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Superiority¿Syntactic and Interpretive

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1. Introduction

One of the major goals of linguistic theory is to understand the universal principles underlying the structure of linguistic expressions. Although it is best to provide the adequate empirical coverage using the smallest number of such principles, sometimes the theory can suffer from having too few principles. That is, certain contrasts in grammaticality judgments can be lost because of the great generality of the existing principles. For example, Lasnik and Saito (1992) discuss and account for such a contrast between pure Subjacency violations vs. Subjacency combined with Empty Category Principle (ECP) violations, which result in a higher degree of unacceptability. In this paper, I take a look at another such situation, namely, Superiority effects in contexts with and without T-to-C movement. I show that the current analyses of Superiority, as they are, cannot account for the contrast in grammaticality status found in these contexts. To fine-grain the system, I will explore the interaction of syntactic and semantic properties of multiple interrogatives: T-to-C movement and the availability of pair-list and single-pair readings in these constructions.

Specifically, I extend the idea of equidistance via head-movement of Chomsky (1993) to the CP domain, with some modification of Chomsky's original notions. This extension along with the consideration of the licensing conditions on single-pair readings allow for better understanding of distribution of Superiority effects crosslinguistically. The analysis has important predictions, one of which is an explanation of the absence of Superiority effects in d-linked wh-questions.

2. Superiority effects in contexts with and without T-to-C movement

The phenomenon of Superiority has been explored since Chomsky (1973). The empirical generalization is that in a language like English, where only one wh-phrase is fronted in a multiple question, it is the 'superior' wh-phrase (i.e. the one that asymmetrically c-commands other wh-phrases) that is fronted. For example, compare the unacceptability of (1b), where the lower wh-phrase *what* has moved over the higher wh-phrase *who*, with (1a), where *what* remains in situ.[1]

(1) a.   Who bought what?

    b.   ??What$_1$ did who buy t_1?

Chomsky (1973) postulates the Superiority Condition, given in (2), basically tracking the generalization above.

(2) No rule can involve X, Y in the structure ..X…[…Z…WYV…] where the rule applies ambiguously to Z and Y, and Z is superior to Y. The category A is superior to the category B if every major category dominating A dominates B as well but not conversely.

To capture Superiority effects in the Minimalist system, where the interrogative complementizer C^0 Attracts wh-phrases to check its [+wh] feature, there has been proposed an economy condition Attract Closest F or Minimal Link Condition (MLC). Chomsky (1995:311) formulates MLC as in (3). 'Closeness' is understood here in terms of asymmetric c-command.

(3) K attracts α only if there is no β, β closer to K than α, such that K attracts β.

MLC correctly rules out (1b) due to the fact that the object wh-phrase *what* which is not the closest to C^0 cannot be attracted by C^0. However, there are facts that MLC alone does not seem to be able to capture. Consider the following asymmetry found in main and embedded clauses in English. Superiority violations in embedded multiple questions, as in (4c), are judged by English native-speakers as more degraded than Superiority violations in matrix questions, as in (4b).

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1.   In multiple wh-fronting languages exhibiting Superiority effects, it is the highest ('superior') wh-phrase that is fronted first, with the other wh-phrases following. For the detailed analyses of multiple wh-constructions in such languages, see Bošković (1998, 2002) and Richards (1997).

(4) a.　Who bought what?

b.　??What$_1$ did who buy t_1?

c.　*John wonders what$_1$ who bought t_1.

The same contrast is even sharper in Serbo-Croatian. While (5b) is as acceptable as (5a), showing that there are no Superiority effects in main clauses in Serbo-Croatian, (6b) is strongly degraded. Thus, Superiority effects emerge in embedded clauses in Serbo-Croatian.[2]

(5) a.　Ko　šta$_1$　o　njemu govori t_1?
　　　who　what　about him　says
　　　'Who says what about him?'

b.　Šta$_1$ ko o njemu govori t_1?

(6) a.　Pavle je pitao ko šta$_1$　o　njemu govori t_1.
　　　Pavle aux asked who what about him　says
　　　'Pavle asked who says what about him'

b.　??Pavle je pitao šta$_1$ ko o njemu govori t_1.

