motivation. In (4a), a piece of tattered or torn paper no longer retains the sheet like shape property purported to be selected by the classifier 張 *zhang1*. Similarly, a chair with a missing leg no longer poses the typical physical features purportedly selected by the classifier. The classifiers seem to select conceptual classes that are not affected by specific occurring events. In other words, sortal classifiers pick up the time independent property of being paper/chair regardless of the physical state of the referent at a certain time. I.e., they encode endurant properties We also picked the polysemous 張 *zhang1* to underline the fact that the classifier system is linguistically conventionalized and not dependent on the specific actual physical properties a particular classifier refer to.

3.2 Measure Words Denote Perdurant Properties
The other sub-class of the syntactic classifier system involves measure words, according to Ahrens and Huang (2016). These are the syntactic classifiers that are known not to select the nouns they modify. The example chosen involves a standard measure word

(5) 這一塊一公斤的肉，煮熟後只剩不到 600 公克
zhe4_yi1_kuai4_yi1_gong1jin1_de0_rou4zhu3sho u2_hou4_zhi3_sheng4_bu2dao4_600_gong1ke4
    this_one_CL_one_kilogram_DE_meat,
    cooked_after_only_left_less_600_gram
 'This piece meat of one kilogram only weighs less than 600 grams after being cooked.'

(5) shows that the property selected by a measure word is time dependent. Note the weight differs before and after cooking in (5), even though the weights belong to the same piece of meat. Hence, the measure words pick up a perdurant property of the object, unlike sortal classifier. This is one of the reasons why sortal classifiers have selectional restrictions (as they refer explicitly to a particular group of endurant entities); but measure words cannot (as the property they refer to is not a constant property of an entity). Huang (2015) hence argue that the sortal classifier vs. measure

word dichotomy in Chinese classifier system is the grammaticalization of the endurant/perdurant ontological contrast.

The presence of 的 *de0* in (5) also underlines a well-known but never explained generalization that insertion of 的 *de0* (DE-insertion) is allowed after measure words but not after sortal classifiers.

3.3 Linguistic expression of ontological notions
Huang (2015) observes that although the fact that DE-insertion is not allowed after sortal classifiers suggests that its presence is linked to non-endurant properties, there are some exceptions.

(6) a. (一)大張(的)紙 yi1_da4_zhang1_de_zhi3
      'a sheet of big paper'
    b. (一)小張(的)紙 yi_xiao3_zhang1_de_zhi3
      'a sheet of small paper'
    c. 一張大紙 yi1_da4_zhang1_de_zhi3
      'a sheet of big paper'
    b. 一張小紙 yi_xiao3_zhang1_de_zhi3
      'a sheet of small paper'

What (6)a-d show very crucially is that DE-insertion is allowed only with the rare cases when a sortal classifier is internally modified. Since such internal modification assigning specific physical properties to the sortal classifier, we assume that it acquires time-dependent properties and hence allows DE-insertion. This hypothesis is supported by the fact that DE-insertion is not allowed when modification is applied to the noun and not the classifier (hence does not change the endurant property of the sortal classifier).

Last, this generalization nicely applies to Chao's (1968) observation of a minimal contrast pair of compound nouns with or without 的 *de0*.

(7) a. 白花油 *bai2hua1you2*
        white_flower_oil
    'Pak Fah Yeow[A brand of Chinese herbal oil]'
    b. 白花的油 *bai2hua1_de_you2*
        white_flower_DE_oil
    'A(n) (essential) oil made from a white flower'

(7a), without 的 *de0*, refers to an endurant which does not necessarily have any relation with white flowers (白花) but is established by convention. (7b), with 的 *de0*, however, requires the

'occurring' of the white flower. Based on this, Huang (2015) concluded that

> DE-insertion is allowed only when the M selects perdurant properties and that in general, DE-insertion does not change the meaning of perdurant D-M compounds

We can further hypothesize that DE-insertion marks the shift to a SPAN (four-dimensional) ontological view, and hence underlines time-dependent properties. This is also consistent with the analysis that modifier constructions with 的 *de0* has intersective reading, as well as the fact that 的 *de0* marks relevant clauses in Chinese (e.g. Huang and Shi 2016). To account for both generalizations, the shift to SPAN ontological view marked by 的 *de0* license the meaning where the pre- and post- 的 *de0* element must be present and interpreted at the same temporal point.

