



‘So’ as a TP-substituting Propositional Anaphor

Myung-Kwan Park (Dongguk University) Wooseung Lee (Konkuk University)



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Myung-Kwan Park (1st author)
Professor, Dept. of English
Language, Dongguk Univ.
parkmk@dgu.edu

Wooseung Lee (corresponding
author)
Professor, Dept. of English
Education, Konkuk Univ.
wlee6@konkuk.ac.kr

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ABSTRACT

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This paper revisits some interesting asymmetry observed between *that*-clause and ‘so’ in English. Despite the fact that *that*-clauses embedded within an array of verb phrases can be pro-formed by ‘so’, the ones embedded within morphologically related noun phrases cannot. Moulton (2015) attempted to offer an account of this asymmetrical phenomenon by proposing that, contra standard assumptions, *that*-clauses embedded within those verb phrases are predicates rather than arguments in a parallel fashion to those embedded within derivationally related nouns. In other words, he argues that, based on derivational relatedness, the semantico-syntactic function of *that*-clause within a noun phrase can be extended to a verb phrase as well. We explore this issue by re-examining the syntactic distribution of ‘so’ and the semantic function of *that*-clause embedded within two distinct syntactic categories, a noun phrase and a verb phrase. We then propose that ‘so’ is a TP-substituting propositional anaphor. In so doing, we argue that there exist two types of CPs (cross-linguistically) and that these distinctions account for different syntactic behaviors of ‘so’ as a propositional anaphor in a variety of constructions.

KEYWORDS

proposition, anaphor, *that*-clause, *so*, argument, predicate

1. Introduction

Kratzer (2006) proposes in a neo-Davidsonian semantics that an attitude verb like 'believe' in (1) with the following 'that' clause compose via Restrict, which is a mode of semantic composition that composes a predicate with the property content of an indefinite-like element (Chung and Ladusaw 2004).¹

- (1) Lucy believes that there are ghosts.

In her analysis, 'that'-clause as in (1) is taken to be more like a predicate rather than an argument. Specifically, the direct object argument of the verb (in its argument structure) is proposed to be restricted, but not saturated. In keeping with Kratzer's (2005) view of 'that' clause as a predicate, Moulton (2015) brings to the fore the syntactic argument that 'that' clause as in (2a) is a predicate, based on the difference between 'that' clause and 'so'.² Crucially, 'that'-clause can complement a noun as in (2a), but 'so' cannot as in (2b).

- (2) a. my belief/claim/fear that pigs fly
b. *my belief/claim/fear so

This sharply contrasts with its verbal counterpart. Specifically, both 'that'-clause and 'so' can complement a verb as in (3).

- (3) a. I believe/claim/fear that pigs fly.
b. I believe/claim/fear so.

Moulton's (2015) argument is grounded on Grimshaw's (1990) Aktionsart diagnostics, in which clause-taking nouns do not form argument structure nominals. According to Grimshaw (1990), nominalization is two-fold; argument-structure nominals (ASNs) and non-argument-structure nominals (NASNs). The one takes arguments and can describe the event that its verbal counterpart does. The other does not take arguments and just depicts various things regarding the verb. Grimshaw (1990) discovered that ASNs have more verbal properties than NASNs. As (4-5) show, nominalizations display the identical Aktionsart distinctions, i.e., aspectual event classes as their relevant verb phrases (Vendler 1967, Dowty 1979). Both 'destroy' and 'destruction' in (a)-examples are telic with a definite object, hence compatibility with *in*-phrases; 'observe' as well as 'observation' in (b)-examples are only atelic, hence compatibility with *for*-phrases only.³

¹ Specify and restrict are proposed as two ways of composition for indefinites (Chung and Ladusaw 2004). Specify is a terminological variation of choice function in that it type-shifts the property denoted by the NP to an individual. The individual, as the output of the choice functions, saturates the argument of the predicate. Restrict, on the other hand, does not saturate the argument of the verb. In case an argument and a verb compose by Restrict, the property argument is construed as a restrictive modifier of the predicate.

² Moulton (2019: 7) introduces CPs as two types: "Non-saturating CPs are $\langle e, t \rangle$ predicates, properties of contentful individuals (Moulton 2009, 2015). Saturating CPs are properties of eventualities $\langle v, t \rangle$. (Hacquard 2006, Kratzer 2013, Moulton 2008, Özyildiz 2019)".

