Concept Sharing Across Verb Classes and Metaphors in Banjara

A thesis submitted to the University of Hyderabad in partial fulfilment of the requirements for the award of

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In

Cognitive Sciences

BY

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This thesis is free from Plagiarism and has not been submitted previously in part or in full to this or any other University or Institution for the award of any degree or diploma.

Parts related to this thesis have been published in the following:

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Abbreviations

Abbreviations	Full forms
1SG	First person, Singular
3FSG	Third Person, Feminine, Singular
3MSG	Third person, Masculine, Singular
3PL	Third person, Plural
3-D	Three Dimensional
ABL	Ablative
ACC	Accusative
AG	Angular Gyrus
ANOVA	Analysis of Variance
BE	Aspect
CHC	Cattle Horn Carroll
CL	Classifier
CVC	Consonant Vowel Consonant
DAT	Dative
DGT	Direct Grading Test
EEG	electroencephalogram
FAT	Free Association Test
FMRI	Magnetic Resonance imaging
FUT	Future
GEN	Genitive
INF	Infinitive
LOC	Locative
MGT	Metaphor Generation Task
MRT	Mental Rotation Task
NOM	Nominative
PST	Past
PRES	Present
PRO	Aspect
RT	Reaction Time

Abstract

Concept sharing across verb classes is a novel thing in cognitive linguistics. Earlier to this many researchers in this area have worked on other grammatical categories like nouns, adjectives and other classes. Apart from working on these grammatical categories they also have worked on various sub-classes of these grammatical categories, especially in major languages. None of the works has made an effort to think from the indigenous or tribal language perspectives. Since the research belongs to an indigenous community called the Banjara language, an effort has been made to work on this language by taking inputs from the earlier works. After selecting the language verbs classes and prototypes are considered as the major theme of the present work. Apart from verb classes and prototypes, the study also attempted to look at the metaphors and their generation with the help of various software available in the field of cognitive linguistics.

The word prototype has been derived from the industrial perspective, especially, making a prototype design of a particular instrument or an object. For example, if one takes into consideration the aeroplane, it has various subparts to come to the conclusion of the imaginary in our mind that it is an aeroplane. Now, there is a question which one we call as a prototype, whether the subparts of the aeroplane or the final outcome of the aeroplane is called as a prototype. This was worked extensively by various researchers in the field of cognitive linguistics, especially Eleanor Rosch which is prominent work in the field. The same concept is applied for the first time to the English language. The present work is a replica of the work done on English language carried out by Rosch in 1983. All the experiments were divided into four tasks, viz. Mental rotation task, direct grading, free association and metaphor generation task. The first three include various types of verbs drawn from the Banjara language. The fourth task is metaphor generation which is a higher level than the verb classes and their prototypes.

The study focused on the mechanisms involved to help how to generate metaphors in Banjara language and the contributions of cognitive functions like vocabulary and RT (familiarity and interoperability) to metaphor generation. In particular, the main focus was on the differential contribution of familiarity and interoperability to simple, novel and conventional metaphor generation. Our hypothesis was consistent, the main finding that emerged from familiarity and interoperability is that both the metaphors can be processed through the continuation of a single

mechanism like conceptual mapping which will help novel metaphors through analogy and conventional metaphors through categorization are understood in conceptual mapping mechanisms. This finding is in line with previous studies showing associations between creativity and saliency features.

The study on verb classes and their prototypes and metaphor generation is confined to only verb category in Banjara language but not to any other grammatical categories. The main concentration was verb classes and their prototypes by using various tests and software. Apart from this, using literal sentences the researcher tried to catch hold of the cognitive aspect of the participants' minds by giving the task of generating metaphorical sentences based on the given verbs. In future the study may be extended to other grammatical categories like nouns, adjective and adverbs which carry content in the language. In addition, the study also can be extended to proverbs which would depict the perception of the inside world of the speakers of an indigenous language like Banjara. Finally, the study can also be extended to other indigenous languages belonging to various families of languages. The study can also be carried out onsite unlike this study which was done online due to the pandemic. If onsite research on a similar topic can be conducted, it may yield better results and can be correlated with the online results.

CHAPTER 1

INTRODUCTION

1.0. Banjara people and their Language

Banjara is one of the communities of tribal groups in India who were spread across India. Some of them are settled in hilly terrains and some of them are in the plains of different states. According to Grierson, (1967) these people speak Rajasthani language who were nomads in nature and spread across India. The language spoken by these people is called differently in different states viz. Banjari, Bangala, Banjori, Banjuri, Brinjari, Dhadi, Gormati, Goola, Gurmarti, Kora, Lakhapati, Lambara, Lamadi, Lamani, Lambadi, Lambani, Labhani, Lavan, Lemadi, Lamalade, Pindari, Sugali, Sukali, Tanda, Vanjari, Vanzara, Vanjuri, Vanji, Wanji, etc. The language belongs to the one of the branches of Indo-European family of languages, i.e. Indo-Aryan.

The Madras Census Report (1891:115), describes the term *Bepari* as "a caste allied to the Lambadis". According to Thurston (1975:147), the name Lambadi (alternative name for Banjara) has synonyms viz. *Banjari*, *Boipari,* and *Brinjari*. He further endorses that the speakers of Banjara language who worship a female deity are also known as 'Banjara', and they speak Lambadi language.

There are various predictions regarding the name Banjara in linguistic communities as well as anthropological studies. According to Enthoven (1922:331-332) the word Banjara may have come from the Sanskrit lexeme 'Banaj', or 'Vanaj' which implies either bargain or trade whereas 'Vanijya' means trading. Further, Lambani or Lambadi are also derived from Sanskrit word 'Lavan' which means 'salt trading'.

According to Aiyer (1928:135-136), Banjaras are called Labanis, Lambadis, and Sugalis. The two names (Banjara and Labhani) appear under many similar names as discussed above. He believed that the lexeme Banjara could be drawn from the Sanskrit word 'Vanija' which means 'trade'. The same statement was also supported by Pawar in 2010. Further he also argues that the name Banjara might have come from the Sanskrit word *vāijya* which translates to 'trading', *vanacara* which translates to 'those who live in forests'.

“The Banjara tribes are said to be descendants of the Roma gypsies of Europe who moved via the steep mountains of Afghanistan to settle down in the deserts of Rajasthan and many other states in India 2300 years ago," Chamanlal (1968, 9-10). According to Lalan (2011), “the word *banjara* is a deprecated, colloquial form of the Sanskrit word *vanacara* which means forest wanderers”.

There are various accounts on the origins of the name of Banjara. However, the elderly *Thanda* (village) residents claim that Banjara is a derivation of the word “vanachara” which indicates “those who live or roam in the forests".

In Telangana State, Banjaras are classified as a Denotified Tribe whereas in Andhra Pradesh State, the Lambadis/Sugalis (local names of Banjaras) are classified as a Scheduled Tribe. People living in Andhra Pradesh call themselves as Sugalis or Sukalis whereas in Telangana, especially in the districts of Mahboobnagar and Khammam they prefer to be called as Lambadis..

1.1. Classification

The Banjaras are classified under different caste categories in different states of India. These classifications are prepared by the government of India to provide facilities and appropriate help through the reservation system to uplift them. Banjaras are considered as SCs and STs in certain states of the Indian Union. For example, in Rajasthan state, they are treated as Other Backward Classes and in Karnataka, they are categorised as Scheduled Tribes. In Maharashtra they belong to Scheduled Caste (SC). In Andhra Pradesh and Telangana, they are Scheduled Tribes (ST). As they fall under the categories of SCs and STs most often and there is scope for development in the majority of their population, there are efforts by NGOs and non-NGOs to improve the livelihood of the community.

1.2. Dialects

In addition to the states of newly formed state of Telangana and bifurcated Andhra Pradesh, they are also available in the other northern states, southern states as well as in the Union territories of Goa and Delhi. Each state has its own dialect of Banjara and one can find the influence of local vernacular language vocabulary in the speech of Banjara.

Thurston (1901:208) in his book titled *Castes and Tribes of Southern India* says that Banjari has two dialects, namely one that of Punjab and the other Gujarat. He further says that these dialects are derived from Western Rajasthani. But Grierson (1967:285) opines that the Banjari dialects of Southern India have a mixture of Dravidian language words. As per the Census of India 1961, the dialect Banjara was identified in Andhra region. Many Telugu words have been borrowed in Lambadi and Sugali dialect to a high extent, whereas in Telangana region there are borrowings from both the languages viz. Telugu and Dakkini Urdu.

Since Banjara has no script, the speakers use the script of the dominant language in their respective states for writing purposes. With regard to the states of Andhra Pradesh and Telangana, Banjara people use Telugu script. In the state of Telangana, some officials of eh Welfare Ministry of the Nizam's Presidency had taken some necessary steps to publish a drama called 'radʰa and moɭa' (which describes the origins of Banjara people and their language) using Devanagari and Telugu scripts. Many such dramas are available in the digital medium.

1.3. Demography

The population of Banjara as per 2011 census is 5,866,800. The population as per different census reports (from 1961 to 2011) along with the population of Telangana and Andhra Pradesh are provided below:

Census	State/Region	Alternate Names	Population	Telangana/Andhra Pradesh Population
1961	All states	Banjara, Lambadi, Banjari, Labani, Labhani, Sugali	27,079	27,079
1971	Mysore, Andhra Pradesh, Himachal Pradesh, Delhi, Bihar, Orissa,	Banjara, Lambani, Sugalis, Lambadis, Banjari	329,410	132,464
1981	Orissa, Andhra Pradesh,	Banjara, Banjari, Sugalis, Lambadis	1,169,267	1,158,342
1991	All states	Banjara, Banjari, Lamani, Lambadi, Sugali, Vanjari.	1,840,407	1,292,662

2001	All states	Lambadi, Banjara, Banjari, Lamani, Sugali.	2,707,562	1,732,018
2011	All states	Sugali, Lambadi, Banjara.	5,866,800	2,346,117

Table 1: Census report from 1961 to 2011 of Banjara population

1.4. Dwellings and Housing System

Banjaras were initially traders and for this purpose they used to travel in bullock cots and whenever it gets darker they stop roadside and used to cook, eat, and sleep in the bullock cots. After the British colonial started levying taxes for travelling on the roads, they slowly moved towards building a hut for their lively activities. First they used to stay in a hut which is called *jhumpda* which is built with leaves in the jungles. Later they built their own *thandas.* It is a regular practice within Banjaras that they built their settlements preferably in the outskirts of the villages and their settlements are called *Thandas.* The main reason for their choice of settling in the outskirts is to make use of the vacant space for cattle and other domestic purposes. After their contact with the mainstream society and started mixing into the cities they started building cement houses and buildings based on their economic conditions. The houses are constructed in rows facing one another by keeping a lane in between. Most of the houses are rectangular in shape but one can also notice square-shaped houses.

1.5. Economic Status

The economic life of Banjaras started with salt trading. For this purpose, they used bullock carts for transportation. During the British colonial times, initially taxes were not levied but later on they were asked to pay taxes. The impact of the tax system collapsed the economic life of the Banjaras. Due to this, Banjaras economic status went down and they started to steal cattles, and other acts of dacoity for survival purposes. However, some people managed to get jobs during the British period. For details on the social life of Banjaras see Census of India (1961:28) and Rathod 1982.

1.6. Occupation

The main occupation of the Banjara people is salt trading. In early days, Banjaras made a living by gathering forest goods and farming. These people are the masters of traditional hand needlework, with a focus on mirror work. The artwork of the Banjara people has a high market demand in India. The ornaments used as decorative items by Banjaras include silver, gold in addition to brass, ivory, etc.

However they are also engaged in agricultural labour (particularly males) but the Banjara women are also involved in sowing, weeding, transplanting and harvesting. Few of them are also involved in the preparation of lime which is used for washing the houses neatly. Few people are still into trade and commerce which happens to be their traditional occupation

1.7. Education

Education in this community reached very late after independence, most of their livelihood was always lived distant from the mainstream society. Before independence, the British declared them as criminal tribes in Hyderabad, Karnataka and Maharashtra regions. They spent the most of their life in the forests until the late 1940s, when they began to emerge from the jungles and build huts outside of villages as a result of their trading with the mainstream population. After the government of India identified them and started schools in thandas and gave them reservations, they slowly started coming to school for education. At present, Banjaras are well-educated and this is evident as we see them occupying positions such as IAS, IPS and other mainstream jobs in India.

1.8. Family

Generally there are two types of families that exist in this community, one is dependent family and the other is extended family. However, most of them observe the nuclear family system.

In this system, the father plays an important role and he has the authority to dictate terms to the family members. Usually the father is the bread earner in the family whereas in joint families, the elder brother or elder sister (if available) is preferred and they direct the daily routine of the family, but preference is given to remaining brothers if they are financially sound.

The family lineage is considered from the male side. One a girl gets married they are treated as per husband's clan. After the marriage her surname changes to the husband's surname whereas the sons get the father's surname.

Usually, after marriage the sons live with their wives along with the parents and if at all with grandparents too. Sometimes the married sons settle with their wives separately from the family. Mostly the Banjara family is patrilineal, the senior most male of the family is the head of the family. Property is inherited through the male, female will not get any share after they get married. Up to marriage, the daughter gets all the equal rights and shares as sons get but after marriage the female members have no right over their paternal property. Usually Women in Banjara community are economically very independent when compared to their husbands, the reason is that the male in the family are addicted to alcohol and they could not have their savings, that is the reason women in the family control the economic activity in the family.

Adoption is practiced among Banjaras, i.e parents who do not have children or parents who have daughters only they prefer to adopt sons in the family. Banjaras usually adopt a brother's son preferably and if not available, they prefer any boy from their own clan.

When their father dies, it is the duty of the elder son to perform the final rituals and ceremonies. Property, if any, is given to only sons. If there are more sons, all the sons equally share both properties. When the girls get married, the ornaments are shared equally to other sisters in the family.

1.9. Marriage

Marriage is a dignified affair among the Banjaras. Hardly anyone remains unmarried. Previously child marriages were norms, but it has changed drastically now. Usually girls get married first, a study shows that about 80 percent of girls got married at the age 18 whereas about 86 percent of the boys got married between the age of 19-24 years.

According to Ambedkar (1985:56-57), Maharashtra Laman (Banjaras are called as *lamans* in this region) marriages happen among the known people and usually are arranged by relatives.

The middle man is known as *dhadi.* The marriage initiations are usually from the groom's side. The parents enquire about the nature of the girl's character in the *thanda*, and if they find fit, the groom's father, accompanied by the Head of the *thanda* along with other elders, travel to the girl's home for confirmation. Ancestors perform *pitru pooja* and after that local Goddess *mavli*, a goat is sacrificed on the occasion.

Ruplanaik (1986) says that "marriage expenses were previously shared by both parties, and the bridegroom was made to pay slightly more". Even though the dowry system (called *hoonda*) was practiced, things have changed now and the dowry system is slowly getting eradicated from this community.

