North East Linguistics Society

Volume 31
Issue 2 *NELS 31: Volume 2*

Article 9

2001

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1. Introduction[1]

English, like many languages, possesses propositional attitude verbs such as *know* that take factive complements (1a) and other attitude verbs such as *think* that take non-factive complements, (1b).

(1) a. Jane knows that Bill won the lottery.
b. John thinks that Mary stole the money.

Interestingly, this does not turn out to be a universal state of affairs. Certain languages lack the ability to form both of the types of sentential complements illustrated in (1) and are only able to form factive sentential complements, i.e., the equivalent of (1a). Zuni (New Mexico) is such a language, and in example (2a,b) are given the Zuni equivalents of (1a) and (1b). Factive complements in Zuni may take the form of nominalized clauses, (2a), but it is not possible to form non-factive complements in similar fashion. Instead a number of non-complementation strategies are used to convey non-factivity; (2b) illustrates one of these, the use of a sentence-initial adverbial particle.

(2) a. ko'le - holh Mary he-we' hanlhi - kowa' John 'ayyu'ya:na
how - indef. M. money-pl. steal - pst.noml. J. know
'John knows that Mary stole the money'

b. (John tappa) 'imat Mary he-we' hanlhi - kya
J. and seems M. money-pl. steal - past
'(As far as John is concerned,) it seems that Mary stole the money.'

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[1]I am grateful to the audience at NELS 31, as well as to Mark Baker, Richard Kayne, Ken Safir and Roger Schwarzschild for discussion of these ideas. I am especially grateful to Mark Baker for discussions on the categorial properties of sentential constituents, which came at a crucial time in the development of these ideas. All errors remain my own. Excluding examples (2a,b), the Zuni data comes from Bunzel (1933). Excluding glottal stop ' , Zuni examples are transcribed using Newman's practical orthography; see Newman (1958).

On the basis of examples such as (2a) vs. (2b), one might simply conclude that the inability to form non-factive CP complements is due to an accidental lexical gap among Zuni verbs: non-factive propositional attitude verbs like 'think' are simply missing. In this study I suggest that we might be able to address the problem in a more principled way.

When factive and non-factive subordination in English are looked at more closely, it can be seen that they have different syntactic properties. For example, it has long been known that factive and non-factive complements differ in the extent to which they permit extraction, as in (3b-c), or even better, as in the minimal pair in (4c-d).

(3) a. Bill won the lottery by buying 100 tickets a day.
b. ???How does John know that Bill won the lottery? *(factive)*
c. How does Mary think that Bill won the lottery? *(non-factive)*

(4) a. John remembered that Bill won the lottery by buying 100 tickets a day.
b. Mary (mistakenly) remembered that Bill won the lottery by running a scam.
c. ???How did John remember that Bill won the lottery? *(factive)*
d. How did Mary remember that Bill won the lottery? *(non-factive)*

The pair in (4c,d) is particularly interesting; it appears that most attitude verbs (except perhaps *think*) have a factive as well as a non-factive usage, an important point that will be returned to later on.[2]

While the standard conclusion is that factive complements are (weak) islands for extraction (e.g. Cinque 1990), this is not particularly explanatory about the syntactic nature of factivity vs. non-factivity, nor is it informative about the gap in Zuni in (2b) for non-factive sentential complements. In this paper, I suggest that an explanation for the weak islandhood of factive complements (and non-islandhood of non-factives) might be found by combining the observations from examples (2) and (3)-(4), i.e., pursuing the idea that there is some syntactic property of complements such that extraction out of factive complements is blocked in English and non-factive complements are missing in other languages.

If non-factives are considered as part of a more general category of intensional predicates, there are at least two types of existing proposals for the treatment of intensionality in complements, a semantic view and a syntactic view (for discussion see Larson 1999). Neither of these turns out to shed much light on the question of the impossibility of non-factive complements. Originating with Montague is the idea that an intensional operator produces the effect of intensionality in NPs and clauses. It is not clear under this approach why non-factive/intensional complement clauses should be impossible in Zuni while on the other hand intensional NP complements are certainly possible, (5).

(5) hon shi-'le' 'anteshem-'a
1du.nom. *sg.-nom.* *want-pres.*
'We wanted a little piece of meat

Under the syntactic view, intensional complements are argued to be covert verb raising contexts (Baker 1988, Larson et al 1997, Larson 1999) as in (6), to capture restructuring effects such as the clitic raising (7) and passivization (8) that occur here.

(6) Mario lo_j-$vuole_i$-leggere $[_{CP}[_{vP}\, t_i\ \ t_j]_k\ [PRO\ t_k]\ ]$ (Larson 1999)

[2]Attitude verbs that permit either factive or non-factive interpretation usually have one of these senses as their default, the other is attainable in certain contexts. I am assuming a definition of factivity in which the truth of a complement is presupposed by the speaker; in cases of non-factivity, the truth of the complement is not presupposed by the speaker (i.e.., rather than expressing a false proposition, a non-factive complement does not commit the speaker to the truth or falsity of the proposition).

(7) a. Mario lo_i vuole [PRO leggere t_i]
Mario it wants to read

b. * Mario lo_i odia [PRO leggere t_i]
Mario it hates to read (Larson 1999, citing Burzio 1986)

(8) a. Questi $libri_i$ si volevano proprio [PRO leggere t_i]
these books SI wanted really to read

b. * Questi $libri_i$ si odiavano proprio [PRO leggere t_i]
these books SI hated really to read
(Larson 1999, citing Burzio 1986)

The implication is that such an account can be extended to all intensional complements, including those of propositional attitude verbs. But this analysis is ultimately observational rather than explanatory since it is unclear how to constrain this covert verb raising to just these cases rather than all verbs. And returning to the immediate concern here, the verb raising view does not shed light on the impossibility of intensional complements in certain languages, particularly in a language where there is overt evidence for verb incorporation as in Zuni.