3.4 Possible Answer to **Why 2**

The ontological account of 的 *de0* above offers a solution to our second puzzle. Being a patient in a hospital is time-dependent (i.e. perdurant) property. That is, we do not expect being sick to be an inherent property of a person, unlike the other properties quoted above (e.g. being a chef, student, or teacher). Hence the presence of 的 *de0* is strongly preferred to mark the perdurant property of a patient in the hospital as in 醫院*的*病人. Without 的 *de0*, 醫院病人 is not ungrammatical yet creates semantic dissonance.

(8) a. 小學老師 *xiao3xue2 lao3shi1*
    'elementary school teacher'
  b.小明媽媽 *xiao3ming2 ma1ma1*
    'XiaoMing's Mom'
  c.小明老師 *xiao3ming2 lao3shi1*
    'Teacher XiaoMing'
  d.小明的老師 *xiao3ming2 de0 lao3shi1*
    'XiaoMing's teacher'

In fact the perdrant/endurant contrast nicely predict the distribution and interpretation of NN's with(out) 的 *de0*, as shown above. The interpretation of (8c) and (8d) is the most crucial

example fact. For NN without 的 *de0* both occupational (8a) and possessive (8b) readings are acceptable, both endurant. However, in contrast with (8b), the relations between XiaoMing and his teacher cannot be expressed without 的 *de0*, as it is a perdurant relation dependent on specific tempo-spatial constraints. The only endurant interpretation available for (8c) without 的 *de0* is an appositional one, where XiaoMing is the name of the teacher.

4. Ontological Basis of Language Variations

Given the fact that the endurant/perdurant time-dependency contrast is linguistically encoded and allow us to resolve two of the linguistic puzzles posed, I will explore the possibility of its contribution to language variations as a step toward solution of the meta-linguistic puzzle 3.

4.1 Incorporation: Chinese VR and VO compounds

The emergence of VR Compounds in Chinese (cf. Liu 2002) during the Northern and Southern Dynasties (CE 420-589) is one of the major grammatical changes in the history of Chinese language. In this process, phrasal 'verb + complement' units become incorporated VR compounds and gradually acquire ability to take direct object over time, but at different pace for different verbs.

Interestingly, we now see a similar process in action with the emergence of VO compounds in Mandarin Chinese for both in Mainland China and Taiwan (Jiang and Huang 2016). In this process, phrasal 'verb + object' units become incorporated VO compounds and gradually acquire ability to take direct object over time. However, intriguingly, this process is happening at different paces for different verbs and for different Chinese varieties. In general, the VO incorporation process seems to be faster in Taiwan Mandarin then Mainland Mandarin.

Verb-noun incorporation is an important linguistic topic from both synchronic and diachronic perspectives and has been extensively studied. Mithun (1984), for instance, describes incorporation as coalescence of nouns and verbs. She later (Mithun1986) claims that incorporation involves reduction of noun classes and incorporated nouns, like nouns in other compounds, do no refer but qualify or narrow the scope of the

host verb. And Jacques (2012) claims that denominalization leads to incorporation

Re-interpreting the positions laid out by both Mithun and Jacques, we can assume that in incorporation, there is a conceptual shift of the R/O unit in terms of losing endurant meaning. That is, they lose the ability to refer independent of time and now becomes part of a time-dependent 'occurring' to the extent of allowing the new perdurant entity to predicate a new class of endurant arguments.

Based on the above generalizations, we envision the conceptual motivation of VO incorporation as follows. O gradually loses its time-independent properties and become more dependent on V because of their highly collocating occurrence to the extent that:

-O is no longer an endurant and hence cannot stand by itself and the V-O sequence losing one dimension of its event structure (still SPAN, but lost the ability to represent a dependent participants)

-Increasing Transitivity: As VO becomes fully incorporate ands strongly perdurant (as a new predicate), it evolves to differentiate itself from the event structure (ontological representation) of the original V by acquiring the ability to add another dimension i.e. ability to take another argument or a participants as a new dimension in the ontology).

It is important to note that this account motivates the decrease in transitivity, a common phenomenon in grammaticalization, as the switch from endurant to perdurant of a participant (and its merge with an extisitng perdurant V), a simple binary conceptual switch. This way, we can also view the variations of whether the incorporated verbs (VO) can take argument or not as ontologically motivated in terms of whether to add another dimension or not to the newly formed event structure. We can even speculate that the reason why Taiwan Mandarin incorporated VO is more likely to take additional object because its being conservative and has the tendency of maintaining the original transitivity or dimensions of event structure (Jiang and Huang 2016).