³ As is well-known, telic predicates, having an end point, are compatible with *in*-phrases while atelic ones, having certain duration with no end points, are compatible with *for*-phrases (Vendler 1967).

- (4) a. The Romans destroyed the city in three hours/*for three hours.
 b. The doctor observed the patient for three hours/*in three hours.
- (5) a. The total destruction of the city in two days/*for days appalled everyone.
 b. Only observation of the patient for several weeks/*in several weeks can determine the most likely course of action. (Grimshaw 1990: 58, (28b)/(29b))

The internal argument is mandatory in the presence of the Aktionsart modifiers such as *in*-phrases or *for*-phrases as illustrated in (6).

- (6) a. *The total destruction in two days was widespread.
 b. *Only observation for weeks can determine the best course of action.

Given these facts, the following grammatical contrasts reveal that CP-taking predicates, unlike the ones without CPs, do not build ASNs. Interestingly, CP-taking predicates such as 'decide', 'prove', 'explain', 'claim' and 'demonstrate', being turned into derived nominals, no longer admit the Aktionsart modifiers as exemplified in (7-11).

- (7) a. I decided that he was a fraud in 5 minutes.
 b. *my decision that he was a fraud in 5 minutes
 c. *my decision in 5 minutes that he was a fraud
- (8) a. John proved that he was competent in only a few minutes.
 b. *John's proof that he was competent in only a few minutes
 c. *John's proof in only a few minutes that he was competent
- (9) a. I explained in under an hour that I was innocent.
 b. *my explanation that I was innocent in under an hour
 c. *my explanation in under an hour that I was innocent
- (10) a. John claimed for years that the earth was flat.
 b. *John's claim for years that the earth was flat
- (11) a. John demonstrated that he was a skilled pianist in just a few short minutes.
 b. *John's demonstration in just a few short minutes that he was a skilled pianist. (Moulton 2015: 315)

Taken together, the above data seem to suggest that NPs with *apparent* CP complements embedded should not be taken to reflect their argument structures since they do not build ASNs.⁴ This conjecture, if on the right track, would further suggest that 'that'-clause in (2a) is not an argument since it stands well with a derived nominal. Based on an array of interesting empirical facts thus far, Moulton (2015) argues that 'that'-clause in (12a) is not an argument and composes with the nominalization by (Intensional) Predicate Modification.⁵ He further proposes

⁴ In a similar line, Hankamer and Mikkelsen (2021) argued that, as is the case in Danish, DPs containing "complement" CPs (DCs, henceforth) are of two types, i.e., anaphoric and referent-establishing DCs, and accordingly should be given two different structures. They suggest that anaphoric DCs involve a CP adjoined at the level of DP, while referent-establishing DCs a D selecting a CP complement. For theoretical and empirical arguments for the proposed analyses, readers are referred to Hankamer and Mikkelsen (2021).

⁵ In a similar line, Ahn (2015) argues that internal arguments as well as external arguments are severed from the lexical verb. Specifically, based on English *out*-prefixation in *out*-predicates such as *outlive*, *outsing* and *outnumber*, he argues that a verb names the type of event, but its arguments are introduced by different functions in accordance with a Neo-Davidsonian approach

that 'so' as a CP pro-form in (12b) always serves as an argument. That is why he argues it cannot combine with non-argument-taking nouns/nominalizations, unlike in (12c).

- (12) a. my belief/claim/fear that pigs fly
 b. *my belief/claim/fear so
 c. I believe/claim/am afraid so.

Here arise two outstanding questions. [1] Is it always the case that 'that'-clause is a predicate, while its anaphoric form 'so' is an argument? Particularly, can we extend an NP-internal characterization of 'that'-clause to its VP-internal characterization, as argued in Moulton (2015), despite the fact that nouns and verbs have exactly the opposite semantico-syntactic properties such as [+N, -V] and [-N, +V] with no shared properties at all? [2] If Moulton (2015) does not stand up, i.e., if NP-internal 'so' is also a predicate, how can we account for the unacceptability of 'so' in NP internal position? Next sections are dedicated to finding answers to these questions.