I will argue here that the absence of non-factive complements of attitude verbs in Zuni is ultimately a principled morphosyntactic issue. I hypothesize that there is a dependency between non-factive attitude complements and their selecting predicates that is similar to that between an irrealis complement + selecting predicate and a subjunctive complement + selecting predicate. This relationship between predicate and complement is mediated by means of variable binding: the selecting predicate in each of these cases is an operator that binds the event variable of the subordinate predicate.[3] Pursing the idea that there are two kinds of sentential categories (or perhaps two ends of a continuum), nominal and verbal, variable-binding into the non-factive complement requires the sentential complement to be verbal, or more specifically, requires the Comp (if present) to be a verbal $Comp_V$. The absence of non-factive complementation in Zuni and certain other languages (e.g. Dyirbal, cf. Dixon 1972, 1995) is ultimately due to the inability to form verbal sentential constituents in these languages.

In section 2 I will discuss in detail the Zuni data; sections 3 and 4 will flesh out the proposals regarding the syntax of the event argument.

2. The Zuni Data

In this section I describe the syntax of Zuni factivity and non-factivity, as well as discuss some morphosyntactic properties of factive complements.

2.1 Part I: Factive Complements and Strategies for Non-Factivity

Factive sentential complements are possible in Zuni and are of two sorts. First, a factive finite clause may be coindexed with an object expletive in the main clause, as in (9).[4]

(9) ho' [te(l)] $_i$ - ank'ohak'e - kkya [hom 'an hewe' hanlhi - na - 'kya]$_i$
1sg.Nom. Expl. - discover - past 1sg.Acc. P money steal - stat. - past
'I discovered that someone had stolen my money.'

[3]Specifically, I assume that the event variable is a complex of several variables and that the selecting predicate anchors the world variable.

[4]It is unclear whether the prefix *te-* associated with object expletives, is agreement or an incorporated noun.

In addition, factive complements are possible as nominalized sentential complements, as in (10a-d). One indication of the nominal character of these complements is the use of relative clause morphology *-kowa'* suffixed to the verb for past relative clauses. Another is the use of the subject-oriented possessive pronoun *yam* in (10b) for the subject of the lower clause, compare (11).

(10)a. kya:k - holhi hom nana hom 'atine - **kkowa'** ho' 'ayyu'ya: - **na**
sometime - indef. my grandf. me tell - pst.nml. I know - stat.
'I still remember what my grandfather told me long ago'

b. 'akkya **yam** ko'le - holh 'a:chi teya - **'kowa'** chim hom **'atine - kkya**
so poss how - indef. Dual be - past.noml now me tell - past
'So then they two told me just what had happened' [lit: how they were (then)]'

c. ko'le - holh 'a: - shiwi 'a: - cawak'i 'ayna - nap - **kowa'** **pe - ye - kkya**
how - indef. pl. - Zuni pl. - youth strike-pl.subj.-pst.noml say-cont.-past
'He told them how the Zuni young men had beaten him'

d. 'a:w-a nana ko'le - holh - i 'a:w - am - peye - **kkowa'** ho' **'ilhtem - 'a**
pl-P grandf. how - indef. - emph. pl. -P - say - past.noml I believe-pres.
'(Now) I believe everything that Grandfather told us [lit: how he told us].'

(11) ho' **yam** chawe' 'anape-kkya
I poss children scold-past
'I scolded my children'

It is a revealing fact about the grammatical expression of non-factivity in Zuni that nominalized structures for non-factives using relative clause morphology, on the analogy of the factive complements in (10), are not possible. As (12) indicates, a non-factive complement cannot be formed by means of the nominalized non-past relative clause suffix ***-'ona'*** .

(12) * Nemme' k^{w}a' y-ayyu'ya:-n-'amme - **'ona'** nana **'ilhtem** - 'a
N. neg. reflx.-know-stat.-neg. - nml. grandf. believe - pres.
'Grandfather believes that Nemme is foolish.'

Instead of nominalized non-factive complements, a variety of strategies are used to express non-factivity in Zuni, none of which involve subordination. First, non-factivity may be conveyed in Zuni by a root clause plus some sentence-initial particle, illustrated in (13).[5] (13a) is a partial list of the more commonly used of such particles. Two examples of their usage are given in (13b,c).

(13)a. **Zuni Sentential Modifiers**

tis	'It would be nice to...'
tachimante	'Just as I thought'
'epash	'truly'
honk'wat	'maybe'
hinik(chi)	'I think that ...'
hinikyati	'It's no wonder that...'
'imat	'It seems that ...'
(l)ek'o	'I think I shall ...'
k'oshi	'of course'

[5]The lexical items in (12a) are clearly adverbial particles and not raising verbs, since they occur clause initially (Zuni is verb-final) and bear no inflection other than an emphatic suffix *-i*.

hapish	'Or maybe...?'
'atish	'It's a shame that...'
holon	'Perhaps not .... ; It is better that not....'
k'oshik'ati	'If only ....

b. hinik 'ele - k'yanna
I.think be.well - irreal.
'I think it will be all right'

c. 'imat to' halhik^{w}i
it.seems you witch
'It seems you are a witch'

An alternative strategy links an independent non-factive/irrealis clause to a predicate in another clause with a demonstrative object, as in (14a-c).

