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INFLUENCE OF THE ORDER OF LANGUAGES LEARNED OVER ATTENDED MESSAGE IN A DICHOTIC LISTENING TASK

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Abstract

Dichotic Listening Tasks have been a very fascinating tool, used over time to study various auditory sensory processes. A variation of it, with a paragraph of 10 sentences each, spoken at approximate speed of 150 wpm, has been employed here to explore whether the order in which the languages are learned by an individual influences the message which is attended in a dichotic listening task. A sample of 120 college students was taken, whose first language L1 was Marwari dialect of Rajasthani, second language L2 was Hindi and the third language L3 was English. They were given a sample of each language in each ear against another language in the other ear, with each language sample provided in both Left and Right ear to counterbalance any potential effect of REA. The language of the message attended was noted. It was found that regardless of the ear in which presented, L1 was preferred over L2 and L3 and L2 preferred over L3 significantly, with L3 preferred least; indicating existence of a hierarchy of languages, where the language learned first may have chances of significant preference over others.

Keywords: Dichotic-Listening, First-language, Attended-message, right-ear-advantage, Language-hierarchy

Introduction

In order to understand the context of the research undertaken, it is important to understand the elemental processes involved into it.

Sensation and Perception

The most basic process to understand can be that of sensation and perception. Sensation can be called one's initial contact with its environment. When an individual is present in its environment, it is cocooned with various stimuli present in the environment, consisting of various individual properties, demanding attention. The sense organs registering the stimuli is sensation and its interpretation is perception.

In simple words, sensation is "inputs about the physical world provided by our sensory receptors" (Baron, 2013) and perception is "the process through which we select, organize and interpret input from our sensory receptors." (Baron, 2013)

It can be understood by the figure below:

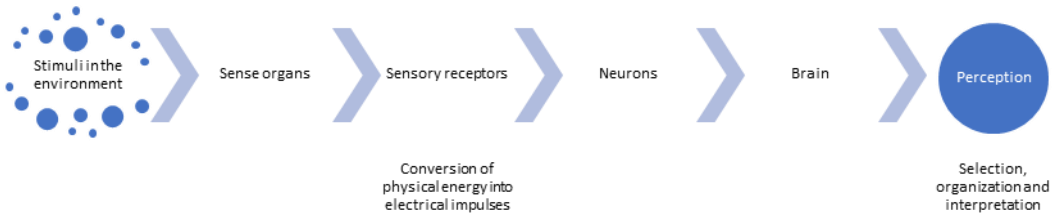

figure 1. sensation and perception

Selective Attention

The sense organs receive the sensation of the stimuli from the environment and convert them into electrical impulses for the neurons to carry to the brain where selection of few from many is done, the information is organized, and interpretation is done. This process is perception.

The quantity of information is usually more than what a person can utilize. So it usually responds to certain stimuli out of all and rest all are processed in the background. This process of selection of a few out of many and their interpretation and organization is called selective attention.

The term *selective attention* refers to the fact that we usually focus our attention on one or a few tasks or events rather than on many. To say we mentally focus our resource implies that we shut out (or at least process less information from) other competing tasks. (Galotti, 2008)

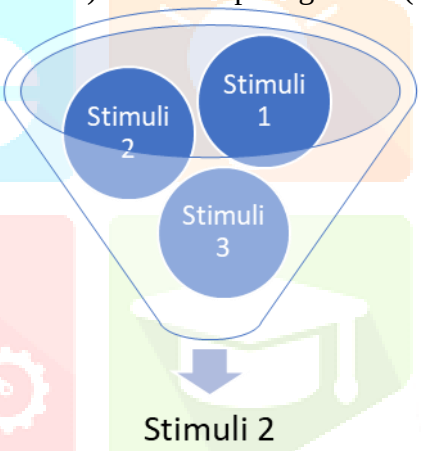

figure 1. selective attention: selection of one stimulus among others

Dichotic Listening Task

In a conventional dichotic listening task, a person is introduced to two different auditory stimuli concurrently, each into different ear through headphones. Depending upon the type of test, the replies are demanded from what the participant hears.

Donald Broadbent pioneered with the use of systematic dichotic listening task in his work regarding attention in 1950s.in his experiments, participants were presented with series of digits in either ear and the results formed the building blocks of filter model of attention. Subsequently, Dichotic Listening Tasks were used Doreen Kimura in 1960s in her work on

lateral asymmetry of human brain, concluding that in healthy participants, there exists a right-ear superiority for perception of verbal stimuli, and left-ear superiority for the reception of melodies. Later, remarkable work was done by Donald Shankweiler, Michael Studdert-Kennedy and Tim Rand in late 1960 and early 1970s.