1.10. Food

There are different names available for food items in Banjara viz. *bati* which isa type of roti. *Daliya,* is another dish which is cooked using different small millets such as wheat, jawar. Banjara people are predominantly meat eaters and prefer it in their daily consumption and for special occasions in addition to the staple food consisting of ragi, jowar and rice. *Sangati* is also predominant among the Banjaras. *Saloi*, another important non-vegetarian dish is made using the blood of the goat and is an added addition in the Banjara cuisine. Spices also play an important role in the Banjara cuisine. Sweet also is part of the Banjara culture, *garell* is an important sweet which is prepared using rice flour and jaggery.

1.11. Dress

Women are noted for wearing colourful and elegant clothes such as the *phetiya* (similar to the *ghagra*, an Indian skirt) and *kanchalli* (a sort of shirt). Mirror chips and coins are frequently embellished in their attire. Women wear thick white bangles which are traditionally made with ivory on their arms (*patli*), which cover from their wrist till their upper arm. There is an ornament called *chotla* which is made up of silver. Along with this there are other rings, necklaces are used in the adornment and sometimes braid the hair. They have an elaborate hairstyle adorned with silver hairpins and ornaments that is unique to their culture.

Men wear a short *dhoti* with many folds and a kurta along with a headscarf. These garments are created specifically to protect people from the harsh desert climate (particularly in Rajasthan region) and this traditional attire is followed by Banjaras in other states also.

With regard to the ornaments, hair ornament *ghugri,* nose ornaments such as "*bhuria, phule",* necklaces "*wanke, har, cheed"* and "*hasla",* bangles like "*chodus, moterabalia",* finger rings like "*winte, phula",* anklets like "*khas, ghode, wankdo, chatki, kuncia, gazera and kusotia"* needs special mention.

Tattooing is also common among Banjara women (popularly known as *haro)*. Women have tattoos on their nose edge, hands, forearms, legs, and their backs. Men usually get their names as tattoos and some men prefer to have tattoos resembling scorpions which is done on the

forearms and they practice that if a scorpion tattoo is put on their body, any scorpion will not come near them. This practice is prevalent even today.

1.12. Ceremonies

Teej festival, which is one of the important festivals of the Banjara community, is celebrated in a big way. This is celebrated during *shravan* month and is mainly regarded as a festival for the better life of unmarried girls. During this festival, Banjara community girls usually put any type of seeds in bowls made of bamboo and water them thrice in a day for almost nine days. If the sprouts start growing thick, it is taken as a good omen for getting a suitable boy. Once marriage is solemnized, the groom's family is greeted royally by Banjaras who offer betel leaves and nuts. The groom and the bride generally exchange seven balls which are prepared using rice flour, ghee, and sugar on the day of the solemnized wedding, which is one of the unique features of a Banjara wedding.

For Banjaras, death is a universal event that is unavoidable, and that all living creatures must die at some point in their lives. The death of an elderly person within the community is considered as an important sign as their elders are believed to transform through new born in the community. Similarly they believe that unnatural deaths due to accidents, suicide, murder, etc. are a sign of bad omen because there is superstition among the Banjaras that they become malevolent spirits and harm people, especially pregnant women, children, brides and grooms.

1.13. Religion and Belief

The Banjaras profess faith in Hinduism and they worship Gods and Goddesses viz. Balaji, Jagdamba Devi, Bhavani of Tuljapur, Hanuman and Renuka Mata. They also worship local deities such as gangamma, peddamma, elarmamma, huliamma, mallalamma, ankalamma, maramma, tulchamma and maisamma. They also have a great respect for Guru Nanak. Sevalal Maharaj, a social reformer is their spiritual guru. There are some Banjaras who converted to Christianity, Islam and Sikhism.

1.14. Linguistic Sketch of Banjara Language

1.14.1. Phonemes in Banjara Language

According to Ronald (1968:7) there are 6short vowels and one long vowel are available. They are as follow: tow high vowels (one front /i/ and the other is back/u/, three central vowels (one front/e/, one central /ə/ and the other is back vowel /o/and only one central i.e. /a/ which also has its long counterpart. In the following subsections Ronaldo 1(968:7) also mentions that Banjara consists of 21 consonants. Among the 21 consonants 10 stops "/p/, /b/, /t/, /d/, /ʈ/, /ɖ/, /c/, /ɟ/ /k/ and /g/, two spirants /s/ and/h/, 4 nasals /m/, /n/, /ɳ/ and /ŋ/, 2 laterals /l/ and /ɭ/ one flap /r/ and 2 continuants /w/ and /y/". Further he also stated that there two more affricates i.e. /č / and /š / which are not listed on the above chart as they form a subsystem by themselves, not patterning like their /s / and /c / counterparts. In the syllable structure, the language uses mono syllabic words /kar/ 'do' CVC and /ka/ 'tell' CV structure are more in number comparing to the other types of syllables.

1.14.2. Morphology

Banjara morphology is a very simple morphology. When it comes to the number, the language has two numbers viz. singular and plural. The number exclusively shown in the pronoun category. The following examples will illustrate the phenomenon:

mã	a:-y-o
I-NOM	come-1st.S.M-PST
I came	
ham	a:ye
We-NOM	come-1.Pl.M/F-PST

In the case of gender, the language follows grammatical gender which is a typical characteristic feature of Indo-Aryan languages.

c^hora	a:-y-o
boy	come-1st.S.M-PST

cʰori a:yi

girl come-1st.S.-F-PST

In the case other nouns irrespective of its nature and sex they are grammaticalized. for example, the chair is feminine and the table is masculine. However, in the case of use of more than one person the gender does not appear overtly.

For example,

ɟa:d̪a manikya ɟa-re-cca:

many people go-PRE-Be

many people are going

According to Krishnamurti (1969:248), "case is the category of affixation which establishes a kind of relation between the nouns and the other word classes in an utterance, particularly the verb". In the case of Banjara, there are six case markers available viz. nominative, accusative, genitive, dative, instrumental, and locative. Among the seven case markers nominative is unmarked. There is no overt marker to convey the nominative case marker.

raju ayo

raju come-1st.S.M-PST

Raju came

mã: gã:vudi-n ma:r-o

I-NOM cow-ACC beat-PST-st.S.M

I beat the cow

mã: gã:vudi-n ca:ro gʰa:l-o

I-NOM cow-DAT fodder give-PST-st.S.M

I gave grass to cow

In Banjar both Accusative dative cases are syncretized into one. This can be seen in most of the Indo-Aryan languages. This is another typical characteristic feature of Indo-Aryan languages.

i: r	raju:-r	gʰar	
this	Raju-GEN	house	

this is raju's house

mã	sa:pe-n	lakdi-θi	mar-o
I-NOM	snak-ACC	stic-INST	beat-PST-st.S.M

I killed the snake with a stick

mã	sa:pe-n	gʰar-ema	diʈ-o
i-NOM	snake-ACC.	house-LOC	see-PST-1st.S.M

I saw a snake in the house

The language is very rich in making use of the pronouns. In the following examples one can observe the pronouns and their oblique forms in the language. This shows though the language was in contact with the official language of the state i.e. Telugu, it did not undergo any changes in the case of pronouns. This is clear evidence of rigidity of pronouns due to its frequent use of the language by the speakers. The following examples are some of the pronouns and their oblique forms.

English	Banjara Pronoun	Oblique form
i	mã:	mã:
we	ham	ham
you	θu	θu
you (Pl.)	θam	θam
he	wu	won
she	wu	won
it	wo	won
they	wo	wunḍen

In Banjara three way distinction of time can be observed viz. past, present and future. The following examples will illustrate the phenomenon:

mã:	ḏa:di	gudi-n	jã:-ro-cu
i-NOM	every-day	temple-DAT	go-PRO-PRE

i go to temple every day

mã:	gudi-n	g-o
i-NOM	temple-DAT	go-PST-1st.S.M

I went temple

mã:	gudi-n	sawar	jã:-u-nchu
i-NOM	temple-DAT	tomorrow	go-PRO-PRE

i will go to temple tomorrow

With the three examples one can easily understand that Banjara makes use of the three way distinction to mark the time. Apart from the above morphological features the language also follows two way distinctions: the use of verbs i.e. finite and non-finite. For the more details, see Ronald (1968).

When it comes to the syntactic structure, Banjara retained the Indo-Aryan language feature i.e. SOV pattern. The language also is an inflectional language. Due to the contact with the state official languages across the country the language has attained some of the characteristic features of the official languages of the states of the Indian Union. However, Banjara language in Telangana has attained few of the characteristic features of Telugu language. One among such characteristic features is the flexibility of word order which can be seen in the Telugu language.

nenu	annam	tinn-a:-nu
I-NOM	rice	eat-PST-1st S.M/F

I ate rice

tinna:nu nenu annam

eat-PST-1st S.M/F I-NOMrice

I ate rice

annam tinnanu neu

rice eat-PST-1st S.M/F I-NOM

I ate rice

mã dʰa:n kʰa:l-ɖ̲-o

I-NOM rice eat-1st S.M-PST

I ate rice

dʰa:n mã kʰa:l-ɖ̲-o

rice I-NOMeat-1st S.M-PST

I ate rice

kʰa:l-ɖ̲-o dʰa:n mã

eat-1st S.M-PST rice I-NOM

I ate rice

In the above three sentences of Banjara language, it is following the free word order of Telugu language due its prolonged contact, however, in terms of the meaning the two types are acceptable even though it has changed the word order but the third type is least accepted by the native speakers because of its characteristic features.

To sum up, the language is an Indo-Aryan language with some of the Dravidian characteristic features obtained due to the prolonged contact with Telugu. The same was supported by the statement of Russel (1916) who commented it as a semi Dravidian language due to the exchange of many linguistic features from Telugu to Banjara language. Apart from this, the language has preserved its original features in the various linguistic levels viz. phonological, morphological and syntactic levels. with the original features the present study which is from the cognitive perspective has taken all the original linguistic features into consideration for identifying the metaphors.

In the next paragraphs in this chapter I will discuss citations of the previous research works in Banjara language. It cites those who had the idea first in Banjara language and also cites those who have done most past works in the relevant area. With proper acknowledgements of the previous works.

1.15. Earlier works on Banjara Language

The first work on the Banjara language was done by **Lyall in 1870**. In this work the author has provided a brief sketch of Banjara people who migrated to Hyderabad during the Nizam's rule.

The second oldest work on Banjara is authored by **Baliram Rathod in 1936** titled "Banjara Itihas"**.** In this book the author has tried to describe the partial history of Banjara people pertaining to Maharashtra region. The main objective of this work was to provide an ethnolinguistic view of the Banjara community. However, this book is written in Hindi language.

Kamala Manohar Rao's (1950) book titled "The Mythological Origin and Clan System of the Banjaras of Hyderabad" discusses the clan system and the mythological origin of Hyderabad Banjara people. He opines that the mythological origins are mostly from Hindu religion and based on that the clan system of Banjara community has evolved.

S. Boopathy in the Census of India (1961), provided a detailed investigation of the Lambadi dialect pertaining to the Coimbatore district of Tamil Nadu state. He provided a descriptive analysis of the phonology, morphology and syntax of this dialect. In addition, the author has provided equivalent word forms (of Coimbatore Lambadi dialect) of Grierson's Linguistic Survey of India.

Ronald L. Trail (1968) Ph.D. thesis titled "The Grammar of Lamani" is based on the Tagmemic theory proposed by Kenneth L. Pike. The author provided basic Banjara vocabulary and sentences that were collected from his field survey. In this work, the author has described the Lamani language in terms of phonology, morphology and syntax.

Chamanlal in (1968) published a book titled "Gypsies: Forgotten Children of India". In this work, the author has provided a detailed connection between gypsies and Indian nomads (i.e. Banjaras). This book is an important contribution as it traces the migration history of Banjara people who travelled from Roma Gypsy to all over the world. The author provided a detailed background of the gypsies. In this volume, the author has collected contributions from several well-known European and American authors to justify his conclusions. He states that the emigration of Gypsies from Europe and to other parts of the world exist in India in large numbers and are sometimes called "Lambadis" and sometimes "Banjara". According to him, the Banjaras are also widely spread in Spain, in Czechoslovak regions, Hungary and many other parts of central Europe and in central Asia as well.

A. K. Rathod (1971) in his thesis on "Lambani Bhasha Aur Sahitya Aur Rajasthani Aur Hindi Se Uska Sambandh" (written in Hindi), has attempted to explain the relationship between Lambani language (one of the dialects of Rajasthani) and Hindi language. This thesis is considered to be one of the oldest in a Banjara language perspective.

M.A. Shering's (1974) book titled "Hindu Tribes, and Castes" Vol. III. provides a detailed description about the Hindu Caste system among the Tribes of India. This volume discusses the caste system and the tribal lifestyle of Madras Presidency, especially Banjara people who are settled in South India. Volume 1 discusses the tribes and castes who lived in Banaras. Volume 2 discusses the Punjab frontier and the Central Provinces and Berar, Bombay Presidency,and the frontiers of Scinde.

Pushpalata Rampure (1975) book titled "Banjara Lok Geet Samuha", written in Hindi talks about how Banjara culture has emerged from time to time. In this book the author has discussed the Banjara songs (with particular reference to the Maharashtra Banjara community) which emerged during their work on the field as well as the songs sung by women in groups during marriage rituals and festivals.

H. D. Lamani's (1976) thesis titled "Karnatak Ke Lambani Lok Geet--Eka Adhyayan" written in Hindi provides a detailed analysis of the Lambani poems and songs. The author has concentrated on the data collected from the Banjaras of the Karnataka region

Motiraj Rathod in (1976) has published two books in the same year, viz. “Banjara Sanskruty” and “Tanda Sanskruty”, both written in Hindi. In these books the author described Banjara culture and their living style in their villages.

Basavaraj Nellisar’s (1977) book titled “Lambanigaru Hagu Baggaru”, written in Kannada describes the Banjaras of the Karnataka region. The author calls the Banjara’s as “Lambanigaru” and in this book he has provided a detailed description on the life-style and health system of the Banjaras.

Kashiram Jadhav in (1980) authored a book titled “Adhunik Banjara Geet”, written in Hindi. In this book, the author has attempted to document Banjara's oral literature.

F.N. Cumberlej (1982) has conducted a project titled “Monograph on Banjara Clan, sociocultural study”. In this project, the author has documented the Banjara clan within India from a sociocultural perspective. This work is one of the pioneering studies in the discipline of sociology. According to Cumberlej, the Banjara tribes were divided into five clans viz. Mathura, Labhani, Charan, Dhadi Bhaat and Dhalias in India.

Ajmera Silmaa Naik (1982) doctoral thesis titled “The marriage culture of Lambadis of Nutankal Mandal of Nalgonda District”, is a detailed description of the marriage system of the Banjaras, especially the Banjaras of Nalgonda district of Telangana state. In this work, the author has clearly mentioned the different marriage ceremonies within the Banjara communities in the Telangana state.

Sannaram’s (1982) book titled “Lambani Vagatugalu”, written in Kannada Language, concentrated on the proverbs of Lambani language particular to the Karnataka region.

V.H. Barikeri’s (1982) thesis titled “A Descriptive Analysis of Lambani Language Spoken In Bijapur District”, laid the foundation for linguistic work on Banjara language. In this work, the author has provided a detailed description of the Lambani language and the methodology is basically from Pike’s phonemics. The author has also discussed the morphology, morphophonemics, syntax and lexicon of the Lambani language.