(14)a. k^{w}a' holh temlha 'uwa''ana 'a:-lha-'anna lhito-k'yappa **'uhs-ona'**
neg. indef. all grow-stat. pl.-large-irreal. Rain-irreal.DS that-topic

ho' **'anteshem - 'a**
I wish.for - pres.
'All our growing things will get large if it rains, that is what I wish for'

b. honk'^{w}ati 'el-holh te'chi-na-k'yanna. **'uhs-ona'** hon **'anc'ummeh** -na-'
maybe well-indef. arrive-stat.-irreal. that-topic we desire-stat.-adv.

hon 'a:-teya-ye
we pl.-be-pres.
'Perhaps we shall get there all right. Desiring that, we live'

c. le: ho'na:wan chawe' 'a:wan wowe' 'a: -tehya-'tu-n'ona'
all our children their animals pl.-valuable-opt.-noml.

'uhsi te'chi hon 'a:- **peye** -:-'a
that only we pl.- say -cont.-pres.
'That our children's flocks may be preserved, of that only we speak'

Note for example the factive/non-factive minimal pair in (15) with *pe-* 'speak'. (15a) contains a nominalized factive complement, while in the similar but non-factive context in (15b) we find instead an independent clauses linked via a demonstrative.

(15)a. yam ko'le - holh - i 'ayyuchi'anna to' peye - **kkowa'**
poss how - indef. - emph. power you speak - past.noml.

to' **pe -** ye - nna
you speak - cont.- irreal.
'Now whatever you told them about your power [lit.: how you told them] you will tell.'

b. tupni - : k'yacco'wa 'ik'e:na - ye **'uhs-ona'** **pe -** ye - n 'iha
toe - pl. top heart - pres. that-topic speak - cont. - subord. desid.
'His heart is in his toenails. That is what he is going to tell'

A third strategy for expressing non-factivity consists of the absence of any linking device at all; two independent sentences are simply juxtaposed as in (16).

(16) pachu yu'he:tu - : hatiya:w - a haliso - nan k^{w}ayi - n 'iha
Navaho understand - adv. hear - pres. sell - subord. exit - subord. desid.
'The Navaho$_i$ heard plainly; he$_j$ was going out to sell him$_i$'

Interestingly, when a speaker is forced to construct a sentence with a non-factive subordinate clause, they do not turn to a nominalizing suffix but instead produce something like (17), where the two clauses are linked by Switch-Reference marking. An interesting property of this example is that "Different Subject" marking is required and at the same time subject coreference is obligatory.

(17) ?? ho' hatiya:wa - p ho' /*to' 'ok'e - kkya
*I hear - DS I /*you win - past*
'I heard that I/*you won [the race] => *usually only* 'hear' + NP

The data presented so far is summarized in the box below.

Summary of Zuni Data, Part I:

Embedded Factivity

(a) Finite CP coindexed with object expletive
(b) Nominalized complement

Embedded Non-factivity: None; At least 3 alternative strategies

(a) Sentence-initial adverbial
(b) Demonstrative object linked to root clause non-factive
(c) Simple juxtaposition.

And one non-strategy:
(d) Despite the analogy of factive clauses, the non-past RC nominalizing suffix **NOT** used.

2.2 Part II: Properties of Zuni Attitude Verbs

While non-factive sentential complements are absent from Zuni, the lexical items that would presumably select them are not. An examination of the examples presented in the previous section indicates that attitude verbs, including those that canonically take non-factive complements like 'believe', 'tell', 'say', 'hear', 'want', 'think' etc., do in fact exist in Zuni. Therefore the absence of non-factive complementation is not due to the absence of non-factive attitude verbs as a lexical class. These attitude verbs in Zuni only occur, however, with sentential complements that have factive senses (including direct quotation) and/or NPs. Examples (18)-(20) provide illustrations.

(18) 'ilhtema 'believe'

a. 'a:w - a nana ko'le - holhi 'a:w - am - peye - **kkǫwa'** ho' **'ilhtem** - 'a
pl - P grandf. how - indef. pl. - P - say - past.noml. I believe - pres.
'(Now) I believe everything that Grandfather told us [lit: how he told us].'

b. to' k^{w}a' **'ilhtema** - nam - kya
you neg. believe - neg. - past
'You didn't believe him!'

Similarly: ***pe*** 'speak', ***'ayyu'ya:na*** 'know, remember', ***'atine*** 'tell',

(19) hati 'think'

c'ana-nt-holh tewusu ce'ma **le' hati -** nan ho' k'o - ye - kkya
young-even.though-indef. prayer think ***thus think*** *- SS I cry - cont. - past*
'Even though he is young, he is always thinking of prayers. So I thought, and I cried.'

(20) 'anteshema 'want'

hom chawe' **lhito:we 'anteshem** - 'a
1sg.poss children ***rain want*** *- pres.*
'My children want/wish for rain'

Similarly: ***hatiya:w*** 'hear', ***'ik ʷa*** 'say'

I pointed out earlier with respect to English that many if not most factive verbs appear to have non-factive uses as well. If this observation holds more generally crosslinguistically, we might also argue from this perspective that the lexical items that would ordinarily select non-factive complements occur in Zuni.

Since the relevant lexical items themselves exist, we might look at the morphosyntax of subordination in Zuni for clues to the absence of non-factive complements.

2.3 Part III: The Nominal Character of Complementation

It is interesting that the best candidates for complementizers in Zuni have a decidedly nominal (or at least, non-verbal) character. Switch-reference markers are often reported to have the distribution of complementizers (cf. Finer 1984 for some examples). Zuni switch-reference markers, illustrated in (21), are either derived from the category-neutral conjunction *tap*[6] or attach only to nominal or nominalized stems.[7]

(21) a. 'an she - 'an ha - ya - **p** lhalla - k'yanna
P corn - P weed - be.collected - DS hoe - irreal.
'Where there are weeds in his young corn, he will hoe'

b. yam teyacchina - kʷin te'chi - **nan** s to - ye: - 'a
poss field - to arrive - SS then plant - cont. - pres.
'When he arrives at his field, he plants.'

