What are Core Linguistic Properties?

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Abstract

There are two views about the distinction between core versus peripheral linguistic properties. Advocates of the theory of Universal Grammar contend that the difference between core and periphery is significant, with core properties having several characteristics that are not shared by peripheral constructions of individual human languages. By contrast, advocates of usage-based accounts of language contend that the distinction between core and periphery has little merit, since human languages differ so extensively, and the same mechanisms that language learners exploit in acquiring peripheral constructions also suffice in acquiring core properties of human languages. The purpose of this paper is to show that the defining characteristics of core linguistic properties are quite different on these different conceptions of human language. The distinction between core and periphery that is cited by critics of Universal Grammar is not the same as the distinction that has been advanced by advocates of Universal Grammar. Consequently, the core versus periphery distinction maintained by proponents of Universal Grammar escapes unscathed from the attacks of its critics. Of course, this leaves the core/periphery distinction open to assault but, hopefully, future criticism will be aimed at the right target.

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Advocates of the theory of Universal Grammar argue that the core/periphery distinction is significant, whereas usage-based theorists claim that the distinction has little merit. Goldberg (2006) remarks that "[t]he impossibility of making a clear distinction between the core and the periphery of linguistic structure is a genuine scientific discovery, and it has far-reaching theoretical implications." Usage-based theorists like Goldberg and Tomasello (2003) have concluded, for one thing, that if a learning mechanism suffices for learners to acquire linguistic phenomena that lie at the periphery of human languages, then it is highly likely that the same mechanism will also suffice for learners to acquire core linguistic phenomena. This conclusion reveals how the notion 'core' is understood by advocates of the usage-based approach. Consider the following statement by Goldberg (2003, 14):

"In fact, by definition, the core phenomena are more regular, and tend to occur more frequently within a given language as well. Therefore if anything, they are likely to be easier to learn. Since every linguist agrees that 'peripheral', difficult cases must be learned inductively on the basis of the input, constructionists point out that there is no reason to assume that the more general, regular, frequent cases cannot possibly be."

On the same wavelength, Tomasello (2003, 104-105) remarks that "not only must there be a mechanism for learning the idiosyncratic, but this mechanism produces an output that has all of the properties of core grammar, except for maximal generality." In short, advocates of the usage-based approach take the position that core properties are ones with 'maximal generality' and, hence, properties whose effects appear with greater regularity in a language, as compared to peripheral phenomena. This invites the inference that language learners will have an even easier time learning core properties.

Proponents of Universal Grammar contend that there are core properties shared by all human languages, and these properties express regularities. But, the regularities in question are quite different from those discussed by usage-based researchers. Here is an instructive quote by Chomsky (1965). "The grammar of a particular language … is to be supplemented by a universal grammar that … expresses the deep-seated regularities which, being universal, are omitted from the grammar itself. Therefore it is quite proper for a grammar to discuss only exceptions and irregularities in detail. It is only when supplemented by a universal grammar that the grammar of a language provides a full account of the speaker-hearer's competence."

There are two noteworthy characteristics of the 'deep-seated' regularities envisioned by generative linguists. First, these regularities are expressed universally and, second, they are 'deep seated' rather than simply occurring with great frequency than other linguistic phenomena. What does 'deep seated' mean? A linguistic property is deep seated if it ties together a number of linguistic phenomena which, on the surface, appear to be unrelated. Advocates of UG ask questions like the following: "Why are words for disjunction (English or, Mandarin huozhe) interpreted as inclusive-or in precisely those linguistic environments that license negative polarity items (English any, Mandarin renhe), but not in other environments?" The answer is revealed largely by cross-linguistic research, where the same basic linguistic machinery (disjunction words, negative polarity items, and so on) are recruited by different languages. We will return to the issue of unification, momentarily. First, lets deal with the issue of universality.

If linguists are struck by the diversity of human languages, they are also struck by the common themes. Nearly everyone admits that there are linguistic universals in some sense. At issue is whether the universals of human languages are specific to language, or whether cross-
linguistic generalizations simply owe to the fact that humans are born with the "same basic conceptual apparatus" (Goldberg 2003:16). In fact, there are compelling reasons for thinking that the interpretations generated by logical expressions in human languages are governed by language-specific constraints, and are not simply entailments that any rational system would make. Take the case of De Morgan's laws of propositional, for example. In logic, disjunction generates a conjunctive entailment when it appears in the scope of negation, as stated in the following one of De Morgan's laws:

\[ \neg(A \lor B) \Rightarrow \neg A \land \neg B \]

This law is operative in human languages too. Consider the English sentence John didn't see Ted order pasta or sushi. The statement is true iff (a) John didn't see Ted order pasta and (b) John didn't see Ted order sushi. In view of these joint truth conditions this sentence is an example of the conjunctive entailment of disjunction under negation in English. Examples (2-7) are translations of John didn't see Ted order pasta or sushi, into Mandarin (2), Japanese (3), Dutch (4), Russian (5), Norwegian (6), and Hungarian (7). These examples include the following language families: Slavic, West Germanic, North Germanic/Scandinavian, Sino-Tibetan, Finno-Ugric and Japonic. The interpretation of the corresponding sentences in each language is the same. In short, disjunction yields a conjunctive entailment when it appears in the scope of negation, across human languages. Negation and disjunction are boldfaced in the examples.