DLT and shadowing

In shadowing processes, the subject is presented with audiotape with different messages, with one message heard in one ear and the other in other ear simultaneously. The subject is asked to ‘shadow’, or repeat out loud one of the messages which captures the attention. As explained by Galotti, “A person listens to an audiotape over a set of headphones. On the tape are different messages, recorded so as to be heard simultaneously in opposite ears. Participants in a dichotic listening task typically are played two or

more different messages (often text borrowed from literature, newspaper, stories or speeches) and asked to "shadow" – that is, to repeat aloud- one of them. Information is typically presented at a rapid rate (150 words per minute), so the shadowing task is demanding. At the end of the task, participants are asked what information they remember from either message – the attended message or the unattended message. " (Galotti, 2008)

It has been argued that due to high auditory tension, most of the mental resources are occupied in shadowing attended message, thus leading to few resources left of non attended message.

These experiments have lead to some fascinating findings, like attention to one's own name (Cocktail- party effect) (Moray, 1959), meaning of the message, message with subjective importance (Treisman, 1960), interference of backward speech (Wood & Cowan, 1995) and working- memory span (Conway, Cowan, & Bunting, 2001)

Selective attention Models

There have been many models introduced related to selective attention and how it works, the relevant have been discussed below:

Broadbent's Filter Model (Broadbent, 1958)

Broadbent proposed the filter model which stated that there exists a selective filter, through which both attended and unattended messages pass. Based on their physical attributes like location of source, loudness or pitch, the message which is to be attended is selected and the message not to be attended is completely blocked. Then the message passes through a bottleneck and goes into working memory.

Cocktail Party effect (Moray, 1959)

It is a phenomenon where focus is on a particular stimulus out of a variety of stimuli being filtered out simultaneously, like attention given to one's own name taken in a crowded party with multiple conversations going on together.

Attenuation Model (Treisman, 1960)

It is a modification of filter model, where it is suggested that the unattended message is not completely blocked, just weakened. Its processing is done at an unconscious level, and instead of a bottleneck, there exists a threshold, where messages like one's own name carry lower threshold and passes easily.

Methodology

Problem

To explore the influence of the order of languages learned over attended message in a Dichotic Listening Task

Objectives

1. To explore the relation between language preferred and order of learning of language.
   1.1. To study if any difference exists between preference of L1 and L2
   1.2. To study if any difference exists between preference of L2 and L3
   1.3. To study if any difference exists between preference of L3 and L1

Hypotheses

1. H1. There would exist no influence of order of learning of language over number of times a language is preferred.
   1.1. There would exist no difference in preference of L1 and L2
   1.2. There would exist no difference in preference of L2 and L3
   1.3. There would exist no difference in preference of L3 and L1

Sample

A stratified random sample of 120 college students was selected from the population for the study. These students belonged to Jodhpur city with their L1, or the first language/ mother-tongue being Marwari-Rajasthani. It was ensured that

- L1 (Marwari-Rajasthani) was spoken at their house frequently while conversing and the first language they learned.
- L2 (Hindi) was learned at an early stage, right before going to school or at time of going to school.
- L3 (English) was learned at school and was not frequently spoken at home or between peers, but the subject was proficient in the language.

The total sample consisted of 80 male and 80 female students.

Gender	Number of students
Male	60
Female	60
Total	120

Variables

Independent Variables in this research are:

- Order of language learned:
  - Language learned first(L1)
  - Language learned second(L2)
  - Language learned third(L3)

Dependent Variable in this research is Preference of Language

Result

The statistical analysis of raw data of preference of L1 and L2 is as follows:

table1. chi-square for preference of l1 and l2

Language Preferred	**Null Proportion**	**Observed Count**	**Expected Count**	**Residual (Obs-Exp)**	**Pearson Residual**	**Standardized Residual**	**X^2**	**P-value**
L1	0.500	72	60.0	12.0	1.55	2.19	4.80*	0.028
L2	0.500	48	60.0	-12.0	-1.55	-2.19		
Total	1.00	120	120.0					

