How Metalinguistic Negation Differs from Descriptive Negation: ERP Evidence

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Abstract

This talk explores degree adverbial modifiers licensed exclusively by metalinguistic negation (MN), and compares them with those licensed by descriptive negation (DN) such as NPIs. It shows how MN-licensing is more marked than DN-licensing in prosody and then attempts to show how anomalies arising from misplacing MN-licensed adverbs in DN-requiring short form negation sentences elicit the approximate N400 but not the P600 in ERPs. This strongly suggests that such anomalies are meaning-related and tends to support the pragmatic ambiguity position by Horn than the contextualist or relevance-theoretic approach.

Keywords: metalinguistic negation; descriptive negation; markedness; prosody; ERPs; N400; pragmatic ambiguity; contextualist

1. Markedness of MN Adverbials

So far researchers have worked more on negative polarity arguments and modifiers, which are licensed by descriptive negation (DN). The NPIs here simply reinforce the falsification of the propositional contents. They are therefore emphatic in general (Potts 2010, Israel 2004). Crosslinguistically and diachronically, NPIs have typically developed from minimizers with 'even' (Lee 1993, Y. Lee and Horn 1994, Lee 1999, Lee 2010 a.o.).

(1) a. *amwu-to*   o-ci anh –ass-ta   (Korean = K)   anyone-even come-not-PAST-DEC

   'Not anyone came.' =b. $\sim\exists_x$ (x: person' (x)) [came (x)]

  b. *dare-mo* ko-nakat-ta   (Japanese = J)

  c. *shwei-ye* mei-you lai   (Chinese = C)

(2) a. theibul-i   *tomwuci* wumciki-ci anh-nun-ta   (K)table – NOM at all   move-CI not-PRES-DEC 'The table does not move at all.' =b. $\sim\exists_x$ (x: way' (x)) [move' (t)(in x)]

  b. teeburu wa *mattaku* ugoka-nai   (J)

  c. zhuo-zi gen-be budong   (C)

 MN, on the other hand, is used to reject, object to or rectify a previous utterance 'on any grounds whatever' ((Horn 1985), (Ducrot 1972)). In (3), what is negated is not the proposition 'I am happy' in its reference or truth but the degree of happiness expressed by the adjective 'HAPPY' in the scale of happiness. The speaker objects to the way how it is put by the interpocutor. Typically, the expression 'HAPPY' occurs or is assumed to occur in a previous utterance. Because the first clause in (3) does not falsify its positive proposition but object to the degree of happiness, the following clarification clause can assert a higher degree of happiness – 'ECSTATIC' without creating a contradiction, even though *ecstatic* entails *happy* in the Horn or entailment scale.

(3) *I'm not HAPPY; I'm ECSTATIC.* (No contradiction arises)
In this metalinguistic use of negation, a negative polarity item such as *at all*, which co-occurs with DN, as in (2),

cannot intervene. See **I'm not HAPPY at all; I'm ECSTATIC*. A metalinguistic use of negation cannot be replaced by a prefixal negation, either, as in **I'm unhappy; I'm ECSTATIC*. Therefore, we cannot include Geurts' (1998) 'propositional' denial as one of the MN-like denials.

Irony also has some sense of refutation, based on the general or mutual assumption, expectation or hope for 'a picnic day' as a mental representation or thought, as in (4) ('echoic use' (Sperber and Wilson 1986; Carston 1996). It is negative, although expressed affirmatively.
(4) It's a **lovely/fine/great** day for a picnic!

 MN is an echoic rebuttal of whatever aspect of an expression in a previous utterance to assert a rectifying expression. Therefore, the speaker's implicit inner alternative Q in Contrastive Focus can be assumed to precede it, as in (3') and its initial reply equivalent to MN can be assumed to be (5a), with the pair of expressions connected by SN *but* (*sino* Spanish and *sondern* German), and its bi-clausal manifestation with no *but* is (5b), whose intonation is the L*(+H) L- H% of incredulity, distinct from the Contrastive Topic intonation L+H* L- H% (Lee 2006, Constant 2012).
(3') Are you HAPPY or ECSTATIC?
(5) a. I'm not HAPPY but ECSTATIC.
   b. I'm not HAPPY; I'm ECSTATIC.

