

Reconciling Semantic Integration and the Complement Deranking Hierarchy

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Abstract

The Semantic Integration Hierarchy is a conceptual hierarchy assigning semantic integration to classes of complement taking predicates (CTPs). The Complement Deranking Hierarchy is an empirical hierarchy which has been observed for deranking within the complements of CTPs cross-linguistically. The similarity of the two promotes the cross-linguistic universal that deranking within complement clauses is employed on the most semantically integrated constructions first. However, in the Complement Deranking Hierarchy, manipulatives like 'order' and desideratives outrank perception, while in the Semantic Integration Hierarchy, the three are equally integrated. From a cause-and-effect standpoint, I argue that perception CTPs are actually less semantically integrated than manipulatives like 'order' and desideratives, and that semantic integration does correspond directly to complement deranking.

Complement-taking Predicates

As defined by Noonan (1985), complementation is the syntactic situation that arises when a sentence or predication is an argument of a predicate. In general, a predication is a complement of a predicate if it functions as either the subject or object of that predicate. For example, the object of (1) can be replaced with a predicate:

- (1) Zeke remembered Nell
- (2) Zeke remembered *that Nell left*

Predicates such as *remember, see, think, cause* that take subject or object complements are referred to as 'complement-taking predicates' (CTPs). As Noonan states, not all embedded sentences are complements: relative clauses, purpose and manner clauses, locative and temporal clauses are not complements since they are not arguments of verbs.

These predicates can be seen to describe two separate state of affairs (SoA). In (2), the main SoA is Zeke remembering something, while the complement SoA is the fact that Nell left. Note that in this case, and with all predicate verbs like 'remember', the complement SoA exists independently from the main SoA: the fact that Nell left does

not depend on Zeke's recollection of it. The relationship between the main and complement SoAs is central to Cristofaro (2003)'s definition for the semantic integration of a complement-taking predicate.

Cristofaro examines the semantics of complement-taking predicates in depth. Following others (such as Givon (1990)), she claims that the semantics of complement relations may be expressed in terms of the semantics coding the main state of affairs. As the complement SoA communicates a specification required by the main SoA, the semantics of the main SoA establishes what kind of specification is required. This means that when studying complement relations, the complement-taking predicate (dictating the main SoA) should indeed be the focus, as opposed to the complement SoA. In (2), the main SoA dictates that the complement SoA is a memory of Zeke.

She focuses on the following complement-taking predicate classes.

- phasals ('start', 'begin', 'stop', 'continue', etc.);
- modals ('must', 'can', 'may', 'be able', etc.)
- manipulatives ('order', 'make', 'persuade', etc.);
- desideratives ('want', etc.);
- perception ('see', 'hear', etc.);
- knowledge ('know', 'understand', 'realize', etc.);
- propositional attitude ('think', 'believe', etc.);
- utterance ('say', 'tell', etc.).

We are interested in correlations between the main predicate, which might fall into a class above, and the subordination of the complement predicate. Cristofaro contributes to this goal in two important ways. First, she defines semantic integration as a relation between state of affairs, and establishes a conceptual hierarchy of semantic integration.

Second, she does a comprehensive examination of how deranking relates to different CTP classes for many languages, finding empirical evidence to support a cross-linguistic universal, the Complement Deranking Hierarchy.

Defining Semantic Integration

Cristofaro's definition of semantic integration for a complement taking predicate is the degree of interconnection of the main and complement SoAs. She proposes the following Semantic Integration Hierarchy:

Phasals > Modals > Manipulatives 'make' > Manipulatives 'order', Desideratives, Perception > Knowledge, Propositional Attitude, Utterance

Cristofaro has the following justifications for each level.

Phasals, including verbs like 'begin', have two SoAs, as do all complement taking predicates: the fact of an entity in some phase of an SoA, and the SoA to which the phase pertains (e.g. "He begins to walk home" vs. "He walks home"). However, starting, finishing, or continuing an action is actually part of an action, so the boundaries of the SoA are unclear; the main SoA is within the context of the complement SoA. The minimum condition here will later be coded as **Solid M**.

For modals, including verbs like 'can' or 'should', the main SoA cannot be regarded as part of the complement SoA, as with Phasals – hence, it is less semantically integrated ("He can walk home" does not imply he is walking home). However, there is no distinct SoA being defined with autonomous participants. Acts of perception, manipulation, or utterances all describe distinct SoAs with distinct participants. This means that modals have highly integrated main and complement SoAs as well. The minimum condition here will be coded as **same referents**.