As for the other potential candidate, namely relative clause morphology, Zuni relative clauses are formed via nominalization with suffixes that also occur as NP suffixes. On the one hand, factive complements do use the same morphology as past relative clauses, compare (22a) and (10a-d). The past nominalizing suffix *-kowa'* is also found as locative suffix with noun phrases, (22b).

(22) a. 'ayna - na - **'kowa'** 'uppo - ky - 'anna
strike - stative - past.noml. be.inside - eventive - irreal.
'The ones who beat him will be put in jail.'

[6]The full form *tap* surfaces as SR marking in counterfactuals.

[7]The allomorphy of "Same Subject" *-(na)n* marking is sensitive to nominal properties of the stem: *-n* with stative stems, *-na* (stative marker) + *-n* for non-stative stems.

b. 'isk'on k'ya - na - **'kowa'** sonta:lu - :k^{w}e yam mu:la
*there water - stat. - **loc.** soldier - pl. poss mule*

'a:-tutu-k'ya-nap-kya
pl.obj.-drink-caus.-pl.subj.past
'The soldiers watered their mules at the springs.'

Non-past relative clauses (present, future, irrealis) also make use of a nominalizing suffix -*'ona'*, (23a), which in addition suffixes to NPs and marks a continued topic, (23b).

(23) a. ten - a: 'a:w - anik - ona' 'a:w - iy - anna
song - pl. pl. - know - noml. pl. - come - irreal.
'Those who know the songs will come'

b. hom kuway - **'ona'** to' 'atine - nna
*my friend - **topic** . you tell - irreal.*
'You will tell my friend'

It is striking that despite the availability in Zuni of a nominalizing suffix compatible with irrealis relative clauses, the nominalizing strategy is not used to form irrealis or any other non-factive subordinate complement clause. I believe that this fact is significant and is an indication of the morphosyntactic requirements posed by non-factivity. I will return to this point again in section 4./

The box below summarizes all of the conclusions from the Zuni data in the preceding three sections.

SUMMARY OF ZUNI DATA :

(a) Complementation is possible in Zuni only in the case of factives.

(b) Dependent non-factives senses are conveyed by various other strategies

(c) The absence of non-factive complementation is not due to a lexical gap per se. Propositional attitude verbs that might be expected to take non-factive complements in Zuni do exist but take only NPs and factive complements.

(d) Complementation and complementizers in Zuni have a distinct nominal (or non-verbal) flavor

(e) A morphosyntactic strategy available to factives - use of a RC nominalizer - is not used in non-factives.

In the remainder of this paper I want to suggest that there is a principled correlation between the nominal character of complementation in Zuni and the absence of non-factive complements. In particular, I argue that non-factive complements must be verbal categories, or (assuming a verbal-nominal continuum for sentential constituents) at least must not be nominal to the degree that nominalized clauses are in Zuni.

3. The Event Argument in Irrealis and Subjunctive Complements

To understand the connection between non-factivity and verbal complementation, it is useful to take a look at irrealis and subjunctive complements, which I would ultimately argue form a class with non-factive complements of attitude predicates.

3.1 The syntactic representation of the event argument:

There is reason to believe that there is a semantic dependency between the main clause and a subordinate irrealis or subjunctive clause that involves the event argument of the lower clause and its interpretation. One result of this semantic dependency is what I will refer to as the *anchoring* of the event variable to the higher clause. In section 4 I will discuss some morphosyntactic consequences of this anchoring, but first I give some background for this idea.

The event argument (cf. Davidson 1967, Parsons 1990) is generally assumed to be an implicit argument, but there does seem to be certain evidence for syntactic sensitivity to the presence of the event argument.[8] Two such arguments come from Kratzer (1989) and Baker & Travis (1998). First, Kratzer argues that if a predicate has an event argument, it will be the highest thematic argument, i.e. the external argument. If stage level-predicates have an event argument but individual-level predicates do not, then the presence of the event argument accounts for why extraction from the subject of stage-level predicates is possible - because they are internal arguments, and why extraction may or may not be possible from the subject of individual-level predicates, depending on whether the subject of the individual-level predicate is external or not. A second type of evidence comes from Baker & Travis (1998), who argue that Mohawk possessor raising accompanying Noun Incorporation is sensitive to the presence of the event argument. Possessor raising is not possible with predicates containing an event argument (event predicates) but is possible with predicates containing no event argument (statives).

There are various proposals for the representation of the event argument. I will not decide here between proposals that the event argument is associated with T (e.g. Lemmon 1967, Kratzer 1989) vs. with V (Harley 1995, Avrutin & Babyonyshev (1997), though in previous work I have argued that it is associated with Tense.

More will need to be said about the semantic properties of the event argument, which is perhaps more precisely an event variable. We might conjecture, for example, that in order for the event variable to be licensed, it must be specified how the event is linked to the context of utterance, for example to reference time t, perhaps location among worlds. Section 4 will attempt to make this point more precise. But we may nonetheless assume that whatever the semantic value(s) of the event argument, these values must be specified or *anchored* , borrowing a term from Enç (1987) but using it in a different sense. And if the event variable is syntactically represented, this anchoring must be mediated by the syntax. (24) gives an informal proposal for the nature of this anchoring.

(24) **Anchoring the event variable (informally):**

(a) The event variable of main clauses and factive subordinate clauses is always anchored locally in its own clause (perhaps through existential closure + binding by local complementizer to anchor to utterance context.)