 This paper explores **degree modifiers licensed by MN**, and compares them with those licensed by DN and shows how MN-licensing is more marked than DN-licensing in prosody first. The MN-licensed degree modifier *A LITTLE* in (6) forms a rising high peak of 254Hz after another peak of *not* (MN) in Fig. 1. This is in sharp contrast with those NPI-like minimizers licensed by DN in (7), one of which forms the *a bit/a little* !H downstep with 211.7Hz, preceded by a high H* *not*. Because of the distinct and marked MN intonation for (6) and other cases, the rectification or clarification clause may not follow; the conveyed meanings which may be called conventional implicatures, not cancellable, seem to be more assertive than 'implicatures.' As a result, the purport of (6) is affirmative whereas that of (7) is negative, although their written form is one and the same, creating ambiguity in English.
(6) She is not A LITTLE upset. (She is VERY upset.)
(7) She is NOT a little upset. [*even* a little] (She is not   upset at all, is quite composed.)   Sentences for our phonetic experiments are modified from Bolinger (1972).
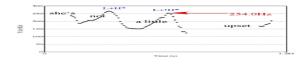

Fig 1 a-little-MN: a double of rising accent peaks

In Korean, the marked intonation of the MN-licensed adverbial **POTHONG** 'commonly,' with a high pitch of **375Hz** on the adverb, is sharply contrasted with the intonation of the adverb of the same form with the scalar marker –*to* 'even' [**pothonguro**–*to*] attached to function as an NPI for DN (as in '--- not do well even commonly'), which generates a comparatively low pitch of **295Hz** on the adverb. The MN adverbial is prosodically marked.

Now turn to the syntactic aspects of Korean negation to see how MN is syntactically marked as well. The MN-licensed stressed degree modifiers *POTHONG* and *YEKAN*, both 'commonly,' require **external negation**, as in (11a), **long form negation**, as in (11b), or **copula negation**, as in (9c), but they cannot occur in a positive declarative S, as in (9d). In contrast, **short form negation** is typically for DN in Korean. Therefore, if the MN-licensed stressed degree modifiers *POTHONG* or *YEKAN* occurs in short form negation sentence, the result is anomalous, as in (8).

(8) a. Mia-ka   **POTHONG**   yeppu-n kes-i ani-i -ya.
        M -Nom commonly pretty-PreN COMP-Nom not-Cop-Dec [extern-neg]
        'Mia is not COMMONLY pretty.' ~> Mia is exceedingly pretty.'

   b.   Mia-ka   **POTHONG/Yekan**   yeppu-ci   anh-a
          M -NOM commonly pretty-CI   not-DEC   (= a) [long-f neg][1]

   c. Mia-ka **POTHONG**(-i)   ani-ya.   [cop-neg][2]

      M -NOM common(NOM) not-DEC

      'Mia is not COMMON/ORDINARY.' ~> Mia is extraordinary.

   d. *Mia-ka **POTHONG/Yekan** yeppu-e. (with no negation)

      M-NOM commonly/relatively pretty-DEC

 (9) * Mia-ka **POTHONG**   <u>an</u> yeppu -e.   [short form neg]
                                            (K)

   M -NOM commonly not   pretty –DEC

   Cf. Mia-ka **cenhye** <u>an</u> yeppu -e   [NPI]

                   at all

      'Mia is not pretty at all.'

In **C**, if *bu* 'not' co-occurs with an immediately following main predicate to negate, it is interpreted as DN, not allowing a rectifying clause, as in (10). If it is, however, followed by the Focus marker *shi* (from 'be') first and then the main predicate, it forms a bi-clausal MN construction with *shi* in the rectifying clause, as in (11). An overt (or covert) modal may replace *shi* for MN-licensing. The

negation of (11) can be assumed to be external (or cleft) S negation in the Conrastive Focus construction. The MN construction is crucially connected to the SN 'but' coordination in C as in (12), *anira* in Korean, *naku* in J, *ma* in Vietnamese, etc. (Lee 2010).