The works of Sharma (1983), Maharaj (1983), Halbar (1986), Khandoba (1988, 1991), Deogaonkar (1992), Jadhav (1996), Krishnamurthy (2000), Naik (2000-2007), Rathod (2003), Naik (2006) and Kamat (2007) are written in Indian languages, especially from the sociological perspective.

The work of Upender Maloth (2007, 2008) on "Terms of address compared in English, Telugu, and Lambada: A Sociolinguistic Study", and "The linguistic and cultural identity of Lambada in Andhra Pradesh: A sociocultural studies" respectively provides a comparative study of the Lambada language and English.

For more previous works in Banjara language, refer census 1961 of Banjara, Banjari Scheduled Caste in Mysore, Delhi and Himachal Pradesh Scheduled Tribe in Bihar, Orissa and West Bengal Denotified Tribe in Madhya Pradesh, Rajasthan and Uttar Pradesh Nomadic Tribe in Gujarat, Mysore and Rajasthan.

1.16. Significance of the work

Most of the research works on Banjara (or its alternate names) are from sociology, anthropology, literature and linguistics perspectives. While these works are important and relevant, there is almost no research on the language in the area of cognitive linguistics. The present research work has attempted to fill this gap. For the research, the Banjara metaphors and prototypes are taken into consideration. This research will provide new insights in the broader area of cognitive linguistics for the Banjara community. Through this research the Banjara community will further realize the importance of findings of prototypes and metaphors. Moreover, the analysis that is presented in this research will provide valuable information for future research that will explore various areas of cognitive linguistics for this particular community.

1.17. Aims and Objectives

The main aim of this research work is to define and understand the prototype theory and metaphors in the Banjara community with the replication of existing models such as Rosch's prototype theory and George Lakoff's metaphors in cognitive linguistics.

This research mainly focuses on descriptive research and its qualitative analysis of the work done in prototype theory and metaphors. The main questions we get as we go on to this research is whether the prototype theory is applied to verb categories of Banjara or it is different for this particular language and whether metaphors exist in this language or not. If yes, what types of metaphors are present and does this community have metaphorical effects? These are the main questions we got from our descriptive research.

1.18. Methodology

For the present study, i.e. verb classes and their prototypes in Banjara language is carried out using qualitative and quantitative methodology. It includes prototypicality rating tests and frequency tests on the verb classes. For the metaphor generation task an analytical method is followed. The data for the present study is collected from the participants of the Banjara community using interview method and online experiments. Based on the participants consent and commitment, we selected 250 participants. The participants are from the Banjara tribal community who reside in different districts of Telangana state. Participant observation method is followed throughout the research work. The data was recorded and transcribed as well as thematic analysis was conducted. This involved coding all the data in psychopy before identifying and reviewing key themes. Each theme was examined to understand the participant's motivation and perception. A detailed description of methodology of each experiment is presented in the sections of chapter three.

1.19. Chapterization

In chapter One, this chapter includes a basic understanding of Banjara language, its population, culture, orthography information, linguistic sketch and previous works done in this particular language. The chapter provides a brief overview of Banjara's education system and political affiliations of this community. Additionally, this chapter also provides the aims and objectives of this research, mentioned significance of the research as well as methodology of this research in practical aspects.

In Chapter two, a thorough examination of the existing literature on the study. It provides an extensive understanding of the theoretical frameworks which have implications for prototype theory and metaphor theory. This chapter also includes thorough literature review of concepts, prototypes, and metaphors. It also presents the developed theoretical framework of the

research. Providing the basis of the overall structure of the research by detailing various theoretical aspects of the issue at hand, such as prototype theory and metaphor theory assessment. After describing the theoretical framework those theories' relevance to this study purpose has been established. This chapter also includes the detailed research methodology which includes qualitative research and audio visual recordings and semi structured interviews for data collection.

Chapter three discusses the research design, experimental design, strategy, methods and hypothesis. This chapter also includes the assessment of primary data collection through qualitative methods, results, discussions and future studies. The chapter also includes figures and graphs for better assessment of the results.

Chapter four presents discussions and summary based on the analysis and results derived. It also includes recommendations for future research as well as concludes the research findings by providing summary and future scope of the present research.

CHAPTER - 2

THEORETICAL FRAMEWORK

2.0 Introduction

Lakoff (1987:62) claims that prototype effects can also be used to examine linguistic categories. He primarily aims at linguistic category asymmetries and gradation away from the category's best example or model. He further states that the impact of prototypes has been observed in all levels of language, including phonology, morphology, syntax, and semantics.

Prototype theory focuses primarily on nouns, with some attention paid to adjectives and prepositions (for example, in English). However, only few efforts have been made to apply prototype theory to verbs Rosch (1973), Pulman (1983). As there is not much work, especially on verbs involving Indian languages, in this present study, we have attempted to work on the prototypes of verbs with particular reference to Banjara language, which is a verb-centric language.

For this purpose, as a starting point we have consulted the verb classification as suggested in Miller 1972 and Levin 1993 for classifying verbs in Banjara. Further for carrying out prototypical experiments we have used Pulman's (1983) model.

In the following sections, we will discuss prototype theory and related concepts as well as present an overview of the theories.

2.1. Verbs and prototype theory

Pulman (1983:107-136) conducted a thorough investigation to demonstrate that prototype theory can be used to investigate aspects of verb meaning. In this work, he discovered that graded membership and prototyping have an impact on categories exemplified by verbs viz. "kill, speak, look, walk, deceive", and so on. He also carried out the research by "applying a taxonomy that begins with a specific beginner and ends with a specific verb".

The following is the verb categorization taxonomy according to from Pulman (1983:108):

1. Unique beginner
2. Life form
3. Generic Level
4. Specific level

However, Pulamn (1983) noticed that there are several complex issues with regard to these levels while relating them to particular beginners and the stage of life form. For instance, according to him “It's difficult to tell whether the verb DO or the verb BE is a hypernym for 'near,' as in 'John closed the door' and 'the door was closed”. As a result, his focus was on the basic and individual levels, examining only verbs that appeared to be arranged in a particular order of "hyponymy sets reminiscent of the distinction between the basic and the subordinate level categories" contained within nouns (ibid). First and foremost, Pulman was interested in seeing if similar results could be produced for verbs, and as a result it is evident that he has carried out a replication of Rosch's (1973) original experiments. In this work, the participants were requested to identify and evaluate who is representative in a particular category by applying Likert scale. For carrying out this task the following eight homonyms were selected, viz. “kill, speak, look, walk, deceive, rub, hold, and burn”. Further for every homonym the researcher identified the hypernyms as well as hyponyms to elaborate the taxonomy. The findings of his experiment are reproduced below for ready reference. The finding of his experiment can be seen in Pulman's (1983:113).

Pulman also decided to gather more prototype-related data by running a test that would provide him with a 'family similarity' indicator. He made the decision “to rank the hyponyms of the selected sets based on the number of features they shared with other hyponyms, in this case, other members of the category”. The obtained results were unable to be classified as they could be divided into roughly five different groups. In this experiment the subjects listed the following: (i) synonyms (or near-synonyms), (ii) meanings, (iii) the category name, (iv) connotations, and (v) attributes when they were asked to provide features for specific verbs.

In order to improve the accuracy that appeared irrelevant in particular verbs (*kill* in this case) to make them more consistent, “Pulman altered the data accordingly and the findings of his study is summarized below:

Kill	**murder**	**assassinate**	**execute**	**massacre**	**sacrifice**	**commit suicide**
Ranked by:						
1 Prototypicality	1	2	3	4	5	6
2 All attributes	1	4	6	2	5	3
3 Shared attributes	2	3	5	4	6	1
4 Edited attributes	2	1	5	4	6	3

Table 2: Pulman's (1983:119) result survey for 'kill'

Pulman inevitably found that the actual similarities do not correlate positively with prototyping which may lead to believe that family similarity is not a causal factor in the development of verb prototypes".

However, Pulman could not achieve a conclusive decision due to varied reasons. One of the reasons for this could be because of the insufficient number of subjects. However, when it came to listing of attributes, verbs proved to be fragile, requiring a more detailed experimental design. In the end, according to Pulman's study, it is asserted that verbs, (similar to that of nouns), shall be treated as members of their semantic domains, and that this type of prototyping may end up from the semantic closeness to a particular category. However, from this pilot study of Pulman, shows that there are facets of the multiple meanings of the verb that can be handled better using Prototype Theory.

In a study by Taylor (1989), the author "examined prototypes in relation to the polysemous nature of the verb *climb* to understand the difference between the family resemblance technique and the core sense approach". However, "core sense approach has the same problem as the classical approach that implicitly calls for a set of necessary and sufficient conditions to regulate the nature or stability of a category". Various senses of scaling show that there is no way to subordinate all of them in the context of the heart. Taylor defines the method in terms of 'ascend' and 'clamber' attributes, as defined by Fillmore (1982). Hence, "while some of the uses of the clambering sense may seem to be similar to the 'core meaning,' and there are others connected to the ascending purpose which depart from this kind of middle". Taylor further

points out that these "multiple senses cannot be combined based on a single semantic denominator; the multiple meanings are interconnected through meaning chains (Taylor, 1989:108)". According to Taylor (ibid) "any node in a chain of meanings may be the source of any number of extensions of meaning".

2.2. Relevance in Banjara Language

The present research on concept sharing in Banjara language through prototype theory and metaphor generation process helps in understanding the broader language phenomenon thereby enabling to understand which members of the language are closer than the other as well as how the speakers conceptually categorize the verbs of the language and the shared metaphorical knowledge of the speakers of the community. As discussed earlier, the prototype theory has generally been applied to lexical categories like nouns, adjectives and pronouns but seems more elusive when applied to the verb category. This study leads the path to understand the Banjara language's semantic patterns, particularly with regard to verbs.

Banjara, being a less-resourced and undocumented language, poses challenge in conducting language-based research, especially from a cognitive linguistic aspect. There is hardly any corpus available in Banjara and this has become a bottleneck for extracting verbs. Hence, we adopt Miller (1972) and Levin's (1993) verb classification. After enlisting verbs in Banjara, we examined how verbs are represented in Banjara metaphors. The use of metaphors varies from language to language, region to region, and are a repository of the working memory strength of the community that is passed on intergenerationally. Metaphors also expose the IQ level of the community that uses them. Past research has shown that documenting metaphors or other new linguistic aspects will be a challenging task and hence an attempt is made in this research towards this direction. Further, the use of metaphors seems to be quite frequent in undocumented languages like Banjara.

2.3. Concepts

According to (Laurence and Margolis, 1999:4), "Concepts are the most basic structures of thought theories; given their relevance to all areas of thought, it is no wonder that concepts pose so many conflicts in philosophy and cognitive science".

A good starting point on concepts is a characterization proposed by Smith (1989:502) who says “a concept is a mental representation of a class or person and deals with what is represented and how this information is typically used during categorization". Oftentimes, in literature, “the distinction between a concept and a category is frequently established”. A concept is an idea or concept that is cognitively owned, whereas a category is a collection of things. “The concept *horse* is whatever the psychological condition which means horse's thoughts. The category horse consists of all entities appropriately classified as horses in the real world”.

Mills (1997) opines that “Cognitive scientists point out that concepts will help us to categorize, learn, remember, interfere, explain, problem solve, generalize and analogize. Correspondingly, the lack of appropriate concepts can hinder learning, interfere with memory, block interference, obstruct explanation and perpetuate problems”.

2.3.1. Words, Concepts, and Thoughts

Until now it is established that words and concepts are linked in a straightforward manner, i.e. “A speaker has a store of lexicalized concepts, which is, of course, smaller than the larger set of phrases or phrases that one can think about or talk about”. There are, however, a variety of viewpoints on “the relationship between these lexicalized concepts and general thinking and reasoning”. There are contrasting points of view: “(i) lexicalized concepts impose restrictions on possible ways of thinking in linguistic relativity, and (ii) the hypothesis of the language of thought maintains that thinking and speaking involve different levels of representation, despite being related”.

Concepts, in essence, serve as filters and we have no direct contact with the outside world. Only by filtering our concepts will we be able to access our world. Concepts are helpful when concepts are worked up on structuring this world informatively or diagnostically. "An excellent way to understand an individual, group, scientific community or culture's mental world is to discover how they organize their world into concepts” (Lakoff, 1987).

2.3.2. Concept in language

In order to understand concepts in language, we will now examine from Saussure’s structuralist point of view. For Saussure (1916) language is a structure and he sees language as a system.

In a particular person, system and culture, meaning is produced on the concept of structure. The structuralist will examine the system's units and rules that make the system work. Units are words in the language, and rules are part of grammar. The grammar rules are different in different languages, for example, in English and or in Banjara, but the structure is still the same in all languages, i.e. the words make sense in a grammatical system. Therefore, the structure that organizes units and rules into a meaningful system is produced by the human mind and not by a sense of perception.

Saussure (1969) introduces four essential dichotomies. According to Saussure, linguistic signs consist of two parts of the structural concept of language: signifier and signified. He further states that “the linguistics sign unites, not a thing and a name, but a concept and a sound-image”. A concept is signified by a sound image, and a sound image is a signifier. The concept or meaning of the word is signified, and the sound pattern of the word is signifier. In signifiers, the sound design is not a sound (something physical), but it is the psychological impression of a sound that evidences the senses. “The concept of signified and signifier is very closely related to the sign because the concept of signifier and signifier derives from the sign proposition. A sign is the fundamental unit of language, consisting of a concept and a sound image”.

The sign as the union of signifier and signified has two primary principles. The first principle is that the sign is arbitrary and it should be noted that the sign is entirely arbitrary. The second is the signifier's linear nature and the meaning here is the word or auditory sense that exists in time and can be measured in a linear sense. At the same time, we cannot say two words; we have to say one and then the next in a linear way. This idea is important because it shows that language is a linear sequence of a chain, mainly when it comes to oral utterances in a language.

Langue and parole are the second concepts. "Langue is the entire language system that precedes and enables speech, and parole is the concrete use of the language, the actual pronouncements. Language is not what is spoken, but the product that has been recorded, while parole is speaking individually.

Synchronic and diachronic is the third concept. Saussure stated that "everything that relates to the static side of our science is synchronous as everything that relates to evolution is diachronic”. It means that language study is synchronic, which can be changed from time to

time. “Synchronic observes language from a static point of view, makes a temporary cut and determines the patterns currently accepted by the speech community that structure language”.

The final concept of Saussure is the dichotomy between syntagmatic and paradigmatic. Saussure said that "the elements are sequentially arranged on the speech chain. The linearity-supported combination is syntagms. "It means that syntagmatic relationships are one in which signs occur sequentially or parallel and create meaning together. The letters in a word, for example, have a syntagmatic relationship, as do the words in a phrase. Syntagmatic relationships, such as spelling and grammar, are often governed by strict rules. Paradigmatic or associative is a relationship in which an individual sign can be substituted. Saussure stated that "a word can always remove everything that can be associated with it in one way or another. "Individual letters, for example, may have a paradigmatic relationship with other letters, since if one letter is used, it may be replaced by another, although the meaning may change. The word may also have a paradigmatic relation to other letters so that the word can be changed with another word that has the same role (such as subject, the verb for verb, object for an object, etc.).

