Natural Logic, de Morgan Inferences, and Negative Concord in Levantine Arabic

Negative concord occurs in Levantine Arabic (LevA), where negative concord is defined as the failure of an *n-word* (a word that expresses sentential negation in sentence fragments) to express negation in syntagm with another word expressing the meaning of sentential negation (c.f. Giannakidou 2002, Watanabe 2004). LevA has three categories of n-words: negative minimizers *gɛšal* "penury, nothing" and *ḥawa* "air, nothing"; the "*never*-words" *ʔabadan* and *bilmarra* "never, not at all"; and noun phrases prefixed by the negative scalar focus particle *wala* "not even, not a single." These differ in several respects: (i) negative minizers always express negation, and have double negation rather than negative concord interpretations when combined with other negative expressions (1-2); (ii) *Never*-words and *wala*-phrase undergo negative concord, but differ in terms of where in full clauses they must be "roofed" (c.f. Ladusaw 1992) by another negative expression: *never*-words must be roofed in all positions in both the pre- and post-verbal fields (3), while *wala*-phrases generally contribute distinct negation and need not be roofed in the pre-verbval field (4), while in the post-verbal field they typically must be roofed if they are interpreted in positions that corrrespond to existential entailments of the predicate (5: c.f. Tovena 1996 and Herburger 2001).

The distribution of negative concord interpretations for LevA n-words is captured by the following: (i) *The Roofing Generalization*: A predicate P with a dependent n-word N must be negated when N's would otherwise contradict an existential entailment in P's interpretation (Tovena 1996, Herburger 2001); (ii) *The de Morgan Generalization*: An n-word with meaning $\neg q$ fails to express negation distinctly in syntagm with another expression with meaning $\neg p$ when the context in which they cooccur licenses the Morgan inference $\neg p \wedge \neg q \Leftrightarrow \neg(p \vee q)$. For example, the meaning of *makaltıš wala iši* in (5) can be represented (given an event e) as both "e was not an eating event, and nothing was eaten at e" and "e was not an event event or an event of something being eaten." The non-acceptable paraphrase *ʔɛkalt wala iši*, in which the wala-phrase *wala iši* "not even one thing" is unroofed, entails a contradiction "e was an eating event and nothing was eaten at e." The analysis therefore claims that n-words are inherently negative, but improves upon existing approaches by removing the need for additional formal devices such as *quantifier absorbtion* or *factorization* (e.g. Haegeman & Zanuttini 1996, de Swart & Sag 2002). It is also superior to standard treatments of n-words as negative polarity items, which incorrectly predict that the interpretations of n-words used as fragments should pattern with those of non-negative NPIs that occur in pre-verbally (Guerzoni & Alonso-Ovalle 2003).

This semantic analysis correctly predicts that the roofing generalization does not apply to non-entailed arguments, such as objects of ECM-verbs (6) or arguments that specify witnesses to presuppositions (7) rather than entailments, or to n-words that have "psuedo-referential" interpretations (8) or "expressive" interpretations (9) that negate degree of significance rather than existence (c.f. Potts 2007), or as predicate nominals (10). However, a purely semantic analysis incorrectly predicts: (i) that pre-verbal n-words should roof post-verbal n-words (11), (ii) that there are scope ambiguities between the negations contributed by an n-word and the negative expression that roofs it (c.f. Richter & Sailer 2004). Therefore, I argue that the de Morgan inference above is actually calculated in the syntax, in the spirit of *natural logic* (c.f. Sanchez-Valencia 1991). I model this by stipulating that negation morphemes introduce interpretable negation features into a derivation that must percolate from leaf nodes to the root node of a derivation, where they are "discharged" as a semantic negation operators. Crucially, a negation feature introduced by an n-word in an existentially entailed position can only percolate up when its sister node also introduces a negation feature. In the absence of a negation-marked sister-node, the n-words's negation feature is blocked from percolating up, rendering the derivation ill-formed and predicting the unacceptability of examples like (11).

The difference between *wala*-phrases and *never*-words in terms of whether they must be roofed in the pre-verbal field is treated as a difference in where in the left-periphery of the sentence they can occur (c.f. Rizzi 1997). Pre-verbal *wala*-phrase are typically interpreted as contrastive topics, with the remainder of the clause predicated of the topic. The negation introduced by the *wala*-phrase then scopes over what can be seen as a tri-partite structure, with the the common noun restriction interpreted as the topic restriction, and the scope as the comment predicated of it (similar intepretations are assumed for negative minimizers). Pre-verbal *never*-words, in contrast, are interpreted as focused phrases, and therefore interpreted as part of the nuclear predication of the clause and hence require roofing. Further evidence is found in the "mute-*ma*" construction: examples in which a pre-verbal *wala*-phrase follows a question word (13) or complementizer (14) that marks it as non-peripheral does in fact concord with a following negation.

Contrasts between the Levantine dialects and and the Maghrebin dialects (Tunisia, Algeria, Morocco) are argued likewise to follow from syntactic differences: in the Maghrebin dialects, n-words must be roofed in *all* positions, including in the pre-verbal field. I argue that this follows from a syntactic difference: in Levantine, pre-verbal nominal expressions are interpreted as topics and therefore subject to a well-known *specificity condition*, understood as discourse topichood, while in Maghrebi, pre-verbal noun phrases are not subject to such a condition. Independent evidence for this conclusion is presented.