(10) a. Ta bu gao.   #Ta feichang gao. (C) (cf. Wible et al 2000)
        3sg NEG be tall 3sg be extremely tall
   b. Ta bu rang wo qu. #Ta bi wo qu.
        3sg NEG let 1sg go   3sg force 1sg go

(11) a. Ta **bu shi** gao.   Ta shi feichang gao.
        3sg NEG FOC tall 3sg FOC extremely tall
   b. Ta **bu shi** rang wo qu. Ta shi bi wo qu.
        3sg NEG FOC let 1sg go 3sg FOC force 1sg go
   c. Ta bu hui rang wo qu.   Ta hui bi wo qu.
        3sg NEG able let 1sg go 3sg able force1sg go

(12) a. Wo **bu shi** xihuan ta,   <u>er-shi</u> ai ta.
        I   not   like her but love her
        'I don't LIKE $_{CF}$ her but LOVE$_{CF}$ her.'
   b. Ta **bu shi** gao, ershi pang. [content also matters]
        3sg NEG FOC tall SN fat
        '(S)he is not tall but fat.'

Likewise in Chinese, *YIBANde* 'commonly' is an MN-licensed degree adverb and freely occurs in an MN sentence, as in (13a), conveying a higher degree expression. But it cannot occur in a positive sentence, as in (13b), nor in a DN sentence, as in (14). Similarly in Japanese, the degree modifier *fuTSUU* is typically licensed by MN to convey a higher degree, as in (15).

(13) a. Ta bu shi **yibande**   piaoliang. (C)

      she MN commonly beautiful

   'She is not COMMONLY beautiful .' ~> (S)he is very beautiful.

      b. *Ta **yibande** piyaoliang.[3]

(14) *Ta bu **yibande** piyaoliang . (C)

      (s)he NEG commonly beautiful

(15) a. fuTSUU-no kawaisa ja-nai [--- ja **naku** honto-no kawaisa-da] (J)

      common –of prettiness not   MN much-of prettiness

      '(She) is not COMMONLY pretty.' ~> She is very pretty.

   b. fuTSUU janai [fuTSUU ja **naku** sugoi]

      common (Adj) not   MN extraordinary

   'Not COMMON.' (EXTRAORDINARY)

Crosslinguistically in general, if d_s is the echoic standard degree of the predicate, its metalinguistically negated utterance generates its positive proposition with a higher degree $d > d_s$ of the same predicate. The epistemic agent is the speaker in a simple sentence, but it can be the subject in an embedded reported speech or complex attitude sentence. *YEKAN* in Korean and *YIBANde* in Chinese are fixed as MN-licensed modifiers whereas *POTHONG(uro)* in Korean and *fuTSUU* in Japanese may have their unstressed uses in positive utterances; *pothong* as an adverb is used in a

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[1] The syntactic form of external negation may favor MN both in Korean and English but external negation is not a sufficient condition for MN. An NPI in the complement clause is not happily licensed.

   (a)   ??It is not the case that anyone came. (ExtN)

   (b)   ?? amu-to o-n key ani-ya (ExtN) (K)
[2] This may be regarded as a variant of external negation, as property negation.

[3] Sojung Im (pc) brought this to my attention. The string *bu **yibande*** in (14) was not found in the Peking University corpus and the anomaly of (14) was confirmed by several native speakers of Chinese.

different quantificational meaning 'usually' and as a predicative noun *pothong* in K and *fuTSUU* in J they have their positive degree meaning of 'common standard.'[4] English has no counterpart of the MN-licensed echoic standard degree modifier 'common,' except the stressed MN-licensed below the middle degree modifier 'A LTTLE'/'A BIT,' previously discussed.

With those marked prosodic features and/or syntactic environments, MN-licensed degree modifiers can take place cross-linguistically, as opposed to DN-licensed ones. We will turn now to the next step: ERP studies.

2. ERPs for MN Adverbials

We conducted ERP experiments with MN adverbials data twice. In the two experiments, we tried to see what happens when MN-requiring adverbials are placed in a short form negation (typically exclusively used for DN) in Korean, not properly in an external negation or a long form negation. Naturally we presented well-formed MN sentences with MN adverbials and ill-formed short form negation sentences with MN adverbials in contrast. In Experiment 1, written sentences were presented visually, whereas in Experiment 2, spoken sentences were presented auditorily.

ERP Experiment 1 Data Set A: Well-formed External Negation with STRESSED MN adverbial in red color vs. ill-formed Short Form Negation with STRESSED MN adverbial all in red. 10 well-formed (with 5 POTHONG sentences and 5 YEKAN sentences), 10 ill-formed sentences (with 5 POTHONG sentences and 5 YEKAN sentences), with 80 fillers, counterbalanced and presented to each.