Concepts are cognitive components that can be combined to produce an infinite number of ideas. Concepts serve as building blocks for creating an infinite number of structures. Many researchers such as Fodor (1975), Fodor, et.al (1980), McNamara & Miller (1989) say that concepts are frequently acquired elements that can be broken down into various semantic elements.

Once a concept has been formed, other concepts can be composed from them. Several researchers have studied the creation and understanding of new combinations of concepts. Finding a connecting relationship between two concepts is commonly used to create word-combination interpretations. In the Concept Specialization Model proposed by Murphy (1988) one can find that “combinations involving nouns are derived by finding a variable that is associated from the second noun which is replaced by the first noun”. Wisniewski and Love (1998) established that “the properties from one concept are often transferred to another concept and vice-versa in case of similar concepts with easily alienable parts”.

According to Fodor and Pylyshyn (1988), cognitive systematicity requires the computational power of concepts while also encouraging creative thinking. “The concept of pragmatics refers

to a system's ability to entertain complex thoughts, which is intrinsically linked to its allowing adequate thought components. Whether the meaning of a combination of concepts can be derived from the meanings of its elements has arisen in the field of conceptual combination. On the one hand, this form of organization is severely harmed. When adjective and noun concepts are combined, the derived relationships are not always predictable by the concept's main effects". "On the other hand, based on how well an object meets the separate descriptions of the conjunction, there have been notable results in forecasting how well an object fits a conjunctive description (Hampton, 1997)". "When concepts are combined, the meanings of the concepts systematically define the meaning of the conjunction, according to a proper reconciliation of these findings".

We can generalize our experiences with specific objects in the same category to other objects using concepts. Many properties can be predicted inductively using the concepts that we use most frequently. We have to digress slightly and consider different concepts to see why this is the case. Categories such as man-made artefacts, adhoc categories and metaphors can be sorted roughly in order of similarity of grounding. These category members do not have much in common with the latter categories.

In contrast to adhoc and metaphor-based categories, members who share many features characterize most natural types and many artefacts. Subjects are listed for basic categories, broader superordinate categories and narrower subordinate categories. "The number of characteristics listed by subjects that are common to items in the same category is used to calculate a measure of similarity within the category. Items in a basic category have many more features in common than items in a superordinate category and nearly as many as items in a subordinate category. Category members do not have to share the same definitional feature, but they do tend to share a number of them".

Natural objects, especially at the basic level of Rosch (1968), generally allow many inferences. "Because their members share similarities in many dimensions and/or features, basic level categories allow for many inductions. Adhoc and highly metaphorical categories allow for fewer inductive inferences. Still, the inferences they allow are so critical in some cases that the categories are formed on a required basis". "One intriguing possibility is that all concepts are created to meet an inductive need, and that standard taxonomic categories like birds and

hammers are automatically triggered simply because they are frequently used" (Barsalou, 1991).

2.3.3. Rules for conceptual development

It is natural that concepts are presented earlier in dictionaries, either print or electronic in an orderly manner. But when it comes to representation, there are ways in which it is done. Let us assume the representation of a concept in a dictionary is given as X, but when these concepts are explained like a lexicographer's representation of this concept X may differ from person to person (as they would come from varied cultural backgrounds) and hence this difference in this presentation of the concept. However, this account of representing concept (as X) claims that "some rule represents a concept that allows one to determine whether or not an entity belongs to the category".

At this juncture it is ideal to look at the hypothesis testing approach of Bruner et.al (1956) which is the most effective rule-based approach to concepts. He says that "Their theorization was, in part, a reaction to behaviourist approaches in which conceptual learning involved the relatively passive acquisition of a link between stimulus and response". Bruner et al. (ibid) claimed that active hypothesis creation and testing is typical of concept learning. In a typical experiment that was conducted, the subjects were shown flashcards with various forms, colours, currency, and borders. They were asked to determine the rule for flashcard grouping by opting the flash-cards to be examined further and reverting the responses from the investigator pointing out whether the opted card is in sync with the rule. The researchers attested various card selection techniques, and a significant number of works revealed significant variations in the ease with which different categorization rules are acquired.

This method, which is a rule-based approach, was dubbed "the classical perspective" by Medin et.al. (1984) who defined it as "stating that all instances of a concept share similar features that are necessary and sufficient requirements for the definition of the concept." Even though there were challenges in the rule-based approach, it sparked an interest in the 1990s which gave rise to neural network models.

2.3.4. Conceptual conditions

“A traditional approach to describing concepts is to define them using necessary and sufficient conditions. If we have a concept like a woman, it must contain all of the information needed to determine whether or not something in the world is a woman”. This may be arranged according to a semantic features such as:
“X is a woman if and only if L.
where L is a list of attributes, like:

X is human;
X is adult;
X is female, etc.”

“These characteristics can be thought of as conditions: if something has to make a woman, then the necessary conditions can be called. Furthermore, suppose we can find the right settings so that this set is all that is needed to define a woman. In this case, sufficient conditions can be invoked, indicating that we have identified the appropriate amount of information for the concept”.

From the above illustration it is evident that one can accept that concepts are part of knowledge. One major assumption with this kind of approach is that if the subjects (speakers in this case) share the same concept, the conditions (necessary and sufficient) shall be agreed upon. However, if we consider nouns which could denote concrete and natural species, it is a challenging and vital task. For instance, let us take the example of Cheetah (which is a noun in English). So,

Cheetah is an animal,
it has four legs,
it is a long-legged spotted cat having non-retractile claws,
it is the swiftest mammal, it is a carnivore, etc.

2.3.5. Conceptual features

Most of the discussions of concepts focused on lexical concepts and these lexical concepts correspond to lexical items in natural languages, such as Banjara, for example, the popular belief that lexical items (the vocabulary of the language) in natural languages are acquired from their meanings from the context in which they are used. Concepts are generally the mental representations expressed in natural languages through words. At the same time, mental representations, sometimes may be wrongly designated as concepts.

2.3.6. Concepts as Abstracts vs Concepts as Mental Representations

It is assumed that concepts are mental representations from natural language expression. “For example, your GRANDMOTHER concept is a mental representation of a specific type, perhaps a structured mental representation in one of our two isolated senses”. However, it should be said that not all theorists accept the thesis that concepts are mental details as their starting point. It is not uncommon to think of concepts as abstract entities in philosophy. Digression is required to clarify the motivations for this view and its relation to standard psychological accounts. However, we hope that the reader will bear with us, as some of the distinctions in this dispute will later be relevant.

It is ideal to look at German philosopher Gott lob Frege (19th century) and his distinction between meaning and reference. Frege focused primarily on language, especially artificial languages used in logic, mathematics and science. But the distinctions he has drawn come from natural language analogues and theories on mental representation.

In the first instance, it is beneficial to consider senses in terms of another technical concept in Frege - the presentation mode for the term's reference. Frege discussed many cases in which different terms refer to the same object differently by characterizing the object. For example, "two plus two" and "the square root of 16" refer to the number four, but they have different ways to characterize it. This distinction between reference and presentation mode is usually applied to all sizes and semantic categories expressions. We can talk about the presentation mode for a name, a kind term, or even a whole sentence, just like we can talk about a phrase. "Mark Twain" and "Samuel Clemens' ' may refer to the same person, but their presentation

modes are not the same for this person. Similarly, "gold" and "atomic number 79 elements' ' may refer to the same material, but clearly in different modes of presentation.

The connection with senses is that Frege held that, in addition to a referent, expressions have a meaning and that the meaning of an expression "contains" the mode of presentation for its referent. We don't have to be concerned with all of the intricacies right now. But to be more precise about the senses, it is worthwhile to think of them as characterized by the roles Frege asked them to play. There should be a clear distinction between three (cf. Burge 1977):

2.4. Cognitive Approach

We can discriminate much more than conceptual stimuli. “If the stimulus is delayed and reproduced, the contribution of category-level information to individual-level information increases (Crawford, Huttenlocher, & Engebretson, 2000)”.” “Together with studies showing that, over time, people tend to preserve the gist of a category rather than the exact members that comprise it (e.g., Posner & Keele, 1970), these results suggest that by preserving category-level information rather than individual-level information, efficient long-term representations can be maintained.” From a theoretical perspective, “it is efficient to store a category in memory instead of a complete description of an individual, as less information is required to specify the category”.

From an information theory perspective, “it is efficient to store a category in memory instead of a complete description of an individual, since less information is required to specify the category”. “For example, Figure 1 shows a set of objects described in two dimensions (shown by circles). Instead of preserving the full description of each of the 19 objects, a fairly faithful representation of the distribution of objects can be created by simply storing the positions of the four triangles in Figure 1”. “This kind of information reduction is particularly significant because computational algorithms exist that can automatically form these categories when supplied with the objects (Kohonen, 1995).” “For example, the competitive learning algorithm (Rumelhart & Zipser, 1985) begins with random positions for the triangles, and when an object is presented, the triangle that is closest to the object moves its position closer to the object.” “The other triangles move less rapidly or at all, leaving them free to specialize in other object classes. In addition to showing how efficient representations of categories can be created, this

algorithm was presented as a model of how a person creates categories, even if there is no teacher, parent or label that tells the person what categories are or how many".

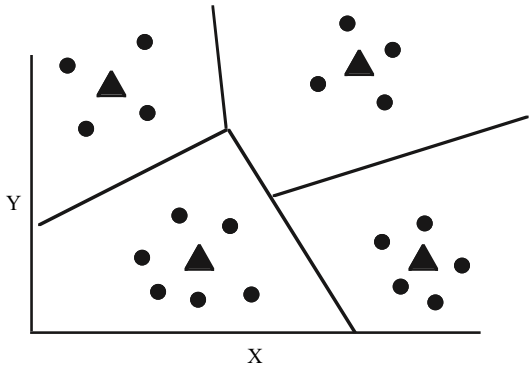


Figure 1: Concepts and Categorization

The above figure reproduced from Robert L et.al 2012, P.611

The above statement implies that memory conservation with regard to concepts may be utilized. "An equally important economizing advantage of concepts is to reduce the need for learning (Bruner, Goodnow, & Austin, 1956)." "An unfamiliar object which has not been placed in a category attracts attention because the observer has to find out how to think about it. In contrast, if an object can be identified as belonging to a pre-set category, less cognitive processing is typically required". One could treat the object as an alternative example of something which is not known, if at all, slightly updating one's knowledge. According to Piaget (1952) "The difference between events requiring changes in one's concepts and not described in terms of accommodation (adjustment of concepts on the basis of a new event) and assimilation". On the similar ground, Grossberg (1982) states that "this distinction was also incorporated into concept learning computational models, which determine whether an input can be assimilated into a previously learned concept, and if it cannot, then reconceptualization is triggered". After a certain time, Palmeri and Nosofsky (1995) observed that "when a category instance is consistent with a sample category description, then people are less likely to store a detailed description of it than if it is an exceptional item consistent with the notion that people simply use an existing category description when it suffices".

2.5. Prototype

Rosch (1973), proposed the prototype theory which has become an influential paradigm in the area of cognitive psychology. Later, the prototype theory was further explained by Rosch and her colleagues who viewed the "prototypes as structured so that central or typical members of a category, such as birds or furniture, are present but then shade into less typical or peripheral members. For example, the chair is a more central member of the furniture category than the lamp". According to Rosch, et.al (1976) sparrow belongs to the category of bird which is more typical than a penguin.

The prototype theory is often associated with cognitive Psychologist Eleanor Rosch who along with her colleagues have carried out pioneering experimental research during the early 1970s. According to Evans & Green, (2006) "The prototype theory which is based on the human categorization system is guided by two basic principles, viz. the principle of economy and the principle of perceived world structure". On similar grounds Rosch (1978), "cognitive economy principle details about the `level of inclusiveness' and the world structure principle is concerned about the representativeness (otherwise called as the prototype structure)".

Based on the experiments conducted by Rosch and others (1976), it can be summarized that the superordinate level (which is the hypernym) can be mapped with the inclusiveness category as against the subordinate level (hyponym). Through these experiments, it is found that the subjects were able to enlist common characteristics (attributes) for a category. For these experiments, Rosch and others (1976) used six taxonomies as stimuli, viz. musical instruments, fruit, toll, clothing, furniture and vehicle as superordinates. For more details, see Rosch, et.al (1976), Evans & Green (2006).

An item in the world may resemble two different prototypes. English speakers can use the word *whale* but are unsure if a whale is a mammal or fish. This could be explained in the concept theory of prototypes because whales are far from the central prototype and are not typical of the mammal category. At the same time, in some characteristics, whales look like prototypical fish which live in the oceans (underwater), and have fins, etc.

In a way, the prototype model can address the classical theory's limitations. If concepts are arranged around prototypes, only features are expected to be characteristic, not necessary or

sufficient. “If objects similar to prototypes from more than one concept are presented, unclear category boundaries are expected. Even while objects belong to a category, their typicality can vary as they may be more similar to the prototype of the category than to the prototype of any other category. Prototype models do not require fuzzy boundaries in terms of concepts”.

“Prototypes have cognitively essential functions. The similarity of an item to its prototype category predicts the results of many converging tasks. It is somewhat correlated with the average rating that the item receives when subjects are asked to rate how good the item is in its category (Rosch, 1975)”.

2.5.1. Conceptual Connection with Prototypes

“Although approaches to knowledge representation have often treated conceptual systems as independent networks, it is important to remember that concepts are linked to both perception and language. The connections between concepts and perception form the basis and their connections to language enable them to transcend direct experience and be transmitted quickly” (Lenat & Feigenbaum, 1991).

According to Fodor (1983), “The formation of concepts is often studied as a modular process. For him participants in category learning experiments are frequently represented using linguistic feature lists. In this approach it is assumed that an object's perceptual processing into features is complete before classification begins. This is a useful simplification assumption because it allows a researcher to test how features are combined to form concepts”. According to Bassok (1996), “identifying features affects the categorization of an object and influences the interpretation of features by categorizing an object”.

Later research shows that perceptual information plays a role in forming concepts and their use. This evidence comes from research on the theory of perceptual symbol systems by Barsalou (1999). In this approach, sensorimotor regions of the brain were stimulated, according to this notion. “However, instead of maintaining a verbatim record of what has been experienced, association areas only reactivate specific components of one's perceptual experience, specifically those that have grabbed one's attention since these reactivated aspects of experience can be common to some different events, they can be seen as symbols representing a whole class of events. It is because they are developed around perceptual

experience, they are perceptual symbols, as opposed to the a modal symbols that are commonly utilized in cognition theories".

For Goldstone (2000) "Concept learning seems effective in combining stimulus properties to create perceptual chunks diagnosed for categorization and isolating perceptual dimensions if they are diagnosed differently". As it is seen, perceptual information influences concepts, and how the information of concepts influences the people perceive the knowledge available from the surrounding. In general many theoretical frameworks on concept formation do not take this interrelationship into account, instead, they take the perceptual attributes and attempt to explain how they are utilized to categorise the responses".

