Historical remarks and the philosophy of generative grammatical theory

1. The theory of generative grammar
   • A few questions:
     -- Why is there a theory of grammar?
     -- What properties of language make a theory of grammar desirable?
     -- How did the theory of generative grammar arise?
   • What is a theory?
     A theory is a set of propositions that characterize a certain states of affairs. When we find a
     set of complex phenomena in the natural or social world in which we observe that there
     seems to be rules, we propose a theory to capture those phenomena, with the hope that our
     theory can provide some insights into the nature of the states of affairs in question and make
     correct predictions, if possible.
   • Example #1: The three thermodynamic laws

0. If two systems are in thermal equilibrium with a third system, then they must be in
   thermal equilibrium with each other.
1. \[ dE = dQ - dW = T dS - P dV, \]
   where \( dE \) is the energy change, \( dQ \) is the change in heat,
   \( dW \) is the work done, \( T \) is the temperature, \( dS \) is the change in entropy, \( P \) is the pressure , and
   \( dV \) is the volume change.
2. The second law of thermodynamics prohibits the construction of a perpetual motion
   machine of `the second kind.' A consequence is the result that \( dQ \leq T dS \).
3. As temperature goes to 0, the entropy \( S \) approaches a constant.

Example #2: Newton’s laws of motion
1. An object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction unless acted upon by an unbalanced force.
2. The net force is equated to the product of the mass times the acceleration – \( F_{\text{net}} = M* a \).
3. For every action, there is an equal and opposite reaction.

牛頓三大運動定律
第一運動定律：動者恆動靜者恆靜
第二運動定律：\( F_{\text{net}} = M* a \)
第三運動定律：作用力與反作用力

Example #3: *Grammatical principles of the Government-Binding framework*

1. A phonetically realized NP must have Case. (Case theory)
2. A chain has one and only one theta-role. (Theta theory)
3. Movement should pass no more than one bounding node. (Bounding theory)
4. An empty category must be properly governed. (The ECP)
5. The three binding principles. (Binding theory)
6. All phrasal categories must have a head. (X’-Convention)

So, why is there a theory of grammar? We need a theory of grammar because we observe interesting phenomena in human languages and we want to characterize them, capture them, and try to find out the nature of human languages.

2. The untaught and the unlearned

What properties of language make a theory of grammar desirable? Two things: the untaught and the unlearned.

Untaught knowledge of Chinese grammar, example #1: *dou- and ge-quantification*

(1) a. Meige ren dou mai-le yi-ding maozi.
   every person all buy-PERF one-CL hat
b. Meige ren ge mai-le yi-ding maozi
   every person each buy-PERF one-CL hat
c. Meige ren dou hui jia le.
   every person all return home PERF
d/ *Meige ren ge hui jia le.
   every person each return home PERF
e. Meige ren dou xihuan Nike Jiman.
    every person all like Nicole Kidman
    every person each like Nicole Kidman

(2) a. Yiban-de qiu-mi dou zhichi mou-zi-ge jiu-dui.
    average-MOD ball-fan all support certain-one-Cl ball-team
b. *Yiban-de qiu-mi ge zhichi mou-zi-ge jiu-dui.
    average-MOD ball-fan all support certain-one-Cl ball-team

(3) a. The boys bought a balloon each.
    *The boys went home each

(4) a. The boys kissed Mary.
    *The boys kissed Mary each.

--- Generalizations:  
* Ge is a distributive operator. It quantifies over an existing set of individuals (the sorting key) and ranges over a quantity (the distributed share). Such a logical structure seems to be universal among languages, since each in English performs the same behavior as ge in Chinese.

* Untaught knowledge of Chinese grammar, example #2: clauses of result

(5) a. Laowang mai-le yi-ben xiaoshuo lai taohao ta taitai.
    Laowang buy-Perf one-Cl novel LAI please his wife
b. Laowang mai-le yi-benxiaoshuo hao taohao ta taitai.
    Laowang buy-Perf one-Cl novel HAO please his wife

(6) a. Laowang mai-le yi-ben xiaoshuo lai du.
    Laowang buy-Perf one-Cl novel LAI read
b. *Laowang mai-le yi-ben xiaoshuo hao du.
    Laowang buy-Perf one-Cl novel HAO read

(7) a. Laowang ba na-ben xiaoshuo mai lai taohao ta taitai.
    Laowang BA that-Cl novel buy LAI please his wife
b. *Laowang ba na-ben xiaoshuo mai hao taohao ta taitai.
    Laowang BA that-Cl novel buy HAO please his wife

(8) a. Na-ben xiaoshuo bei Laowang mai lai taohao ta taitai.
    that-Cl novel BEI Laowang buy LAI please his wife
b. *Na-ben xiaoshuo bei Laowang mai hao taohao ta taitai.
    that-Cl novel BEI Laowang buy HAO please his wife