요즘 ｜ 아이들은 ｜ 보통 ｜ 큰 게 ｜ 아니야
these days children   commonly tall-Comp not-Cop-Dec
'It is not that these days children are COMMONLY tall.'

Fig 2 well-formed: MN-licensed 보통 is in external negation

저 영화 ｜ 어제 ｜ 보통 ｜ 안 ｜ 졸렸어
that movie yesterday commonly not boring
'It is not that that movie yesterday was commonly boring.'

Fig 3 ill-formed: MN-licensed 보통 is in short form negation

Procedure, EEG Measurement and Analysis

a. Subjects were presented with written sentences visually by E-Prime 2.0 our stimulus presentation software.

b. Ag/AgC1 electrodes and Brainamp were used;. VEOG and HEOG were employed with online filtering at 0.1Hz-70Hz, sampling rate at 500Hz, and the impedance of electrodes under 10 kΩ.

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c. To measure individual subjects' brainwave responses to each stimulus, the waves by each stimulus were divided by the time units at which each stimulus was presented. In Experiment 1 with Set A, the averages of the divided waveforms from all the electrodes were measured to get respective significant P-values. By targeting the average of all subjects' ERP responses, we produced the final, grand average curve of ERP responses with the N400, as shown in Fig 12.
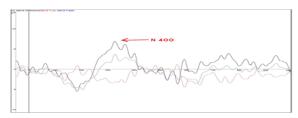

Fig 12 N400 ERP results on Cz. Grand average of four subjects' brain-wave curves. N400 typically reveals semantic anomaly.

Discussion of Experiment 1 on Written Visual Data

What do the results of Experiment 1 say? The N400 ERP results on Cz in Fig 12, the grand average of four subjects' brain-wave curves, reveal that some **meaning**-related anomaly occurred from data Set A of the contrast between the well-formed external MN sentences with the MN-licensed degree adverbials and the ill-formed short form negation sentences with the same MN-licensed degree adverbials. In the Set A experiment, when a subject's eyes in the external negation condition reach the MN-licensed degree adverb marked in red, (s)he must expect an adjective or adverb to be modified by the MN adverb and the complement clause ending, followed by external negation. But in the short form negation condition, when the subject's eyes reach the same MN-licensed degree adverb marked in red, (s)he must expect exactly the same external negation (or a long form negation) that can license the MN degree adverb but in fact (s)he encounters the short form negation in the fourth column, followed by an adjective or adverb to be modified. (S)he would then be in a conflict between the MN adverb and the DN. An MN adverb cannot be licensed or interpreted by DN, which implies that MN and DN are distinctly used at least in pragmatic meaning.

The adverb in red must have been charitably interpreted as a stressed MN adverb. Similarly, even without red for the adverb in the case of the intended ill-formed unstressed adverb condition in the external negation sentence in Set 1, because of the forceful MN bias of the external negation, participants seem to have interpreted the adverb in black charitably as (stressed) MN-licensed degree adverb and that seems to be why no results appeared.

Experiment 2: ERP Analysis of MN Adverbials in Spoken Sentences

Method
Subjects

15 undergraduate subjects (4 females and 11 males) with a mean age of 23.53 years (range: from 20 to 34, undergraduate Seoul National University students)

participated for a cash payment of W25, 000 (about $25/hour). All were standard (Seoul-Gyeonggi) Korean speakers, right-handed, not weak-sighted, with no history of neurological disorders. These conditions were announced beforehand in the internet recruitment and were met in the subjects' written experiment protocol in the lab.   .

Stimuli

In Experiment 2, recorded auditory sentences, unlike the written sentences in Experiment 1, were presented. The match (well-formed) condition with the stressed MN-licensed degree adverb in external negation sentence vs. the mismatch (ill-formed) condition here with the same stressed MN-licensed degree adverb in short form negation sentence is the same as in Experiment 1 (Set A). The only difference lies in that the MN adverb was in red in written sentences of external negation and short form negation in Experiment 1 but the same MN adverb was heard or auditory in recorded sentences of external negation and short form negation in Experiment 2.