2. Propositional 'that'-clauses and the Distribution of 'so'

In this section, we will go through the distribution of anaphoric 'so' (and 'it') that replaces a proposition. Propositional anaphors 'so' and 'it' each occur after two different groups of verbs listed in (13-14).⁶ Notably, some verbs host either 'so' or 'it' as in (15) (Cornish 1992):

- (13) Verbs hosting 'so' only:
 appear, be, believe, hope, presume, remain, suppose, think . . .
- (14) Verbs hosting 'it' only:
 acknowledge, be surprised (at), claim, deny, doubt, ignore, know, prove, realized, regret, understand . . .
- (15) Verbs hosting either 'so' or 'it':
 assume, be afraid (of), believe, do, expect, fear, guess, imagine, say, seem, tell, wish . . .

According to consultation of COCA, Meijer (2018) also presented table (16), which well documents frequency of the occurrence of 'so' or 'it' after certain predicates.

(Parsons 1990, Schein 1993, a. o., Lohndal 2012: Ch3 for an overview). In his proposal, each argument is introduced by unique semantic functions corresponding with unique syntactic positions.

⁶ Propositional anaphors 'so' and 'it' exhibit the following general contrasts in terms of semantics and syntax. "Anaphor 'so', as an event type, expresses a mitigated and typically weak assertion, conveying judgements about the truth of a proposition; anaphor 'it', as an event token, does not signify judgments about the truth of a proposition. It represents a rather stricter condition on co-reference" (Gast and König 2008: 2).

(16)

<i>n</i> hits with <i>so</i>	Predicates searched for in COCA - Underlined predicates cannot select <i>it</i>
<i>n</i> > 20	<u>appear</u> (32/129736), <u>assume</u> (32/45888), <u>believe</u> (405/228502), <u>hope</u> (1399/155179), <u>know</u> (21/1213856), <u>say</u> (1640/2545469), <u>seem</u> (98/280331), <u>suppose</u> (182/20311), <u>tell</u> (559/511579), <u>think</u> (7456/987224)
0 < <i>n</i> < 20	<u>argue</u> (1/65282), <u>admit</u> (1/44499), <u>claim</u> (1/93399), <u>convince</u> (1/21822), (<u>see</u> (3/932664)) ¹²
<i>n</i> = 0	<u>acknowledge</u> (0/28889), <u>comprehend</u> (0/3838), <u>confirm</u> (0/26386), <u>demonstrate</u> (0/39348), <u>deny</u> (0/33110), <u>doubt</u> (0/46253), <u>exclaim</u> (0/4314), <u>ignore</u> (0/34915), <u>figure out</u> (0/23790), <u>notice</u> (0/61768), <u>realize</u> (0/81684), <u>regret</u> (0/12424), <u>resent</u> (0/3732)

We will focus on the syntactic environments where propositional anaphor 'so' occurs. Other than the position following a verb as introduced above, it occurs right after 'if', which is taken as compelling evidence for 'so' as a TP-substituting anaphor (Cornish 1992; Needham 2012):

- (17) Is John coming tonight? If so, we should order more pizza.
 (18) Do you work for Starbox? If so (i.e., if you do work for Starbox), I can't say I dig your new marketing strategy. (COCA)
 (19) He might be within that very ship, already on his way. But if so (i.e., if he is within that very ship, already on his way), he was grossly cheated. (COCA)

Sailor (2012) demonstrates that 'so' may follow sentential adverbs, only if they are mid-scalar, e.g., 'maybe', 'apparently', 'possibly' and 'perhaps':⁷

- (20) A: Did you remember to lock the door?
 B: Maybe so.
 (21) A: Is John coming tonight?
 B: Possibly so.
 (22) Even so, you shouldn't do.

Additionally, 'so' may follow certain *wh*-words:

- (23) A: He was very subdued, and he was very different.
 B: How so? (COCA)
 (24) A: I get really confused about everything.
 B: How so? (COCA)
 (25) A: You have to leave now.
 B: Why so?⁸
 (26) A: Harry has the British nationality.
 B: Why so? (Sailor 2012: 4)

To recapitulate, propositional anaphor 'so' occurs immediately after a set of verbs, conditional 'if', some sentential

⁷ Other than those, 'so' can follow sentential adverbs such as 'obviously', 'unfortunately', 'regrettably' and 'hopefully'.