The generalization is that the degree of superiority effects increases in embedded clauses in both English and Serbo-Croatian. Crucially, MLC alone cannot distinguish Superiority violations in matrix and embedded clauses. However, as I report above, the contrast exists. That is, the degree of unacceptability caused by Superiority violations increases in embedded clauses.

There is an independent asymmetry between matrix and embedded clauses that might be relevant here. While T-to-C movement occurs in main clauses in English, it does not take place in embedded clauses, as shown in (7).[3]

(7) a.　What can John buy?

b.　*What John can buy?

2.　For an account of the matrix vs. embedded contrast in Serbo-Croatian, which involves covert insertion of the interrogative complementizer, see Bošković (2002).
3.　See Pesetsky and Torrego (2001) for an analysis challenging this assumption.

    c.   John wonders what Mary can buy.

    d.   *John wonders what can Mary buy.

Taking English as the starting point, we can now state the preliminary generalization in terms of T-to-C movement: *Superiority effects increase in contexts without T-to-C movement*. In the following section, I will explain how the careful consideration of the (un)availability of T-to-C movement, can help in accounting for the asymmetry we find in main vs. embedded clauses.

3.   Attracting elements from non-local domains

How can the availability of T-to-C movement be relevant for the degree of Superiority effects? It has been previously suggested that head-movement has some effect on locality. Chomsky (1995) develops an account first proposed in Chomsky (1993) where head-movement licenses extraction of elements from otherwise non-local positions. The basic notions of domain and minimal domain of α are formulated by Chomsky as in (8), where α is a head (or a feature), and CH is the chain (α, t) or a trivial chain α.

(8) a.   Max(α) is the smallest maximal projection including α.

    b.   The *domain* δ(CH) of CH is the set of categories included in Max(α) that are distinct from and do not contain α or t.

    c.   The *minimal domain* Min (δ(CH)) of CH is the smallest subset K of δ(CH) such that for any $\gamma \in \delta$(CH), some $\beta \in$ K reflexively dominates γ.

Now consider the derivation in (9). On Chomsky (1993) analysis, the chain [V, t_1], with the head V in Arg$_O$, extends the minimal domain of V to include Arg$_O$P, making Spec,Agr$_O$P and Spec,VP equidistant from the object position. Thus, V-to-Agr$_O$ movement in (9) allows for the object to raise to Spec,Agr$_O$ over the subject occupying Spec,VP without violating minimality.

(9) [$_{TP}$ T [$_{AGRoP}$ NP$_2$ [Agr$_O$ - V$_1$] [$_{VP}$ NP   *t$_1$ t$_2$*]]]]

Bobaljik and Jonas (1996) further explicate the idea of equidistance via head movement in analyzing how Spec,TP positions are used by subjects in Icelandic. In (10), Agr$_O$-to-T movement makes the Spec,TP and Spec,Agr$_O$

equidistant from the subject position in Spec,VP, allowing for the subject to move over the object in Spec,Agr$_O$.[4]

(10) $[_{TP}$ NP$_2$ [T $[_{AGRo}$ Agr$_O$ -V]$_1$] $[_{AGRoP}$ NP t_1 $[_{VP}$ t_2 ...]]]

That was the version of the equidistance from the perspective of Move. Chomsky (1995) carries the main ideas over to Attract, with some modification. Specifically, he suggests that an element in the minimal domain of CH headed by an element X adjoined to an attracting head Y, can be ignored for the purposes of Y attracting a particular feature F. It is this part of Chomsky's approach that is relevant when we consider CP domain and, particularly, the interaction of the Superiority effects and T-to-C movement in multiple questions. Let us consider in detail the example of Superiority violation in the main clause in (11) and some aspects of its derivation in (12).[5]

(11) ??$[_{CP}$ What$_2$ $[_C$ C-[T-did]$_1$] $[_{TP}$ who t_1 buy t_2]]