In the match (well-formed) condition, **30** external negation sentences (15 with **pothong** 'commonly' and 15 with **yekan** 'ordinarily') were prepared, and in the mismatch (ill-formed) condition, **30** short from negation sentences (15 with **pothong** 'commonly' and 15 with **yekan** 'ordinarily'), **60 experimental sentences in total**, were prepared, as well as **80 filler sentences**, **totaling 140 sentences**. The MN-licensed degree adverbs were all stressed in the **spoken** sentences. Each subject heard all these types, but with each sentence randomly assigned to one type.

The **Well-formed Condition** sentences and the **Ill-formed Condition** sentences were constructed in the same fashion as done for Experiment 1.

Procedure, EEG Measurement and Analysis

In order to keep the participants attentive during the whole session, they were told to press M if the sentence just heard is natural and to press Z if not natural, at the end of each sentence heard. From this test, we could distinguish a group of seven participants who made the wrong opposite responses 11 to 30 times from the rest who made less than six wrong responses. We eliminated the seven ill-behaved subjects from the analysis. Because a last minite E-Prime programming error (of placing a pair of anomalous sentences in a row) was found, one relevant subject was also eliminated and the total left for analysis was seven (7) subjects.

Significant differences were detected at the five electrode sites near the center (particularly C4) with the N400 effect in Experiment 2. This is slightly different from Experiment 1, where the locus was exactly Cz (center) of the scalp. In order to decrease the noise effect, the ERP signals were down sampled to 30Hz (and the +-200uv ones (30-40 out of 115~117) were eliminated).

By employing the t-value of the T-Test as the Test Statistics in Permutation Test, we obtained the following:

(16)   a.   From the five electrode sites (C4, CP2, CP5, P4, P7) significant differences between

the mismatch (ill-formed) (S10 in the E-Prime) condition and the match (well-formed) (S20 in the E-Prime) condition were obtained. 5,000 times repeated; α=0.05, [IMG1].

b. ANOVA: The following were examined:

   (i) subjects (random) x experiment manipulation (repeated measures) (ii) electrodes (random) x experiment manipulation (repeated measures)

An F1 repeated measures ANOVA with hemispheres (2) x ROIs (electrodes) x manipulation is desirable but will be addressed in a later refinement with the total raw data.

Discussion of Experiment 2

As indicated, the N400 effect was elicited from the five electrode sites near the center on both hemispheres including C4 in Experiment 2 with the spoken sentences in which MN-licensed degree adverbs placed in the matching external (MN) sentences vs. those placed in the mismatching short-form negation (DN) sentences. A certain difference with the results of Experiment 1 with the written sentences lies in that the N400 effect was elicited from channel Cz (center) in Experiment 1. The difference may be due to visual vs. auditory data. The same perspicuous negativity with the N400 effect in Experiment 2, however, should be caused by the same meaning-related anomalies. The N400 is 'qualitatively distinct' from the P600, which is a reflection of syntactic anomalies such as number and gender agreement, phrase structure, verb subcategorization, verb tense, constituent movement, case, and subject-verb honorification agreement to be added in this work (see Osterthout et al (1999) for the distinction, stating that the ERP brain responses to semantic/pragmatic anomalies (selection restriction violation etc.) is dominated by a large increase in the N400 component and the response to a disparate set of syntactic anomalies is dominated by a large-amplitude positive shift. See Kutas et al (2011) for a survey of ERP N400 and meaning.
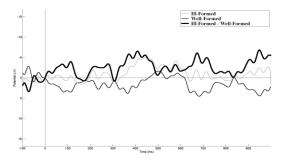
Fig 19: The N400 elicited at C4.

3. General Discussion of ERPs for MN Adverbials

The markedness hierarchy of the three different types of S must be:

(17) MN S> DN S> Affirmative S[5] (DN = descriptive negation)

MN reveals phonetic and/or syntactic prominence in Contrastive Focus (CF) in contrast to DN in English/Korean. Because the stressed *POTHONG/YEKAN* in Korean cannot appear in a positive sentence, as in (11d), researchers so far could not distinguish this from NPIs in Korean linguistics (Cho et al 2002; Whitman et al 2004). But crucially they cannot co-occur in a negative sentence. A long form negation in Korean can license either an NPI or an MN adverb but only separately. See (1a) with an NPI and (11b) with an MN adverb, both licensed by long form negation. Not the same negation can, however, license both NPI and MN-adverb at the same time.[6] Observe (18).