⁸ (i) A: Will anyone show up? If so, who?
 B: *John is someone who I think so. (Sailor 2012: 4)

adverbs or *wh*-words 'how/why'.⁹

On the other hand, 'so' cannot substitute for propositional 'that' clauses embedded in noun phrases, i.e., nouns or nominalizations never select 'so':

- (27) *the/her {admission, announcement, answer, assertion, assumption, claim, comment, complaint, conclusion, expectation, guess, hope, indication, inference, judgment, knowledge, objection, prediction, presumption, pretence, promise, prophecy, proposal, reasoning, report, ruling, sense, speculation, statement, stipulation, supposition, suspicion, teaching, theory, thought, threat, understanding, worry} so (Higgins 1973: 347-348; Moulton 2015: 308)

In a similar line, 'so' cannot substitute for 'that-clause' in 'now that...' as exemplified in (28).¹⁰

- (28) a. Now that Giannis will be named MVP, Giannis will be offered a supermax contract.
b. *Now so, Giannis will be offered a supermax contract.

Nor can it replace 'that-clause' in the Subject position as shown in (29-30). Specifically, 'that-clause' can occur in the Subject position as in (29). Still, anaphoric 'so' in place of 'that-clause' results in ungrammaticality as in (30).

- (29) That Giannis will be named MVP is {believable, probable, true}.
(30) A: Giannis will be named MVP.
B: *So is {believable, probable, true}.

To sum up, propositional anaphor 'so' is not allowed when preceded by a noun, a clause-introducing adverbial *now* meaning 'since' or in the Subject position.

⁹ Given that the null C is cliticized to the higher matrix verb in our proposal, one of the reviewers asked how 'so' is licensed in (20-26) despite the absence of [+V] elements on the surface. We take examples (20-26) to be indirect interrogative constructions with implicit matrix clause as fully paraphrased in (i-vii), hence availability of the higher matrix verb.

- (i) A: Did you remember to lock the door?
B: Maybe so. (= I guess I remembered to lock the door.)
(ii) A: Is John coming tonight?
B: Possibly so. (= It is likely John is coming tonight.)
(iii) Even so, you shouldn't do. (Contexts given, this sentence can be paraphrased in a similar fashion.)
(iv) A: He was very subdued, and he was very different.
B: How so? (COCA) (= I wonder how he was very subdued, and he was very different.)
(v) A: I get really confused about everything.
B: How so? (COCA) (= I wonder how you get really confused about everything.)
(vi) A: You have to leave now.
B: Why so? (= I wonder why I have to leave now.)
(vii) A: Harry has the British nationality.
B: Why so? (= I wonder why he has the British nationality.) (Sailor 2012: 4)

¹⁰ This is equivalent in use to 'as a consequence of the fact that', 'seeing that' or 'since'. The core sense of 'now that' is that now, in the present, one thing has been accomplished, and what follows as a consequence is in operation in the present or lies ahead in the future. What is in the future, however, may or may not be known; 'now that' is very often used in situations where it is unknown.

3. Towards an Analysis of the Syntactic Distribution of 'so'

Based on the discussion in Section 2, we attempt to provide an analysis of the syntactic distribution of 'so'. Specifically, we propose that propositional 'so', as a TP anaphor, replaces a TP after the null C cliticizes to a verbal host. The prediction here is that the distribution of propositional anaphor 'so' depends on that of the null C.

Let us first offer an account of why 'so' is forbidden in certain positions. First, nouns or nominalizations never select 'so' as above (27), which can be accounted for by the fact that the complementizer is never realized as zero after a (derived) noun as in (b)-examples of (31-32) (Bošković and Lasnik 2003).

- (31) a. I heard about the proof that Mary did it.
 b. *I heard about the proof \emptyset Mary did it.
- (32) a. I heard about the fact that Mary did it.
 b. *I heard about the fact \emptyset Mary did it. (\emptyset = a null C)

Given that the head of a CP complementing the preceding noun should always be overt and that 'so' is a TP anaphor, examples in (27) should be unacceptable.¹¹

Second, the null C is not licensed in the Subject position as in (33), which predicts that 'so' does not occur in the Subject position. This prediction is borne out in (34), which again is in support of our proposal that propositional 'so' is licensed by a null complementizer.¹²

- (33) a. [_{CP} That [_{TP} he liked linguistics]] was widely believed.
 b. * [_{CP} \emptyset [_{TP} He liked linguistics]] was widely believed.
- (34) A: Giannis will be named MVP.
 B: That Giannis will be named MVP is {believable, probable, true}.
 B': *So is {believable, probable, true}.