(1) bɪddku ddiːmokratiyya? bɪddku **gɛšal**!
want.2mp the-democracy want.2mp nothing
"Y'all want democracy? You're going to get squat!"

(2) ɪlʔarab (mɪš) mæːkliːn **ḥawa**!
the-Arabs not at-them.mp eating.mp air
"The Arabs (don't) have nothing!"

(3) (**ʔabadan**|**bilmarra**) *(**ma-**) baʔrif ḥada | *(**ma-**) baʔrif ḥada (**ʔabadan**|**bilmarra**)
never in-the-once not- ind.1s.know one not- ind.1s.know one never in-the-once
"I never know anyone, I don't know anyone at all."

(4) **wala yoːm** ʕağab-ni l-ɛkil | **wala yoːm ma-**ʕağab-ni l-ɛkil.
not.even day pleased-me the-food not.even day not-pleased-me the-food
"Not one day did the food please me," "Not one day did the food please me."

(5) *(ma-) ʔɛkalt wala iši.
not ate.1s not.even thing
"I (didn't) eat even one thing."

(6) ʔana nafsi ʔaːrɪf šu bɪddhʊm bɪẓẓabṭ. bɪddhʊm **wala ḥada** yruːḥ iṣalli bɪlmasğɪd.
I self-my knowing what want.3mp exactly want.3mp not.even one 3.go 3.pray in-the-mosque
"I mean, I myself know what they want exactly: they want no one to go pray at the mosque."

(7) battafɪg maʕ **wala waːḥad** fiːku.
ind.1s.agree with not.even one in-you.mp
"I agree with not even one of you."

(8) ʔɪntaχabɪt bi**wala ḥada**. kæːn ɪlmʊršɪḥ ɪlʔašraf.
voted.1s with-not.even one was the-candidate the-most.honest
"I voted for no one. He was the most honest candidate."

(9) ʔɪnti zaʕlæːna ʕala **wala iši**!
you.fs angry.fs upon not.even thing
"You're angry for nothing at all!" (i.e.: "you're angry for a reason that has no degree of significance")

(10) ʔana wala iši. ɪlmudiːr ɪlli mʊmkɪn isaːʕdak.
I not.even thing the-director rel can 3.help-you.ms
"I'm nothing at all. The director is who can help you."

(11) * wala ḥada ʔɛkal wala iši.
not.even one ate not.even thing

(12) ʔɪnt **wala marra ma**ʔʊltɪli laḥæːlak ʔɪnnak bɪtḥɪbbni.
you.ms not.even once not-told.2ms-to-me to-self-your.ms that-you.ms ind-2.love-me
"You have not even once told me of your own accord that you love me."

(13) [$_{CP}$ leːš [$_{IP}$ **wala marra ma**ḥaṭṭeːna waːḥad masiːḥi rayiːs wʊzara]] ?
why not.even once not-put.1p one Christian president ministers
"Why have we not once appointed someone Christian as Prime Minister?"

(14) maʕ [$_{CP}$ ɪnni **wala marra ma**kalt ʔaχṭubuːṭ] kull ɪlli ʔakalu ʔaːl ʕannu ʔɪnnu laziːz.
with that-I not.even once not-ate.1s octopus every rel ate-him said about-him that-he delicious
"Even though I not once have eaten octopus, everyone who has eaten it says about it that it's delicious."

de Swart, H. & Sag, I. A. (2002), 'Negation and negative concord in romance', *L&P* **25**, 373–417.

Giannakidou, A. (2002), N-words and negative concord, *in* H. van Riemsdijk & R. Goedemans, eds, 'Linguistics Companion', Blackwell.

Guerzoni, E. & Alonso-Ovalle, L. (2003), Double negatives, negative concord and metalinguistic negation, *in* 'Proceedings of the Chicago Linguistic Society 38'.

Haegeman, L. & Zanuttini, R. (1996), Negative concord in west flemish, *in* A. Belleti & L. Rizzi, eds, 'Parameters and Functional Heads', Oxford, pp. 117–179.

Herburger, E. (2001), 'Negative concord revisited', *Natural Language Semantics* **9**, 289–333.

Ladusaw, W. (1992), Expressing negation, *in* C. Barker & D. Dowty, eds, 'Proceedings of SALT II', number 40, pp. 237–259.

Potts, C. (2007), Conventional implicatures, a distinguished class of meanings, *in* G. Ramchand & C. Reiss, eds, 'The Oxford Handbook of Linguistic Interfaces', Oxford Handbooks in Linguistics, Oxford University Press, pp. 475–502.

Richter, F. & Sailer, M. (2004), Polish negation and lexical resource semantics, *in* L. S. Moss & R. T. Oehrle, eds, 'Electronic Notes in Theoretical Computer Science', Vol. 53, Elsevier, pp. 309–321.

Rizzi, L. (1997), The fine structure of the left periphery, *in* L. Haegeman, ed., 'Elements of Grammar: A Handbook of Generative Syntax', Kluwer Academic Publishers (Dordrecht), pp. 281–337.

Sanchez-Valencia, V. (1991), Studies on Natural Logic and Categorial Grammar, PhD thesis, University of Amsterdam.

Tovena, L. M. (1996), Studies on Polarity Sensitivity, PhD thesis, University of Edinburgh.

Watanabe, A. (2004), 'The genesis of negative concord: Syntax and morphology of negative doubling', *LI* **4**, 559–612.