



AN EXPERIMENTAL STUDY ON THE IMPACT OF NEGATIVELY FRAMED SENTENCES ON SENTENCE-PICTURE VERIFICATION TIME AND ERROR RATES.

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ABSTRACT:

This experiment explores how negatively framed sentences affect sentence-picture verification time and error rates. Prior theories suggest that negative sentences are harder to process leading to longer response times and more errors. The experiment involved 20 college students and found that participants took significantly longer time to verify negatively framed sentences (5.36 seconds on average) compared to positively framed ones (3.21 seconds). Error rates were also slightly higher for negative sentences. The findings confirm that negatively framed sentences demand more cognitive effort leading to longer verification times.



KEYWORDS: *positive framed sentence, negative framed sentence, language comprehension, and attention.*

INTRODUCTION:

Language plays a crucial role for cognitive learning skills. According to Psychologist Singer in 1990, language encompasses key aspects of learning such as perception and schemas. It is divided into two parts: language comprehension and language reproduction including speech perception and various influencing factors.

Language Comprehension

Language comprehension involves the ability to understand spoken, written, or sign language. It includes decoding sounds, words, and sentences to derive meaning. Language reproduction, on the other hand, involves the ability to produce coherent speech or text based on the comprehension of language.

Factors Affecting Language Comprehension

a) Passive Voice: Passive voice structures are generally harder to understand than active voice structures. For example, "Rama eats a mango" (active) is more straightforward to comprehend than "A mango is eaten by Rama" (passive). The passive voice often requires additional cognitive processing to understand the agent and the action, which can slow down comprehension.

b) Ambiguity: Ambiguity arises when words have multiple meanings or when sentences can be interpreted in different ways. For instance, the words "right" and "write" sound the same but have

different meanings. Such ambiguities can create confusion and make it difficult to derive the intended meaning of a sentence. Ambiguous sentences require more cognitive effort to resolve the different possible interpretations.

c) Negatives: Negative sentences are often more complex and take longer to process than affirmative sentences. For example, the sentence "The cat is not on the mat" requires the listener to understand the negation and then form a mental image of the scenario. Affirmative sentences, such as "The cat is on the mat," are processed more quickly and with less cognitive load.

Role of Attention in Language Comprehension

According to Singer (1990), attention plays a critical role in language comprehension. It involves focusing cognitive resources on relevant linguistic information while filtering out distractions. Effective attention enables individuals to:

1. Attentional focus helps in distinguishing between different phonetic sounds and understanding words accurately, especially in noisy environments.
2. Resolve Ambiguities: Attention helps in resolving ambiguities by allowing the listener or reader to consider the context and select the appropriate meaning of a word or sentence.
3. Process Complex Sentence: Complex structures, such as passive voice and negative sentences, require sustained attention to be processed accurately. Attention helps in maintaining and manipulating information in working memory to understand these structures.
4. Integrate Information: Attention aids in integrating new linguistic information with existing knowledge, allowing for better comprehension and retention of language.

In summary, language is essential for cognitive learning, with comprehension and reproduction being key components. Factors such as passive voice, ambiguity, and negatives can affect language comprehension, and attention plays a vital role in effectively processing and understanding language.

METHODOLOGY

HYPOTHESES

1. The Mean Reaction Time is higher for negatively framed sentences as compared to Affirmatively framed sentences, and
2. The number of errors is higher for negatively framed sentences as compared to affirmatively framed sentences.

VARIABLES

Independent Variable

Framing of sentences (2 levels)

- 1) Positive sentences (without the word 'not')
- ii) Negative sentences (with the sentences 'not')

Dependent Variable

1. Time taken to respond correctly that the sentence does or does not describe the relationship between the geometrical figures/signs/symbols/letters/numbers in the picture, and
2. Number of errors.

CONTROLS

1. Half the sentences of each type negative and positive were so framed that "True" was the correct response, while for the other half, "False" was the correct response. The four types of cards (T+, F+, T-, F-) were presented in a Random order. This was done to prevent the development of a set to respond in a certain way.
2. Four counterbalanced sets of cards were prepared in such a way that each representation of geometrical figures was paired with each type of sentence (Positive-True, Positive-False, Negative-True, Negative-False) across the four sets. Each set was used equally often across the group of Participants.