Sentential subjects are widely thought to be a part of a complex DP as opposed to standalone CPs (Davies and Dubinsky 2010; Lohndal 2014). This leads to a conjecture that there seems to be a correlation between a CP with non-DP structure above and a TP-substituting propositional anaphor 'so'.

Still, there is a case in which the null C and TP anaphor 'so' distributional correlation breaks down:

- (35) Now (that) I live only a few blocks from work, I walk to work and enjoy it.

Given that the null C is licensed in expression 'now (that)...', the prediction is that 'now so' should be acceptable since 'so' is a TP-anaphor.¹³ This prediction, however, is not borne out; 'so' cannot follow 'now' that has a

¹¹ Given that propositional 'so' is always licensed by a null complementizer, we do not encounter over-generation problems such as **the proof that so* without postulating an additional independent constraint that can exclude that type of example (cf. *the proof that Mary did it*).

¹² A crucial assumption here is that a null complementizer fails to be incorporated in the sentential Subject position.

¹³ As for example (35), one of the reviewers raised a similar question to the one offered in footnote 9: how the null C is cliticized to the higher matrix verb. Crucially, we assume that the subordinate clause introduced by 'now' is generated in the post-verbal position, i.e., underlyingly, the matrix clause is assumed to precede the subordinate clause, thereby the matrix verb being able to host the cliticization of the null C.

meaning of 'since' as in (28) above. Here the correlation between the null C and 'so' goes awry.¹⁴

Other than expression 'now that...', we find various non-canonical positions in which the null C is not licensed. In displaced positions, the null C is not licensed. In (36a), a CP undergoes rightward movement to avoid ambiguity related to an adverbial expression 'at that time'. This postponing leads an adjunct to intervene between the predicator and 'that'-clause. Example (36b) is a pseudo-cleft, in which a CP occurs in the foregrounded position. A CP is realized as a shared constituent in (36c). A CP is topicalized in the pre-Subject position in (36d). All of these are non-canonical positions, in which the null C is not licensed.¹⁵ This predicts that 'so' is not available as a replacement for the displaced CPs.¹⁶

- (36) a. *It seemed at that time [_{CP}∅ [_{TP} David had left]].
 b. *What the students believe is [_{CP}∅ [_{TP} they will pass the exam]].
 c. *They suspected and we believed [_{CP}∅ [_{TP} Peter would visit the hospital]].
 d. * [_{CP}∅ [_{TP} John likes Mary]] Jane didn't believe. (Bošković and Lasnik 2003: 529)

In "extraposed" clauses, the null C is licensed, hence the availability of propositional 'so':¹⁷

- (37) a. It seems [_{CP}∅ [_{TP} John likes Mary]].
 b. It seems to me [_{CP}∅ [_{TP} John likes Mary]].
 c. It is likely [_{CP}∅ [_{TP} Mary will read the book]].

Examples in (37) differ from those in (36) in that the CPs in (37) are base-generated ones while those in (36) are displaced ones.

Let us now go over other constructions in which propositional anaphor 'so' is observed. Examples (38-41) exhibit that 'so' can occur in pre-Subject position.

- (38) Preposed 'so':
 a. Five of us, so I believe, have had fiction published in magazines... (Huddleston and Pullum 2002: 1537)
 b. So wrote a ten-year-old student in a letter to his parents... (Huddleston and Pullum 2002: 1537)
- (39) a. They seem diametrically opposed, or so I thought until I investigated further.
 b. The optical and mechanical first principles could be inferred directly from experiments - or so Newton would have his readers believe.
 c. (i) A: The clock has stopped.
 (ii) B: So I see.
 d. Nor, so did I believe, had anyone yet effectively caught the gaping contrast between the heedless flow of time and the fleeting evanescence of existence.

¹⁴ Still, we do not take this example as undermining our proposed analysis. Rather, we are just dealing with a particular usage of 'that'-clause in that the complementizer employed here should be accompanied by 'now', with the whole expression denoting 'since'.