Manipulative predicates like 'make' invoke a direct causation relationship between two SoAs; however, they might involve separate participants ("They make me play with him"). They can be conceptualized as distinct SoAs involving different entities (the process of causation with causer and affectee, and the SoA brought about by the affectee). The minimum condition will be coded as **solid C**.

Not all manipulatives are like 'make', however. In manipulatives like 'order', the main SoA does not imply direct causation of the complement SoA ("They order me to cook" \equiv "They want me to cook" \neq "They make me cook"). Cristofaro ranks desideratives (verbs like 'want'), and perception predicates ("I saw him walk the dog") all at the same level. Her reasoning is while the main SoA must refer to the complement SoA, the occurrence of the complement SoA is independent of that command, desire, or observation itself. Hence, it is less semantically integrated. The minimum condition will be coded as **MC linked**.

Finally, she ranks knowledge, propositional attitude, and utterance predicates ("I know the president is here", "I think the president is here", "I said the president was here") as not semantically integrated at all, as the complement SoA is a proposition, which does not have to be related at all to the main SoA.

Balancing and Deranking

According to Stassen (1985), in order to code the sequential occurrence of two linked state of affairs, a language normally employs two strategies: coding SoAs with two balanced verbs, or with one balanced and one deranked verb.

A verb form is said to be balanced if it could occur in an independent clause, while it is deranked when it cannot be used in independent clauses. In 3, the two clauses are juxtaposed, with the main and complement verbs usable in independent clauses.

Canela-Krahô (Amerindian, Ge-Pano-Carib)

- (3) [pê wa i-p‘ym] pê inxê ty
 PAST 1 1-fall PAST mother die
 ‘My mother died when I was born’
 (Popjes and Popjes 1986: 139, in Cristofaro (2003))

Deranking typically involves a lack of usual distinctions in verbs, such as tense, aspect, mood, or person agreement markers. An example of this can be seen in 4, where the past participle indicates a completed action, but has no mood or person agreement.

- Finnish (Uralic-Yukagir)
 (4) Huomaan pojan osanneen suomea
 realize-1SG boy-GEN know-PAST.PTCP-ACC Finnish-PAR
 ‘I realized that the boy knew Finnish’
 (Sulkala and Karjalainen 1992: 38, in Cristofaro (2003))

Deranking can also involve the use of special marking not occurring in independent clauses. For example, in 5, different case markers are used depending on the type of subordination linking the SoAs. In this case, the relationship is reason, so the marker is instrumental:

- Tamil (Elamo-Dravidian)
 (5) [ava vizzuntatunaale] azutaa
 she fall-PAST-NOMLZR-INSTR weep-PAST-3FSG
 ‘Because she fell, she cried.’
 (Asher 1985: 21, in Cristofaro (2003))

In general, languages default to deranking for most complement clauses, but will use balanced verb forms for certain complement classes. The universal which we would like to provide theoretical justification for is that for a given language, the deranked verb forms, as a sign of the dependency of the complement SoA on the main SoA, apply to the most semantically integrated forms first.

Complement Deranking Hierarchy

Cristofaro draws data from a genetically diverse sample of eighty languages, from which she finds balancing and deranking rules for each of the aforementioned CTP classes:

Language	Mod.	Phas.	Man. (‘make’)	Man. (‘order’)	Des.	Perc.	Kn.	Pr. a.	Utt.
Finnish	D	D	°	D/B	D/B	D/B	D/B	D/B	D/B
Basque	D	D	°	D	D	D	B	B	B
Egyptian (Ancient)	D/B	D/B	D/B	D/B	D/B	D/B	D/B	D/B	D/B
Jacaltec	D	D/B	D/B	D/B	D/B	D/B	B	B	B
Lezgian	D	D	D	D	D	D	D/B	D/B	D/B
Maricopa	D	D	°	D	D	D	D	D	D/B
Resigaro			°	D	D	D	D	D	D
Tok Pisin	B	B	B	B	B	B	B	B	B

B = balancing; D = deranking; D/B = both balancing and deranking; ° = the relevant relation is not expressed by means of clause linkage; blank = no information available

Complement relations: balancing and deranking in different languages. Reproduced from Cristofaro’s *Subordination*, 2003

From the sample, she picks some representative languages, instantiating possible cut-off points for the Complement Deranking Hierarchy.