(12)
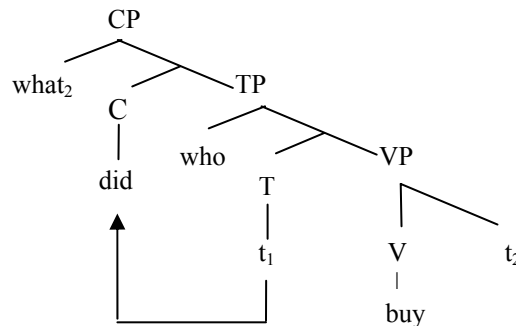
Spec,TP and Spec,CP are in the same relation with respect to the chain created by T-to-C movement: they are both within the minimal domain of this chain. Recall that MLC depends on the definition of 'closeness'. Given

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4.   Note that Split VP Hypothesis of Koizumi (1995) and overt object shift analyses of Koizumi (1995) and Lasnik (1995) avoid the problems of object and subject raising over each other entirely due to subject originating higher than Agr$_O$P. Even though this renders the notion of equidistance unnecessary for the problems in question, it still allows for the possibility of finding equidistance effects in other contexts, like in the presence of T-to-C movement.

5.   The structure is somewhat simplified here for the purposes of exposition.

that the minimal domains are sensitive to chains, Chomsky (1995:299) defines *closer to* as follows.

(13) β is *closer to* HP (headed by H) than α if β c-commands α and is not in the minimal domain of CH (CH = (γ, t) and γ is adjoined to H).

For Chomsky, being within the minimal domain of CH means being within a "neighborhood of H", the domain that can be ignored for the purposes of Attract by HP. In (12), the subject wh-phrase *who* is within the minimal domain of (T, *t*), T being adjoined to C. Hence, C can ignore *who* when attracting the [+wh] feature and is free to attract the [+wh] feature of *what* without violating MLC.

Crucially, the same will not hold in the embedded clauses. Since the embedded contexts in (4c) and (6b) do not involve T-to-C movement, there are only unrelated minimal domains of T and C in the structure. Hence, the subject wh-phrase is not within C's neighborhood. The object wh-phrase cannot be attracted by C, or it would result in the MLC violation.

We can develop the line of reasoning of Chomsky (1995) by suggesting that the attracting head H not only *can* ignore the elements in the minimal domain of the chain CH whose head is adjoined to H, but that it *must* ignore these elements. The idea is that a head H attracts elements only from outside its local domain (neighborhood) in order to bring them into its neighborhood. If an element is already within that neighborhood, like *who* with respect to C in (12), it will never be attracted by H since H would only search the area beyond its own neighborhood.[6] Conceptually, we seem to be defining the domain of Attract F more precisely, which has been considered the c-command domain of the attracting head. If this line of reasoning is correct, the domain of Attract F is a more intricate notion: it is the c-command domain outside the local domain of the attractor.

Besides the conceptual insights, the present analysis offers a potential answer to an old question of why questions like (14) are not possible in English.

(14) *Who did leave?

The problem is often approached with an attempt to explain why T-to-C movement is not permitted in the context of subject extraction. However, on

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6.   Note that being in H's neighborhood is not sufficient for the feature checking to take place. That is, *who* cannot check the uninterpretable [+wh] feature of C from the position it is in (Spec,TP) even if it is within its local domain. Spec-head configuration seems to be required for the actual feature checking.

the analysis developed here, it is the subject extraction that is not permitted when T-to-C movement has applied.[7]

Turning to the Superiority effects in main vs. embedded clauses, we have concluded so far that, unlike in embedded clauses, T-to-C-movement eliminates locality restrictions like MLC in main clauses in the way described above, resulting in the absence of Superiority effects. The question arises, why matrix questions like *What did who buy?* are still degraded. In the next section, I will account for this remaining unacceptability.

4. Interpretive Superiority

Consider (4) again, repeated below as (15).

(15) a.   Who bought what?

b.   ??What$_1$ did who buy t_1?

c.   *John wonders what$_1$ who bought t_1.

Given the effect T-to-C movement has on the derivation, as is explained in the previous section, the degraded status of (15b) cannot be a result of a locality violation, contrary to the standard accounts. Hence, it must be due to some independent factor. I will try to derive the badness of (15b) from the semantic properties of multiple interrogatives. Specifically, my account is concerned with the licensing conditions on Single-Pair (SP) and Pair-List (PL) readings in questions.