(b) The event variable of irrealis and subjunctive subordinate clauses are anchored to the main clause

3.2 Binding the Event Variable

A view of how the subordinate event variable is anchored rests on observations such as the following. Irrealis seems to be in essence a dependent interpretation, its occurrence depending in part on the meaning of the matrix clause verb. For example, Stowell (1982) points out that *wonder* and *know* take irrealis complements, while *hate* and *cause* both take realis complements.

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[8] In contrast to the implicit argument of passives which Jaeggli (1986) argues to be semantically licensed only.

(25)	a.	John wondered how to solve the problem.	(irrealis)
	b.	Jane knows how to fly a plane.	(irrealis)
	c.	I hated to tell you the truth about your boss.	(realis)
	d.	Bill caused Mary to fall overboard.	(realis)

(Stowell 1982)

Similarly, the different ECM verbs in (26) contribute the realis or irrealis meaning to the complement.

(26)	a.	I expected John to win the race	(irrealis)	
	b.	I remember John to be the smartest	(realis)	(Stowell 1982)

Another grammatical context with a similar relationship between main verb and subordinate clause may be subjunctive complements. Iatridou (2000) argues that subjunctive meaning is not contained in subjunctive morphology, rather subjunctive meaning is contributed by the verb in the main clause (the presence of the special subjunctive morphology simply fulfills some sort of PF wellformedness condition).

If we add to these observations the fact that the event argument appears to behave like a bound variable in certain contexts - for example, Baker & Travis (1997) argue that certain Mohawk Mood morphology can act as operators binding the event argument, it becomes plausible to propose the relationship between selecting predicate and subordinate event argument described in (27).

(27) Certain verbs (predicates) V_x are operators that bind the event variable *e* of the subordinate clause they select.
(Subordinate *e* is thus anchored to the higher clause containing V_x.)

In other words, the semantic dependency between subordinate and main clause can be characterized by an operator-binding relationship between main clause predicate and the event variable of the subordinate clause.

Now, it is extremely interesting that several arguments have been made (Stowell 1982, Pesetsky & Torrego 1999) that irrealis interpretation in infinitives is correlated with covert movement of Tense to Comp in these infinitive clauses. For example, Pesetsky & Torrego (1999) argue that Tense-to-Comp movement is correlated with object wh-movement to the specifier of CP for reasons related to Case and is reflected in the movement of the auxiliary in (28a). Subject wh-elements do not move to CP, hence there should be no accompanying Tense movement for Case reasons, (28b).

(28) a. What did Bill fix?
b. Who fixed the car?

They point out that in an infinitive clause with a(n in situ) null subject wh-operator such as (29), there will be no T to C movement. Since Tense-to-Comp in infinitives is correlated with irrealis interpretation, as a consequence clauses such as (29) can have only realis interpretation.

(29) Jane$_i$ was the only one [Ø$_i$ to actually climb to the summit]

The semantic motivation behind this correlation between covert Tense-movement in subordinate clauses and irrealis interpretation has not been pursued, but the proposals made here linking the event argument to the interpretation of irrealis subordinate clauses make it possible to consider a reason for this correlation, expressed in (30).

(30) Subordinate Tense moves to Comp in irrealis/subjunctives so that the main predicate may bind subordinate event variable *e*.

Some interesting evidence in support of this hypothesis comes from European Portuguese. It is reported (Ambar 1998) that where there is overt verb movement (of an inflected infinitive) to Comp in the (non-factive) complement of attitude verbs like 'think' 'say' 'believe', the result is generic interpretation. The operator-bound interpretation in Portuguese examples (31a-b) is the kind of evidence that the statement in (30) predicts should occur.

(31) a. Penso **comerem** as crianças demasiados chocolates
*think-1sg. **eat-3pl** . the children too many chocolates*
'I think some children eat too many chocolates'

b. Eles disseram **virem** essas aves do Norte da Europa.
*they said **come-3pl.** these birds from-the north of Europe*
'They said these birds come from the north of Europe'

c. * Penso **comerem** as crianças a sopa
*think-1sg. **eat-3pl.** the children the soup*

d. * Penso a Joana **comer** a sopa
*think-1sg. Joana **eat-inf(3sg.)** the soup* (Ambar 1998)

The box below gives a summary of the ideas in this section.

SUMMARY:

(a) Event variables are anchored, either within own clause or to a higher clause.

(b) Dependent event variable anchoring involves operator-binding by the higher clause verb and Tense-to-Comp movement (if Comp is present, cf. (26)).

(c) There may be a necessary correlation between the type of binding and type of movement in **(b)** .

In the next section, I will argue that this operator-binding relationship between main predicate and subordinate event argument imposes a requirement that the subordinate clause be verbal in category. Tense-to-Comp movement turns out to be one of the syntactic methods by which a complement is rendered verbal in category.

3.3 Appendix: Syntactic Consequences of Event Variable Anchoring

One final comment on the ideas in section 3 is in order. I assume that we ought to pursue a syntactic explanation of event variable anchoring because there are syntactic consequences to this anchoring in irrealis and subjunctive subordinate contexts, and, as will be discussed in section 4, in non-factive attitude complements as well. This appendix briefly illustrates some of these syntactic consequences.

Examples (32)-(34) illustrate that long extraction of wh-words and null operators is possible in irrealis contexts in English, and long extraction of null operators is possible in subjunctive contexts in Rumanian, (35).

(32) a. * What$_i$ did you know how they fixed t_i ?

b. * Which$_i$ problem did John wonder how they solved t_i ?

c. * What picture did you show Jane how she can paint?

(33) a. What$_i$ did you know how to fix t_i ?

b. Which$_i$ problem did John wonder how to solve t_i ?

c. What picture did you show Jane how to paint?

