

## NEGATION & SENTENCE COMPREHENSION

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18 Egyptian university graduates enrolled in TEOSL program, with approximately the same score on an objective test for their level, were presented with 8 variations of eight sentences (64 in all). Each sentence consists of two parts: the first part changes only in the adjective; and the second was negated by using (un—), (not), and (not un—) attached to the adjective. The purpose was to test the effect of negation on comprehension time. The results supported the hypotheses that negation delays comprehension in the second language; and (not) causes more difficulty in comprehension than the negative prefix (un—), even when (un—) is used to imply sentence negation and not only the adjective. The hypothesis that double negation causes more difficulty than single one, is also confirmed.

Before the work on transformational grammar began in psychology, processes of sentence comprehension were studied by British psychologist Peter Wason in his investigations of psychological aspects of negation (1959, 1961). It was found that negation increases comprehension time. Other studies confirmed the findings that subjects took longer time and made more errors on the negative statements than on the affirmative statements; (Gough, 1965; Slobin, 1966). Similar findings were reported for Hebrew-speaking subjects, (Eifermann, 1961). It seems that the simplest type of sentence, viz. active, affirmative, declarative, produces less interference with the recall of words than any other type of sentence as Deese (1971) has suggested.

In such experiments, it seems that negative sentences are difficult to process not because of their syntactic form but because of the way they must be used in the task at hand. The difficulty seems more a conceptual than a syntactic one. In the sense that plausible or true negatives are easier, faster, and more correctly to process than false affirmatives. This interpretation is supported by findings from other experiments; (Wason, 1965). This makes it clear that semantic and pragmatic factors must be considered along with syntactic variables.

A second point of interest in the comparison is that most of the studies used negators as (not), while others used different negators as (never). Another study used prefix, and (not) plus prefix; (Sherman, 1973). Sherman's study used the double negative in adjectives that do not have the quality of denying a quality, i.e. adjectives that have gained a semantic implication of a certain quality; not of denying a certain quality (as 'impossible' or 'unhappy'). Just & Carpenter (1971)

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found differences between the effects on comprehension of semantic and syntactic negators, but their negatives were not equated in meaning. A comparison of (un—) with (not) varies syntax while holding meaning constant.

A third point is its relevance to the theory that ease of sentence comprehension is inversely proportional to the number of potential deep structures that a sentence can have as each word is reached; (Fodor, Garrett, & Bever 1968; Bever, 1968, 1970). Such a theory would predict that sentences containing (un—) should be easier than those containing (not), because the former has a much smaller range of possible contexts; (Bellugi, 1967; Zimmer, 1964.)

A fourth source of interest is the question of whether 'linguistic economy' leads to 'logical economy'. One might guess that a negative prefixed word comes into common use when a particular stem word is frequently negated. In this view, the linguistic motivation for prefixation would be a possible reduction in comprehension and production difficulty than (not).

Taking all the above into consideration will lead us to predict that (un—) should lengthen sentence processing time less than the word (not), even with those who learn English as a second language.

In the present study, a verification task was used in order to measure the relative effects of (not) and (un—) on the speed and accuracy of sentence comprehension in second language learning. The simultaneous effect of the two types of negation (as in 'not unlikely') was also measured. It may be assumed that (un—) might affect verification clearly in the presence of the second negative. It has been claimed that (un—) negates a word while (not) negates the sentence. To undermine this argument, the prefixed adjectives were used in a way that they might imply sentence-negation rather than word-negation.

#### **Design & Material:**

8 pairs of adjectives were used to produce the stimulus sentences. Each pair consists of a base adjective and its prefixed opposite. The pairs were (likely, un—; usual, un—; common, un—; doubted, un—; expected, un—; necessary, un—; suitable, un—; reasonable, un—).

8 stimulus sentences were created for each adjective pair (for a total of 64 sentences) and each sentence was written separately and clearly on a quarto plastic sheets used for overhead projectors. For each pair, sentences varied in three ways: (a) Reasonableness (R = reasonable & NR = not reasonable) which was determined by the initial clause in the sentence; (b) The presence or absence of the negative prefix; (c) the presence or absence of (not).

For all the adjective pairs, only a single word in the first clause differentiated the R & NR versions (e.g. early/late). Thus the differences in surface structure among the 8 sentences of each adjectives pair were as small as possible.

**Subjects.**

18 Egyptian university graduates enrolled in Public Service Program at Tanta University (College of Education), to learn English as a second language, studied English in the program for two terms; each term lasted for three monthes (50 hrs), with approximately the same score on an objective test for their level with a range of 5 marks only were selected. All of them were males. To eliminate anxiety, they were told that the treatment had no effect on their standing in the program, and that the main purpose of the experiment was to test a new technique of teaching.

**Procedures:**

The experimenter presented the 64 stimulus sentences, one at a time, using an overhead projector that illuminated the sentence when he pressed a switch; depression of the switch also started a timer (accurate to 1/100 of a second). The subject rested his hands on two response switches labeled TRUE & FALSE. The TRUE switch was on the left for half the subjects and on the right for the other half. Each subject was tested individually and was told that his task was "to decide, as fast but as accurately as you can, whether or not each sentence is reasonable, by pressing the switch representing the choice, without sacrificing accuracy for speed. It is very important that you make virtually no errors". Subjects were assured that there were no tricky sentences; and were given an example of a sentence that made sense and one that did not, and a schematic like those in Table I was also presented. Those examples used adjective pair not appearing in the stimulus sentence 'questionable, un—'.