The emergence of the VR compound can in fact be described similarly as R typically is the property of an endurant object/theme. Hence the incorporation of R also reduces an endurant.

4.2 Case and Infection Loss in Middle English

Another well-known and well-studied case of historical change is the loss of case and inflection in Middle English. Note that both case (agreement) and inflection are in fact dependent on the concept of time. Inflection marks time directly, while case agreement allows an endurant to be linked to a perdurant and be associated with time dependency. Hence the loss of inflection and case simplifies the grammatical representation of ontological information by reducing the time dependent dimensions. I.e. it reduces the associated perdurant properties on an endurant entity.

4.3 Variations in Light Verb Selection in World Chineses

In a series of studies based on comparable corpora from Mainland China and Taiwan, Huang et al. (2014) and Jiang et al. (2015, 2016) showed that that the light verb 進行 *jing4xing2* 'to proceed' and some similar light verbs have different constraints on taking eventive nominals objects.

(9)a 進行研究 jing4xing2 yan2jiu4
　　'to carry on research'
　b.進行 議案/議程 *jing4xing2 yi4an4/yi4cheng2*
　　'to carry on (in a meeting) discussion items/agenda'

In general, when such variations occur, light verbs in the Mainland Mandarin variant take only deverbal nouns, but NOT event nouns. That is (9a) will be used but (9b) not accepted. In Taiwan Mandarin, however, both (9a) and (9b) are commonly used and accepted.

In this context, our basic assumption is that as light verbs lack eventive content, it needs to take an object with eventive information. In the ontological view, this means that verbs represents four or higher dimension SPAN ontology but light verbs misses some essential dimension (esp. in terms of participants). Recall Chierchia's (1984) account of deverbal nouns as turning events into a referring entity but allowing the eventive information of argument structure to be preserved. In other words, a deverbal noun loses the dimension of time but retains the dimensions of participants. Hence, in terms of eventive or ontological information, light verbs and deverbal nouns complement each other. Non-derived event

nouns, however, are *bona fide* nouns and should be endurants and time-independent by default. Note that the above discussion of light verb + deverbal noun combination assumes that they are both perdurant but with missing dimension(s) in SPAN ontological representation and hence can be unified to fill in the missing information. Hence a possible account of this variation is that these two variants differ in whether to allow the non-derived event noun to be viewed as perdurants and provide the kind of time-dependent participant information to complement that of the light verbs. And in this particular case, the Taiwan variant allows the non-derived noun to provide perdurant information while the Mainland variant does not. Note that this analysis is compatible with the VO variations that we discussed earlier, as one possible account (e.g. Huang 1990) of the VO's ability to take additional participants is in fact that O is encoded with eventive participant role information.

4.4 Emergence of Classifiers in Chinese

It is well known that Num+Measure Phrases occur after head nouns in Old Chinese and that they moved to pre-nominal position to develop the current classifier system in Mandarin Chinese. However, what motivated such change if their functions are similar in enumerating the noun?

(10) 陳文子有<u>馬十乘</u> (Confucius Analects 論語)
  'Chen Wenzi used to have 40 horses (=horses enough to drive 10 quadriga).'…[He abandoned them to emigrate from a deteriorating staete.]

(11) 昔者吾先君中行穆子<u>皮車十乘</u>，不憂其薄也，憂德義之不足也。今主君有<u>革車百乘</u>，不憂德義之薄也，唯患車之不足也。(XinXu 新序)
  'Our deceased king …owned 10 quadriga (chariots)...; Now my lord owns 100 quadriga (chariots)..'

What has been generally observed is that in Old Chinese, there were fewer Measure words, they occur less often, and are less versatile in collocation. This is in contrast with the modern classifier system, which is pretty much required in a noun phrase, occurs frequently and typically can select multiples nouns. Careful reading of the two examples (10) and (11) involving the Measure word 乘 *cheng2* 'quadriga, chariot paired with four horses' and similar post-nominal measure words gives us good hints. One characteristic that jumped out in these examples is that all three instances of Num+Measure are describing a particular time-dependent event of ownership. And this seems to be true of most of the attested Old Chinese examples of post nominal Num+Measure phrases. Note also that 乘 *cheng2* can only measure either chariots or horses, not other nouns. The reason is self-evident as this is exactly what 乘 *cheng2* means and dependent on the actual event of pairing a chariot with four horses. In other words, this measuring is event-dependent, hence can only measure the two participants of the event. This particular usage is therefore conceptually perdurants, referring to a specific SPAN ontology where an event is measured. It does NOT select any other endurants that is not involved in the event and is different from the modern classifier system.