Object recognition research is one of the research areas which is a rule-bound approach. According to Schyns (1998) "object recognition can be seen as an example of object categorization. In contrast to categorization theories, object recognition theories highly emphasize the role of perceptual information in identifying an object. Interestingly, some of the theories proposed for the recognition of objects have characteristics similar to categorization theories". For instance, "the structural description theories of the recognition of objects are similar to the prototype theories of categorization in that a newly found specimen is compared to a summary representation of a category to determine whether the specimen is a member of that category or not" (ibid).

2.5.2. Concepts and Language

From the earlier research, it is established that in language relationships, concepts play a reciprocal role. That is, one's concept vocabulary can influence the types of words one acquires, while the language which a person uses can influence the types of semantic domains one utilizes in the language.

Because the extent to which "different types of words map directly to existing concepts varies, learning some types of words is easier than others". For example, nouns shall be linked to the object concepts directly, which indicates that children learn nouns relatively early in their childhood as compared to other categories. On the other hand, the relationship between verbs and prelinguistic event categories are acquired easily. "The nature of children's prelinguistic

sequence activities is unknown, but available evidence suggests that they are structured differently than verb meanings when compared to noun categories".

The concept of influencing one's mother tongue is not simple, rather controversial. It is also proved that a concept is learnt in the surrounding presence of a person or due to the absence of the concept in the language which is acquired from another language.

The major differences with regard to "conceptual learning situations is that one piece of information, namely the category label, is identified as important to predict in learning labelled categories". Therefore, "if participants can adequately predict the category label based on a single attribute, additional attributes do not need to be examined and it is automatically included. On the other hand, if no information is identified, as in the case of unlabelled categories, subjects who have learned a predictive relationship cannot be sure that they have acquired everything they need to learn". In the similar way, Billman & Heit, (1988) stated that "they can preferably take care of those attributes that have already been found helpful, thus facilitating learning of other relationships involving these attributes ".

Early experimental evidence suggests that linguistic skills relatively do not affect concepts. Heider in his 1972 work on Dani community of Papua New Guinea identified speakers who learnt new colour concepts which are similar in nature to English. Even though Dani had only two colour terms, it can be emphasized that concepts in Dani were decided by the perception of the speakers rather than the use of language. It can be suggested that the English colour spectrum division may be more in terms of perception and could be less in the human colour physiology.

Regardless of the explanation given by Heider (1972) and Roberson et al. (2000), "there are clear reasons to expect at least some language influence on one's concepts". On similar grounds, Homa and Cultice (1984) have also shown "people better learn concepts when category labels are provided as feedback". It is fair to assume that when a concept is classified in a language, it is more likely to be learned than not. To be specific, Goldstone (1994) opines that "it can be predicted that when a language refers to a particular dimension, people learn concepts about that dimension, the perceptive sensitivity of people to that dimension is increased". This Language can indirectly influence the concepts of people through one's perceptive abilities.

2.6. Related Theories

The approaches to representation have taken all work into account regardless of the theories on the meaning of the concepts. It is both a benefit and a responsibility for the research activity. It is an addition because it includes applying different approaches universally on any material. They share the property that they can operate on any data set formally described in numbers, features or coordinates with inductive statistical techniques.

According to Medin, (1989), Komatsu, (1992) “the categorization of people seems to depend on their theories about the world”. In argumentation of categorization theories, Murphy and Medin (1985) stated that “if a man jumps into a swimming pool with clothes on and if the man is classified as drunk because the theory of behaviour and drunkenness explains the man's actions”. On similar grounds (ibid), “one can argue that categorizing the man's behaviour does not depend on matching the characteristics of the man with the characteristics of the category drunk. It is doubtful that this category would have a specific feature such as jumping into a pool. This classification of the instance is not determined by the similarity between the instance and the category; rather the category provides a theory that explains the behaviour of the person”.

Keil (1989) arrived at a similar conclusion using different empirical techniques. Children are increasingly claiming that the animal is a skunk with increasing age. In other words, children tend to categorize based on heredity and biology theories instead of visual appearance. Rips, (1989) for example “shows an explicit dissociation between judgments of categorization and judgments of similarity in adults in a similar experiment. An animal transformed from a bird into an insect is judged to be more similar to an insect by subjects but is also judged to be still a bird. Again, category judgment appears to depend on biological and historical knowledge, while similarity judgments appear to be more dependent based on outward appearance”.

Scholars in the field have experimented with modifying background knowledge to shape our notions for instance Pazzani, (1991) says that “Concepts are easier to learn when a student has appropriate background knowledge, which indicates that our concepts are based on more than brute statistical regularities”. Similarly, Sloman, Love & Ahn, (1998) opines that “category

learning is facilitated if prior knowledge of concepts can link the features of a category are disproportionately represented by conceptual features that are closely linked to other features".

The creation of categories based on data, which is drawn from statistical evidence and their formation based on the world's knowledge-rich theories appear to be basic and different from each other. This may be the most basic difference between concept theories in the field. Nevertheless, these techniques need not be mutually incompatible. In the works of Murphy & Medin, (1985) "the most explicit advocates of theoretical concepts do not claim that similarity-based or statistical approaches are not necessary". In addition, some researchers suggested that these two approaches can be integrated. On the similar grounds, Heit (1997) describes "a similarity-based, exemplary categorization model that incorporates background knowledge by storing category members and storing unseen cases consistent with background knowledge". Earlier studies by Choi and others in 1993 in which they described neural network models based on the concept of learning. Both approaches also allow subjects from the semantic domains.

2.7. Category and Boundaries

In category and boundaries, there is a notion that says that the boundary of a category is described in terms of conceptual representation. A boundary model of the category would be represented by the categories in four dividing lines in which one of them is categorical perception. Categorical perception is an interesting phenomenon to consider if centres or peripheries of concepts are representationally produced. According to this phenomenon, when stimuli come from different categories, people can better distinguish between physically different stimuli than those from the same category (for more details see Harnad, (1987)). For speech related categories, the effect was best documented.

Categorical perception effects are observed for various visual categories; for details see Calder et al., (1996). Similarly for the arbitrarily created laboratory categories, see Goldstone, (1994). From prototype or border representations, categorical perception may emerge. According to Liberman et al., (1957) "a categorized item could be compared to the prototypes of two categories of candidates. Items falling on different sides of the border would have very different representations, as they would be closest to various prototypes". Pastore (1987) proposed an alternative boundary which could be represented as a reference point because when two things

get closer to the border, it is easier to distinguish between them because they are close to this reference point.

There are models based on the computational techniques that are designed based on certain principles. Considering the prototype approach, Harnad and others (1995) describe “a neural network in which the representation of an item is pulled to the prototype of the category to which it belongs. A neural network learns to vigorously represent critical boundaries between categories by moving perceptual detectors to these regions following the boundary approach”. The results are mixed empirically.
It is found by earlier researchers that perfect critical review is close to a familiar prototype under the prototypes represented. For details on sound sequences of prototypes, see Repp & Liberman, (1987).

According to earlier prototype approaches, researchers such as Posner & Keele, (1968), Read, (1972), and Homa, (1984) opine that the categories are represented by forming a summary representation which is a tendency that is central to members within a category. However, in exemplar models as suggested by Medin & Schnaffer (1978), Hintzmaa, (1986), Representational notions can be categorized which have several constraints. Boundaries can be confined to a different dimensional axis which can be equally close to prototypes for neighbouring categories. They may produce optimal categorization performance.

2.8. Exemplars Model

“Prototypes are not explicitly extracted in exemplar models, stored in memory and used to categorize new objects from individual cases. Instead, a conceptual representation in exemplar models consists only of the actual individual cases observed. The category bird's prototype representation consists of the most typical bird, an assembly of all birds' most common attribute values, or the central tendency of all attribute values for observed birds. The exemplar model, by contrast, represents the bird category by representing all the instances (exemplar) belonging to this category”.

While these models were primarily motivated to fit the results of human experiments well, “computer scientists pursued similar models to use the power to store individual stimulus exposures in a relatively raw, abstracted form. Psychological evidence suggests that, under

these models, people show good transfer to new stimuli in perceptual tasks only to the extent that the new stimuli superficially resemble previously learned stimuli (Kolers & Roediger, 1984; Palmeri, 1997)".

"The frequent failure of human generalization to transcend superficial similarities can be human stupidity or laziness. On the contrary, if there is a lack of a robust theory of what stimulus features promote valid inductions, the least commitment strategy is to preserve the entire stimulus in its full detail (Brooks, 1978)". In other words, "one can be confident that one's generalizations are not systematically biased by storing whole instances and basing generalizations on all the features of these instances. In many situations, the categorization of new instances by their similarity to old instances has been shown to maximize the likelihood of correctly categorizing new instances (Ashby & Maddox, 1993; McKinley & Nosofsky, 1995; Ripley, 1996)". "In addition, if the information is available at a later point that specifies which properties are helpful for proper generalization, these properties can be recovered by preserving entire instances. If people were less 'lazy' in their instance generalizations, such properties could be lost and unrecoverable".

"Given these considerations, it is understandable that people often use all the attributes of an object, even if a task requires specific attributes. Doctors' diagnosis of skin disorders is facilitated if similar to previous cases, even if the similarity is based on attributes known to be irrelevant to the diagnosis (Brooks, Norman, & Allen, 1991). Even if people know a simple, straightforward rule for a perceptual classification, performance on frequently presented items is better than rare items (Allen & Brooks, 1991). The responses to stimuli are often based on their overall similarity to previously exposed stimuli under exemplary models".

"The exemplar approach assumes that the category is represented by the exemplar category found. The decision to categorize the category is based on the similarity of the object to be categorized into all exemplar categories. As a result, the likelihood of an item being placed in category A increases as it becomes more similar to the exemplar of category A or less similar to the exemplar of other categories. Categorization judgments can be changed if an item is approximately equal to two sets of examples, as probabilistic decision rules are typically used. Items will vary by category in their typicality as long as they vary in their similarity to the aggregate set of examples".

“The exemplar categorization approach raises several questions. First, once it has been decided that concepts should be represented in sets of examples, the obvious question remains: How should the examples be represented? Some exemplar models use a feature or attribute value representation (Hintzman, 1986; Medin & Schaffer, 1978)”. “There is probably a human process that calculates the representation of objects and can derive similarities between objects. Still, this process is not currently modelled on exemplary models (see Edelman, 1999)”.

The secondary implication for exemplary models is "If exemplary models do not explicitly extract prototypes, how can they account for the results that concepts are organized around prototypes? A helpful starting point is to consider Posner and Keele's (1968) result in the better categorization of the unprecedented prototype than new prototype distortions. Exemplary models could model this result because the categorization of an object is based on its summary similarity to all previously stored models (Medin & Schaffer, 1978)”.

Given the prototype categorization account of the exemplary model, one could ask whether the predictions differ from the exemplary and prototype models. “They typically do so, mainly because categorizations in exemplary models are not based solely on the summary similarity of category exemplars but on similarities weighted by the proximity of the exemplary to the item to be categorized. In particular, models have mechanisms to bias categorization decisions to be more influenced by examples similar to categorization items. In the context model of Medin and Schaffer (1978), this is achieved by calculating the similarity between objects by multiplying instead of adding their similarities to each of their characteristics”. According to Nosofsky's GCM (1986), “similarities between objects are based on an exponential function of the distance of objects in an MDS space. With these quantitative biases for close specimens, the exemplary model better predicts the accuracy of categorization for the experiment by Posner & Keele (Shin & Nosofsky, 1992)”.

The next question after the second for exemplary models is, "How are conceptual representations economical if each experienced specimen is stored? with large real-world categories, it is certainly not possible to assume that each previously experienced instance is stored in a separate trace. However, more realistic exemplary models may store only part of the information related to the exemplar (Lassaline & Logan, 1993), or only a few exemplary models (Aha, 1992; Palmeri & Nosofsky, 1995). One exciting way to conserve empirically supported space (Barsalou, Huttenlocher, & Lamberts, 1998) is to combine separate events that

constitute a single person into a single representation. Instead of passively recording each event separately, people naturally seem to consolidate events that refer to the same person. Suppose an observer fails to record the difference between a new specimen and a previously encountered specimen (e.g., two similar-looking chihuahuas). In that case, the two can be combined, resulting in an exemplary representation, a mixture of two instances".

2.9. Mental Rotation

"Mental rotation is the process of imagining an object rotating in three-dimensional space" Shepherd and Metzler, (1971). Mental rotation task was first drafted by Shepherd in November 1968, based on his sleep experience of "spontaneous kinetic image of three-dimensional structures majestically turning in space" he first announced the MRT. Later Shepherd and Metzler, (1971) developed the task. Before Shepherd and Metzler, the mental imaginary approaches were non logical where people asked to describe what they imagined without any objective checks. Shepherd and Metzler resolved the problem of objectivity, viz. initially they ensured that the participants or a subject's responses are described whether they are correct or incorrect, later they developed the "recorded reaction times for their correct responses as measures of mental processing time". Later in 1979 Vandenberg & Kuse developed a mental rotation task as an application, that is the reason the mental rotation task is also called as Vandenberg's test.

As it turns out, there are some gender differences in performing mental rotation tasks. It appears that men perform better on these tasks than women do. This appears to be universal as found in China, Japan, Ecuador, Ireland and the US. The organization of mental rotation tasks is done by labelling things, and the most basic and vital step is knowledge (which is called concept here). A concept is a mental group of events, objects, or people. So, for example, the concept of an animal can include mental groups for birds and fish and so on. Further these can be broken down into different categories of birds—for instance, an elephant or pigeon. These concepts help us to organize and perceive the world around us, and we often engage in what's called a concept hierarchy, which is an arrangement of concepts in an organized way. Some concepts are general, and some are specific; there are two definitions we need to address here. The first is category; A category is when multiple concepts are organized around one concept that they all have in common. For example, vehicles or trees, all these different types of vehicles, or all the different types of trees organized around this category can be well defined. Still, other

categories can be fuzzy, such as good, bad, or consciousness. It can be challenging to organize other concepts and if prototypes are introduced, it takes care of the fuzziness involved.

According to Johnson (2008) Mental rotation experiment or task is “the process by which people imagine how an object would look when rotated into a different orientation in space; it may be related to performance on tasks like perspective-taking and navigation”. In addition, (ibid) “men typically perform faster and more accurately than women on MR tasks. Known influences on mental rotation performance in adults are biological (e.g., exposure to testosterone) and experiential (e.g., practice at spatial tasks), raising vital questions about the developmental origins of mental rotation”.

An experimental work, "A Large Sex Difference on a Two-Dimensional Mental Rotation Task" by Collins and Doreen (1997), describes that "The Vandenberg Mental Rotations Test illustrates rotations in three-dimensional space and often gives one of the most significant established cognitive sex differences favouring males." “It's unclear whether this male advantage is due to the nature of rotations represented in 3-D space or the task's high difficulty level. A male advantage as significant as that seen on the Vandenberg test was found for the difficult component. These findings suggest that processing in 3-D is not a necessary condition for a large sex difference on mental rotation tests”.