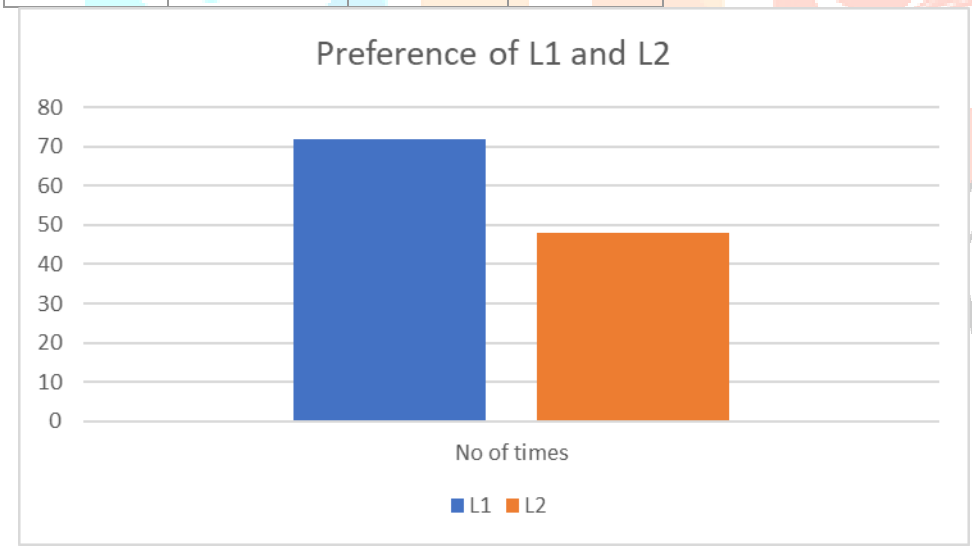

figure 3. preference of l1 and l2

After the administration of DLT in Session I, the raw data collected was analyzed by calculation of Chi - square, it was found that for observed count of 72 for L1 and 48 for L2, against expected count, the residual came out to be 12.0 for L1 and -12.0 for L2. The value of chi-square (X^2) came out to be 4.80. For Df =1, the value of X^2 is significant at 0.05 level.

At the beginning of the research, a null hypothesis was adopted, which claimed that there would be no difference between the two variables. To check if this stands true or not, the p-value was calculated, which came out to be 0.028. The value is <0.05, which indicates that the chances of the null hypothesis being rejected is high.

The statistical analysis of raw data of preference of L2 and L3 is as follows:

table 2. chi-square for preference of l2 and l3

Language Preferred	Null Proportion	Observed Count	Expected Count	Residual (Obs-Exp)	Pearson Residual	Standardized Residual	X^2	P-value
L2	0.500	100	60.0	40	5.16	7.30	53.33 **	<0.0001
L3	0.500	20	60.0	-40	-5.16	-7.30		
Total	1.00	120	120.0					

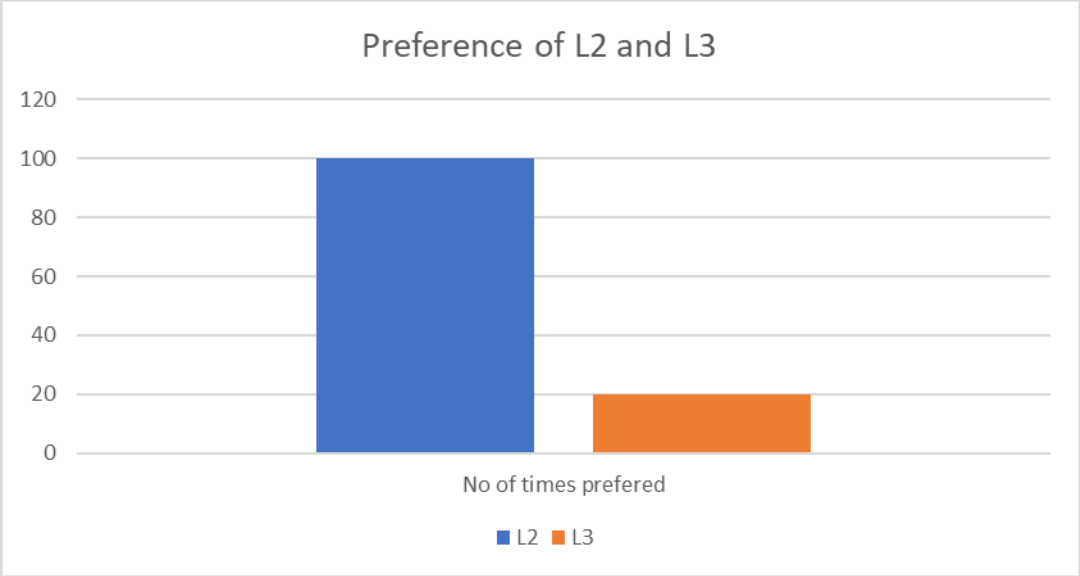

figure 4. preference of l2 and l3

After the administration of DLT in Session II, the raw data collected was analyzed by calculation of Chi - square, it was found that for observed count of 100 for L2 and 20 for L3, against expected count, the residual came out to be 40 for L2 and -40.0 for L3. The value of chi-square (X^2) came out to be 53.33. For Df =1, the value of X^2 is significant at 0.01 level.