(Cf. Ross 1967, Chomsky 1986 among many others)

(34) a. * This problem is impossible [Op$_i$ [to show to John how he can solve t_i]]]

b. This problem is impossible [Op$_i$ [to show John [how to solve t_i]]]

(Stowell 1986)

(35) **Rumanian**

Problema $Ø_i$ ce încercaseşi [să termini [să rezolvi t_i]]
the.problem that had.tried.2.sg subj.prt finish.2sg. subj.prt solve.2sg.

la timp nu avea soluţie.
at time not had solution (Grosu and Horvath 1987)

'The problem that you had tried to finish solving on time had no solution'

Various explanations for this phenomena exist, all essentially similar sorts of stipulations about the barrierhood of tensed clauses: Chomsky 1986, Manzini 1992, Cinque 1990. An alternative explanation of these long extraction possibilities may be possible based on how the event variable is anchored.

Nichols (1999, 2000) argued that the size of a syntactic domain (or derivational phase) is determined not by the presence of tense and force as (Chomsky 1998, 1999) would have it but by where the event argument is anchored. If a subordinate event argument is anchored to a higher event argument, the two clauses form a single syntactic domain, not two, for the purposes of extraction, hence long extraction is possible in the cases in (33), (34b) & (35) above, in other words in exactly those contexts where there is a semantic dependency. Long extraction is excluded out of tensed clauses is simply a canonical subjacency effect.

4. The Absence of Syntactic Non-Factivity as the absence of Verbal Sentential Complementation

Because propositional attitude verbs are usually conceived of as operators following Hintikka (1969), there is a natural extension of the proposed analysis to attitude complements that will have important consequences for their syntactic behaviors. Specifically, I suggest that a non-factive attitude verb is an operator that binds the event variable of the non-factive complement clause. This means that the event variable of a *non-factive complement* is dependent for its interpretation on the attitude verb of the main clause. On the other hand, *factive complements* are like main clauses: their event variables are anchored locally within the clause and are non-dependent.

4.1 Anchoring contexts

What this anchoring of the event variable means with regard to attitude contexts can be fleshed out with some insight from Schlenker (1999). He notes that under the standard approach to propositional attitudes, propositional attitude operators quantify over possible worlds (Hintikka 1969). An attitude verb like 'believe' therefore expresses a relation between an individual and a proposition, or, since a proposition is equivalent to a set of

possible worlds, a relation between an individual and a set of possible worlds. Schlenker argues , however, that the standard semantics of attitude operators is not quite rich enough. His observation is that in order for the embedded indexicals of the Amharic type in (36a), for the De Se readings of PRO(36b) (cf. Morgan 1970, Chierchia 1987, Higginbotham 1989), and for logophoric pronouns (36c) to be interpreted properly, there is some interpretive dependency that the complement of an attitude verb manifests that must be captured.

(36) **Amharic embedded indexicals** (Leslau 1995)

a. mən amTa ənd*ä*l*ä*NN als*ä*mmahumm
[[what bring-imp.2sg] that-he-said-to-me] I-didn't hear
'I didn't hear what he told me to bring.'

De Se reading of PRO

b. Smith hopes PRO to be elected

Ewe logophoric pronoun (Clements 1975)

c. kofi be yè - dzo
Kofi say LOG - leave
'Kofi$_i$ said that he$_{i/*j}$ left.'

[examples from Schlenker 1999]

Schlenker proposes that propositional attitude operators quantify over context of speech/thought rather than simply over possible worlds. Specifically, attitude operators, just as utterances, introduce a context variable into a logical form. He argues that the context variable is actually a complex of variables, since contexts are characterized by 3 or 4 coordinates, namely speaker, (hearer), time of utterance, world of utterance.

While this proposal may be enough to account for the cases in (36a-c), it is not clear that this treatment of attitude verbs is able to account for non-factivity and in addition the morphosyntactic properties that often accompany it crosslinguistically. Schlenker's proposal generalizes over all attitude operators and does not address the factivity distinction within the class of attitude verbs. But factive and non-factive attitude complements show syntactic and morphosyntactic differences such as those discussed in sections 1 and 2, and these differences require an explanation that a purely semantic account does not appear to be able to give.

On the other hand, the hypothesis that a non-factive attitude operator binds the event argument of the subordinate clause has both syntactic as well as morphosyntactic consequences (see below). Thus we must go further than introducing a context variable in attitude complements and specify how the event argument (perhaps equivalent to the context variable) is anchored in these dependent contexts in order to be successful in accounting for the syntactic properties of attitude complements.

Whether we should in fact identify the event variable with Schlenker's context variable I leave as an open question for now. Either the event argument *is* the syntactic correlate of Schlenker's context variable or some part of it (e.g. the world variable), i.e. more precisely it is the eventuality of the clause that needs to be anchored to context rather than simply the propositional content, or we need to assume Schlenker's context variable in addition to the event argument. I leave the choice open for now until we have reason to decide between them.

4.2 Non-factive Sentential Complements are Verbal Categories

I now return to a sharpened version of the question posed in the introduction: how does the proposal that an attitude verb is an operator that binds a subordinate event variable help us to understand why some languages lack the complement structures in (37), even though these languages contain propositional attitude verbs?

(37) [... Propositional Attitude Operator ... [$_{CP}$ Non-Factive Complement]]

Webelhuth (1992) suggested on the basis of evidence from a number of Germanic languages that sentential constituents divide into at least two classes categorially, nominal and verbal, though this may be better conceived as a continuum that as an absolute categorization. Observing that Zuni has only nominal complementation and allows factive sentential complements but lacks non-factive complements, I offer the hypothesis in (38):

(38) **Hypothesis:**

a. Factive complements are more nominal in syntactic character (and category)

b. Non-factive complements are more verbal in syntactic character (and category)[9]

Thus the reason that Zuni (or Dyirbal) does not allow non-factive sentential complementation must be that Zuni does not have/allow sentential constituents that are verbal in category. The question of course is, what is the necessary connection between verbal category and non-factivity.