¹⁵ Refer to Bošković and Lasnik (2003) for a specific analysis of the relevant constructions.

¹⁶ a. It seemed yesterday morning that it rained, and it seemed so yesterday evening (*so), too.

b. *What my brother believes is that he will pass the exam, and what my sister believes is so too.

c. Mary suspected, but John knew for a fact, that Peter would visit the hospital. Furthermore, you suspected, but I knew so for a fact, too. (Acceptability judgments due to Michael Barrie (perl. comm.))

¹⁷ The term 'extraposition' is employed for ease of exposition without any implication that the embedded clause ever undergoes movement from its theta-position (Bošković and Lasnik 2003).

- (40) a. It seems so/that John left.
 b. *That (it) seems./*It seems that.
 c. So it seems. (Moulton 2015)
- (41) a. Albert boasted {that the results were fantastic/*it}.
 b. *That the results were fantastic, Albert boasted. (Moulton 2015)
 c. So boasted Alfred. (Meijer 2018: 269)

Examples (42-44) show that 'so' can occur in pre-verbal position.

- (42) Preverbal position: volitional verbs ('wish', 'desire', etc.), with 'so' substituting for the non-finite complement; non-finite verbs
 a. If you so wish / desire / choose, you can do it tomorrow.
 b. If you so wish, you can have our equipment.
 c. You can, if you so wish/choose, join for a trial period of three months.
- (43) So saying, he gave deadly poison to the herdsman and sent him off.
- (44) 'So' in the second object position of Double Object constructions:¹⁸
 a. When the princess asked him who taught him so? He said ... (OED, s.v. 'so', 2a.)
 b. She didn't approve of the idea and told them so/*not.
 c. She was totally opposed to the idea and told the premier so.

Taken together, we tentatively suggest that unlike the TP whose upper null C is cliticized to the higher matrix verb, its anaphoric pro-form 'so' can undergo pre-subject or pre-verbal leftward displacement thanks to its own lexical cliticization to the Spec of the null C that serves as a head/lexical governor for its trace.

4. 'That' Clauses that Attitude Verbs Take: a Predicate or an Argument?

Section 3 went over the syntactic distribution of 'so'. Still unclear is the function of 'so' whether it is an argument or a predicate. Putting this issue aside (for later discussion), this section discusses the function of 'that' clauses that *attitude* verbs take. Moulton (2015) argued that VP-internal 'that-clause' is a predicate in an analogous way that NP-internal 'that-clause' is a predicate. Let us reintroduce Moulton's (2015) major points first. As mentioned above in section 1, 'that'-clause can follow a noun as in (45a), but 'so' cannot as in (45b).

- (45) a. my belief/claim/fear that pigs fly
 b. *my belief/claim/fear so

Contrastively, both 'that'-clause and 'so' can complement a verb as in (46).

¹⁸ Examples (44) are classified as 'so' in pre-verbal position on the following grounds. In Larsonian VP-shell hypothesis (Larson 1988), 'so' in (44) can be viewed as preceding a verb, the head of the inner contentful VP. Initially, this verb takes the second object of double object constructions, which is realized as 'so' and then assumed to move to the preverbal position, yielding examples as in (44).

- (46) a. I believe/claim/fear that pigs fly.
 b. I believe/claim/fear so.

This led Moulton (2015) to propose that both VP-internal and NP-internal *that*-clauses in (45-46) function as predicates, contra our traditional assumption.¹⁹ The following cross-linguistic consideration, however, makes the proposal less convincing. Korean possesses a complementizer that has two morphological variations, i.e., *-ko* and *-nun*. The complementizer is realized as *-ko* when embedded within a VP while it surfaces as *-nun* when embedded within an NP. These two distinctive usages of a CP are found in relation to English *that*-clauses: argument(al) and predicative usage. The CP in (47a) functions as an argument, saturating the main verb while the one in (47b) does not. In (47b), the CP behaves as a predicate, modifying a noun. These diverging usages of a CP undermine Moulton's (2015) claim that an NP-internal function of a clause should be extended to a VP-internal function of a clause.