(1) John didn't see Ted order pasta or sushi.
(2) Yuehan mei kanjian Ted dian yidalimianshi huozhe shoushi.
(3) John-wa Ted-ga sushi ka pasuata-o tanomu-no-o minakat-ta.
(4) John zag Ted niet pasta of sushi bestellen.
(5) Ozhon ne videl/uvidel chto/akazal/zakazval pastu ili sushi.
(6) Jon så ikke Ted bestille pasta eller sushi.
(7) János nem látta Edvardot tészttét vagy szusit rendeln.

The conjunctive entailment of disjunction in the scope of negation holds only if disjunction is interpreted as inclusive disjunction (inclusive-or), as in first order logic.

Is this a specific contingent fact about human languages, or simply a consequence of the human capacity to reason? It is a specific continent fact. If the expressions for disjunction in any of these languages had the truth conditions associated with exclusive-or, rather than with inclusive-or, then the language would not generate a conjunctive entailment. Interestingly, the interpretation of disjunction in human languages has many of the earmarks of a contingent a priori truth. Contingent, because it could have been otherwise; a priori, because children do not discover the conjunctive entailment of disjunction through experience; this entailment follows from the meanings of the logical expressions adopted by these different human languages. Though the meanings of logical words are contingent, knowledge of the syntax and semantics of human language makes sentences like (1)-(7) necessary truths in human languages, once the meanings of the expression are fixed.

How can we be sure children do not learn the meaning of disjunction words by inductive reasoning from exemplars? As the examples in (1)-(7) attest, sentences in which disjunction generates a conjunctive entailment are quite complex, with negation appearing in a higher clause than the (embedded) clause that contains disjunction. If children require exemplars like the ones in (1)-(7) in order to learn the meaning of disjunction, then the requisite primary linguistic data is too exotic to assist children in the acquisition process. Yet, simple positive and negative sentences won't provide children with the requisite data. Simple positive sentences with disjunction are subject to scalar implicatures, so these sentences are consistent with exclusive disjunction. And disjunction does not generate a conjunctive entailment in simple negative sentences in many (perhaps most) languages. Consider the English statement, Ted didn't order pasta or sushi. This generates a conjunctive entailment for the vast majority of adult English-speakers, i.e., Ted didn't order sushi and Ted didn't order pasta. However, if this sentence is translated into Japanese or Russian or Mandarin, it does not generate a conjunctive entailment. Example (8) is the Mandarin translation of the English sentence Ted didn't order pasta or sushi. Adult speakers of Mandarin do not judge (8) to generate the same conjunctive entailment as the English version of the sentence does, namely that Ted ordered neither sushi nor pasta. Rather, adult speakers of Mandarin judge (8) to mean that Ted didn’t order sushi or Ted didn’t order pasta.

(8)(Wo cai) Ted meiyou dian yidalimianshi huozhe shoushi.
   (I guess) Ted not order pasta or sushi
   (我猜) 泰德没有点意大利面食或者寿司。
   'it’s pasta or sushi that Ted did not order, but I am not sure which one he did not order’

In logic, the corresponding form for the interpretations of (8) in Mandarin is \( \neg(A \lor B) \), which does not entail \( \neg(A \land \neg B) \). This suggests that the Mandarin disjunction operator huoze in (8) has scope over negation (meiyou) at the level of interpretation, Logical Form. So, the truth conditions for simple negative sentences with disjunction in Mandarin are logically equivalent to \( \neg(A \land B) \), rather than \( \neg(A \lor B) \). In many languages then there is little evidence informing children that disjunction is inclusive-or. There is a great deal of evidence, however, that even young children know the disjunction is inclusive-or (see e.g., Crain 2008) The
ends our case that the meaning of disjunction is known \textit{a priori}.