More still needs to be known about verbal and nominal sentential constituents to address this question with any degree of completeness, but one answer is that the nominalness of a constituent may block the scope of the main predicate operator into the subordinate clause. Alternatively, the attitude operator may require a subordinate clause headed by a verbal complementizer so that it may first bind (the context variable associated with?) the complementizer and the complementizer then directly binds the event variable. The event variable may require a verbal operator, so that a nominal complementizer may not be able to act as the appropriate binder.

While some aspects of the proposal remain speculative pending further evidence, one point that we may be more precise about is the need for a complementizer that is verbal in category in non-factive contexts.

(39) Non-factive complements are headed by C_V.

There are various sorts of evidence that support hypotheses (38a-b) and (39): properties logophoric contexts, the behavior of extraction in factive contexts, and verbal properties of Tense-to-Comp movement in the subjunctive of some languages.

First, logophoric effects occur in Abe (West Africa) attitude contexts only where the complementizer has verbal properties. I assume along with Schlenker (1999) that in order for pronouns to receive a logophoric interpretation, the attitude operator must be associated with some context variable (or in present terms, bind some event variable) in the complement. It is therefore striking that logophoric effects occur in Abe attitude contexts only where the complementizer has verbal properties.

(40) yapi$_i$ hE kO O$_j$/n$_{i,(j)}$ ye sE
Yapi said *kO* he is handsome (Abe; Koopman & Sportiche 1989)

Specifically, logophoric interpretation of what Koopman & Sportiche (1989) refer to as the *n*-pronoun series in Abe does not occur in all propositional attitude contexts but rather is limited to the contexts in which the complementizer *kO* is selected. *kO* is etymologically related to the verb 'say' (similar facts apparently hold for other

[9]Another way to think of the difference in sentential complements is suggested by Baker (2000). Nouns are things that can bear a referential index; factive sentential complements are nominal arguments of the main predicate. Verbs are things that assign theta roles; the non-factive sentential constituent joins together with the main clause predicate as a sort of extended predicate assigning a theta role to the main clause subject.

logophoricity languages), so it is reasonable to suggest that this complementizer in (40) has verbal categorial properties.

It is interesting that a similar effect is also found in purpose clauses in Ewe and Gokana where the complementizer is verbal, (41) and (42a). The complementizer used here is in both languages derived from the verb 'say' and is different from the complementizer used in relative clauses. Essentially, the verbal complementizer induces 'go' in (41) and 'come' in (42a) to become an operator to bind the subordinate event variable. The hypothesis put forth here suggested that both irrealis and non-factive complements involve the binding of the event variable. This account predicts therefore that irrealis and non-factive attitude complements should sometimes behave as a natural class, thus the behavior of Ewe and Gokana purpose clauses need not be considered exceptional. Schlenker (1999: 33) on the other hand is forced to posit a covert attitude operator in these contexts.

(41) **Ewe** purpose clauses (Clements 1975)

e-yi be yè-a-va-kpɔ kɔku
pro-go so that LOG-T-P-see Koku
'He went to see Koku'

(42) **Gokana** purpose clauses (Hyman & Comrie 1981)

a. lébàrée dù kɔ baá mɔn-ɛɛ ɛ
Lebare came that they see-LOG him
'Lebare$_i$ came for them to see him$_i$'

b. * lébàrée dù vaá baá mɔn-ɛɛ ɛ
Lebare came and they see-LOG him

[Examples from Schlenker 1999]

On the other hand, there is suggestive evidence in support of (38) from the behavior of English factives. Extraction out of factive complements in English is blocked, (43a); in the context of the present study, this is due the nominal character of the complement constituent since extraction would violate subjacency.[10] Extraction out of non-factive complements is possible (43b) because these complements are verbal.

(43) a. ???How does John know that Bill won the lottery? *(factive)*
b. How does Mary think that Bill won the lottery? *(non-factive)*

In addition, it difficult to drop the complementizer of factive complements in English, (44a) but in the case of non-factive complements the complementizer may be dropped fairly freely, (44b).

(44) a. John remembered *(that) Mary had taken his passport.
b. John believed (that) Mary had taken his passport.

Now, Webelhuth (1992) has argued on the basis of independent evidence that the category of English sentential constituents may be linked to the type (or presence) of complementizer. Sentential complements with the 'that' are more nominal and the ones without 'that' are more verbal. If a factive complement must be nominal rather than verbal, the inability to drop the complementizer in (44a) supports Webelhuth's argument: dropping the complementizer would render the complement verbal.

[10]Kiparsky and Kiparsky (1971) propose a similar type of account (though they argue that factives are dominated by an NP node).

Note, however, that while the factive in (45a) is noticeably worse without the 'that', (45b) seems to improve[11] with a focused NP in the specifier of CP (cf. Rizzi 1997). This focused NP presumably renders the Comp position nominal once more via coindexation between the specifier of CP and the head of CP.

(45) a. *John remembered Mary had taken his laptop.
b. John remembered *Mary* had taken his laptop.

In sum, there is evidence that sentential constituents may differ in the nominalness or verbalness of their syntactic category, and the basis of this difference may lie in the character of the complementizer.[12] One aspect of the preceding discussion now becomes clearer, namely the role of Tense-to-Comp movement in contexts where a predicate operator binds into a subordinate clause. Two types of evidence indicate that the complementizer in at least one of these contexts, subjunctive complements, is verbal, and we suggest that it is Tense-to-Comp movement in the subjunctive clause that renders the complementizer verbal.