(47) Two uses of 'that'-clauses in Korean:

- a. Cheli-nun [wucwu-ka phayngchangha-ta-ko] cwucangha-nta.
 Cheli-TOP universe-NOM expand-PRE.DCL-SUBORD/COMP claim-PRE.DCL
 'Cheli claims that the universe expands.'
- b. Cheli-nun [wucwu-ka phayngchangha-ta-nun] cwucang-ul
 Cheli-TOP universe-NOM expand-PRE.DCL-ADN claim-ACC
 mitnu-nta.
 believe- PRE.DCL
 'Cheli believes the claim that the universe expands.'

In a similar vein, Elswyk (2020) also offered a reason for thinking *that*-clauses are referential expressions, based on what is dubbed the argument from valid inferences (Schier 1972; Bealer 1998). Let us consider (48-51), in which viewing *that*-clauses as referential expressions accounts for various valid inferences. In (48), *that*-clauses refer to propositions as the objects of Aaron's and Marc's belief. The same account applies to other examples. In (49), *that*-clause refers to a proposition as the object of Marc's saying. In (50), *that*-clause refers to a proposition as the object of Aaron's belief and that 'so' refers to that same proposition as the object of Aaron's belief. In (51), *that*-clause refers to a proposition as the object of Wes' saying and that 'so' refers to that same proposition as the object of Wes' saying. All of these accounts suggest that the valid inferences stand up only if *that*-clauses are referential expressions.

- (48) Aaron believes that Giannis will be named MVP.
 Marc believes that Giannis will be named MVP.
 There is something they both believe.
- (49) Aaron believes everything said by Marc about Giannis.
 Marc said that Giannis will be named MVP.
 Aaron believes that Giannis will be named MVP.

¹⁹ In traditional grammar, *that*-clauses in (a)-examples of (45-46) are complements of the preceding heads, N and V, respectively.

- (50) Aaron believes that Giannis will be named MVP.
 Marc also believes so. There is something they both believe.²⁰
- (51) Aaron believes everything said by Marc about Giannis.
 Wes said that Giannis will be named MVP. Marc also said so.
 Aaron believes that Giannis will be named MVP.

Elswyk (2020) further shows that Substitution tests fail in (52), which in fact speak for the distinction between argument and predicative use of 'that'-clauses, contrary to Moulton (2015).²¹ In (52), the DP and CP within a VP headed by a single verb 'explain' denote two different things. Specifically, (a)-example represents explanandum while (b)-example explanans. An explanandum refers to a sentence describing a phenomenon that is to be explained, and the explanans are the sentences adduced as explanations of that phenomenon.

- (52) a. Angela explained [_{DP} the fact that Boris resigned]. explanandum
 b. Angela explained [_{CP} that Boris resigned]. explanans (Elliot 2020: 58)

5. Conclusion

Based on the discussion so far, we make some generalizations: [1] 'So' -- regardless of whether it is an argument or predicate -- is not allowed in the NP-internal structure with a non-argument-taking head noun. [2] The thesis that the predicative function of 'that'-clause in NP internal structure carries over to that of 'that'-clause in VP internal structure does not seem to be justified. The latter is not a predicate but an argument.

One remaining issue is concerned with the distribution of 'so' with respect to 'that' clauses: 'so' occurs in place

²⁰ Anaphor *so* contributes to better understanding of the same valid inferences.

²¹ One of the reviewers asked how our proposal accounts for the following empirical facts presented in Moulton (2015):

- (i) a. The destruction *(of) the city. [N *(P) DP]
 b. The idea *(of) that Fred would leave. [N CP]

As for the syntax of the superficial form [D N CP], we postulate the following structure:

- (ii) [_{DP} D [_{NP} [_{NP} N DP_{it}] CP_{that-clause}]]

To be specific, as schematically illustrated above, we assume that the head 'N' takes a null DP 'it' as its complement, which has an associate 'that'-clause' adjoined to the NP. Given our proposed analysis, the unacceptability of (ib) is accounted for by the assumption that the null DP cannot be assigned Case by a preposition.

