

## Background

“Scope Marking” (SM) has been described in a variety of languages including German [1], Hindi [2], and Hungarian [3], as see in (1-3)

(1) Was glaubst du, mit wem Maria gesprochen hat?  
What think you, with whom Maria spoken has?  
With whom do you think Maria spoke?  
Ex. From [1] (1b)

(2) Jaun kya soctaa hai Meri kis-se baat karegii?  
John what thinks Mary who-with will talk  
Who does John think Mary will talk to?  
Ex. From [2] (18)

(3) Mit mondtál hogy mire számítanak a gyerekek?  
What<sub>acc</sub> said-2sg-indef<sub>DO</sub> that what<sub>al</sub> count-3pl the kids<sub>nom</sub>?  
What did you say (that) the kids expected?  
Ex. [3] (13c)

### Previous analyses

The Direct Dependency Approach (DDA):

- The first wh-phrase is an expletive marking the scope of the true wh-phrase
- Semantically equivalent to long distance (LD)

$\lambda p \exists x[\text{person}(x) \wedge p = \text{You think Maria spoke to } x]$   
From [5].

The Indirect Dependency Approach (IDA):

- The first wh-phrase is a true wh-phrase
- “second” question limits set of possible answers to “first” question

$\lambda p \exists q[\exists x[q = \text{has spoken}'(m,x)] \wedge p = \text{think}'(j,q)]$   
From [2].

## Puzzle & Proposal

**Puzzle:** Neither the IDA nor the DDA satisfactorily accounts for the cross linguistic variation seen.

**Proposal:** SM is two phenomena: one syntactic (synSM), one semantic (semSM).

**SynSM:** Expletive scope marker with embedded clause associate (see [6])

**SemSM:** Two, contentful wh-phrases. The second limits the scope of the first.

SynSM does not necessarily correspond to semSM.

**Hypothesis: Manipulating semantic input will affect syntactic output**

## Syntactic Output

We consider Long Distance (LD), Sequential Questions (SeqQs) and SM as potential optimal syntactic outputs. Following [6] and [3], we consider the scope marker to be an expletive with an embedded clause associate. The scope marker originates in SpecAgroP and moves to the intermediate SpecCP. The contentful wh-phrase moves to the intermediate SpecCP.

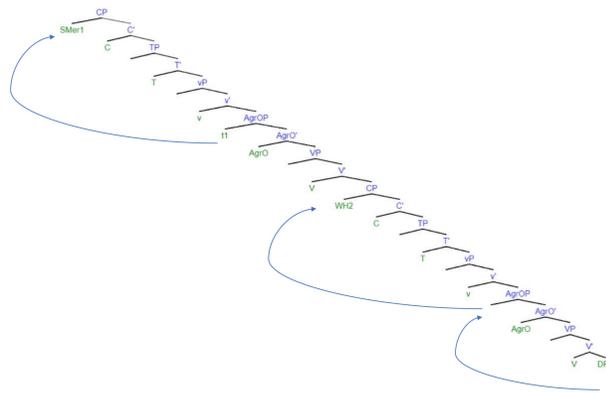


Figure 1.

Figure 1. Illustrates a generic, non-language specific structure in which the contentful wh-phrase is the object of the embedded clause verb.

## Semantic Input

Based on the semantic analysis of [2], we investigated which semantic and pragmatic factors resulted in different syntactic outputs by means of acceptability judgments

### Task:

Brief scenarios were presented, followed by questions. We explained that all questions were known to be grammatical, but perhaps one was better in this situation.

Speakers were asked to judge on a likert scale (1-7). Where a score of (1) indicated the question was “extremely awkward in this scenario” and (7) indicated the question was “perfect in this scenario”

### Participants:

Native speakers of English (n=22), German (n=2), Hindi (n=2), Hungarian (n=1)

### Manipulations:

**Question Under Discussion (QUD) [7]:** We controlled whether the question addressed by the embedded clause (Q2) is resolved or unresolved. E.G. In What do you think this is

**Contrastive Topic (CT) [8]:** Whether or not the subject is a CT

### Survey Results:

As seen in Table 1, different conditions elicited different judgments on what type of structure was optimal in each context.

