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Briefs

Social Evolution and Commitment: Bridging the Gap Between Formal Linguistic Theories and Language Evolution Research

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Abstract

This article argues based on some concrete empirical evidence that what is called "(social) commitment" is grammaticalized in human language at the latest stage in the evolution of syntax. It is further argued that as a result of this grammaticalization process, our ancestors acquired a way of making their linguistic communication sufficiently trustable/reliable, by encoding the signaler's liability to the truthfulness of what is communicated. That is, the presence of commitment as a concrete grammatical element provided our species with a way of (indirectly) solving the problem of dishonesty of linguistic signals. The proposal is made in such a way that its validity can be tested by experimental means, and hence it is hoped that the model presented in this article facilitates important collaborative works among theoretical linguists, (evolutionary) biologists, and other experimentalists. Overall, the idea laid out here aims to bridge the gap between formal linguistics and language evolution studies.

Keywords

commitment, communication, evolution of syntax, language of thought, social evolution

1. Introduction

In this brief article, we propose an initial hypothesis for how language evolved so as to be usable for "trustable" or "reliable" communications in which the conversation participants mutually seek to expand their mutually shared beliefs and intentions (i.e., Common Ground [CG] in the sense of Stalnaker, 1978, 2002). The proposal to be made is based

on the view that language is both for thought and for communication (Miyagawa, 2022; Wiltschko, 2021, 2022). In the next section, we briefly overview how the language-for-both-thought-and-communication (LTC) view began to emerge in the formal linguistics literature. We then introduce the notion of commitment, more precisely, private and social commitment, to the literature of evolution of language, which plays a central role in the LTC view. In this section, the fundamental features of commitment are explicated with some specific linguistic evidence. Section 3 takes a look at commitment from an evolutionary perspective, and discusses that the emergence of commitment as a part of our grammatical knowledge is germane to the cultural aspect of language evolution. Taking all these into consideration, Section 4 proposes an initial hypothesis for how commitment began to be grammatically encoded in the species, on the basis of Progovac's (2015, 2016) gradualist hypothesis on the evolution of syntax. Section 5 concludes the article.

2. The LTC View

It has long been held in the tradition of generative grammar that language evolved as a system for thought (cf. Berwick & Chomsky, 2016; Chomsky, 2010, 2017, 2021). Chomsky (2017, p. 298) claims, for instance, that "the modern doctrine that communication is somehow the "function" of language is mistaken... Language is fundamentally a system of thought." According to this view, each linguistic expression is constructed by applying the binary set formation operation called *Merge* to linguistic items in a recursive manner, to form a hierarchically structured expression like

(1) $[_{CP}$ C $[_{TP}$ -ed $[_{vP}$ Louis $[_{v'}$ *v* $[_{VP}$ write $[_{DP}$ a song]]]]]].

The object Determiner Phrase (DP) *a song* here consists of the indefinite article *a* and the noun (phrase) *song*, and this DP Merges with the verbal root *write* to form the Verb Phrase (VP). The entire VP further Merges with the verbalizer *v* (Embick & Noyer, 2007; Halle & Marantz, 1993). This *v* head takes the subject of a sentence (*Louis*) as its (external) argument, and by doing so the entire *v*P is formed, where a basic thematic role of each argument is determined and a particular event is described (in the sense of Davidson, 1967). The *v*P further combines with the tense-marker *-ed* to specify the tense of the event described by the *v*P. According to generativists under Chomsky's persuasion, the entire TP is then sent to the Conceptual-Intentional Interface at the timing of the completion of the CP (Complementizer Phrase), where the propositional content is determined on the basis of how the structure is constructed, and the entire expression becomes semantically interpretable (see Chomsky, 2007, 2008, 2013, 2015, and others for details). According to Chomsky, the structure building by recursive Merge is

optimal in the sense that it operates in such a way that the semantic interpretation of its resultant can be determined solely on the basis of how Merge is applied.

In contrast, Chomsky argues, language is not designed for communication. This is exemplified by the filler-gap problem. Take an example from the following expression:

(2) What did Louis write *x*?

The *what* in this example should be interpreted as the object of the verb *write* or *wrote*, but it is not realized at the canonical object position marked with *x*. In order to interpret the expression properly, one has to reconstruct the *what* to *x*, and this is proven to be a heavy cognitive burden (see Berwick & Chomsky, 2016 and much other work). Given the factual assumption that this filler-gap problem is caused due to the externalization process of a linguistic structure, in the absence of which language cannot be used for communication, Chomsky claims that language is not designed for communicative use. Thus, he concludes, the computational aspect of language, which is assumed to be the sole biological trait unique to our species in the generative tradition, is designed for thought.