After being told the nature of his task, the subject received two practice trials. He then was permitted to examine the eight schematics (Table I) for five seconds each in order to prevent exceptionally long response latencies that could result merely from unfamiliarity with sentence content. The 64 stimulus sentences were than presented with an intertrial interval of 5 to 10 seconds. The subject was told to press the TRUE switch when the sentence makes sense and press the FALSE switch if the sentence does not. His response appeared as a green or a red light; the experimenter stopped the timer once the light appeared and recorded the choice as well as the time lapse. The order of the sentences was shuffled for every subject.

**Results:**

For each subject, the median response time was determined for each of the eight factor combinations (across adjective pairs). These medians were based on latencies for correct answers only, because latencies for errors are difficult to interpret (Slobin, 1966), and because less than 6% of the responses were erroneous. Thus each median was based on 8 scores, or less if there were errors (the smallest number of scores contributing to any median was 4). Table III presents geometric means of median response time (each mean based on 18 medians). The overall effects of (not) & (un—) on comprehension were of central interest in this study, reasonableness judgements being primarily a means to this

end. The (un—) sentences took significantly longer to verify than positive sentences, (not) sentences took significantly longer than (un—) sentences, and so on.

### **Discussion:**

It could be assumed that the length in verification time in (not) sentences is due to the additional time needed to read the morpheme, which may apply also to the (un—) sentences. Such assumption has been refuted in Sherman's study (1973), and it was found that length could not account for response time difference.

It might be argued, as well, that negative prefixed adjectives occur less frequently than their bases and this may account for their extra difficulty. (not) is far more frequent in English than the negative prefixation (according to Howe's (1966) word count for spoken English), yet the former is more difficult. Bellugi (1967) found that (un—) adjectives may not appear before 4 years, while (not) sentences appear at an average age of 2 years.

The negative prefixation causes less difficulty than the particle (not), so it came to be used as an easing of the use of the particle. So, it has been suggested and motivated by cognitive economic gains, (Bever, 1970). It would be surprising, if the negative prefix caused the same difficulty as the negative particle. For this means that the prefix would be unmotivated.

The results support the view that the language-comprehension mechanism is not a neutral device, responding with equal facility to all inputs, but rather that it is "pre-set" to process certain inputs more quickly than others and more accurately than others as well, (Miller & McNeill, 1969). The results of the present study show that even when negation is at the morphological level, where reversal of sentence meaning is not necessary for correct interpretation, it still slows comprehension. Even if we take into consideration the results of Gough's study (1965) that "the hearer of a complex sentence must transform the sentence into the underlying kernel sentence before understanding it, and hence that speed of understanding a sentence would vary with the number and nature of the transformation separating it from its kernel", the use for the adjective to imply the negation for the whole sentence than the adjective helps to lessen this burden.

In classroom practices, a pupil who cannot give correct answer, especially in reading, may not be completely wrong and it may not be necessary to spoonfeed him with an appropriate response or to tell him that he is wrong; for this may force him to throw out what he does know and start again or to give up in despair. No text is comprehensible, if it is looked at without cognitive easiness.

**TABLES:**

**Table I  
Stimulus sentences**

- A) Trial sentences:  
 - He is uninterested, so it is questionable that he will come to this meeting. (uninterested/interested) (questionable/not, un—, not un—)
- B) Test sentences:  
 1- He is always early, so it is likely that he will come before any one. (early/late) (likely/not, un—, not un—)  
 2- It is cold here, and it is usual to have the heater working. (cold/hot) (usual/not, un—, not un—)  
 3- The air is polluted here, so it is common to see people with breath troubles. (polluted/pure).....  
 4- He is very poor, so it is doubted that he will lend me money. (poor/rich).....  
 5- She is very stupid, so it is expected that she will fail. (stupid/clever).....  
 6- He is very weak, so it is necessary for him to ask for help. (weak/strong).....  
 7- Esmat is a woman, so it is suitable for her to wear earrings. ( a woman/a man)\*.....  
 8- The price is very low, so it is reasonable to buy now. (low/high).....

**Table II  
Sentences containing 'likely & unlikely'**

- |    |   |                    |       |
|----|---|--------------------|-------|
| 1- | He is always early, so it is likely that he will come before every one. |                    |       |
| 2- | ..... late,   | ..... likely       | ..... |
| 3- | ..... late,   | ..... unlikely     | ..... |
| 4- | ..... early,  | ..... unlikely     | ..... |
| 5- | ..... late,   | ..... not likely   | ..... |
| 6- | ..... early,  | ..... not likely   | ..... |
| 7- | ..... early,  | ..... not unlikely | ..... |
| 8- | ..... late,   | ..... not unlikely | ..... |

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\* 'Woman' is not an adjective, but it is used here as it makes no difference for the main purpose of the stimulus.

Sentence	negative present sentence type	Reasonableness
1- .....	P	R
2- .....	P	NR
3- .....	Un—	R
4- .....	Un—	NR
5- .....	Not	R
6- .....	Not	NR
7- .....	Not un—	R
8- .....	Not un—	NR

Table III  
Mean response times\* (in seconds) and error rates (percentage) for sentence types and reasonableness values

Sentence Type	R	NR	AVERAGE
	time error	time error	time error
P	2.7 00	2.9 3.6	2.8 1.8
Un—	3.1 3.6	3.2 5.4	3.1 4.5
Not	4.4 5.4	4.3 2.7	4.4 4.0
Not un—	5.5 11.6	5.6 9.8	5.5 10.7

To sum up, response time and error data clearly show that (un—) increases the comprehension of the difficulty of sentences although to a lesser degree than (not). (un—) may help the listener to reverse only the word not the whole sentence. Although the prefixed adjective asserts a quality, it remains a second class citizen in the lexicon of adjectives.

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