According to Halpern, 1992; Kimura, 1996 “females excel on perceptual speed or verbal fluency measures, and males consistently outperform females on specific tests of spatial ability”. Linn at.al, (1985) suggests that “the male advantage is largest on mental rotation tasks”. Generally, participants must decide if two figures are identical, then rotated versions of each other seem to be mirrored images. According to Vandenberg & Kuse (1978) as described earlier, the standard measure of this function is the Vandenberg Mental Rotations which uses depictions of 3-D cube figures which was also designed by Shepard and Metzler in their 1971 work. According to Shepard & Cooper, 1982 “The rotation trajectories of the cube figures in the Vandenberg test are around a vertical axis parallel or slightly tilted to the picture plane and have been referred to as rotations in-depth. Consequently, participants must imagine the cube stimuli revolving in 3-D space in order to perform the task. Alternative proposal have been made by Berg, Hertzog, & Hunt, (1982); Newcombe, (1982); Stumpf, (1993) that the magnitude of the sex difference found on a spatial test may function the difficulty of the test. According to this view, the level of difficulty of the rotation task per se, and not the nature of

the rotations depicted, is critical with regard to the size of the male advantage. Thus, the large sex difference observed on the Vandenberg test may be related to the high level of difficulty inherent in this task".

2.10. Metaphor

According to Levorato and Cacciari, (2002) "figurative language or metaphoric language is a very powerful tool or method to evaluate the generation of new ideas and it leads to linguistic innovation". For Ricoeur, (1981, 2003) "metaphoric language is considered as a verbal form of creative thinking, which results in an individual who is able to describe a wide range of emotions and experiences in real life (Beaty and Silvia, 2013)".

For example, 'an argument is war' is the most common example of war metaphors, and it is partly abstract in parts of human minds. If we can discuss more 'war' metaphors

a. Your claims are indefensible
b. There is a weak point in my argument
c. Her criticisms are on target
d. She shot down and destroyed my argument
e. He attacked my argument

So, why do we do this? Because a 'war' and an 'argument' are systematic, both are structured in a recognizable/common nature that has sides, positions, win, and losses. "There are similarities to describe the way people can easily understand. We borrow from pre-existing something, and we describe something conceptual. Let's take another example: 'time is money' time and money have structural similarities so that we can use one to describe another". If we can see some more related examples:

"f. You are wasting my time
g. This gadget will save you hours
h. I didn't have the time to give you
i. That flat tire costed me an hour
j. You're running out of time"

They also say that metaphors change from time to time as we think further about the situations, generation by generation, they change.

Recently the University of Nottingham published an article called “metaphors in the time of coronavirus” they have argued that why look at metaphors in the time of coronavirus? Because metaphors have creative meaning, “they have been tools for meaning-making as long as humans can talk and watch others. Metaphors are essential for the development of language, cognition, and culture. They also play an essential role in how we think and talk about health, illness, and medicine, and they shape how we act individually and collectively. So, if we can see, some of the examples related to coronavirus metaphors are mostly war metaphors because it is currently happening in all kinds of reporting worldwide. We hear a lot of fight, battle, combat, attack, defend, etc. in the media reports”.

“l. It is people's war against the covid-19 epidemic
m. The government declared war on coronavirus with a battle plan to kill the deadly virus”.

On the other hand, some people oppose the "war" metaphors used in the media reports because they argue that using "war" metaphors during a pandemic will panic the people and win the obedience to authorities of the governments across the world.

If we can see some more pandemic metaphors below,

“London is a coronavirus reactor, and it has to be cut off. China is Chernobyl! Cases are flattening the curve, Breaking the chain of infections, Starving the virus of fuel, slowing it in tracks and pushing it back, Sending the virus packing, Shutting down the borders, Fighting against coronavirus is on One step ahead of the virus. Covid is the disease of stoppage of social distancing of self-isolation”.

“Metaphor has traditionally been regarded as the most important form of figurative language use and is usually seen in literary or poetic language as reaching its most sophisticated forms. However, we can start our discussion with a couple of examples from journalism. Both come from reports about the 2002 Hollywood Film Awards, the Oscars”:

“i. Film studios love a good fight, as well as a bad one. But the battles of the Oscar have become a war of trench and dirty tricks”.

As it is observed that there is a harmonious competition for awards is depicted in terms of warfare, and the image of a car race is depicted in ii. Metaphors can be explained in a number of ways. Still, one common idea is that the metaphor is similar to a similar one, “E.g., reading this essay was like wading through mud) in that it involves identifying similarities. Still, this metaphor goes further by causing a transfer in which properties are transferred from one concept to another. As we will see later, this transfer has some interesting properties”.

Let's introduce some terminology before we continue. “In literature, the two concepts involved in a metaphor are referred to differently. We can select two: The starting point or described concept is often referred to as the target area”. In contrast, the comparison concept or analogy is referred to as the source area. “A. Richards (1936) terminology, the former is called the tenor and the latter is called the vehicle. Both sets of terms are commonly used in literature; the former, target and source, will be adopted”.

“On the role of metaphor in language, there are two traditional positions. The first, often referred to as the classical view, since it can be traced back to Aristotle's metaphor writings, sees metaphor as a kind of decorative addition to ordinary plain language. This rhetorical device can be used at certain times to achieve certain effects. This view depicts metaphor as something beyond ordinary language and requires unique forms of interpretation by listeners or readers. In literal language theory, a version of this approach is often adopted. In this approach, metaphor is frequently regarded as a deviation from literal language, which the listener detects as irregular, forcing the listener to engage some tactics in order to discover the speaker's intended meaning”. We can take “Searle (1979: 114) as an example of this general approach, which describes the beginning of the process (where Sam is a person in a contextual assumption)”:

Suppose if a person listens to an utterance, "Sam is a pig. He knows it can't be true literally, that the utterance is radically defective if he tries to take it literally. And, indeed, such a defect is a feature of almost all the examples we have so far considered. The hearer's defects may be evident falsehood, semantic nonsense, violations of speech rules, or violations of

communication principles. This suggests a strategy that underlies the first step: If the utterance is literally defective, look for an utterance that differs from the sentence's meaning".

"The second traditional approach to metaphor, often referred to as the romantic view, since it is associated with romantic views of the imagination of the 18th and 19th centuries, takes a very different view of the metaphor. Metaphor is a significant factor of both language and cognition. as a way to experience the world from this perspective. In this view, metaphor demonstrates the role of imagination in conceptualization and reasoning, and all language is metaphorical. In particular, literal and figurative language are not distinguished".

2.10.1. Features of metaphor

Cognitive Semitists argue that metaphors have characteristic and systematic features, far from being distinctive anomalies. "We can look at some of these characteristics in the headings of conventionality, systematicity, asymmetry and abstraction. The first, conventionality, raises the question of the metaphor's novelty". "Some writers would argue that some metaphors have become fossilized or dead. According to literal language theory, they began to be metaphors and became literal language, as indicated by Searle (1979: 122)".

"Dead metaphor. The original meaning of the sentence is rejected, and the sentence takes on a new literal meaning that is identical to the previous metaphorical meaning. This is a move from metaphorical to literal expression."

"Cognitive semanticists argue against this approach, pointing out that even familiar metaphors can be given new life and thus retain their metaphorical status. If we take, for example, the up-down metaphor, we might consider an example such as My spirits rose to be a dead metaphor, but this general metaphor is constantly being extended: In this view, it is no accident that recreational stimulant drugs are called uppers and tranquilisers, downers".

The second character feature of "systematicity, refers to how a metaphor does not only set a single point of comparison. The features of the source and target domain are combined to extend the metaphor or have its own internal logic".

In cognitive semantic views of metaphor, this systematicity has been an important focus: “Lakoff and Turner (1989), for example, identify a metaphor life as a journey that permeates our usual way of speaking. Birth is often described as arrival as next week's baby is due, or she has a baby on the way, and death is seen as a departure as she passed away this morning or he's gone. Lakoff and Turner (1989: 3 - 4) identify the systematicity of the two concepts in this mapping”:

Another example is the “metaphor's role in creating new vocabulary: The coining of the term computer virus for a specific type of harmful program; See for discussion Fauconnier (1997: 19ff.). This coining is based on a conceptual biological virus model that is generalized or schematized away from biological details”:

“Biological virus schema (Fauconnier 1997: 19)
a. x is present, but not desired; it comes from the outside; it does not belong naturally;

b. x can be replicated; new x tokens with the same unwanted properties as the original x appear;

c. x disrupts the system's standard function;

d. The system should be protected against x; this could be achieved if x could not be included in the system or if other elements were added to the system, which would counteract the effects of x, or eject x, or destroy x.

This scheme is transferred to the computer situation's general aspects; it provides a way to characterize the new domain. (Talmy 2000, vol. 1: 409–69)”.

“This metaphorical mapping of a health scheme and a computer domain can be seen as an analogue mapping form (Gentner 1983, Holyoak and Thagard 1995). It licenses an entire system of lexical innovations so that anti-virus programs can be called Dr Solomon's; they are said to disinfect, programs, files can be said to be infected, and the program places them in particular memory areas called quarantine. The importance of the metaphorical extension of the vocabulary can be seen in the following list of conventional mappings from parts of the human body”

Our third feature, asymmetry, is the direction of metaphors. “They do not compare two concepts symmetrically, establishing points of similarity. They instead cause the listener to transfer features to the target from the source”.

This asymmetry is our final feature, abstraction. “It has often been noted that a typical metaphor describes a more abstract target using a more concrete source”. Life is once again a travel metaphor that shows this feature: “The source and target may be equally concrete or abstract, but this typical view of the abstract through the concrete is seen in cognitive semantics as allowing the metaphor to play a central role in the categorization of new concepts and the organization of experience”.

2.10.2. Metaphor in cognitive semantics

Metaphor is an important feature of cognitive semantics. “In view of the classical/romantic opposition we described, the cognitive semantics approach can be seen as an extension of the romantic view. Cognitivism argues that metaphor is ubiquitous in ordinary language, although they draw back a little from the strong romantic position that all language is metaphorical. Although the metaphor is regarded as a significant way of thinking and talking about the world, non-metaphorical concepts are also accepted”:

“Metaphors enable us to understand each other's domain of experience. There must be some grounding to serve this function, some concepts that are not fully understood as source domains via metaphor”. (1989 Lakoff and Turner: 135)

Lakoff and his colleagues have identified many common metaphors by stressing the important role of metaphor in common peoples language. “For example, one group describes the many metaphors associated with an up-down orientation as spatial metaphors. These include a selection of some of their examples. (Lakoff and Johnson 1980: 14 – 21)”.

“As the authors point out, these metaphors seem to be based on our physical experiences of lying down and rising and their association with consciousness, health and power, i.e. verticality in human experience. When discussing image schemes, we will discuss this experiential basis. For now, we can see that Lakoff and Johnson's point is that speakers do not add rhetorical or poetic flowers to their language when using language like this: This is how

we conceive of happiness, health, etc. Metaphors are, therefore, conceptual structures that penetrate ordinary language. We look at some of the metaphor characteristics identified in this approach".

2.10.3. Metaphor in Cognition

Scholars in the area of cognitive linguistics, argue that metaphors influence a wide range of linguistic behaviours due to their presence in speakers' minds. For example, Sweetser, (1990) "identifies a cross-linguistic metaphor of mind - as - body, as when we talk about grasping an idea or holding a thought in English. She identifies this metaphorical view of the mind as an important influence in the historical development of polysemy and cognate words in related languages in terms of the physical. The verb see thus has two meanings in English: The basic physical meaning of 'perceiving with the eyes' and the metaphorically extended meaning of 'understanding', as I see what you mean. Sweetser discusses how verbs of sense perception have shown a consistent and widespread tendency to shift from the physical to the mental domain over time in Indo - European languages. She claims that this primary metaphor underlies the paths of semantic change in many languages. Words of seeing mean understanding, words of hearing mean obedience, and words of degustation meaning choosing, deciding or expressing personal preferences".

"Sweetser points out that the historical change in languages is not random, but they might be influenced by metaphors like mind-as-body with some semantic features. Metaphor sometimes lead to lexical change in a particular direction as if they motivated. They provide a key to understanding the coining of polysemy and semantic change. For details and illustrations see Heine, Claudi and Hünnemeyer (1991).

2.11. Conceptual convergence

"Conceptual mixing or conceptual integration is the development of the theory of mental spaces, which, taking into account aspects of the conceptual metaphor, aims to consider the ability of speakers to create and develop extended analogies". "This ability involves speakers taking knowledge from different areas of experience, viewing it as mental spaces, and combining it to create new relationships between the elements of space. Fauconnier and Turner (2002)" following example:

“There is a growing literature on mixing as cognitive Semitists sought to identify the sub-processes involved in creating mixtures. These include the composition process, in which the speaker creates links between spaces, using identity links in our example; completion, in which speakers can bring in knowledge from the relevant spaces and rely on it; and development, in which the innovative structure of the blend is developed and new inferences are formed”. “Like the previous metaphor, mixing is proposed as a more general cognitive process than language: Mixing has been identified in non - linguistic areas such as rituals (Sweetser 2000)”.

2.12. Metaphor Generation Process

Metaphor generation processing (generation/comprehension is linked to linguistics as well as computational and various cognitive functions in general. The word association between base words and target words brings in co-occurrence relationship between words thereby defining the processing of metaphor in a language (Kameya & Sato 2005). “A metaphoric language is a powerful tool that assesses linguistic innovation and helps generate new ideas. Metaphors can be described based on novelty and familiarity (Beaty & Silvia 2013)”. “Conventional metaphors are clear and easy to compare between a particular topic and the formed metaphor (Tourangeau & Stern berg, 1982)”. “In contrast, novel metaphors are linguistically original and unique (Beaty & Silvia 2013). Cognitive tools like vocabulary, selective attention, executive functions and working memory could contribute to the generating process of metaphors”.

“Metaphor processing depends on linking different conceptual domains and finding similarities between two unrelated concepts”. Metaphors can be described based on their novelty and familiarity. For example, conventional metaphors as described earlier in section compare particular topics and the formed metaphor. “Ex: ‘This lawyer is a shark’ these are coded in the mental lexicon. At the same time, novel metaphors are linguistically unique and original. The generation of novel metaphors exposes obvious patterns of thinking to adopt creativity or think conceptually and abstractly”.

To conclude, the chapter discusses various types of works related to verb classes and metaphor generation. For this, many works in the field of cognitive linguists were reviewed and paraphrased related to verbs. Apart from that, some of the works related to other grammatical

categories other than the verbs were also reviewed for the better inputs. Finally the chapter is a ground work for the further experiments that are going to be carried out in the next chapter.

CHAPTER - 3

EXPERIMENTS AND DISCUSSIONS

3.0 Introduction

This chapter discusses in detail the experiments carried out in this research work. It includes the hypothesis, design of the experiment, the methods involved in them, experimental strategy and experimental procedure, and results. Apart from the main procedural and strategic designs, the chapter also highlights the method of data collection through qualitative methods, quantifying followed by discussions and by indicating future studies. As a part of experimental strategy and experimental procedure the chapter also includes figures and graphs for a better understanding of the experiments that are executed in the research. The following are the four experiments carried out in the research:

1. Mental Rotation Task (prototype effect)
2. Direct Grading Test (prototype effect)
3. Free Association Test (prototype effect)
4. Vocabulary and Reaction Time (metaphor generation).