In contrast, scholars such as Tomasello (2008) advocate the view that language is fundamentally a system for communication, the view shared by some functional linguists such as Levinson (2019). This view is widely held in cognitive science (cf. Carruthers, 2002). The view claims that our language capacity primarily arose in the interests of communicating with our group members to enhance the probability of achieving joint goals (see Jackendoff, 2002 and others). Tomasello (2008), for instance, makes use of the notion of the CG to capture our species' joint intentionality, which according to him is one of the key factors to capturing the evolutionary scenario of our linguistic communication.

These two alternative views are often construed in a dichotomous fashion, as the quote from Chomsky (2017, p. 298) above reveals. However, these brief skims of the previous literature already reveal that they are not mutually exclusive. That is to say, it is possible that both thought and communication are essential parts in the evolution of our language capacity, with one being responsible for some key aspects of it and the other being pertinent to some others. In this context, it is very useful to point out that there has been mounting evidence that speaks for the view that language is for both thought and communication. This view, which we call the LTC view, is recently advocated by syntacticians such as Wiltschko (2021, 2022) and Miyagawa (2022), but its origin can be traced back to at least Ross 1970. The LTC view claims that human language grammatically encodes not only the elements that contribute to propositional expressions such as the one we observed in (1). It claims that it also grammatically "regulates the use of language, including particles expressing the speaker's attitude towards the truth-conditional content of the utterance" (Wiltschko, 2022, p. 6). One such element is what authors such as Krifka (2015, 2016, 2019, 2021b), Wiltschko and Heim (2016), Heim (2019) and

Miyagawa (2022) call *commitment*, which we focus on in this article (see Davis 2011; Farkas & Bruce, 2010; Farkas & Roelofsen, 2017; Geurts, 2019; Gungloson, 2003; Portner, 2019 and others for the formal semantics frameworks that make use of commitment; see Brandom, 1994, 2000, 2008 for philosophical investigations of commitment). Commitment encodes who should take liability for the truth of a proposition in a given discourse. For instance, if the speaker utters (3) below, they become committed to the truth of it, thereby declaring to accept a (contextually defined) punishment when it turns out false.

(3) He stole Sam's 12-string guitar.

Miyagawa (2022) claims that there is linguistic evidence that commitment should be encoded at the level of syntax as a syntactic head we call Commitment, instead of treating it as an ancillary effect of speech act performance (see Searle, 1969, 1975a, 1975b; Vanderveken, 1994, 1999, and others for speech act). One piece of evidence comes from the Japanese sentence-final discourse particle *ne*. According to Miyagawa, although a bare sentence (sentence without a discourse particle) commits the speaker to a proposition's truth, if this particle is used, the entire expression commits the addressee to the truth of a proposition, without making the speaker committed to it.

(4) a. Rai-ga kuru.
Rai-NOM come
'Rai will come.'
b. Rai-ga kuru (*no*) *ne*?
Rai-NOM come *no* *ne*
'Rai will come, won't he?'

Because of this discourse effect of *ne*, which is a stably grammaticalized element in Japanese, (4b) yields a tag-question meaning.[1]

1) Technically, Miyagawa assumes that *ne* is a confirmational particle which expresses that the addressee is committed to a proposition *being true*. Crucially, he assumes that the particle is not usable in imperatives, in which the addressee is expected to become committed to the proposition *being made true*. He argues that this assumption is supported by the following observation, which seems to show that *ne* is incompatible with an imperative sentence.

(i) *Ik-e *ne*!
go-IMP *ne*
'Go!'

However, the assumption that imperatives are incompatible with *ne* is not empirically correct, as the following example shows.

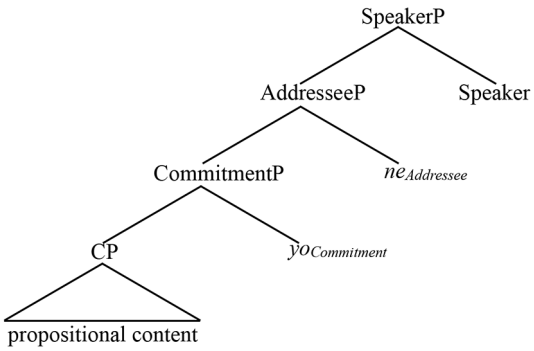
(ii) It-te *ne*!
go-IMP *ne*
'Go!'

Another discourse particle in Japanese relevant to Commitment is *yo*, which according to Miyagawa (2022) amplifies one's commitment to a proposition's truth.

(5) Rai-ga kuru *yo*.
Rai-NOM come *yo*
'Rai will come.'

According to Miyagawa and Hill (2023), (4a) commits the speaker to the proposition's truth, but the commitment is amplified in (5), in the sense that (5) signals that the speaker has evidence for the proposition's truth. Based upon this kind of observation, Miyagawa (2022) and Miyagawa and Hill (2023) propose that *yo* is a commitment-amplifier, which realizes the Commitment-head Merging above the syntactic structure embodying a propositional information (i.e. CP). To be more precise, they propose the following syntactic structure.