Table 1		Condition			
		Q2 unresolved, Subj CT	Q2 unresolved, Subj not CT	Q2 resolved, Subj CT	Q2 resolved, Subj not CT
Language	Adult English	LD	LD	LD	LD
	Child English	Seq Q	Seq Q	LD	LD
	Hungarian	Seq Q	Seq Q	synSM	synSM
	German	synSM	Seq Q	synSM	LD
	Hindi	synSM	synSM	synSM	synSM

### Example Stimulus:

English, Q2 resolved, Subj not CT

*Carol and Cathy are paleontologists looking for valuable fossils at a collectors' fair. They see one table with larger rocks. Carol immediately recognizes that one of the rocks is, in fact, a dinosaur egg. After examining the rock, Cathy agrees. This is an incredibly rare find. Wondering if the collector knows what a find this is, Carol turns to the him and asks:*

What do you think? What is this?  
What do you think this is?  
What do you think?  
What is this?

\*Languages with synSM included the relevant structures

## OT Analysis

**Optimality Theory (OT) :** A means of formalizing both an input-output relation and the resolution of conflicting constraints on linguistic systems ([9],[10]). The syntactic system is given an *input*, an intended semantic/pragmatic meaning, and evaluates multiple possible syntactic *outputs* or structural expressions of that meaning. The optimal output is determined by universal, violable constraints which are ranked by a language specific hierarchy of importance.

### Constraints on the Syntax:

\*T [11]: no traces, overt or covert.

WH- CRIT [12]: Wh-items surface in a specCP whose head is +Q.

MARKFOCUS: Items with a focus feature appear in FocP.

MINPROJ [11], [9]: Projections should be minimal.

MINLINK [13]: Links between traces should be minimal. Longer links are less harmonic than shorter links.

### Constraints on the Syntax Semantic Interface:

FULLINT [11]: A lexical item has an interpretation at LF.

FAITH QUD: The number of true wh-phrases reflects the number of unresolved QUDs.

FAITH CT: The item marked as CT in the input has highest focus scope in the output.

FAITH LF/SYN: The output reflects the relative scope of verbs in the input.

Tableau 1. Hindi	*T	FAITH LF/SYN	FAITH QUD	BAR 4	BAR 3	MIN PROJ	FAITH CT	FULL INT	MARK FOC	WH-CRIT
Input: Q2 resolved, Subject not CT										
LD	**!			**					*	
SM with movement	**!			*	*		*	*	**	*
SM with movement to Focus P	**!			*	*	**	*	*		****
SM with no movement				*	*		*	*	**	****
SeqQs with movement	**!	*	*	**					**	
SeqQs with no movement		*!	*	**			*		**	****
SeqQs with movement to Focus P	**!	*	*	**		**				****

Tableau 2. German	FAITH CT	WH-CRIT	FAITH QUD	BAR 4	BAR 3	MIN PROJ	*T	MARK FOC	FULL INT	FAITH LF/SYN
Input: Q2 resolved, Subject not CT										
LD				**			**	*		
SM with movement	*!	*		*	*		**	**	*	
SM with movement to Focus P	*!	***		*	*	**	**		*	
SM with no movement	*!	***		*	*			**	*	
SeqQs with movement			*!	**			**	**		*
SeqQs with no movement	*!	****	*	**				**		*
SeqQs with movement to Focus P		****!	*	**		**	**			*

We found unique rankings of these constraints for each language which predicted the optimal outputs reported by native speakers in Table 1.

Tableaux 1 and 2 illustrate that the same input results in different optimal outputs in German and Hindi.

## Discussion & Conclusion

Different semantic and pragmatic conditions determine when native speakers judge different structures acceptable. SemSM can be realized as SynSM (Hindi, Hungarian, German when the subject is CT), this is not always the case (e.g. English, German when subject is not CT). We used OT to formalize a unified analysis of synSM and semSM which accounts for the cross-linguistic variation found.

**Further Directions:** We hope to collect more judgments from native speakers of these languages as well as others. We also hope to analyze acquisition of semSM and synSM by children.

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