For each of the experiments in the research a particular technique is followed. Shepherd and Metzler (1971:19-23)) method is used for mental rotation Task, in which sociolinguistic variables are used especially sex for identifying prototypes. In this task of identifying the prototype, three tests are executed viz. mental rotation task, direct grading test and free association test. For all the three experiments, Eleanor Rosch, (1983) and Pulman (1983) models were used. For the fourth experiment i.e. metaphor generation, Lakoff's (1967) Conceptual Metaphor theory has been adopted.

Banjara language is taken as the main source for data. By taking Banjara language, the main focus concentrates on prototypical effects, particularly on the verb categories of Banjara language and the processing of metaphor generation from a cognitive linguistic perspective. Many researchers in the area of prototype studies endorsed that it is easier to identify prototypical effects on grammatical categories especially the seven parts-of-speech (nouns, pronoun, adjective, adverb, preposition, conjunction and interjection) but not on the verb category. Since prototype study of verb is not possible based on the existing literature, this

study is aimed at looking at the verbal categories in Banjara which are difficult. Once the verb category is identified then it is very easy to work on the other parts-of-speech because the verb inflects for many grammatical categories like tense, aspect, mood.

3.1. Earlier Studies on Prototype

Daniel and Osherson's (1981) work is concerned with the compatibility of the concept membership with criteria of adequacy for theories of concept. In this research the authors considered two aspects of concepts that are relevant to choosing between prototype theory and classical theory. Further, the conceptual combination is the process whereby relatively complex concepts are pushed out of relatively simple concepts. The second is concerned with the truth conditions of thoughts where the declarative proposition is true. This paper also discusses prototype theory along with the fuzzy-set theory published by (Zadah, 1965), In addition, they have also explored implementing the prototype approach to the fuzzy set theory and demonstrated its implementation. In the concluding section, they opined that analysis holds true for virtually any version of prototype theory and also considered ways of reconciling previous evidence for this theory with the wisdom of the older kind of theory of concepts.

Lakoff's (1984) seminal work in the area of Prototype theory is one of the pioneering works on Metaphors. In this work, Lakoff has attempted to apply prototype theory to cognitive aspects, acknowledging earlier works by Rosch, Berlin, Kay and Filimore. His work on prototype theory is one of the earlier works in the field of cognitive sciences. In this work, the author has provided elaborated illustrative examples with regard to prototype theory. It also provides a summary of fuzziness or fuzzy boundaries versus prototype theory as well as the differences between both. Lakoff clearly points out the cultural variations of prototype theory; he particularly says it is unlikely that the prototypes available in the English spoken in the USA might not be available in other languages.

The work by Eleni Antonopoulou (1987) tests the whether prototypes applicable to verbs or not to a lexical semantic analysis of verbs, with particular reference to the modern Greek motion verbs. The author demonstrated the difference between noun and verb in terms of prototype theory applicability, based on the noun category the verb category has demonstrated. The author points out that in the case of nouns the meaning is important while doing prototypes

but in the case of the verb category, the gradation and their attributes combined in non-arbitrary ways with the members are non-equivalent. The author discovered two categorizations of motion verbs and they are discussed at length throughout this work. The author also identified that the "factors may be responsible for the formation of verb categories, it is recalled that the validity of the principle of 'family resemblance' and the method for identifying the basic level of abstraction cannot be tested in the case of verbs". The author has suggested that "other factors may be operative, such as the relative 'salience' of certain combinations of properties, 'linguistic markedness' familiarity and frequency". The author adopted the method that has been "extensively tested nouns which have not previously been applied. The author mentioned the history of replication experiments based on Rosch (1972) and Pulman (1983) replicated Rosch (1972) experiments but replacing noun categories with verb category.

Hampton's (1995) paper attempts to provide two tests for prototypes. The first test is aimed to differentiate between prototype theory and the binary model whereas the second is on how feature matches are combined to drive a measure of similarity. In this paper, the author has also conducted four experiments that were designed to test two predictions of prototype theory, viz. (i) The first prediction was that when the necessary features of concepts are only partially matched by an instance, then non necessary features of concepts can affect categorization and (ii) The second prediction is related to the independence of features in determining similarities. However, the results are completely contrary to the above predictions. i.e. "the effect of changing a feature was greatest when other features were all positive, and so categorization probability was at maximum". The results do not support either logistic combination rule or an exponential generating function.

Antony Galton (1997) had demonstrated that "for progressive and perfect aspects in English, there exists a family of senses that can be regarded as variations on a prototypical meaning applied to prototypical situations". These aspects are derived from the prototypes by dropping one or more of its salient features, with regard to either the primary or secondary aspects. However, the author has not found any new individual facts about the English aspect, rather the author's main purpose has been "to develop a perspective within a particular theoretical framework given the various natures of facts". The author has also put forth related works in the area of verb aspects and prototype theory in this paper.

Thomas Adajian (2005) aimed to remind the standard arguments bearing on prototype theory as well as the writings of philosophers and psychologists who study concepts. The author has suggested that the prototype theory is controversial to a non-trivial degree. This article is based on Jeffrey T. Dean's paper 'The nature of concepts and the definition of arts' (2003 29-35). Adajian (2005) describes Dean's (2003) paper "overplays the independent plausibility of anti-definitionism and historical narrativism".

Hampton's (2006) work has covered a considerable amount of distance on current issues concerning prototype theory representations. It convinced the reader that in spite of the unpopularity of the prototype theory which represents concepts, the phenomena of concepts and prototypes still needs exploration. This article has classified the prototypes into four types that were reviewed. The author tried to discuss the notions that are common in philosophy, such as 'Externalist view of conceptual contents' and ideas of difference in 'conceptual atomism' in this article. The author also points out that the integration of multiple angles from philosophical, lexical semantics and psychology into true cognitive science of concept is still a distant goal. Finally the author had provided discussions on theory of concepts by way of explaining on how people's language is vague, variable, generic and opaque, "as well as explaining how concepts can be reduced to automatic symbols for the understanding of logical reasoning". In the end the author concludes that "the central notion of prototype remains at the heart of our understanding of the way of thinking".

Aberra (2008) reflects on the understanding and the use of prototype theory of concepts in cognitive linguistics. The author has detailed the assessment of prototype's life and the role in cognitive linguistics based on the works of Rosch, (1978); Smith & Medin, (1981), Geeraerts, (1989); Wierzbicka, (1990), Newmeyer, (1998) and others. The author has observed four types viz. prepositions, phonology, syntax and lexical semantics of observations based on results in this work. This paper pointed out two trends in four arguments, one could be a misunderstanding and overuse of prototype theory, on the other hand "there is an extension or refinement of prototype model applications from the original study of noun concepts in cognitive psychology to at least four areas of linguistics namely preposition, phonology, syntax and diachronic lexical semantics". For overall understanding the author discussed "how categorization in terms of prototype and schema have been understood, conceptualized, explicated, empirically supported and extended vice versa cognitive psychology.

Dusan etal. (2017) investigated "whether there are link between verbs' prototypicality and the choice of appropriate translation equivalents", with the help of motion verbs that is highly relevant to our day-to-day experience. The author had composed the theoretical framework into four parts, first three parts dedicated to the evaluation of prototypicality of English motion verbs and the last part on the translation of motion verbs from English into Serbian and related empirical procedures. In the end the results indicated that there has been statistically significant correlation between the verb's prototypicality and the choice of its translation equivalents.

In the later work by Dusan and Milos, they aimed to check whether prototype theory can be applied to the analysis of the English verbs of motion. This paper attempts various resources of Pulman's (1983) model of prototype for effective testing of semantic analysis of English motion verbs. The methods of analysis used in this study are rating test, frequency and corpus data analysis. The results show that the "semantic pattern is related to the obtained category structure of motion verbs". The author finally concludes that in a prototypic scale, "the more generic verbs seem to be closer to the centre and, as we move towards the periphery of the scale, the verbs tend to be more specific".

3.2. Experiment on Mental Rotation Task

Before the 1960s and 1970s, experimental studies in cognitive linguistics were based on imagination. Participants are mainly given a task by the researchers and prepare them for the imagination and then elucidate the imagination. These experiments do not even have objectivity to verify. After the 1970s, researchers in this field used to think innovatively in which picture imagination has come into existence. The picture imagination mainly involves three underlying principles namely objectivity, true or false and reaction time which were lacking in earlier studies. With these kinds of innovative techniques, the first test came into existence, namely the mental rotation task.

Mental Rotation task involves imagination of an object when rotated in a three-dimensional structure with a particular turning in space in general. The same thought was captured by Shepard. This was arises from his personal experience when he was awaking slowly from his sleep during November 18, 1968. The same phenomenon was attested in Shepard & Cooper (1982) in the following manner: "experienced a spontaneous kinetic image of three-dimensional structures majestically turning in space".

3.2.1. Earlier Works on Mental rotation

Hochberg (1977) aimed at conducting one mental rotation experiment to determine “varying what we take to be the saliency of landmarks, (for cues to location and orientation that are unique and visible from the distance)”. “The slope and intercepts of the time/angle function in the mental rotation task”. The stimuli used in the experiment are standard and reflected from five shapes. The mental rotation function served to measure the accessibility of landmark features. But the author's first task is to determine whether the mental rotation functions differently for the above stimuli as expected. The stimuli used in this experiment are replicated from Shepard and Metzler (1971). Finally, the author concludes that “the shapes with salient landmarks have lower slopes and intercepts in their time/angle function than the shapes in which these features have been made less distinguishable”.

Koriat and Norman (1984) work consists of two hypotheses for mental rotation, the first one is “image rotation hypothesis” in which subjects rotate a watch stimulus image from top to bottom and the reaction time (RT) was noted based on the angular deviation from top to bottom. The second hypothesis “frame rotation hypothesis”, the subjects were asked to rotate their frames of reference to match the disoriented stimulus, the RT was noted for a “derivation between the current stimulus and preceding stimulus”. Four experiments were conducted, one for normal reflected letters, and the other three experiments on “lexical decisions on Hebrew letter strings were earned out”. These experiments were contrasted on the two proposed hypotheses for mental rotation. The author had pinned down a couple of findings with regard to “the evidence for the image rotation hypothesis" and “there was no indication of consistent individual differences in the preference for the frame rotation strategy”. Another salient finding with respect to “the application of the mental rotation paradigm to word recognition were also noted”.

Corballis (1986) shows the distinction between controlled and automatic processing in relation to mental rotation tasks pioneered by Cooper and Shepard (1971). This paper is based on the procedure by Logan (1978). One experiment was conducted in this paper, which consisted of two short-term memory tasks. The author points out that performance on the memory tasks did not vary with the angle of mental rotation even after two tasks. Finally the author achieved the results according to his replication work from Cooper Shepard (1971) and Logan (1978). The

paper's results supported their hypothesis "attentional control is required to set up the mental structures required in mental rotation".

Hertzog and Rypma (1991), replicated the study of Bethell-Fox and Shepard's (1983) study of serial mental rotation tasks in order to see the age differences in rotation rate in decision times. The main goal of this paper is to regulate if "age X rotation angle interactions would be observed in the both rotation and the decision phase of the task", as well as to see if any "discrepancies between mental rotation slopes for the same". This paper was aimed to see if the "age changes in ability to hold a presentation of the figure in spatial WM would lead to increased age differences in mental rotation error rates as a function of increases in the amount of rotation". The results indicated that older adults RT was longer in each processing stage and there were small age differences in the rotation stage of the tasks, the error rates increased as the age differences were increasing. The results were consistent with the hypothesis with regard to age differences of mental rotation tasks.

Jonathan Bell in 2003, explored whether two-dimensional mental rotation task is more associated with left parietal EEG activation rather than right parietal activation and in three-dimensional mental rotation tasks are associated with more right parietal EEG activation than left parietal activation. This paper hypothesised that in two-dimensional mental rotation tasks men would perform great at left parietal activation than right whereas women would perform great at right parietal activation than left, on the other hand for three-dimensional mental rotation tasks it was assumed that both men and women perform better at right parietal than left activation. Experiments consisting of two tasks were conducted. For the two-dimensional rotation task they used a Gingerbread man sample figure presented on the computer screen with two choices, whereas in the case of the three-dimensional rotation task they used a 3-D block design which rotates in multiple dimensions. Finally, the results are in sync with the hypothesis i.e, men perform better than women on the three-dimensional mental rotation tasks, whereas there were no differences between men and women on the two-dimensional mental rotation tasks from the evidence of repeated measures of ANOVA.

Gunnar and others (2007) investigated whether mental rotation can be trained through manual rotation tasks in a virtual environment. This paper adopted and replicated the model of mental rotation that was introduced by Shepard and Metzler in 1971. The main reason to test this manual training of mental rotation is "since manual rotation does visualize the process of mental rotation and as mental rotation is assumed to be a covert motor rotation (Wexler,

Kosslyn & Berthoz, 1998)". Hence, the authors wanted to find out whether the mental rotation should be processed only based on the rotation and it need not be memory based. In this paper the authors conducted two experiments, in an experiment one is about virtual mental rotation test and for experiment two manual training of mental rotation in an virtual environment was conducted. These experiments' goal was to see the effect of manual training in a virtual reality that is based on the mental rotation ability. In the first experiment, the results indicated that RT and errors are highly correlated, whereas in the second experiment the number of errors were increased thereby disclosing that manual training does improve the mental rotation ability, however, the manual training did not help in reducing the error rate.

Aaron et.al (2017) is one of the recent research papers on mental rotation. In this paper the authors tried to explore cognitive strategies in the mental rotation task using time frequency analysis of EEG and independent component analysis. Their findings are "sensorimotor *mu (μ)* power reduction, association with motor simulation, parietal alpha *(pα)* power reduction, association with visuospatial representation, and frontal middle theta *(fmθ)* power enhancement, association with working memory maintenance and manipulation". Their findings have drawn inference that mental rotation task performance is flexible between cognitive strategies like motor simulation mental rotation strategy and working memory analytic strategies. The authors summarized in their findings that the cognitive strategy used is due to the aptitude and spatial intelligence that is inbuilt in various cognitive domains. This wide ranging analysis suggested that the mental rotation task along with motor simulation and other analytic cognitive strategies depend on visuospatial representation and visual working memory.

Thurston et.al (2021) attempted to study mental rotation task performance in a diverse Thai population from Thailand. This paper also provides "a novel cross cultural outlook on visuospatial cognition by simultaneously considering its association with sex assigned at birth, sexual orientation and gender identity". Throughout this paper the authors confirmed about the "understanding of visuospatial sex/gender differences and the applicability of neurohormonal theory across cultures". One experiment and two tests were combined out, whose results indicated that for mental rotation tasks "the straight cis men out performed straight cis woman". The results were consistent with their hypothesis.