First, Koopman & Sportiche (1989) argue that the Abe *n*-pronoun series requires an operator in Comp (SpecCP) to bind it in its clause. But in Abe subjunctive complements the *n*-pronoun operator is blocked from SpecCP and instead of the its normal referential pattern in the indicative shown in (46a,b), the *n*-pronoun in the subjunctive must be coindexed with another *n*-pronoun in the higher clause, (47a,b).

(46) **Abe (Koopman & Sportiche 1989)**

a. $nku_i/Ø_i$ bO wu ye $n_{(i)j}$ mU api (indicative)
Nku/she(O) believed ye she(n) knew Api

b. n_i bO wu ye $n_{i(j)}$ mU api (indicative)
he(n) believed ye he(n) knew Api

(47) a. $yapi_i/Ø_i$ kolo ye $n_{j,*i}$ wu api (subjunctive)
Yapi/he(O) wants ye he(n) see Api

b. n_i kolo ye n_{i*j} wu api (subjunctive)
he(n) want Comp he(n) see Api
'He wants to see Api'

The conclusion is that the Comp operator required by the *n*-pronoun series is nominal and therefore is incompatible with the verbal Comp of subjunctives.

Similarly, Kempchinsky (1986) argued that the subjunctive Comp in certain Romance languages is not available for Wh-phrases. This again is an indication that subjunctive Comp is verbal, since it prohibits a nominal element in its specifier (that must presumably be coindexed with Comp).

The larger conclusion to draw from evidence such as these is that a verbal complementizer is required in contexts like subordinate subjunctive complements in order for the main clause predicate operator to bind the subordinate event argument.

[11]There is some disagreement among speakers as to the degree of acceptability of (45b).

[12]I am intentionally leaving aside a more detailed discussion of the category of sentential constituents, though one is clearly needed to address questions of the following sort: why are other constituents unambiguous in their categorization while sentential constituents allow variation, is the character of sentential constituents due to the number and/or type of functional projections included.

5. Summary & Further Issues

This paper has perhaps handed out more promissory notes than it has fulfilled. Many arguments require further substantiation and there are many new questions that have been asked. It is hoped, however, that the study has been successful in opening up new topics for discussion in the syntax and morphosyntax of propositional attitude verbs and their complements. To briefly summarize, this paper began by asking why certain languages like Zuni may be able to form factive complements but yet lack the ability to form non-factive complements. I suggested that non-factive attitude complements form a natural class with irrealis and subjective complements because the event variable in each of these complements is bound by a predicate operator in the main clause. The idea that sentential constituents may be either nominal or verbal was revisited, and it was argued that non-factive complements of propositional attitude verbs are verbal in category. Finally, it was hypothesized that Zuni cannot form non-factive sentential complements because it lacks the ability to form verbal sentential constituents. The absence of non-factive complements in Zuni is therefore not due to a lexical gap but is due to deeper syntactic principles.

The ideas discussed here bring up certain other issue that are worth at least touching on, if only briefly. A question arising from this investigation that begs to be addressed is, what about languages like Turkish and Mapuche where all clausal complements are nominalized, including both factive and non-factive complements?

(48) Mapuche (Chile; Smeets 1989))

a. wenu - mapu kütpa - lu troki - nge - y
above - land come - SVN opine - PASS - IND
'They thought that he came from heaven.'

SVN = subject verbal noun (i.e., argument of nominalized clause is a subject)

b. ka - ke - lu pi - la - y ta - ñi elu - a - fiel
other - DISTR - SVN want - NEG - IND the - poss3 give - NRLD - TVN
'They did not want to give to others'

TVN = transitive verbal noun NRLD = non-realized

This question can only be answered on an intuitive level at the moment. Languages seem to differ not only in how prevalent nominalization is, but also in 'how nominal' their nominalizations are. It may be that nominalization in Zuni has a higher degree of 'nominalness' and therefore excludes complements incompatible with this property, while nominalization in languages like Turkish and Mapuche is somewhat less nominal and so accommodates a larger range of clausal complement types. Whether the former vs. latter property of nominalization has to do with the number and type of functional projections included in the nominalized constituent I will leave this for future research.

Finally, I conclude with a note on languages that lack the ability to form indirection quotation structures.[13] Zuni is such a language; some examples of reported discourse are given in (49)-(51). Paralleling Zuni in yet another respect, Dyirbal is reported by Dixon (1995) to be another instance of such a language.

(49) K^{w}akina-k^{w}in 'iya. "Si' chuwa-p to:'o ho'na:wan cha'le?" k^{w}a' pe-ye:-na'm-a
K^{w}akina-to come now who-Q you our child neg. say-cont.-neg.-pres.
'They were coming toward K^{w}akina. "Now who are you, my child?" He did not speak'

[13] For discussion of this phenomenon, see Palmer (1986) and Dixon (1995).

(50) hom kyakya 'a:chi yam hota to' s 'ampachunna le' hom 'a:ch 'anik^{w}akya
my uncle dual poss grandm. you then follow-irreal. thus me dual P-say-past
'My two uncles said, "You will succeed your grandmother." So they said to me.

(51) c'ana-nt-holh tewusu ce'ma le'-hati-nan ho' k'oy-e-kkya
young-even.though-indef. prayer think thus-think-SS I cry-cont.-past
'Even though he is young, he is always thinking of prayers. So I thought, and I cried'

Note that the verb 'say' is non-factive, i.e., the truth of its complement is not presupposed by the speaker, and, like 'think', it appears difficult to form a corresponding factive construction based on 'say'.[14] The hypotheses put forward in the present study suggest the intriguing speculation that the inability to form indirect quotation in Zuni and other languages is related to the inability to form non-factive complements and categorially verbal sentential complements in general.

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[14] Though this may be possible in very special contexts, e.g. echo question contexts.

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