(6)



Miyagawa and Hill (2023) further seek to corroborate their analysis on the basis of Romanian data, showing that the language also has some particles which express a particular agent's commitment.

Even though the analysis is interesting in many respects, there remains an important issue concerning the structure in (6) and how these authors treat commitment. First, Brandom (1994, 2000, 2008) and Geurts (2019) show that commitment is something to be made on the basis of the presence of evidence that is available to the agent who makes the commitment. In the absence of such evidence, the agent's commitment violates the

The only difference between (i) and (ii) is that while *-e* is used for the imperative mood, *-te* marks the imperativeness in (ii). Even though there are slight connotational differences between the two types of imperative marking (*-te* sounds softer than *-e*, for instance), both share the same "imperativeness". Since this empirical issue is not relevant to our discussion, we will not delve into the topic further, leaving the issue for future research.

Gricean maxim of quality (Grice, 1975). In this sense, that the speaker has evidence for a proposition's truth is not something that amplifies their commitment, but rather it is a prerequisite for the commitment to be made.

In this respect, it is highly suggestive to look back at Brandom (1994, 2000, 2008) and Geurts (2019). Brandom and Geurts show that commitment is a tripartite relation that involves an agent *a*, an agent *b* and a proposition p: *a* is committed to *b* to act upon p. These authors further claim that if $a = b$, the commitment corresponds to the agent's *belief* or *intention*, depending on what type of commitment it is; if it is *a*'s commitment to *a*-self to act upon the proposition's truth, then it corresponds to the agent's belief, and if it is the same agent's commitment to act upon the proposition's being made true in the future, then it is their intention. Following Geurts (2019), let us call this type of commitment an agent's *private commitment*. Private commitment as a belief is an important aspect of our linguistic communication as a means of expanding mutual knowledge. And private commitment as an intention is crucial to another important function of linguistic communication: formation of joint intention (cf. Tomasello, 2008). We will see more on how the present analysis sheds light on this latter aspect of linguistic communication in Section 4.

In contrast, in the case of $a \neq b$, the commitment binds *a* to act upon p's (being made) truth, making the agent liable for it. Geurts calls this type of commitment *social commitment*, which serves as a deontic social norm imposed upon *a* in a particular discourse.

What is important from the perspective of our present discussion is that a's social commitment imposes a severer restriction upon the agent's future actions than their private commitment does. One can believe that p or intend to make p true (and publicize the belief or intention by means of uttering a sentence) while refraining from being responsible for the truth of the proposition by means of hedging such as "I just heard it, so it may be wrong".[2] But once the agent is socially committed to act upon p, then they become responsible for its truth, and the responsibility becomes uncancellable.

It is particularly intriguing to look at how *yo* works a bit closer in this respect. The following data shows that *yo* makes the speaker's liability to p's truth uncancellable.

(7) (Context: Fuensanta and Loren are meeting up with Genevieve, whom Fuensanta knows while Loren doesn't. Loren wonders where Genevieve is, and Fuensanta says the following.)

Hora,	asoko-no		kurosyatu-o	kit-ei-ru		*no*-ga	Genevieve
see	that-GEN		black.shirt-ACC	wear-PROG-PRS		*no*-NOM	Genevieve
des-u	(#*yo*).	Tada,	mimachigai	kamosirena-i	kara,	kakunins	-imas-yoo.
cop-POL	(#*yo*)	but	mistake.in.vision	may-PRS	because	confirm	-pol-exh

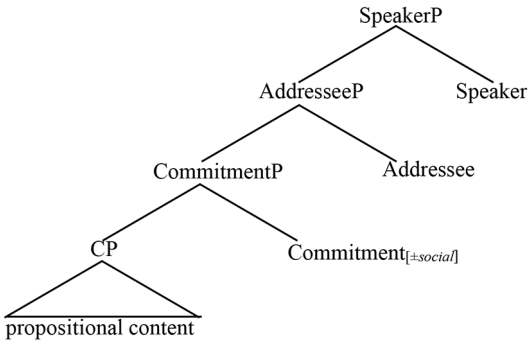
'See, that one wearing a white shirt is Genevieve. But I may be mistaken, so let's see whether I'm right.'

2) We will see more on hedging by means of evidentiality in Section 5.

The fact that the bare declarative sentence in (7) is compatible with the expression that cancels Fuensanta's responsibility for p's truth indicates that what Miyagawa (2022) calls commitment that can be made with a bare declarative sentence is only pragmatically implicated (cf. Grice, 1975). In stark contrast, if *yo* is used, the same expression cannot follow Fuensanta's assertion. This indicates that *yo* semanticizes the speaker's social commitment. We can further assume that in the case of a bare declarative, it only semantically encodes an agent's private commitment, and their social commitment is only pragmatically implicated.[3]

Given this, we can modify (6) as follows.