Multiple interrogatives can sometimes have a PL or a SP reading. A question in (17) with the PL reading is felicitous in a scenario like in (16). An expected response to such a question involves listing propositions involving ordered pairs as in (18).

(16) *PL Scenario:* John is at a formal dinner where there are diplomats and journalists. Each journalist was invited by a different diplomat. John wants to find out all the details, so he asks the host:

(17) Who invited who to the dinner?

(18) Mr. Smith invited Mr. Jones, Ms. Black invited Mr. Green, etc.

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7.   I will return to some points related to this issue in Section 5.

A scenario corresponding to the SP reading is given in (19). English lacks SP reading in non-d-linked wh-questions as in (17), a fact first pointed out by Wachowicz (1974). However, one can use a d-linked question in (20), where the SP reading is available, with the felicitous single-pair response in (21).

(19) *SP Scenario:* John knows that a very important diplomat invited a very important journalist to a private dinner. John wants to find out all the details, so he asks the caterer:

(20) Which diplomat invited which journalist to the dinner?

(21) Ms. Black invited Mr. Smith.

The distribution of PL/SP readings is subject to crosslinguistic variation, as reported by Hagstrom (1998) and Bošković (2001). SP reading is unavailable in the English question in (22a), and in Bulgarian (22b). However, it is freely available in Serbo-Croatian (23a) and Japanese (23b). That is, unlike the questions in (22), the questions in (23) are felicitous in both PL and SP scenarios.

(22) a.   *PL/*SP*
         Who invited who to the dinner?

    b.   *PL/*SP*
         Koj kogo e pokanil na večeriata?   Bulgarian
         who whom Aux invited to dinner
         'Who invited who to the dinner?'

(23) a.   *PL/SP*
         Ko je koga   pozvao   na večeru?   Serbo-Croatian
         who aux whom invited   to dinner
         'Who invited who to the dinner?

    b.   *PL/SP*
         Dare-ga dare-o syokuzi-ni manekimasita-ka?   Japanese
         who-Nom who-Acc dinner-Dat invited-Q
         'Who invited who to the dinner?

An interesting phenomenon can be observed in languages allowing SP readings in multiple interrogatives: fronting the lower wh-phrase over the higher wh-phrase forces SP reading. Hagstrom (1998) discusses this with respect to Japanese and Bošković (2001) reports that the same holds in

Serbo-Croatian. The relevant data they provide are in (24) and (25). Bošković (2001) calls this phenomenon *Interpretive Superiority*, meaning that, instead of unacceptability on any reading, only one of the two readings is lost.

(24) a. *PL/SP*
      [Nani-o t_Q]$_j$ dare-ga t_j katta no?   Japanese
      what-ACC   who-NOM   bought Q
      'Who bought what?'

   b. *PL/SP*
      Šta je ko kupio?   Serbo-Croatian
      what is who bought
      'Who bought what?'

The question I would like to ask is the following. What happens if a similar fronting of the object wh-phrase takes place in a language where the SP reading is unavailable? It seems plausible that, if a SP reading is forced in a multiple interrogative in a language lacking SP readings in these constructions, straightforward unacceptability is to be expected. Let us consider our crucial English example in (25). *What* is fronted over *who*, forcing a SP reading, which is unavailable in English bare wh-questions, hence the degraded status of the question.

(25) ??What did who buy?

The interpretation facts do not show any asymmetry in main vs. embedded clauses. Hence, the same factor will be present in the embedded clauses in English. Combining this with the discussion of T-to-C movement in Section 3, we now have the needed explanation for the contrasts in Superiority effects. In addition to the problem in both main and embedded contexts caused by the unavailability of the SP reading in a context forcing such reading, there is also the absence of T-to-C movement in embedded clauses in English, which makes them worse than the parallel examples with main clauses.

In the remainder of this section, I will explore how one could represent this general approach formally: what syntax and semantics of wh-questions might be needed. I largely adopt the Hagstrom (1998) syntactic and semantic analysis of questions with PL and SP readings. On this approach, the distribution of an interrogative morpheme (Q-morpheme) is crucial. Hagstrom assumes two different syntactic positions for the Q-morpheme in PL and SP readings. In a question with a PL reading, it merges with the lowest wh-phrase, as in (26a); and in a question with the SP reading, it merges in a position F^0, taking scope over both wh-phrases, as in (26b). The

Q-morpheme in both cases ends up in the interrogative C, where it checks the uninterpretable [+Q] feature of C.