(18) *amwu* yeca–**to** *POTHONG/YEKAN* yeppu-ci anha

    any woman-even commonly pretty-conn not(LF)

    'Not any woman is commonly pretty.' (Intended)

Regarding the distinct functions between MN and DN, unlike scholars such as Russell (1905) and Karttunen & Peters (1979), who advocate the semantic ambiguity position, Horn (1985, 1989) takes the pragmatic ambiguity position. Horn's position is based on the unavailability of the implicated upper bound of weak scalar predicates (e.g. ---*we don't like coffee, we love it*), which he argues is pragmatic. It is a denying of the assertability or felicity of an utterance or statement rather than negating the truth of a proposition. His pragmatic ambiguity must be between two uses MN and DN in his still one semantic negation monoguist position. Levinson's (2000) criticism that even a semantically negated statement doesn't have any implicatures is not tenable. Some more echoic, nonveridical contexts may license MN uses, often rhetorically. I argue that the prosodically frozen MN uses of *A LITTLE*, **POTHONG** (K), and *fuTSUU* (J) and lexicalized MN uses of *YEKAN* (K) and *YIBANde* (C) have their pragmatic **meaning** associated with MN. On the other hand, the context-driven or relevance-theoretic approach by Sperber & Wilson (1986), Carston (1988, 1998), Noveck et al (2007), Breheny et al. (2006) and Noh et al (2013) also as monoguists argue that there is no pragmatic 'ambiguity' or separate MN use/meaning and that scalar implicature is by the pragmatic enrichment of the scalar term involved. So, the literal form *a or b* as excluding *a and b* is due to the contextual enrichment from inclusive ('literal') to exclusive, not by default for them. But consider 'not *a or b*' by DN becoming 'not *a and b*'='neither *a* nor *b*.' We need MN to get *a and b* from *a or b*.' To settle the debate, we need empirical, experimental evidence.

In the case of English and other intonation-based MN languages, prosody distinction elicits the MN vs. DN ambiguity (with the frozen MN ~ MN adverb intonation), as in (6) vs. (7). Here semantically weak degree adverbs like 'a little' were involved. In Korean and Japanese, stress (prosody) distinction (less in J) elicits the same ambiguity but on the standard degree adverb such as 'commonly.' Furthermore, some lexicalized MN-licensed degree adverbs developed in K and C, as in *yekan* 'ordinarily' and *iban*de 'commonly.' The MN-licensed adverbs placed in short form negation (DN) sentence in contrast to those in external negation (MN) sentence elicited the N400.

Unlike the contradictory pairs with explicit or implicit negation involved in the past experiments, which often didn't elicit any immediate N400 effect and needed previous proper linguistic contexts for due expectations (Staab et al 2008), the distinction between MN and DN is not necessarily context-dependent because of MN's marked prosodic and/or lexical features that require MN and the necessary conveyed implicature or following clarification clause.

I give an independent support to my claim that pragmatic meaning anomalies elicit the N400. Sakai's (2013) ERP studies on Japanese honorific processing show: If you address a boy by "Kato-sama" honorifically, it is mismatched with the context and elicits the N400 when in contrast with calling him "Kato."

Noh et al (2013) report in a rare valuable psycholinguistic eye-tracking experiment on MN that the subjects' processing times at the clarification clauses were not different between MN and DN in their eye-tracking experiments, claiming that their results support the contextualist or relevance theory. As indicated, this theory has no separate use or pragmatic 'meaning' and therefore no ambiguity; MN is also truth-functional for them. But the Korean examples this study employed are dubious; the first "MN" example the authors provided is the following short form negation **an** 'not': (18) (7) a. Yuna-nun ton-ul **an** pel-ess-e; ssule moa-ss-e.

    Yuna-TC money-AC not make-PST-DC; rake in-PST-DC
    "Yuna didn't make money; she raked in money."