(8)



The [±*social*]-feature is added to the CommitmentP in (8). If the value is –, then only an agent's private commitment is semantically encoded, while an agent's private and social commitments are both semantically expressed if the value is positive. In the case of Japanese, if the value of this feature is +, then *yo* surfaces. *Ne* realizes Addressee in an analogous manner.[4] If Commitment has [–*social*], then an agent's private commitment

3) It is known that some pragmatic implicatures can be semanticized by means of grammaticalization (see Traugott & Dasher, 2003; Traugott & Ekkehard, 1991). Thus, it seems at least initially plausible to assume that *yo* and *ne* emerged from grammaticalization. I thank one of the reviewers for relevant discussion.

4) The anonymous *Biolinguistics* reviewers point out the importance of how the present analysis "would claim for languages in which there is no such grammaticalization of [*social*] commitment," such as English. For such languages, we can assume that they just realize both the [+*social*]-Commitment and [–*social*]-Commitment in the same way, with no morphological distinctions between the two. But this does not mean that these languages do not have any way of marking [+*social*]. For instance, Wiltschko and Heim (2016) argue that expressions such as *eh* marks the Addressee's social commitment to act upon a proposition's truth. This indicates that *eh* realizes the Addressee-head in this language when Commitment has [+*social*]. We can further argue based on Krifka (2016, 2019, 2021a, 2021b); Kamali and Krifka (2020) and others that some sentential adverbs such as "really" and "certainly" serve as a social-commitment modifier adjoined to the CommitmentP. Given the abundance and ubiquity of such adverbs in human languages, it should be safe to assume that even for those languages which do not have explicit morphemes and other grammaticalized elements that mark one's social commitment, there are various elements that enable children to acquire the CommitmentP-system along with the [±*social*]-feature. See also Heim (2019), Heim et

(i.e., belief or intention) is semantically expressed, and their social commitment to act upon the truth of a proposition is only pragmatically implicated, which means that it can be canceled. But if the same head has [+*social*], then the social commitment becomes uncancellable. This effect of [+*social*] is particularly important from an evolutionary perspective, since it makes an agent's liability for the honesty of a linguistic signal uncancellable. Below, the [*social*]-feature is often omitted and we simply refer to Commitment as a syntactic head responsible for introducing one's social commitment to the semantic expression.

Another crucial point is that CommitmentP mediates conversation participants and a propositional linguistic expression. The former is obviously relevant to communication, as one's social commitment is a social act that is meant to bind the agent with social deontic norms in the eyes of another (group of) agent(s) (who may happen to be the agent who makes the commitment), as Brandom (1994, 2000, 2008) and Geurts (2019) point out. The latter is what has been assumed in the generative tradition as the key element for language as a system for thought. Put simply, CommitmentP, within which a CP is embedded, clearly depicts the fact that language is used for both thought and communication. In this sense, Commitment as a concrete grammatical head (and especially [±*social*] associated with it) aptly illustrate(s) the LTC view, which claims that language is for both thought and communication. Given the presence of mounting evidence that empirically supports the LTC view, and given also the fact that Commitment is germane to both thought and communication, it is expected that the view provides us with a new way to look at language evolution, hopefully reconciling the conflict between the two (not mutually exclusive but erroneously so-assumed) views on language and its evolution. But how? This is the question we address in the rest of this article. To be precise, we seek to present an initially plausible evolutionary scenario for the Commitment system of human language that combines the thought aspect and the communicative aspect of language straightforwardly. The proposal is based on the nature of commitment and its cultural implementation in societies. More specifically, the proposal has as its basis some recent work on social evolution and how it explains one of the most mysterious aspects of our linguistic communication: namely, its dishonesty. Let us thus next see how social evolution studies shed light on the evolution of linguistic communication as dishonest signaling.

al. (2016) and others for relevant discussion. See also Ross (1970) for one of the earliest proposals that assume that there is a designated Speaker and Addressee heads in the syntactic structure. Thanks to the reviewers for relevant discussion.

3. Social Evolution and Dishonest Linguistic Signaling

Recently, there has been a growing interest in the effects that social evolution has on the evolution of various aspects of language. Much work provides a persuasive argument for the view that social evolution played a crucial role in the evolution of language (see Caldwell & Millen, 2008; Kempe et al., 2015; Kirby et al., 2015; Scott-Phillips, 2014; Scott-Phillips & Kirby, 2010; Tamariz & Kirby, 2016 among many others; see also Henrich, 2016; Henrich & Henrich, 2007; Shennan, 2009 for cultural evolution).