Language	Mod.	Phas.	Man. (‘make’)	Man. (‘order’)	Des.	Perc.	Kn.	Pr. a.	Utt.
Tamil	D	D		D	D	D			D
Lezgian	D	D	D	D	D	D	D/B	D/B	B
Lango	D	D	D	D	D	B	B	B	B
Egyptian (Ancient)	D/B	D/B	D/B	D/B	D/B	D/B	D/B	D/B	D/B
Tok Pisin	B		B	B	B	B	B	B	B

Balancing and deranking: cut-off points in the hierarchy of complement relations
Reproduced from Cristofaro’s *Subordination*, 2003

Overall, she finds data consistent with a single hierarchy of complement clauses, which she proposes as the Complement Deranking Hierarchy:

- (6) Modals, Phasals > Manipulatives (‘make’, ‘order’), Desideratives > Perception > Knowledge, Propositional Attitude, Utterance

If a deranked verb form is used at any point in the hierarchy, it is used at all points to the left.

She also details cross-linguistic patterns on other dependent phenomena, such as the lack of TAM or person markings in the complement clause, and the lack of A, S or O arguments in the complement clauses. She shows that these also tend to be consistent with the results above. For example, if a language lacks person agreement for a phasal CPT, then it will also lack person agreement for a perception CPT. If a language lacks agent distinction in the complement for a perception CPT, then it will also lack agent distinction in the complement for an utterance CPT, and so on.

Semantic Integration and CDH

The Semantic Integration hierarchy (for the main predicate) and the Complement De-ranking Hierarchy (for the complement predicate) are mostly aligned, which supports the universal that dependency markings on complement clauses are employed on the most semantically integrated clauses first. As is noted by Cristofaro (1998) and Morrone (2016), this makes sense from an economic perspective: if a listener can infer information about the complement SoA from the initial SoA, the speaker should not have to repeat information.

However, there are two discrepancies. First, manipulatives like 'make' and manipulatives like 'order' are observed to be treated equally cross-linguistically, while they have different semantic integration. Cristofaro proposes that this is due to a lack of data: there are only 26 languages with both modal and phasal data, and only 4 significant results from those. Second, perception is observed to be below manipulatives like 'order' and desideratives; while they have the same semantic integration. This is a harder problem to solve.

Iconicity of Distance



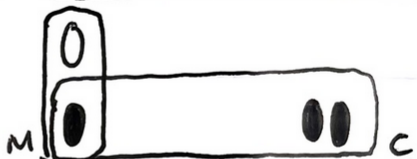
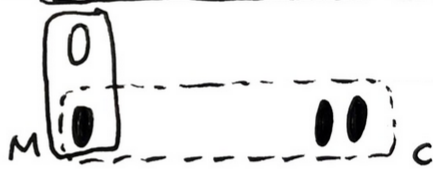
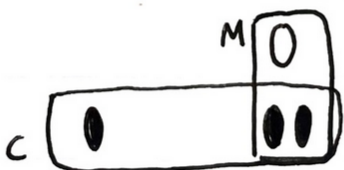
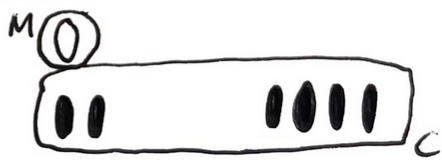
Givon (1990) considers the preference of an agent in bringing about a complement SoA to affect the semantic integration of a CTP. This would explain manipulatives like 'order' and desideratives being above perception. However, Cristofaro is reluctant to use preference in her definition of semantic integration, as Givon does, and which I agree with. We cannot assume that a preference for an SoA should contribute to that SoA happening.

Instead, she chooses to make an argument with iconicity of distance, saying that it is intuitively clear that someone wanting the realization of some SoA (as with manipulatives like 'order' and desideratives) is conceptually closer to that SoA than two SoAs that happen at the same time (as with perception); thus, the greater dependence in 'order' or desideratives is an iconic reflection of conceptual closeness. However, this explanation is not quite satisfying, because we would like to have a model that fits our empirical results exactly.