If the meaning of disjunction is a specific contingent fact about human languages, then we must establish that children's knowledge is not simply a consequence of their innate ability to reason. We have seen languages vary in the way (inclusive) disjunction interacts with negation in simple negative sentences (see Goro 2004; Crain 2008, Crain, Goro & Thornton 2006, Crain & Khlentzos 2008). In one class of languages, disjunction takes scope over negation in simple negative sentences, at the level of logical form. Languages that adopt this parameter setting included Chinese, Japanese and Russian. In another class of languages, including English and German, disjunction is interpreted in the scope of negation in simple negative sentences. In these languages, what you read or hear is what you get. How can we state the different linguistic environments in which languages differ, versus those in which they are the same? It is simply a matter of labeling brackets. When a clause boundary (S) intervenes between negation and disjunction, all of the languages mentioned above assign the same interpretation.

(9) Diversity
a) [Ted NEG order pasta OR sushi ]

Uniformity
b) [John NEG see s[Ted order pasta OR sushi ]]

That is, when negation appears in a higher clause than the clause that contains disjunction, then disjunction yields a conjunctive interpretation. This is why the languages represented in examples (1)-(7) were all seen to adhere to De Morgan's laws. The structural relations in question are schematically depicted in (9), where (9a) shows negation NEG and disjunction OR in the same clause, and (9b) indicates that NEG resides in a higher clause than OR. In classical logic, NEG would take scope over OR in the formulas corresponding to both (9a) and (9b), because the brackets of classical logic are not labeled. But, apparently, human languages distinguish between structures in which NEG and OR resides in the same clause versus in different clauses. If these logical expressions are sufficiently separated, this prevents the disjunction operator from taking scope over negation, yielding the conjunctive entailment of disjunction across human languages. In conclusion, the difference between the 'symbolic structure' of first order logic and the structure of logical expressions in human languages is a specific contingent property of human languages.

We pointed out that, according to Universal Grammar, there are two critical features of 'deep-seated' linguistic regularities. One is universality, and the second is unification, i.e., tying together a number of linguistic phenomena which, on the surface, appear to be unrelated. Let us elaborate briefly on this second feature, unification. We will take as our example, the semantic notion of \textit{downward entailment}, where for any arguments X and Y, if X ⊆ Y then any operator ∆ such that ∆ (Y) ⇒ ∆ (X) is downward entailment. So, for example, if the specific term \textit{Prius} can be substituted for the general term \textit{car} in some particular linguistic environment, then this environment is downward entailment.

Some sentences are downward entailing in one part, but not in another part. For example, the antecedent clause of a conditional statement is downward entailment, as shown in (10), but the consequent clause of a conditional statement is not downward entailment, as shown in (11).

(10) If a linguist ordered a car, he got a rebate.
⇒ If a linguist ordered a Prius, he got a rebate.

(11) If a linguist got a rebate, he ordered a car.
*⇒ If a linguist got a rebate, he ordered a Prius.

This is not just a fact about the interpretation of conditional statements in English. If we translate the English examples into Mandarin (or into any of the other languages discussed earlier), the same asymmetry is manifested. That is, the antecedent clause of a conditional statement is downward entailment, as shown in (12), but the consequent clause of a conditional statement is not downward entailment, as in (13).

(12) Ruguo yi-ge yuyanxuejia mai-le qiche, ta jiu na-le huikou
if one-CL linguist buy-ASP car he then get ASP rebate
如果一个语言学家买了汽车，他 就 拿了回扣.
'If a linguist bought a car, he got a rebate.'
⇒ Ruguo yi-ge yuyanxuejia mai-le \textit{Puruisi qiche},
ta jiu na-le huikou.
if one-CL linguist buy-ASP Prius car
he then get-ASP rebate
如果一个语言学家买了普鲁士汽车，他就拿了回扣.
'If a linguist bought a Prius, he got a rebate.'

(13) Ruguo yi-ge yuyanxuejia na-le huikou, ta jiu mai-le qiche.
if one-CL linguist get-ASP rebate he then buy-ASP car
如果一个语言学家拿了回扣，他就买了汽车.
'If a linguist got a rebate, he bought a car.'
*⇒ Ruguo yi-ge yuyanxuejia na-le huikou, ta jiu mai-le \textit{Puruisi qiche}.
if one-CL linguist get-ASP rebate he then buy-ASP Prius car
如果一个语言学家拿了回扣，他就买了普鲁士汽车.
'If a linguist got a rebate, he bought a Prius.'
Having uncovered an asymmetry in downward entailment, we can check to see whether other interpretive properties of downward entailment expressions show a similar asymmetry. We saw earlier that disjunctive words (English or, Mandarin huoze) generate a conjunctive entailment when they appear in the scope of negation. And we know that negation is downward entailment. It turns out that disjunctive words are also assigned a conjunctive entailment when they appear in antecedent of a conditional statement. This is illustrated in the English example (14). By contrast, when or appears in the consequent clause, it does not generate a conjunctive entailment; instead, the interpretation of or is ‘disjunctive’, as illustrated in (15).