At the beginning of the research, a null hypothesis was adopted, which claimed that there would be no difference between the two variables. To check if this stands true or not, the p-value was calculated, which came out to be <0.0001. The value is <0.01, which indicates that the chances of the null hypothesis being rejected is very high.

The statistical analysis of raw data of preference of L3 and L1 is as follows:

table 3. chi-square for preference of l3 and l1

Language Preferred	Null Proportion	Observed Count	Expected Count	Residual (Obs-Exp)	Pearson Residual	Standardized Residual	X^2	P-value
L3	0.500	15	60.0	-45	-5.81	-8.22	67.50 **	<0.0001
L1	0.500	105	60.0	45	5.81	8.33		
Total	1.00	120	120.0					

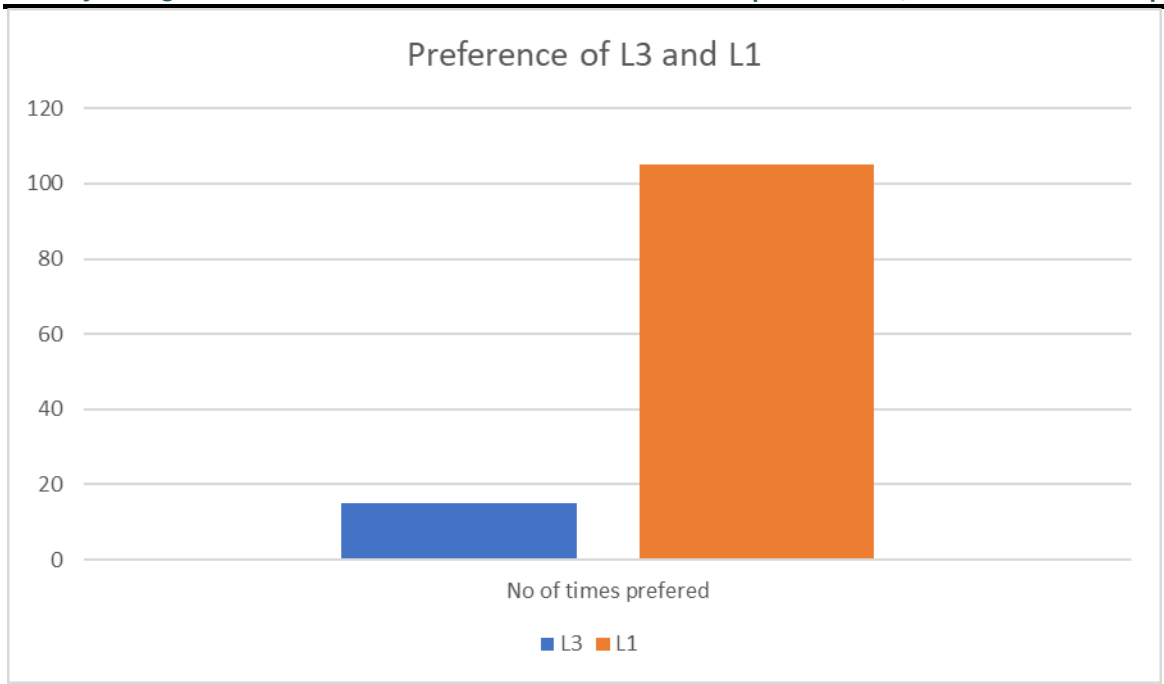

figure 5. preference of l3 and l1

After the administration of DLT in Session III, the raw data collected was analyzed by calculation of Chi - square, it was found that for observed count of 15 for L3 and 105 for L1, against expected count, the residual came out to be -45 for L3 and 45.0 for L1. The value of chi-square (X^2) came out to be 67.50. For Df =1, the value of X^2 is significant at 0.01 level.

At the beginning of the research, a null hypothesis was adopted, which claimed that there would be no difference between the two variables. To check if this stands true or not, the p-value was calculated, which came out to be <0.0001. The value is <0.01, which indicates that the chances of the null hypothesis being rejected is very high.