Semantic Integration viewed through cause-and-effect

Cristofaro concedes this, and states that "If one assumes that the fact that the dependent SoA is unrealized determines a higher position on the hierarchy, this would account for the positioning of desideratives and manipulatives such as 'order' vs. perception predicates" (pg. 135). This is the angle from which I will attempt to approach semantic integration.

There is a key difference between perception and desiderative/manipulative CTPs. Perception CTPs must reference a realized SoA, or a realized cause-and-effect. On the other hand, desideratives and manipulative CTPs must reference unrealized SoA, or a possible cause-and-effect. Considered with respect to time, the difference between manipulatives and perception becomes clear.

	PAST	PRESENT	FUTURE
PHASAL	∅		
MODAL	∅		
MANIPULATIVE 'make'	∅		
MANIPULATIVE 'order'; DESIDERATIVE	∅		
PERCEPTION			∅
KNOWLEDGE PROPOSITIONAL A. UTTERANCE	∅		

Here, the action in the complement clause (C) is always doubling, while the action of the main clause is denoted M. Our old definition (Cristofaro's) is to initially require {solid M, same referents, solid C, MC are linked}. Our new definition is to initially require {solid M, same referents, solid C, MC goes to future, MC are linked}.

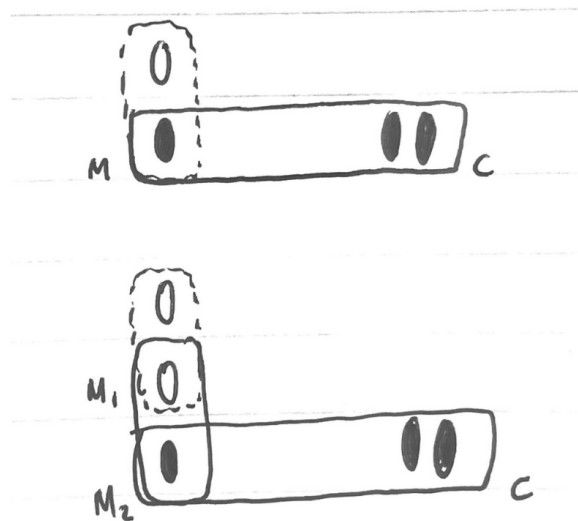
To read the hierarchies, relax the conditions in order.

MC are linked clearly corresponds to semantic integration of any kind. **Solid C** corresponds to when C (as a cause-and-effect) is guaranteed. **Same referents** corresponds to same referents, and **solid M** corresponds to when M (as a cause-and-effect) is guaranteed. Thus, our old definition can be expressed, in order of semantic integratedness: **MC are linked, solid C, same referents, solid M.**

Our new definition adds one rule, separating manipulatives/desideratives from perception CTPs. For manipulatives/desideratives, the complement SoA is *derived* from

the main SoA: one follows the other in time from the present. For perception, this is not true; in a construction like "I saw him walk the dog", the main and complement SoAs occur at the same time. Because the complement SoA necessarily describes a situation in the future, relative to the main SoA, the rule can be expressed as **MC goes to future**. As it expresses a potential cause-and-effect between M and C, it goes above **MC are linked**, but below **solid C**, as it is not a definite cause-and-effect, as with manipulatives like 'make'.

Why should **same referents** come between **solid M** and **solid C**? **solid M** requires the same referents, but **solid C** does not require them. *I begin to (cause X / double) > I may (cause X / double) > I make you (cause X / double)* is grammatical, but *I may you (cause X / double)* is not grammatical, whereas the repair *I may cause you to (cause X / double)* is has self-referential M.



Self-referential M_1 , regular M_2 and C construction.

Limitations

Although the diagrams and notation shown above are informal, I believe that they communicate the differences between Cristofaro's and my version of semantic integration in an effective manner. A more important limitation is the conceptualization of C as being the intransitive (X doubles). However, the purpose of the doubling is simply to illustrate C as a change with respect to time, which I think it accomplishes.

Conclusion

In this paper, I look at a cross-linguistic universal for complement taking predicates, known as the Complement Deranking Hierarchy. I argue that manipulative CTPs like 'order' and desideratives are more semantically integrated than perception CTPs, by

viewing semantic integration from the lens of cause-and-effect. I reexpress Cristofaro's old Semantic Integration Hierarchy in a cause-effect diagram, and motivate the addition of another rule for a potential cause-and-effect. The result is a Semantic Integration Hierarchy that aligns with the Complement Deranking Hierarchy.

References

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