In this brief article, we focus on one particular aspect of language and communication to which social evolution is of high relevance: dishonesty of linguistic signaling (cf. Staler, 1983 and Searcy & Nowicki, 2005 for honest signaling). Human language communication as a signaling system is always potentially dishonest or unreliable in the sense that the information conveyed by the signal is not always true. You can publicize your false beliefs either intentionally or unintentionally. Sometimes you happen to believe something (p) that is actually false. In this case, your assertion of p happens to be incorrect. In other cases, you can make a statement that p despite your knowledge that it is in actuality false. Then, you are in effect telling a lie. In both of these cases, your statement is dishonest with regard to the truth value of p. This kind of dishonesty is ubiquitous in our ordinary communication, be it intentional or unintentional. In this sense, our language is not an honest signaling system. Because of this dishonesty inherent to linguistic communication, the speaker can produce lies and mis/disinformation, which oftentimes causes some devastating consequences. Scott-Phillips (2007, p. 747) aptly puts the evolutionary problem of dishonesty in human language communication as follows:

> That problem – honesty, or reliability – is arguably *the* central problem for any evolved signaling system: if there is no mechanism by which individual signals are kept honest then free-riders can invade. If one can gain through the use of a dishonest signal without paying additional costs then we should expect natural selection to favor such behavior. Consequently, signals will cease to be of value [as a means of expanding mutual knowledge: author], since receivers have no guarantee of veracity. Ultimately, dishonesty will produce listeners who will not attend to signals and the system will collapse in an evolutionary retelling of Aesop's fable of the boy who cried wolf. [emphasis original]

Scott-Phillips (2007, pp. 747–750) then discusses the potential factors that prevented actual dishonesty from becoming widespread to the extent that the entire linguistic communication system would go bankrupt, based on the extant evolutionary theories such as Maynard Smith (1994), Axelrod (1995), Clutton-Brock and Parker (1995), Maynard Smith and Harper (1995, 2003). Scott-Phillips (2007, p. 748) claims that the crucial factor is

the system of loss of reputation (coming under the banner of repeated interactions) and punishment. To be specific, the idea echoes Lachmann et al. (2001) in that it claims that the relevant costs associated with dishonest signaling are "paid not by honest individuals as a guarantee of their honesty... but by dishonest individuals as a punishment for their dishonesty" (Scott-Phillips, 2007, *ibid.*). Game-theoretically speaking, the costs are paid by those individuals who cause the deviation from the evolutionarily stable strategy (ESS) by producing dishonest signals (when such dishonesty is spotted in a repeated manner). In simpler terms, if someone tells lies and/or makes others hold incorrect beliefs repeatedly, that individual loses their reputation, and they will be punished in accordance with some relevant social norms (of course, losing one's reputation already serves as a punishment).

Notice already that one's (social) commitment to the truth of a proposition is highly relevant to this reputation and punishment system that prevents dishonesty from becoming dominant in linguistic communication. As we have seen, when one is socially committed to a proposition, then the individual carries responsibility for its truth, and if it turns out false, then they will be punished. In this sense, Commitment as a grammatical element presupposes the existence of the system that Scott-Phillips and other scholars make use of in explaining the evolvability of linguistic communication.[5]

What Commitment does, then, is make explicit an individual's willingness of taking liability for a proposition's truth, which in turn means that it expresses that a certain discourse agent is aware of the loss of reputation and other relevant punishment. From this perspective, we can say that *yo* in Japanese amplifies an agent's commitment by making the agent's awareness of punishment uncancellable. *Ne* signals that the speaker will come to hold a proposition's truth once the addressee socially commits themselves to act upon its truth. The latter is precisely the effect of one's commitment which Brandom (1994) calls the *deferral of justificatory reasons*; one can become committed to a proposition('s truth) by letting the relevant liability be held by another individual whose commitment to it enables their commitment to the same content.

Human beings use language to exchange information in lively conversations so that the discourse participants expand their mutual knowledge, i.e., CG (cf. Stalnaker, 1978, 2002). For the expansion of mutual knowledge to succeed, the information to be conveyed by the linguistic expression/signal should be true; otherwise, one or many of the interlocutors may hold a false belief, and hence the CG cannot be established. Thanks to the presence of Commitment as a grammatically encoded element, we can increase our reliability semi-directly and hold some beliefs (and intentions) in a more secured manner than without it. In this way, we can expand our CG relatively safely via linguistic

5) It is worth noting incidentally that this reliability account is made use of in the formal pragmatics literature so as to explain how certain linguistic expressions (and ultimately, how a linguistic agent) can be marked as trustable. See especially McCready (2014).

communication, despite the undeniable fact that linguistic signaling is always potentially dishonest.

If the CG and its expansion are two of the key factors in the evolution of (linguistic) communication in our species, as Tomasello (2008) has in mind, then, the presence of Commitment is a key ingredient of language evolution. Now the question is: how did Commitment as a grammatical knowledge emerge in our species? In the next section, we propose a possible scenario of the evolution of Commitment based on Progovac (2015, 2016).