Discussion

The obtained results show a significant preference of L1 over L2 and L3, and a significant preference of L2 over L3. This result is similar to that of Tiv, o'Regan and Titone (2021), who found that attending the message in L2 required more mentalizing to logical inferences than L1 readers, thus taking up more of cognitive resources for attention than L1. Thus in an induced auditory stressful situation like that created by DLT, quicker processing might be given preference and one requiring more cognitive resources might not. This presumption also confirms to the findings of Sánchez, Struys and Declerck (2021) who in their research on language switching found that switching costs cognition more when done in L2 than when done in L1. Thus, we can conclude the probable cause of this occurrence to be the tendency of fastest choice of attended message with least expenditure of cognitive resources in a stressful auditory environment.

However, these findings indicate presence of a clear hierarchy of languages when it comes to attended message, where the language learned before seems to be preferred over subsequent languages, and so forth.

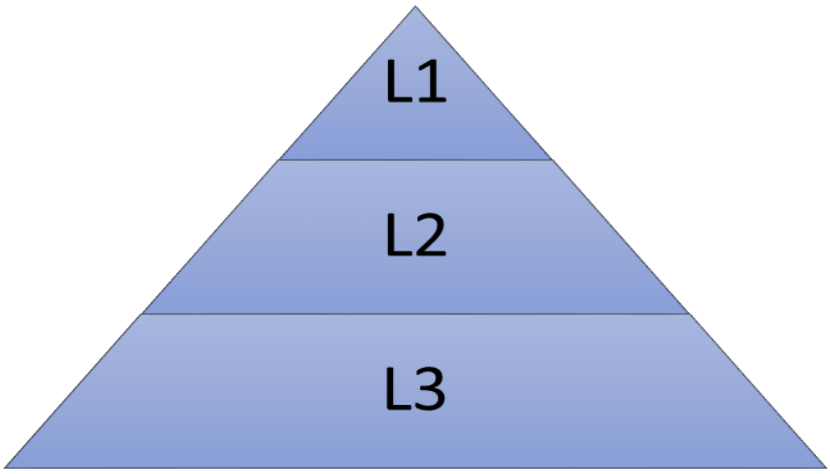

Figure. hierarchy of languages in attended messages in DLT

When looking at the results in the light of the selective attention models, according to Triesman's model (1960), the language learned later has higher chances of passing through the filter in weakened state. When considering Wood and Cowen (1995)'s model, the language learned later does consume cognitive resources, even if not attended to, but less than those used in message attended.

However, many other factors might prove to be influencing this outcome, like effect of language most used, or the language most exposed to, etc.

References

Baron, R. A. (2013). Sensation and perception: making contact with the world around us. In R. A. Baron, *Psychology* (pp. 84-85, 99). New Delhi, India: Pearson Education, Inc.

Broadbent, D. E. (1958). *Perception and Communication.* New York: Pergamon Press.

Bronkhorst, A. W. (2000). The cocktail party phenomenon: A review on speech intelligibility in multiple-talker conditions. *Acta Acustica United with Acustica, 86*, 117-128.

Contributors, W. (2022, March 14). *Cocktail party effect.* Retrieved from Wikipedia, the free encyclopedia: https://en.wikipedia.org/w/index.php?title=Cocktail_party_effect&oldid=1064288007

Conway, A. R., Cowan, N., & Bunting, M. F. (2001). The cocktail party phenomenon revisited: The importance of working memory capacity. *Psychonomic Bulletin and Review, 8*, 331-335.

Galotti, K. M. (2008). Chapter 4 : Paying Attention. In K. M. Galotti, *Cognitive Psychology : Perception, Attention, and Memory* (pp. 91-98). Delhi, India: Cengage Learning India Private Limited.

Marinato, G., & Baldauf, D. (2019). Object based attention in complex, naturalistic auditory streams. *Scientific reports*, *9*(1), 2854.

Moray, N. (1959). Attention in dichotic listening: Affective cues and the influence of instructions. *Quarterly Journal of Experimental Psychology*, 56-60.

Sánchez, L. M., Struys, E., & Declerck, M. (2021). Ecological validity and bilingual language control: voluntary language switching between sentences. *Language, Cognition and Neuroscience*.

Shinn-Cunningham, B. G. (2008). Object based auditory and visual attention. *Trends in cognitive sciences*, *12*(5), 182-186.

Tiv, M., O'Regan, E., & Titone, D. (2021). In a bilingual state of mind: Investigating the continuous relationship between bilingual language experience and mentalizing. *Bilingualism: Language and Cognition*, *24*(5), 1-14.

Treisman, A. M. (1960). Contextual cues in selective listening. *Quarterly Journal of Experimental Psychology*, 12, 242-248.

Wood, N. L., & Cowan, N. (1995). The cocktail party phenomenon revisited: Attention and memory in the classic selective lisening procedure of Cherry (1953). *Journal of Experimental Psychology: General*, *124*, 243-262.