Based on the above analysis and on what we know about the Mandarin classifier system, we can speculate that the move of the Num+Measure from post-nominal to pre-nominal position is motivated by its functional shift from perdurant to endurant. That is, from measuring a specific time/event dependent relation to representing an endurant property shared by a class nouns. It is this differentiation of function that allows new pre-nominal position to emerge and eventually making the less grammaticalized post-verbal usage less favorable. Such account is in fact consistent with the residual use of post-nominal measure phrases in time-specific counting situation and with the existence of transitional period when both pre- and post- nominal measure phrases were used.

4.5 *-er*/-ee Asymmetry in English

The last set of variations I will look at is the lexical gaps in the participant nominalization in English involving suffixes *-er* or *-ee*. It is well known that there are gaps in terms of the nominalization of agent/patient applying this pair of suffixes. However, they were simply assumed to be lexical idiosyncrasies and do not require explanation in previous studies. In general, the *-er* normalization is more frequently attested but there are some exceptions:

(12) Agent Gaps
  a. *Awarder/Awardee

b. *Granter/Grantee

(13) Patient Gaps
      a. Presenter/*Presentee
      b. Hijacker/ *hijackee
      c. Robber/*Robbee
      d. Preacher/*Preachee
      e. Famer/*Farmee
      f. Eater/*Eatee
      g. Caretaker/*Caretakee

Of course there are many additional historical and morpho-phonological reasons for some gaps. However, a generalization emerges after examining a range of data, including additional examples that strongly prefer *-er* affix and not listed here. That is, with either *-er* or *-ee*, the attested nominalized forms have endurant interpretations. For instance, an awardee is a time-independent meaning, regardless of when s/he got the award, is always the awardee (of the prize/award). The person who presented the award, however, has the property of presenting the award only on that particular occasion. Hence the property of giving an award is perdurant. This also explains why there are many more words with *-er* affixes than *-ee* affixes. It is typically much easier to derive the enduring property of doing X when the participant is the actor/agent. E.g. it is much easier to conceptualize someone involving and engaging in the act of hijacking having that as an enduring property but very difficult to conceptualizing a person with the time-independent inherent property of being hijacked. In short, since the participant nominalization involving the conceptual manipulation of individualization, the identified individual must be endurant. Hence, for a participant nominalization to occur, the participant's involvement in an event can be able to be viewed as enduring. This conceptual necessity nicely accounts for the gaps and asymmetries in *-er/-ee* nominalization.

5. Conclusion
In this paper, I started with exploration of the nature of three linguistic puzzles and went through arguments for the necessity to present and preserve the endurant/perdurant dichotomy in language. I further demonstrated how the dichotomy is grammaticalized in the Chinese language. Lastly, I try to account for a few phenomena in language variations with the endurant/perdurant dichotomy. There is now one last meta-linguistic puzzle to be resolved in this conclusion. That is, what does +N/Nouny or +V/Verby represents?

It should be clear from the data and account presented above that I will propose that the +N feature stands for endurant properties, and the +V feature stands for perdurant properties. In other words, being nouny is referring to the time-independent properties of the linguistic element and being verby is referring to the time dependent properties of a linguistic element. And in fact, as mentioned, being endurant/perdurant does not necessary refer to the actual physical properties of the entity but could also refer to the (linguistic) perspectives of how we view the entities.

Hence, we use our fundamental conceptual bifurcation of time-dependency to conventionalize linguistic categories (i.e. using the N and V features to defined the PoS's). However, once the linguistics categories are conventionalized, we can then change our perspectives on the relevance of time-dependency for any linguistic element. The goal of this paper is to suggest that this simple change of perspective can be viewed as the conceptual motivation of a wide range of language variations in terms of lexical derivation, categorical changes, incorporation/transitivity, grammaticalization, and even variations among different variants. Although the accounts presented here is sketchy and somewhat speculative in a few cases, I hope our work will encourage more future work on the conceptual motivation for language changes and variations. I believe such ontology-driven accounts have the potential of unearthing the underlining mechanisms of linguistic variations and provide a more coherent and predictive account of language changes and variations in the future.