4. Commitment as the Latest Stage in the Evolution of Syntax

In this penultimate section, we propose that Commitment emerged as a concrete grammatical element in our species at the latest stage of the evolution of syntax.[6] Specifically, we adopt the gradualist hypothesis of syntax evolution proposed by Progovac (2015, 2016), claiming that after the establishment of the system of reputation and punishment, our species began to lexicalize the abstract concept of (private and social) commitment. Let's see the proposal in detail.

Progovac (2015, 2016) proposes a gradualist approach to the evolution of syntax, which is in line with, e.g., Pinker and Bloom (1990), Culicover and Jackendoff (2005), Hurford (2012). Progovac argues against the saltationist view that our syntactic capacity that creates a propositional thought (and its externalization) emerged abruptly as a result of some small rewiring of the brain, the assumption shared by many generative grammarians. Instead, she claims that the structure-building capacity that yields what we call the CP (see Section 2) evolved in a gradual manner. Specifically, Progovac assumes that there are three basic stages for the evolution of our species' capacity to build complex structures. The stages are illustrated in (9) below.

(9) Three basic stages for the evolution of syntax by Progovac (2015, 2016):

a. Small Clause (SC)/VP Stage
b. *v*P Stage
c. TP/CP Stage

(9a) is a stage where the proto-language basically had two-word phrases consisting of a verbal root and its object, such as *[SC/VP eat fish]*. According to Progovac, living fossils of this stage can be found in verb-noun compounds such as *cry-baby* (see also

6) I thank one of the reviewers for suggesting using this terminology in lieu of "last stage," to make explicit that language can still evolve further.

Jackendoff, 2002). The next stage is the *v*P Stage. At this stage, the verbalizer *v* is added to the structure-building apparatus. Since this head takes the subject of a sentence as its argument, the presence of this head enabled our species to produce transitive sentences, where the agent and patient of the event (among others) can be explicitly described. Finally, the TP/CP-layer began to be superimposed on the *v*P layer at a later stage, which equipped our ancestors with the capacity to linguistically mark the (spatio-)temporal information of the event to be described. At this stage, our species came to be able to construct and communicate a propositional thought.

Under this proposal, our syntactic capacity has evolved in such a way that it enables our species to construct complex propositional thought and express it by means of utterance in a gradual manner. The gradual hypothesis by Progovac thus presents an exciting way to consider the evolution of our syntax, which enables us to construct and communicate our propositional thought. Given that the way the syntactic operation combines lexical items is free (modulo certain categorical restrictions), our propositional thought constructed on the basis of syntactic operations exhibits our creativity: that is, our use of language is essentially creative, as Chomsky (1966, 2012) repeatedly emphasizes. Thus, Progovac's account provides us with a plausible way to consider how our creative thought evolved (along with the way to externalize it).

However, from our present perspective, one crucial stage is missing in Progovac's original account: namely, the stage where the dishonesty problem began to be semi-directly solved. The thought thus constructed by some syntactic means can be externalized so that it can be shared with other individuals, but the receivers of the linguistic signal have no way of knowing the content is infallibly true. Likewise, they do not have a way of telling false information from correct one. We saw that the problem can be avoided due to the presence of Commitment$_{[+social]}$, which enables our species to mark one's willingness to be responsible for the truth of a proposition in an explicit manner. Given this, we claim that there was another, latest stage in the evolution of syntax, in which Commitment is superimposed on the TP/CP-layer, as in

(10) Four basic stages for the evolution of syntax:

a. Small Clause (SC)/VP Stage
b. *v*P Stage
c. TP/CP Stage
d. Commitment Stage with [±*social*]

Thanks to the addition of Commitment with [±*social*] to the grammatical inventory, our ancestors could communicate the creative propositional information they syntactically construct up to the TP/CP-layer in a sufficiently reliable/trustable fashion. Commitment makes explicit a certain discourse participant's awareness of that individual's responsi-

bility for a proposition's truth, and hence it makes it easier for other agents to come to believe it (or intend to make it true).

It is plausible to assume that Commitment presupposes the presence of the reputation/punishment system in groups/societies. Thus, the Commitment Stage in (10d) happened later than the implementation of the relevant social norms/systems. This means that it should be later than the stages where rudimentary linguistic communication was already in place. This is in line with Progovac's original three-stage model of the evolution of syntax, where it is assumed that our ancestors already had a way of communicating linguistic information at each one of the stages. The crucial point is that in these three stages, the reliability of the signals that they produced were not semantically secured, and they began to be semantically marked at (10d).