As we already explained, the short form negation *an* 'not' is typically used as DN in Korean. Then, what can we expect from the bi-clausal construction in (18)? Sheer contradiction and it is. Native Korean speakers who are not biased will all agree. The English bi-causal MN construction is prosodically marked and cannot allow for the concessive *But/but* before the clarification clause. Therefore, if the combined use condition is met, MN can involve even truth-conditional entailment cases and that's why Horn's definition has the expression 'on any grounds whatever.' The following utterance:

(19) I'm *not* HAPPY; (*but) I'm MISERABLE

is an MN case for Horn even though *miserable* entails ∼*happy*, not creating any contradiction. The first clause of (19) objects to the expression HAPPY and asserts the salient alternative clarification clause.[7] Compare it with (3), where *not* leads to a contradiction if read descriptively. This is not an MN for contextualists. Of course, there are quite a few researchers who do not adopt this claim and narrow down the range of MN cases. Although this is still debatable, taking such "DN" examples occurring in external negation that typically licenses MN is not convincing; for Horn, they are simply other cases of MN. This is particularly true of pairs of expressives or emotion-charged expressions such as *wangtaypak* 'hit the jackpot' vs. *phwungpipaksan* 'break into fragments,' occurring in MN-licensing constructions in Korean. Either one of the two expressives may be metalinguistically negated. The participants might have skipped 'non-sensible' MNs quickly 'with a fast effect' (in their sensicality test, the mean sensicality of MNs was significantly lower than that of DNs) and might have read sensible MNs slower than DN ones with a slow effect, resulting in 'no difference' between conditions. As the reviewer supposed, this is rather in support of the 'meaning' approach than their contextualist position. MN-licensing is most optimal in external negation and far less optimal in long form negation. The long form negation tends to lead to DN by default, although it can license MN. The intended

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[5] Giora (2006) takes the symmetry position between (descriptive) negation and affirmation.

[6] A similar phenomenon in English has been indicated: an NPI cannot appear in MN, as in (a). (Karttunen et al (1979:46 47).

  (a) *Chris didn't manage to solve any of the problems---he managed to solve all of them. (Horn 1989, 374).

[7] In German, the SN 'but' is employed for this situation: *Ich bin nicht gluecklich,* **sondern** *ungluecklich*.

MN alternatives in contrast may become more easily non-sensible in long form negation than in external negation and they are doomed to be non-sensible in short form negation.

4. Concluding Remarks

We made the distinction between two types of modifiers: those licensed exclusively by MN and those by DN. The former are some MN-licensed degree adverbs, which are prosodically, lexically and syntactically conditioned, and the latter are NPIs, which reinforce negation unlike the former. The distinction suggests that MN and DN have distinct functions and uses, even if we assume that there is one single logical negation, departing from Russell (1905) and Karttunen et al (1979). Horn's (1985, 1989) pragmatic ambiguity position is in contrast to the context-driven or relevance-theoretic approach by Sperber et al (1986), Carston (1988, 1998), who deny that there is pragmatic 'ambiguity' and claim that scalar implicature is by the pragmatic enrichment of the scalar term involved. How can we settle the debate?

We are curious about possible empirical, experimental evidence that may shed light on the debate. A hypothesis can be: if the stressed MN-licensed degree adverb *POTHONG*/*YEKAN* co-occurs with short form negation (DN) in a sentence, the adverb will not be licensed by MN, which is absent, and as a result the sentence will be anomalous. But would it be meaning-based or structure-based? With this in mind, we conducted two types of ERP experiments on MN for the fisrt time as far as we know: in Experiment 1 (pilot), the pair of written sentences (with the stressed adverb in red) was presented and by targeting the average of all the four subjects' ERP responses, we produced the final, grand average curve of ERP responses with the N400 over Cz, the central site. In Experiment 2, fifteen subjects participated. In the well-formed condition, 30 external negation sentences, with **pothong** 'commonly' and **yekan** 'ordinarily,' and in the ill-formed condition, 30 short form negation sentences, with stressed **pothong** and **yekan**, as well as 80 fillers, were presented all in recorded sound. The N400 effect ranging near 400ms from onset was elicited from the five electrode sites near the center including C4 in this experiment with the spoken sentences. Also, a significant negativity signal around 700ms was detected. This is an interesting difference with the results of Experiment 1, where a rather typical N400 effect was observed. However, nothing like the P600 was detected.

We need more data and analyses but we tentatively claim that the N400 effect was elicited from the two conditions and that if this turns out to be valid it shows that the anomaly is meaning-related, though pragmatic. This tends to be in support of the pragmatic ambiguity position than the contextualist non-ambiguity approach. This is just the first step in the direction of researching brain responses to anomalies involving MN-licensed degree modifiers.

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