The scope of negation and universal quantifiers:
A cross-linguistic and diachronic investigation

This study investigates the cross-linguistic variation in the use of inverse-scope constructions like (1). These constructions exhibit a form-meaning mismatch in that the interpretation ("It is not the case that all that glitters is gold") is at odds with the order in which the logical elements (negation and the universal quantifier) appear in the sentence. This study seeks to explain why inverse-scope constructions have come to be used in some languages but not others.

(1) All that glitters is not gold.

Previous studies have argued that languages only use inverse scope as a last resort when their word order is not flexible enough to avoid it, or other grammatical constraints interfere (Beck 1996; Szabolcsi 1997; Bobaljik & Wurmbrand 2012). However, these studies have mostly focused on inverse scope in sentences with multiple quantifiers and have not investigated sentences like (1), where there is a single quantifier and negation. Consequently, existing theories cannot explain why many languages (see below) allow inverse-scope sentences like (1) despite having alternative transparent-scope constructions like (2), where the meaning matches the word order.

(2) Not all that glitters is gold.

This study is the first to investigate inverse scope from a cross-linguistic and diachronic perspective, using a large, representative sample of the world's languages. The primary data source for this study was translations of the New Testament into over 200 languages, utilized as a parallel corpus. Notably, historical translations of this text were accessible for 31 languages, providing a rich dataset for examining diachronic changes in the interaction between negation and universal quantifiers.

I distinguish five strategies for expressing propositions of the form "Not all X are Y" (simplified for brevity):

- Strategy A: an inverse-scope construction (*Everyone didn't come*)
- Strategy B: the negative marker precedes the quantifier phrase (*Not everyone came)*
- Strategy C: standard negation with VS word order *(Not came everyone*)
- Strategy D: a cleft (*It was not everyone who came*)
- Strategy E: a floating quantifier construction (*They did not all come*)

A surprising finding is that inverse-scope constructions (strategy A) are very common cross-linguistically: they are found in more than half of the world's languages, and in many languages, these constructions are even the dominant strategy for expressing propositions of the form "Not all X are Y".

Table 1: Proportion of languages where each strategy is (i) attested; (ii) the most common strategy

	Strategy A	Strategy B	Strategy C	Strategy D	Strategy E
Attested	54%	51%	18%	27%	14%
Most common	31%	41%	7%	20%	1%

The results further reveal a recurrent diachronic pattern: a language develops a novel transparent-scope construction like (2), and it gradually pushes a pre-existing inverse-scope construction out of use. During this transition, inverse scope is used alongside its transparent-scope competitor.

Consequently, the synchronic cross-linguistic variation can only be explained by considering the diachronic trajectories of individual languages.

In conclusion, this study provides strong evidence for an evolutionary bias for scope transparency. However, another result is that even though languages tend to dispose of inverse scope over time, these constructions can rearise through several diachronic scenarios due to broader grammatical changes, such as the development of a novel negative marker. Consequently, inverse-scope constructions are very common cross-linguistically, and the bias for scope transparency can only be observed through the lens of language change.

References:

Beck, Sigrid. "Quantified structures as barriers for LF movement." Natural language semantics 4.1 (1996): 1-56.

Bobaljik, Jonathan David & Wurmbrand, Susi. 2012. Word order and scope: Transparent interfaces and the ¾ signature. Linguistic Inquiry 43.3, 371-421.

Szabolcsi, Anna. 1997. Strategies for scope taking. In Anna Szabolcsi (ed.), *Ways of scope taking*, 109–154. Dordrecht: Kluwer Academic Publishers.