Interestingly, the CP in (ii) is generated to play a dual role, i.e., it semantically serves as a complement while syntactically behaving as an adjunct. These binary characteristics further account for the fact that CP 'complements' of nouns, like adjuncts, obviate Condition C violations as argued in Moulton (2015):

- (iii) a. *Which depiction [of John's₁ face] does he₁ hate most? Argument
 b. Which book [from John's₁ library] did he₁ read? Modifier
 c. Which book [that John₁ hated most] did he₁ read? Modifier
- (iv) a. The fact that [John₁ has been arrested] he₁ generally fails to mention.
 b. Whose allegation [that Lee₁ was less than truthful] did he₁ refute vehemently? (Kuno 2004: 335 (72))

In our proposed analysis, CP is adjoined to the host NP, which naturally accounts for the fact that *that*-clause in (iv) behaves like a modifier in (iii), precluding Condition C violations.

of non-nominal 'that'-clauses, but not of nominal 'that' clauses. Example (53) shows that verbs such as *hope*, *feel*, *insist* and *reason* etc. take *that*-clauses, but they are not compatible with a nominal 'that' complement. We take this to suggest that *that*-clauses in (53a) do not have [+N] feature, which is confirmed by the ungrammaticality of the passivized forms in (54).²²

- (53) a. Most baseball fans {hoped/felt/wished/insisted/reasoned} that the Giants would win the World Series.
 b. *Most baseball fans {hoped/felt/wished/insisted/reasoned} that. (Alrenga 2005: 183)

- (54) *That the Giants would win the World Series was {hoped/felt/wished/insisted/reasoned} (by most baseball fans). (Alrenga 2005: 183)

- (55) It was {hoped/felt/wished/insisted/reasoned} (by most baseball fans) that the Giants would win the World Series. (Alrenga 2005: 183)

The fact that verbs listed in (55) are compatible with 'so', but not with a nominal 'that' suggests that 'so' is a substitute for a predicative 'that'.²³ This is further in support of our claim that there are two usages of 'that'-clauses cross-linguistically.

Note that verbs such as *express*, *capture*, *reflect* etc. select [+N] complements only, which is verified by the ungrammaticality of the omission of the parenthesized parts in (56). This corroborates our claim that the NP-internal *that*-clauses are predicates with [-N] features.

- (56) a. This formulation of the rule {expresses/captures/reflects/brings out} *(the fact) that these nouns behave differently.
 b. Even Aristotle contemplated *(the possibility) that the moon is made of cheese.
 c. We can attribute {the observed behavior of these consonants/*that these consonants behave exceptionally} to the fact that they are coronals.
 d. We have given *(the possibility) that Jack is a double agent serious consideration. (Alrenga 2005: 184)

Interestingly, *that*-clauses that are unacceptable right after a set of verbs in (56) can stand alone in the Subject position in relevant passive constructions as demonstrated in (57).

- (57) a. That these nouns behave differently is {expressed/captured/reflected/brought out} by this formulation of the rule.
 b. That the moon is made of cheese was even contemplated by Aristotle.
 c. That these consonants behave exceptionally can be attributed to the fact that they are coronals.
 d. That Jack might be a double agent has been given serious consideration. (Alrenga 2005: 184-185)

This is in line with Takahashi (2010), which proposes that the clausal complement that predicators in (53) take involves a run-of-the-mill CP (CP-Type I), while the one that passivized verbs in (57) select involve a DP structure

²² This argument is based on the constraint that movement in passivization is Case-driven and that only NPs/DPs need Case.

²³ Other verbs that behave the same are listed below (Huddleston and Pullum, 2002: 1536):
 appear, assume, believe, fear, gather, guess, hope, imagine, presume, reckon, regret, say,
 seem, suppose, suspect, tell, think, trust

headed by a covert determiner right above a CP (CP-Type II).

In relation to his proposal, we take it that there seems to be a correlation between a CP without a covert determiner (CP-Type I) and a TP-substituting propositional anaphor 'so'. For CP-Type II, a plausible line of analysis to pursue is to postulate a DP shell on top of a CP, which, as a weak island, ultimately prohibits a null C from escaping a CP to a matrix V for cliticization, hence unavailability of 'so'.²⁴

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²⁴ Readers are referred to Han (2005) for cross-linguistic evidence in support of positing DP shells for Subject CPs. She argued that postulation of DP shells above Subject CPs in English could fundamentally offer a unified analysis for the syntax of clausal Subjects in English, Korean and Modern Greek. She further implied that the DP shell analysis could be extended to some non-Subject CPs.

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Examples in: English
 Applicable Languages: English
 Applicable Level: All