(26) a. $[_{CP}$ Q_j-C^0 …$[_{TP}$ … wh1 …V… $\boldsymbol{t_j}$ -wh2 …]]   *PL*

     b. $[_{CP}$ Q_j-C^0 …$[_{FP}$ $\boldsymbol{t_j}$-F^0 $[_{TP}$ … wh1 …V… wh2…]]]   *SP*

Wh-phrases are treated as sets of individuals (type <et>). Q-morpheme is interpreted as a quantifier over choice functions. By movement from the clause internal position to C^0, Q-morpheme leaves behind a variable whose value ranges over generalized choice functions (type <αt,α>), picking a member out of the set it is merged with. The major difference between the PL and SP derivations is that there is no choice function variable in the PL derivation immediately above TP. This allows for the set of individuals denoted by *wh1* to propagate through the derivation, resulting in the end in set of sets of propositions.[8] However, it is not possible in the SP derivation due to the choice function above TP reducing the set of propositions denoted by TP to a single proposition. It becomes the input to further computation, producing in the end just a set of propositions. Thus, what licenses a SP reading semantically is the presence of the Q-morpheme above both wh-phrases in the structure.

In Grebenyova (2003), I argue that the crosslinguistic variation with respect to the availability of the SP reading can be explained in terms of the availability of a specific Q-morpheme. On this analysis, English and Bulgarian do not license SP readings because they lack the Q-morpheme of an appropriate kind. In other words, the Q-morpheme in these languages only selects a wh-phrase and never FP.

On this line of reasoning, if the PL derivation crashes in languages with the SP Q-morpheme, there would be an alternative derivation available (i.e. the SP derivation with the Q-morpheme originating in FP). However, if a language does not have the needed Q-morpheme to 'rescue' the derivation, all we can get is ungrammaticality. Consider the first option in (27), which demonstrates abstractly what happens when an object wh-phrase is moved over the subject wh-phrase in the PL derivation.

(27) $[_{CP}$ wh2$_j$ Q_i-C^0 …$[_{TP}$ … wh1 …V… t_i t_j]]   *PL*

The choice-function variable left by Q-movement must have a set to apply to as in (26a). However, by moving out the object wh-phrase, we leave the Q-morpheme without a set to apply to. Since the PL reading derivation crashes in the context of object wh-fronting, the SP derivation is

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8.   See Hagstrom (1998) for the explicit formal semantic derivations.

forced, with the SP Q-morpheme as the required lexical choice. The SP Q-morpheme will not be affected by object fronting since it originates higher in the structure and takes a different set as its argument.

The degraded status of English matrix questions like in (15b) is then the result of not having a SP Q-morpheme in the SP-forcing context. Recall that T-to-C movement obviates MLC in this case. Thus, the only source of unacceptability here is semantic in nature and not syntactic, contrary to standard accounts.

As for the Superiority effects in embedded questions in English, two factors are responsible for the ungrammaticality in this case: lack of T-to-C movement and lack of SP Q-morpheme. As we saw above, only the latter is involved in matrix clauses; hence, the contrast in grammaticality judgments follows naturally.

5. Predictions and Consequences

On the analysis developed here, presence of T-to-C movement should not affect locality (MLC) in multiple questions that do not involve a wh-phrase in matrix Spec,TP. Therefore, we should expect to find an asymmetry between subject and non-subject wh-questions in English. That is precisely what we find in (28a) – (28d). The matrix wh-question involving a subject in (28a) is less degraded than the matrix question in (28b) and the embedded question in (28c) questioning the objects. These have the same status as the familiar embedded subject question in (28d), where T-to-C movement is absent.

(28) a. ??What$_1$ did who buy t_1?

    b. *What did Mary tell who to read?

    c. *Bill wonders what Mary told who to read.

    d. *Bill wonders what who bought.