This point is relevant to one of the reviewers' concern. They point out that "[i]f the grammatical element Commitment$[_{[\pm social]}]$ as a functional lexical item was established at the very last [or latest: DM] stage in the evolution of syntax in our hominin lineage, and if at least some degree of trustable commitment would have been needed among groups of our ancestors (not among other animals), it is expected that the missing important role played by this novel element in the syntactic layer in (10) for communication in our ancestors should have been somehow supplemented by some kind of pragmatic strategy. Otherwise, trustable cooperation among the group members would not have been possible". Indeed, it is assumed in the present article that before Commitment with the [±*social*]-feature was grammaticalized, the trustability of signals were handled by some pragmatic means. In this respect, it is useful to quote the following passage from Scott-Phillips (2010, p. e1) that shows that our close biological relatives do have a means of pragmatically assessing the trustability of a signal.

> ...when a vervet monkey, *Chlorocebus aethiops*, hears the alarm call for an eagle, uncertainty is reduced not just with respect to the presence or otherwise of an eagle, but also all of the following: that there is another member of its troop in the local vicinity; that the caller's productive tools (its vocal tract, etc.) are in working order; that the monkey's own receptive tools (its ears, etc.) are in working order; and so on.

Given this, it seems safe to assume that before the emergence of Commitment with [±*social*], our ancestors calculated reliability of a signal in terms of some pragmatic means. See also Arnold and Zuberbühler (2006a, 2006b, 2012, 2013) among others, who carefully examine how primates (putty-nosed monkeys) pragmatically interpret the meaning of signals.

It should also be noted that one can only be committed to something the truth of which can be evaluated. That is to say, one's commitment can be made only to a propositional content. Given these two points, it is natural to assume that the Commitment

Stage is the latest stage in the evolution of syntax, later than the TP/CP Stage, where a propositional thought came to be in our species' hand.[7]

In this way, we have arrived at our hypothesis for the evolutionary scenario of our reliable/trustable linguistic communication. The grammatical element Commitment is established as a lexical item at the latest stage in the evolution of syntax by conceptualizing the reputation/punishment system, and its superimposition upon the TP/CP-layer enabled our species to increase the chance of our linguistic signaling being taken as trustable.

Before moving on to the next section, it is important to point out that the latest stage in language evolution is related to not just the vague notion of commitment, but rather commitment with the [±*social*]-feature. That is, (10d) is relevant to private commitment, i.e., the belief formation and intentionality, as well as social commitment. At least since Tomasello (1999), it has been known that (joint) intentionality in our species is a crucial key to our fully-fledged language capacity, with which we can share our beliefs and goals with our conversation partners. Tomasello (2008) further presents a concrete proposal of how our present linguistic communication came into being in a step-wise fashion, based on various kinds of observations and ample evidence (along with philosophical considerations) regarding rudimentary intentionality of apes and how our (joint) intentionality emerged gradually. The present proposal supports his idea from an intriguing point. That is, our proposal claims that our complex intentionality arose from the rudimentary intentionality system shared with other species, and it is crystalized when Commitment was grammaticalized. And the "jointness" of our intentionality is due to [+*social*].

5. Concluding Remarks With Implications for Future Research

In this brief article, we introduced Commitment, the notion that has been widely used in the literature on formal semantics, formal pragmatics and syntax, to the discourse of language evolution. The notion has not received the attention it deserves in the field of evolution of language. But it should be noted that the importance of Commitment from an evolutionary perspective is not entirely new. Miyagawa (2022, pp. 199–200) conjectures that at the heart of the exceptional nature of human language lies commit-

7) Note that as one of the reviewers points out, "[g]radual evolution works with degrees and overlaps, not with rigid, categorical distinctions". This indicates that the stage in (10d) should also be at least partially overlapped by some earlier stages. Regarding this point, it should be pointed out that some rudimentary pieces of what we termed (social) commitment can be found in other species, where dishonest signalers are socially punished (see Tibbetts & Izzo, 2010, among others). This suggests that there already were the basic biological and social grounds for the Commitment Stage before the emergence of [±*social*] in (10a-c). What was crucial is that this social system was gradually lexicalized, by means of which the Commitment-head emerged. Thanks to the reviewer for relevant discussion.

ment, claiming that without the presence of this grammatical element, human language would have been very much like vervet monkey's alarm calls (cf. Seyfarth & Cheney 2003; Seyfarth et al. 1980a, 1980b; see also Arnold & Zuberbühler 2006a, 2006b, 2012, 2013; Schlenker et al., 2016 for alarm calls of putty-nosed monkeys). Even though it is not discussed in the monograph in what sense commitment differentiates our linguistic signal from those found in other animals, our proposal provides us with the missing details. As we have seen, at the stage in (10c), our ancestors acquired the capacity to construct (and express) linguistic thoughts in a creative manner. This is arguably one of the uniquest aspects of human language, as Chomsky (1966, 1980) already points out. In this sense human language is unique even in the absence of Commitment.