Figure I: DOLCE Upper Ontology: Entities
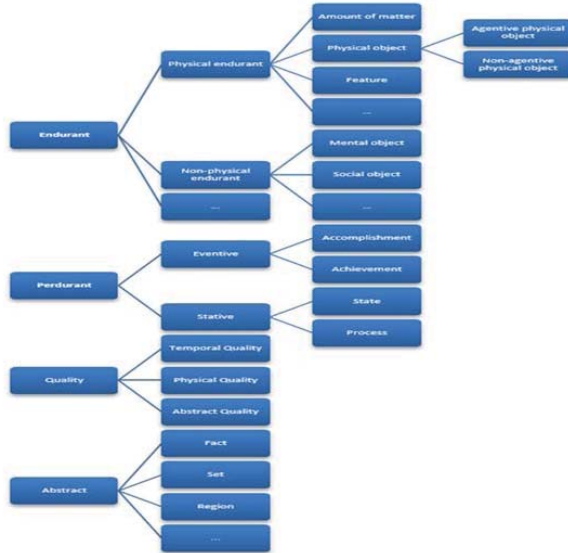

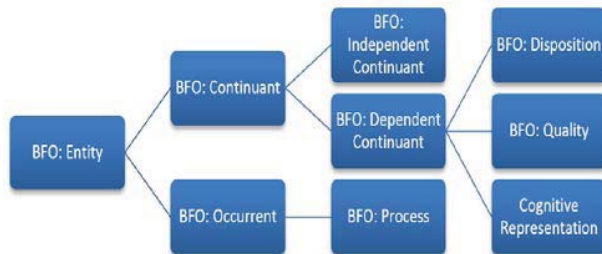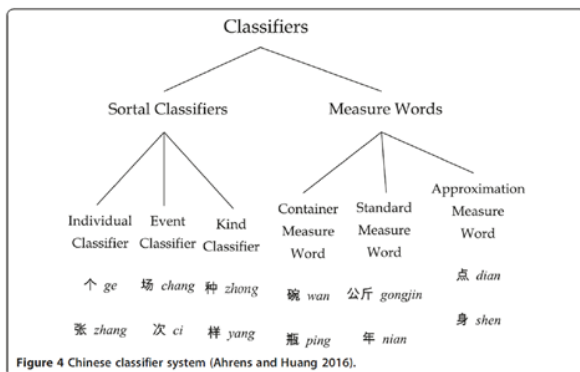**Figure 2: Basic Formal Ontology (BFO) Upper Ontology**

Figure 3: Chinese Classifier System (Ahrens and Huang 2016)

References

Ahrens, K. and C.-R. Huang. 2016. Classifiers. In Huang and Shi (2016). Pp. xxx-yyy. Cambridge University Press

Aikhenvald, A. Y.. 2003. Classifiers: A typology of noun categorization devices. Oxford: Oxford Univ. Press.

Aikhenvald, A. Y. 2001. Classifiers. Oxford Bibliographies in Linguistics. Oxford University Press.

Chao, Y.R. 1968. A Grammar of Spoken Chinese. Berkeley: University of California Press.

Chao, Y.R. 1955. Notes on Chinese Grammar and Logic. In Philosophy East and West, Vol. 5, No. 1, pp. 31-41.

Chierchia, G. 1984. Topics in the Syntax and Semantics of Infinitives and Gerunds. University of Massachusetts Ph.D. Dissertation.

Chou, Y.-M. and C.-R. Huang. 2010. Hantology: conceptual system discovery based on orthographic convention. In Huang et al. (Eds.), Ontology and the Lexicon: A Natural Language Processing Perspective (pp. 122-143). Cambridge: Cambridge University Press.

Gangemi, A., N. Guarino, C. Masolo, and A. Oltramari. 2003. Sweetening Ontologies with DOLCE. AI Magazine. 24.3.13-24.

Gangemi, A., N. Guarino, C. Masolo, and A. Oltramari. 2010. Interfacing WordNet with DOLCE: towards OntoWordNet. In Huang et al. (2010) pp. 36-52.

Grenon, P. and B. Smith. 2004 SNAP and SPAN: Toward Dynamic Spatial Ontology. Spatial Cognition and Computation. 4.1.69-103.

Gruber, T. 1995. Toward Principles for the Design of Ontologies Used for Knowledge Sharing. *International Journal of Human-Computer Studies.* 43 (5-6). 907–928.