Consider the table summarizing the relevant crosslinguistic facts.

	Superiority		T-to-C		PL/SP
	Matrix	Embedded	Matrix	Embedded	
English	??	*	+	-	PL/*SP
Bulgarian	*	*	-	-	PL/*SP
Serbo-Croatian	√	??	-	-	PL/SP
Icelandic	√	√	+	+	PL/SP

The analysis makes correct predictions for Bulgarian matrix questions. Like English, Bulgarian lacks a SP Q-morpheme, as shown in (22b), hence there are Superiority effects in matrix questions, as in (29). Note that these Superiority effects are stronger than in English (24). This is due to the absence of T-to-C movement in both matrix and embedded clauses in Bulgarian.[9]

(29) *PL/*SP*
    *Kogo koj   e pokanil na večeriata?   Bulgarian
    whom who Aux invited to dinner
    'Who invited who to the dinner?'

     The Serbo-Croatian facts can be somewhat misleading. Although there is no T-to-C movement in Serbo-Croatian, the matrix clauses do not show Superiority effects at all. One would expect them to be degraded since the absence of T-to-C movement would cause an MLC violation if C attracts the object wh-phrase. However, there is an interfering factor. Bošković (2002) and Stjepanović (1998) argue that in Serbo-Croatian wh-phrases do not move to C^0 at all in these contexts but rather move to a focus position lower than C^0.

     Some evidence in support of my analysis can be found in Icelandic, where there is V2 phenomenon (i.e. verb movement to C^0 via T^0) in matrix and embedded clauses. In addition, Icelandic allows SP readings in multiple questions. As expected, there are no Superiority effects in either matrix (30) or embedded clauses (31).

(30) a. *PL/SP*
     Hver bauð hverjum í veisluna?   Icelandic
     who invited whom in the-dinner
     'Who invited who to the dinner?'

   b. Hverjum bauð hver í veisluna?
      whom   invited who in the-dinner

(31) a. Jón veit ekki hver bauð hverjum í veisluna.   *PL/SP*
    John knows not who invited whom in the-dinner
    'John does not know who invited who to the dinner.'

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9.   See Izvorski (1993) for the extensive arguments showing that T^0 in Bulgarian does not move all the way to C^0.

    b.   Jón veit   ekki hverjum bauð   hver   í veisluna.
         John knows not whom invited who in the-dinner

The account also provides a potential answer to an old puzzle of why D-linked multiple questions do not exhibit Superiority effects (32a). Importantly, D-linked wh-questions in English do have SP readings. Recall that the question in (20), repeated here as (32b), is felicitous in the SP reading scenario in (19). Hence, the only factor responsible for the degraded status of English matrix questions like *What did who buy?* is not there in d-linked questions.

(32) a.   Which journalist did which diplomat invite to the dinner?

    b.   Which diplomat invited which journalist to the dinner?

As was pointed out in Section 3, the approach disallowing attracting elements from inside the local domain of the attractor correctly rules out (33a), which is another favorable consequence of the overall analysis. The badness of (33b) suggests that C^0 may not be there in the structure in this case, otherwise we would expect T-to-C movement to take place. Lack of the CP layer would then also apply to (33c) and (33d). Subject wh-phrase does not raise higher than TP in these configurations.[10]

(33) a.   *Who did leave?

    b.   *Did who leave?

    c.   Who left?

    d.   Who bought what?

The analysis also presents an insight into the nature of head-movement. It is crucial for the account that head-movement is a syntactic operation and not a reflex of phonology, as it has been treated in some recent accounts.

To summarize, I have explored an approach to Superiority that considers both syntactic and semantic properties of wh-constructions. We now have a refined account of Superiority where two factors are responsible for the ungrammaticality of embedded questions in English: lack of T-to-C movement and lack of SP Q-morpheme; while only the latter is involved in matrix clauses. To the extent that this approach is on the right track, the

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10.   The interrogative force must be located in T^0 in these constructions. For some related discussion, see Pesetsky (1989).

accounts that postulate T-to-C movement in embedded clauses in English are called into question. In addition, if this analysis is correct, head-movement must be a *syntactic* operation and not a reflex of phonology.

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