(14) If Ted ordered pasta or sushi, then Max ordered pizza.
    = Conjunctive

(15) If Max ordered pizza, then Ted ordered pasta or sushi.
    = Disjunctive

Mandarin works in the same way. In the antecedent clause of a conditional statement, disjunction (huoze) generates a conjunctive entailment, as illustrated in (16). When it appears in the consequent clause in Mandarin, the interpretation is ‘disjunctive’, as shown in (17).

(16) Ruguo Taide dian-le yidalimianshi huoze shousi, name Maikesi dian-le pisa.
    if Ted order-ASP pasta or sushi, then Max order-ASP pizza

如果泰德点了意大利面食或者寿司，那么马克思点了披萨。

‘If Ted ordered pasta or sushi, then Max ordered pizza.’

(17) Ruguo Maikesi dian-le pisa, name Taide dian-le yidalimianshi huoze shousi
    if Max order-ASP pizza, then Ted order-ASP pasta or sushi

如果马克思点了披萨，那么泰德点了意大利面食或者寿司。

‘If Max ordered pizza, then Ted ordered pasta or sushi.’

Downward entailing linguistic environments license the conjunctive entailment of disjunction, and non-downward entailing linguistic environments do not license the conjunctive entailment of disjunction. Rather, non-downward entailing linguistic environments license the ‘disjunctive’ (‘not both’) truth conditions for disjunctive words.

There is another asymmetry involving negative polarity items like any. The example (18a) shows that, whereas any is licensed in the antecedent of a conditional statement, it is not licensed in the consequent clause, as illustrated in (18b). The same is true in ruguo conditionals in Mandarin. Adult speakers judge example (19a) as acceptable, where the negative polarity item renhe appears in the antecedent of a conditional statement, but they did not accept renhe in the consequent, as in (19b).

(18) a. If John ate any ice cream, he became ill.
    ANT[If John ate any ice cream] CONS[he became ill]
    b. If John became sick, he ate any ice cream.
    ANT[If John became ill] CONS[he ate any ice cream]

(19) a. ANT[Ruguo Yuehan chi-le renhe binjiling]
    CONS[ta jiu shengbing].
    If John eat-ASP any ice cream
    he then become ill

    ANT[如果约翰吃了任何冰激凌], CONS[他就生病了].
    ‘If John ate any ice cream, he became ill’

    b. ANT[Ruguo Yuehan shengbing-le] CONS[ta jiu chi renhe binjiling]
    if John become ill ASP he then eat any ice cream

    ANT[如果约翰生病了], CONS[他就吃*任何冰激凌]
    ‘If John became ill, he ate *any ice cream’

It is time to seek unification. We have been describing several linguistic phenomena: downward entailment, the interpretation of disjunction, and the licensing of negative polarity items. Although these phenomena look quite different, there are some striking parallels between them. Let us briefly review. By definition a linguistic expression is downward entailing if it validates inferences from expressions referring to a set of entities (e.g., car) to expressions referring to a subset of those entities (e.g., Prius). We observed, first, that the antecedent clause of conditionals was downward entailing. This feature is graphically represented in (20a). We proceeded to consider how disjunction was interpreted in the same linguistic context. Although the basic meaning of disjunction is the same everywhere, namely inclusive-or, we saw that disjunction generates a conjunctive entailment in downward entailing linguistic contexts, but not elsewhere. This generalization is graphically represented in (20b). The third linguistic phenomenon we discussed was the licensing of negative polarity expressions, such as English any and Mandarin renhe. We have seen that these expressions are accepted in the antecedent of conditionals, but not in the consequent, as indicated in (20c).

(20) a) If ANT[ set ⇒ subset ] then CONS[………..]
    If ANT[……………..] then CONS[ set # ⇒ subset ]

    b) If ANT[ … OR…] then CONS[……….] = Conjunctive
    If ANT[…. ] then CONS[…. OR ..] = Disjunctive

    c) If ANT[….any/renhe…..] then CONS[……………]
    If ANT[…………….] then CONS[…. *any/*renhe…]
The same pattern appears in languages from other language families, including Slavic, West Germanic, North Germanic/Scandinavian, Finno-Ugric and Japonic.

To conclude, I wish to comment on the relationship between core linguistic properties and universality. Some of the linguistic phenomena discussed in this paper are not found in every human language. For example, human languages do not all have a word for disjunction. Nevertheless, all human languages have object-level terms (e.g., English magpie) as well as superordinate-level terms (e.g., bird), and all human languages have at least one downward entailing expression (e.g., negation), and all human languages have some means for expressing existential quantification (e.g., English some, any, Mandarin shenme, renhe). In short, human languages all have the building blocks for the same patterns of linguistic phenomena discussed in the paper. In this sense at least, core linguistic properties are likely candidates to be universal properties of human languages.

References


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