3 of 6
(9) The *lai*-construction

```
(9) The *lai*-construction

IP
  | DP
  | I
  | VP
  | tsubj
  | v
  | mai-le
  | 'bought'
  | xiaoshuo
  | 'novel'
  | tv
  | CP
  | Op
  | C
  | lai
  | IP
  | PRO du tv
  | 'read'
```

(10) The *hao*-construction

```
(10) The *hao*-construction

IP
  | CP
  | C'
  | Pro
  | Zhangsan mia-le
  | hao
  | yiben xiaoshuo
  | 'Zhangsan bought a novel'
  | I
  | VP
  | tv
  | t
  | PRAO
  | PRO
  | v
  | quiie
  | 'please'
  | DP
  | tv
  | ta taitai
  | 'his wife'
```
--- Generalizations about the *lai*-construction and the *hao*-construction: the *lai*-clause (i.e. the part after *lai* in a *lai*-sentence) is the complement of the main verb of the sentence. The *hao*-clause (i.e. the part after *hao* in a *hao*-sentence) is itself the main predicate of the sentence; the part preceding *hao* is a sentential subject (a subject which is itself a sentence structure).

Unlearned knowledge of Chinese grammar, example #1: Binding Principle C

(11) The Binding Principle C
A referential expression must not be bound.

(12) A is bound if and only if there is an expression B such that B c-commands A and is co-indexed (i.e. co-referential) with A.

(13) a. Zhangsan$_i$ juede ta$_{ij}$ hen congming.
    Zhangsan feel he very smart
b. He$_{ij}$ juede Zhangsan$_i$ hen congming
    he feel Zhangsan very smart
c. Jiao-guo ta$_{ij}$ de laoshi dou juede Zhangsan$_i$ hen congming.
    teach-Exp he Mod teacher all feel Zhangsan very smart

(14) a. John$_i$ thinks that he$_{ij}$ is smart.
    b. He$_{ij}$ thinks that John$_i$ is smart.
    c. All the teachers who have taught him$_{ij}$ think that John$_i$ is smart.

(15) a. Taroo$_i$-wa kare$_{ij}$-ga kasikoi to omotteru.
    Taroo-TOP he-NOM smart COMP think
b. Kare$_{ij}$-wa Taroo$_i$-ga kasikoi to omotteru.
    he-Top Taroo-NOM smart COMP think
c. Kare$_{ij}$-o osieta sensei-wa zenbu Taroo$_i$-ga kasikoi to omotteru.
    he-ACC taught teacher-Top all Taroo-NOM smart COMP think

Unlearned knowledge of Chinese grammar, example #2: Adjunct Condition

(12) Adjunct Condition
An adjunct is an island, out of which nothing can be moved.

(13) a. John fired Bill [after he met Mary].
    b. Who did John fire ___ [after he met Mary]?
    b. Who did John fire [after he met ___ ]?

    Zhangsan at boss scold-PERF Lisi after fire-PERF Wangwu
b. Nayige ren, Zhangsan [zai laoban ma-le Lisi zhihou] kaichu-le __?
   which person Zhangsan at boss scold-PERF Lisi after fire-PERF __
c. *Nayige ren, Zhangsan [zai laoban ma-le __ zhihou] kaichu-le Wangwu?
   which person Zhangsan at boss scold-PERF __ after fire-PERF Wangwu

The fact that a great portion of the knowledge of Chinese grammar is untaught, or even unlearnable, to us indicates that the nature of human grammar is not really like the grammar books that we read or study in school. It is something deeper. We do not learn the grammar of a language like we learn the significant events in the Three-Kingdom period of Chinese history or the tricks to quickly solve a difficult question in calculus. We acquire a language. That is, we internalized the grammar of the language into our mind. We acquire a language just like we acquire an ability. Thus language is an ability, not a set of pieces of knowledge stored in our long-term memory.

3. The language faculty
   The ability of language is also called the language faculty. Two characteristics of the language faculty deserve special attention:
   --- Poverty of stimulus during acquisition, and
   --- Creativity in production and use.
   --- Children learn a language quick, accurate, and perfect. This is all the more surprising in view of the poverty of stimuli that would typically be necessary when one is learning a skill, e.g. piano playing, biking, swimming, etc. This motivates the thought that children may have been born with an innately endowed capacity, or instinct, that facilitates the acquisition of language.
   --- The free and creative uses of meaningful or meaningless linguistic expressions without effort in ordinary people somehow indicate that the human grammars are so powerful that they can generate an infinite number of linguistic expressions spontaneously.
   Thus, what properties of language make a theory of grammar desirable? The answer: the existence of a language faculty, and its generative capacity.