3. In each set, 32 sentences were used, out of which 8 each were T +, F +, T-, and F-
4. Each set consisted of 32 cards, with each of the 4 kinds of relationships between the geometrical figures Left-Right, Above-Below, Bigger-Smaller and Inside-Outside presented on 8 cards.
5. Two cards depicting the same kind of relationship were not presented successively.
6. The E gave a "ready" signal, started the stopwatch and simultaneously started reading the sentence aloud during stimulus presentation. Immediately after E finished the reading of the sentence, E showed the card with geometric figures on them to the Participant over the screen. E stopped the stopwatch exactly when the Participant responded "True" or "False". E did all three tasks with the same precision across all the sentences. (The sentence was written on reverse side of the card to be shown to the Participant, so that E could read it with ease, just before showing the card over the screen).
7. The reaction time for each sentence was accurately recorded.
8. All four kinds of relationships were demonstrated with the help of 4 sample cards.

SAMPLE

A group of 20 college students from K.M.C. College, Tal. Khalapur, Dist. Raigad, were participated in the experiment.

APPARATUS AND MATERIALS

- 1) 32 stimulus cards, each having a representation of geometrical figures/signs on it and a list of 32 sentences describing the figures on the cards. 16 sentences were negatively framed, and the other 16 were affirmatively framed.
- 2) Four sample cards
- 4) Screen
- 5) Record sheet
- 6) Stationery

DESIGN

A repeated measures design was used in this study, wherein a single independent variable has two levels. This independent variable consisted of the framing of sentences, categorized into two conditions: negatively framed sentences and affirmatively framed sentences. Each participant in the study was systematically exposed to both levels of the independent variable. This means that all participants encountered both the negatively framed sentences and the affirmatively framed sentences during the experiment.

DISCUSSION

The experiment was conducted to determine if sentence-picture verification was more challenging with negatively framed sentences compared to positively framed sentences.

The results from 20 participants show that the average response time (RT) for negatively framed sentences was 5.36 seconds, while for positively framed sentences, it was 3.21 seconds. The average number of errors was 1.8 for positively framed sentences and 1.9 for negatively framed ones. This indicates that participants took longer and made more errors with negatively framed sentences compared to positively framed ones.

Table no. 1

	Mean R. T.	Mean no. of Errors
Negatively framed Sentences	5.36 Sec.	1.9
Positively framed Sentences	3.21 Sec.	1.8

$t(19) = 3.65, p < .001$, one-tailed

$t(19) = .36$, not significant

The reactions of participants to negatively and favourably framed sentences are compared in Table No. 1, which indicates that the mean reaction times for the two types of sentences were 3.21 and

5.36 seconds, respectively. This implies that phrases with negative framing require more processing time. Furthermore, the mean number of errors for negatively framed statements (1.9) was marginally greater than for positively framed sentences (1.8), suggesting that negative framing somewhat increases errors, but with negligible effects on accuracy.

According to (Clark et al., 1973) theory, negatively framed sentences take more time and lead to more errors than positive ones. This theory was highlighted in studies comparing the effects of negative and positive sentence framing, showing that negative sentences are harder to understand.

Similarly, (Clark & Chase, 1972) found that people take longer and make more mistakes with negatively framed sentences. They introduced the Conversation Model, which suggests that when we hear a sentence, we create a mental image of it. For positive sentences, the image is straightforward, but for negative sentences, we first create the image and then mentally cancel it, which takes more time and leads to more errors.

The experiment mentioned above supports the theories that negatively framed sentences take longer to complete and produce more errors than positively framed sentences.

The fact that it takes longer to check or understand negatively framed sentences than positively framed sentences is one example of how this applies to everyday life. The statement "Few people strongly deny that the world is not flat" (Matlin, 1995) was used to illustrate this point. The more negatives there are, the more difficult it is to receive or comprehend the information (Sherman, 1976).

CONCLUSION

1. The Mean Reaction Time is higher for negatively framed sentences as compared to Affirmatively framed sentences.
2. The number of errors is higher for negatively framed sentences as compared to affirmatively framed sentences.

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