Guarino, N. 1998. Some Ontological Principles for Designing Upper-Level Lexical Resources. In Proceedings of the First International Conference on Language Resources and Evaluation, 527–534.

Guarino, N., and C. Welty. 2002. Evaluating Ontological Decisions with ONTOCLEAN. Communications of the ACM 45(2): 61–65.

Her, O.-S., and C.-T. Hsieh. 2010. On the Semantic Distinction between Classifiers and Measure Words in Chinese. Language and Linguistics. Vol. 11, No. 3, pp. 527-551.

Huang, C.-R. and D. Shi. 2016. A Reference Grammar of Chinese. Cambridge University Press.

Huang, C.-R, and S.-K. Hsieh. 2015. Chinese lexical semantics: from radicals to event structure. In William S.-Y. Wang and Chao-Fen Sun (Eds.), The Oxford Handbook of Chinese Linguistics (pp. 290-305).New York: Oxford University Press.

Huang, C.-R. 2015. Notes on Chinese grammar and ontology: the endurant/perdurant dichotomy and Mandarin D-M compounds. *Lingua Sinica. 1*(1). http://link.springer.com/article/10.1186/s40655-015-0004-6

Huang, C.-R., J. Lin, H. Xu, and M. Jiang. 2014. Corpus-based Study and Identification of Mandarin Chinese Light Verb Variations. The Workshop on Applying NLP Tools to Similar Languages, Variations, and Dialects (VarDial), at the 25th International Conference on Computational Linguistics. Dublin, Ireland. 23 August.

Huang, C.-R,黃居仁。2013. 關於「的」的功能一致性研究。沈陽（主編），《走向當代前沿科學的現代漢語語法研究》，北京：商務印書館，頁 129-135。

Huang, C-.R. et al. 2010. Ontology and the Lexicon. Cambridge University Press.

Huang, C.-R., and K. Ahrens. 2003. Individuals, kinds and events: classifier coercion of nouns. In: Language Sciences. Vol. 25, No. 4, pp. 353-373.

Huang, C.-R. 1990. A unification-based LFG analysis of lexical discontinuity. *Linguistics. 28*(2). 263-307.

Jacques, G. 2012. From Denominal Derivation to Incorporation. Lingua. 122.1207-1231.

Jiang, M., and C.-R. Huang. 2016. Constructional Correspondences of Transitivity of Mandarin VO Compounds: A corpus-based study. Paper presented at the 24rd annual conference of the International Association of Chinese Linguistics (IACL). 17 August. Beijing Language and Culture University, Beijing, China.

Jiang, M., D. Shi and C.-R. Huang. 2016. Transitivity in Light Verb Variations in Mandarin Chinese -- A Comparable Corpus-based Statistical Approach. To be presented at the 30th Pacific Asia Conference on Language Information and Computation (PACLIC). 28-30 Octobber, Kyunhee University. Seoul, Korea.

Jiang, M., J. Lin, and C.-R. Huang. 2015. *A comparable corpus-based study of VO compound variations between Mainland and Taiwan Mandarin. Presented at* the 23rd annual conference of the International Association of Chinese Linguistics (IACL). 26-28 August. Hanyang University, Seoul, Korea.

Li, C. N., S. A. Thompson. 1981. Mandarin Chinese: A Functional Reference Grammar.

Liu, C. 劉承慧. 2002. 漢語動補結構歷史發展. 台北：翰盧圖書出版有限公司.

Mithun, M. 1986. On the Nature of Noun Incorporation. Language. 62.1-32-37.

Mithun, M. 1984. The Evolution of Noun Incorporation. Language. 60.4.847.894.

Niles, I. and A. Pease. 2001. Towards a Standard Upper Ontology. Proceedings of the international conference on Formal Ontology in Information Systems. Pp. 2-9.

Smith, B., 2012. On classifying material entities in Basic Formal Ontology. *Interdisciplinary Ontology. Proceedings of the Third Interdisciplinary Ontology Meeting*. Keio University Press 1-13

Smith, B. and P. Grenon. 2004. The Cornucopia of Formal-Ontological Relations. Dialectica, 58.3.279-296.

Tai, J.H-Y. 1994. Chinese classifier systems and human categorization. In In Honor of William S-Y. Wang: Interdisciplinary Studies on Language and Language Change. Edited by Matthew Y. Chen and Ovid J.L. Tzeng. Taipei: Pyramid Press. pp. 479-494.

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