But there is a crucial difference between human linguistic communication and animal communications in terms of the need of Commitment (with [+*social*]). Commitment is needed in human language so as to make our linguistic signals reliable enough by making explicit one's awareness of the responsibility that the individual has to carry if the signal is dishonest. In short, Commitment is needed for our species to use our complex and creative linguistic capacity for communicative purposes, as assessing the veracity of what's expressed in complex and creative ways is extremely hard. In contrast, other animals do not essentially need a way of directly encoding one's commitment in signals, as long as the entire signaling system is (relatively) simple and trustable. In this sense, the presence of Commitment marks uniqueness of human language, as Miyagawa speculates.

Let us mention one potential implication of the present proposal, which pertains to another interesting aspect of human language grammar: evidentiality. One of the reviewers wonders what the present analysis can say about evidential expressions in various languages. For instance, Cuzco Quecha is known for its rich system of evidentials: *-mi* indicates that the speaker has the visual evidence for the proposition's truth, and *-si* indicates that the speaker has a hearsay piece of evidence for the proposition's truth. This is shown in (11) from McCready (2014) (see Faller, 2002 for an excellent survey).

(11) a. Para-sha-n-mi
rain-PROG-3-*mi*
'It is raining.' + speaker sees that it's raining

b. Para-sha-n-si
rain-PROG-3-*si*
'It is raining.' + speaker was told that it's raining

The present account presents an interesting evolutionary consideration for how evidentials began to be grammaticalized. Notice that evidential elements mark the source of evidence for a proposition's truth. Hearsay evidentials defers the speaker's justificatory reasons for the relevant commitment to someone else, and this would weaken the blame that they have to take if the proposition turns out false. In contrast, *-mi* in (11a) indicates

that the speaker has the most reliable source for (social) commitment, which would make the addressee easier to come to hold the same belief that the proposition is true. Given these facts, we can say that evidentials came after (10d) to supplement (social) commitment. If this is true, then we should modify (10) accordingly, but we leave this for future research.

Before concluding, it should be noted that the ideas laid out in this article is only theoretical. The empirical (in)validity of it must be evaluable by some experimental means; otherwise, it would be only an armchair theory. Against this backdrop, it is worth pointing out that whether the idea is evolutionarily valid or not can be put to an experimental scrutiny. Although the exact simulation must be a topic for future research, let us sketch out one possible model of such an experiment. We can define two groups of agents G and H, where G consists of those agents who have some Commitment$_{[+social]}$-like communicative means, which makes the signaler liable for the conveyed information's honesty, whilst H consists of those who do not have it. Suppose that the selective pressure is defined in such a way that the more easily/smoothly an agent's signal is trusted, the more it remunerates for the agent or the group which the agent is in. If this selective pressure favors G, then the present account will be experimentally supported, as it claims that social commitment is responsible for keeping the credibility of a signal high. The present proposal will be further supported if the experiment shows that G expands the shared knowledge more smoothly than H, and G forms joint intentionality more smoothly and efficiently to achieve a certain goal than H. If we design such an experiment in a practical manner, then it would serve as an empirical test of the present account.

Recall that we assume that every language has Commitment$_{[+social]}$, regardless of whether a given language has an overt morpheme that marks an agent's social commitment. This assumption is made on the basis of the previous literature (cf. Krifka, 2016, 2021a, 2021b; Wiltschko & Heim, 2016, and so on). In those languages that do not mark one's social commitment with the overt Commitment-head, they use adverbs such as *certainly* to mark the positive value of [*social*] in Commitment. Thus, the proposal assumes that there would be no substantial difference between the Japanese-type of languages (languages with overt Commitment morphemes) and the English-type of languages (languages with no overt Commitment morpheme). But it may be the case that one of these two types of languages should be eventually evolutionarily favored over the other.

Given this, we can think of another potentially interesting experiment, once we succeed in a useful definition of a selective pressure that favors some "effective means" of marking one's social commitment. If the pressure favors those agents who have Japanese-type of languages, then we may predict that in some distant future, those languages which do not have overt Commitment morphemes will gain the relevant morphological

elements. Or it may be the opposite. If such an experiment is designed, the present account will shed light on futuristic glossogeny in an intriguing way.

As a conclusion, it is hoped that the present article provides a good opportunity to look at language and its evolution from a novel standpoint, reconciling the two conflicting ideas with each other: namely, the view that language evolved as a system for thought, and the other view that it evolved as a system for communication. The present account claims that it evolved for both, in such a way that Commitment makes our complex linguistic communication trustable enough as an information exchange system. It is also hoped that the evolutionary account we proposed in this article opens up greater possibilities for collaborative works between formal linguists and (evolutionary) biologists, psychologists, and other scholars working in the field of evolution of language. Of course, there are many functions of language other than expansion of mutual knowledge (and formation of joint intentionality), as one of the reviewers points out. It may be the case that at least some of such functions ("to persuade or to dissuade, to cooperate or to compete for resources and mates," to borrow some of them from what the reviewer lists) arose as a corollary of having Commitment with [±*social*] as a grammatical element. But this speculation must be tested for future research.

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