3.2.2. Method and Design

For performing mental rotation tasks on Banjara participants, many methods were studied for execution of the task. Among the various methods, the Vandenberg Mental Rotations test, which is a three-dimensional test, is selected for better results. There are innumerable three-dimensional images available in the Vandenberg model. However, only 48 images are extracted for carrying out the experiment on Banjara participants. The reason for selecting 48 is based on the time set for the experiment. Among these 48 images, there are different sizes and angles which are kept in rotation mode. All the images are sent to the participants through a link designed before the experiment.

3.2.3. Participants

For this experiment, Telangana state was selected. The reason for selecting Telangana is due to the concentration of Banjaras who are more in number, especially in the districts viz. Warangal, Karimnagar, Sangareddy, Rangareddy, Zaheerabad and Hyderabad. The sociolinguistic variables are taken into consideration for the test, especially age, sex and education. The total number of 55 participants are selected randomly where they are further divided into age groups between 21-30 and 31-40. Among the 55 participants, male and female are seen in a reasonably equal ratio. Among the 21-30 age groups, 19 males and 21 females are seen. Within the 31-40 age groups, 10 males and 5 females are identified. Altogether, 29 males and 26 females are selected. Within the 55 participants, education is also taken into account. Among the 55 participants, 48 are post-graduates, 4 are graduates and 3 participants are from school education background.

The data was distributed normally with the Shapiro wilk test . Hence the parametric tests were used to measure the differences. Prism Graphed version-7 software was used to check the statistics.

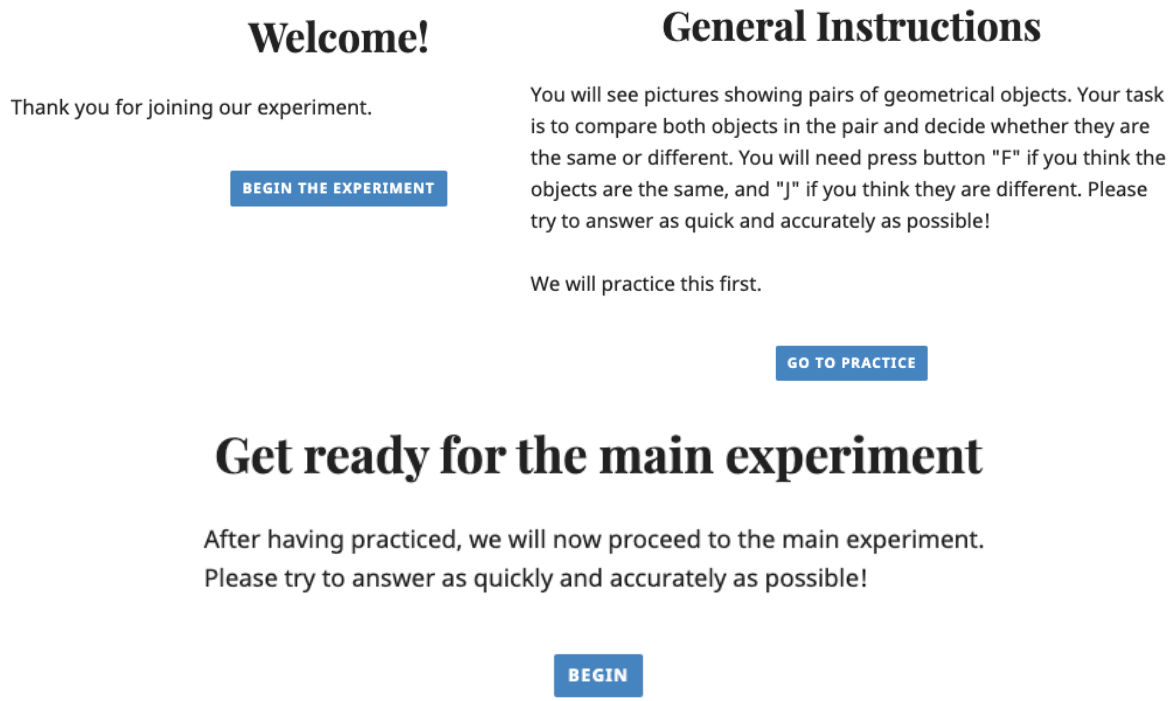
3.3.4. Procedure

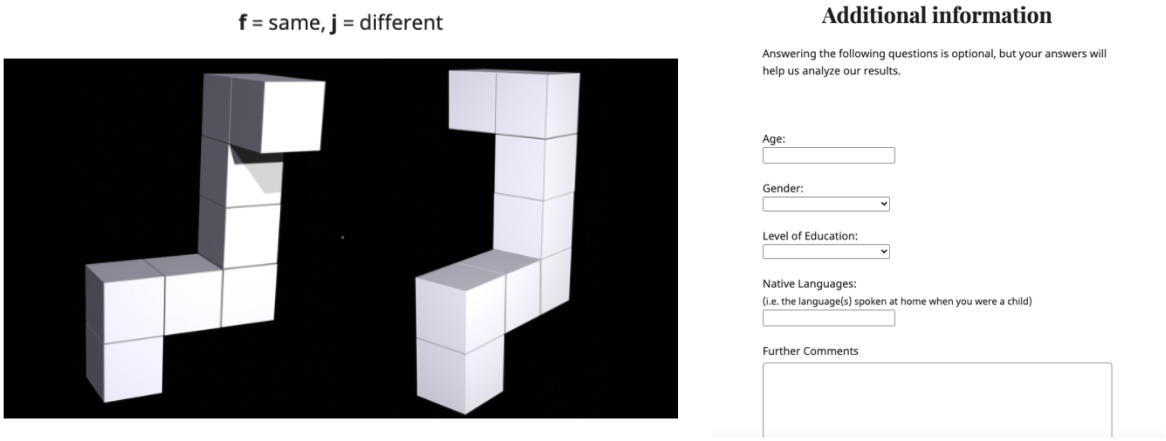
As a part of the test, a link is sent to the participants along with the instructions. After the thorough explanation of the instructions, a trial run was administered on the participants. In the trial run, the participants were asked to follow the instructions as specified. In this trial, 12 images were shown and they were asked to follow the instructions randomly. The instructions are to identify whether the images are similar or different from each other. During this process,

the time taken by the participants were automatically recorded as per the test design. The trial run also will be validated after the original test is executed.

After the trial run was executed successfully, the main experiment was implemented in which 48 images were loaded in the test. The main test follows certain procedures in the following manner: a) welcome message, b) general instructions, c) preparation for the test by pressing the button, d) original test, e) pressing the button F (for similar) and J (for different) images, f) additional information which consists of age, sex, education, mother tongue, further comments, if any. Once these steps are over, the results will be automatically displayed along with the reaction time taken by each participant. The results were displayed in a tabular format consisting of the trial run results and the orignal test results. In both the versions, the correctness, reaction time, picture type, expected results, end time and the experiment ID are represented horizontally.

The following pictures explain the experiment in a detailed manner after which the results are discussed.





Debug Mode

trial_type	trial_number	key_pressed	correctness	RT	picture	item	expected	angle	u
practice	1	f	incorrect	29278	images/practice/15_150_different.jpg	15	different	150	u
practice	2	j	incorrect	3794	images/practice/15_50_same.jpg	15	same	50	u
practice	3	j	correct	9156	images/practice/14_150_different.jpg	14	different	150	u
practice	4	f	incorrect	32940	images/practice/15_50_different.jpg	15	different	50	u
practice	5	j	incorrect	3121	images/practice/15_150_same.jpg	15	same	150	u
practice	6	f	incorrect	2850	images/practice/13_150_different.jpg	13	different	150	u
practice	7	j	incorrect	3116	images/practice/14_50_same.jpg	14	same	50	u
practice	8	f	incorrect	3094	images/practice/13_50_different.jpg	13	different	50	u
practice	9	j	incorrect	2870	images/practice/14_150_same.jpg	14	same	150	u
practice	10	f	incorrect	2864	images/practice/14_50_different.jpg	14	different	50	u
practice	11	j	incorrect	3091	images/practice/13_150_same.jpg	13	same	150	u
practice	12	f	correct	2964	images/practice/13_50_same.jpg	13	same	50	u
main	1	j	incorrect	26974	images/main/6_50_same.jpg	6	same	50	u
main	2	j	incorrect	11552	images/main/5_150_same.jpg	5	same	150	u
main	3	j	correct	3447	images/main/1_150_different.jpg	1	different	150	u
main	4	j	correct	5059	images/main/10_150_different.jpg	10	different	150	u

Figure 2: Experiment design

3.3.5. Results

After the final results were displayed, they were divided into mean and standard deviation in terms of male and female with that of Paired T Test Analysis which shows significance. On the vertical axis age and reaction time are represented. On the horizontal axis male, female and Paired T Test Analysis are represented. The mean age of male participants is 23.42 and standard deviation is ±2.437 whereas the reaction time equivalent to mean is 2623.28 and standard deviation reaction time is ±35.67. In the case of the female participants, the mean age is 23.565

and the standard deviation time is ±2.1283. The reaction time of female participants in terms of mean is 4477.04174 and the standard deviation is ±74.67. When these two types of participants are analysed through analysis (paired t test) the significance in terms of age is =0.064 and the significance of reaction time is <0.001. If we look at the overall test results in terms of mean and standard deviation, and in terms of male and female participants, the results vary from male to female. The variation of reaction time is high in terms of male and less with female participants. It indicates that the participants who take less reaction time are considered as high performance (attention) in the test. So the test concludes male participants have taken less reaction time compared to the female participants. Hence it is concluded that male participants performed better than female participants. The reasons may be attributed to the exposure to the outside environment. The same can be observed in the following table.

	Male		Female		Paired T test analysis			
	Mean	SD	Mean	SD	*t*	*Df*	*r*	Significance
Age (years)	23.42	±2.437	23.565	±2.1283	1.01	2	0.21	=0.064
Reaction Time (Ms)	2623.28	±35.67	4477.041744	±74.67	3.15		+0.89	< 0.001

**p<0.005 is considered as significance

**** Note: [High RT= Low Attention, Low RT= High Attention]**

Table 3: Reaction time means difference with Paired T test between the genders (N=55).

If we look at the results deeply, they can be represented in the following bar chart which clearly shows that the reaction time taken by the male participants is less compared to the female participants. The blue color in the chart indicates less reaction time taken by the male participants and pink color indicates the reaction time taken by the female participants which is more in time.

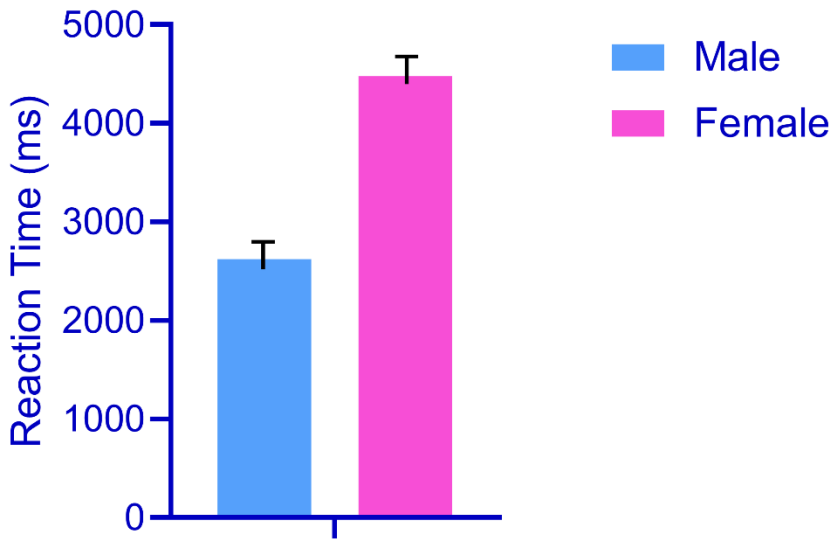


Figure 3: Bar chart illustration showing the reaction time differences in Male and Female participants.

Note: [High RT= Low Attention, Low RT= High Attention]

3.3.6. Error Rate and Correct trials in Mental Rotation task

As a part of the test, errors were also taken into consideration by representing correctness and errors. These errors are represented vertically in terms of error rate and corrected trials. On the horizontal axis, the error rates were represented in terms of male, female and analysed using Paired T Test analysis to bring out the significance. The error rate in male participants is 12.57 and errors in female participants is 16.69. In the similar manner, the corrected trials in males is 35.36 and females are 27.86. The standard deviation of male (in terms of error rate) is ±3.05 standard deviation of female is ±4.20. In the similar manner, the standard deviation of corrected trials in terms of male is ±3.04 and females are ±4.52. All the mean and standard deviation in terms of male and female as well as error rates and corrected trials for males and females are paired through T test and analysed for final significance. After the analysis the significance of error rate is $p<0.005$ and corrected trail is <0.001. This shows that the performance of male participants in terms of corrected trials is high and less in error rate compared to female participants. In terms of error rate and corrected trials it is evident that male participants performed better than female during the test.

	Male		Female		Paired t test analysis			
	Mean	SD	Mean	SD	*t*	*Df*	*r*	Significance
Error Rate	12.57	±3.05	19.69	±4.20	4.72	3	+0.92	p<0.005
Corrected Trials	35.36	±3.04	27.86	±4.52	6.31	3	+0.88	< 0.001

**p<0.005 is considered as significance

Table 4: Mental rotation task error rate and correct trial scores mean difference with paired t test between the gender(N=55).

The error rate and corrected trials of the 55 participants is represented in the following box and whisker chart and scatter chart. Both can be seen in the following figures.

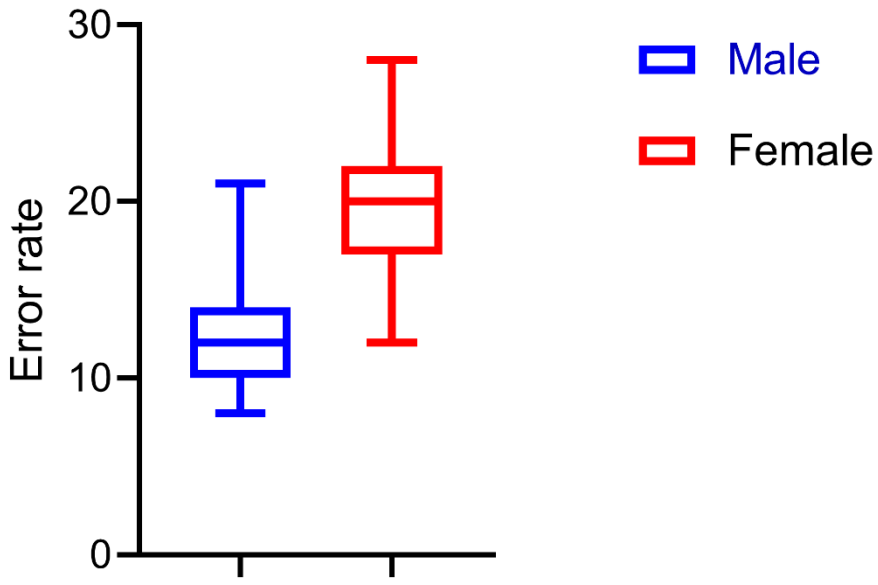


Figure 4: Box and whisker charts showing the error rate in Mental rotation task between Male and Female participants.

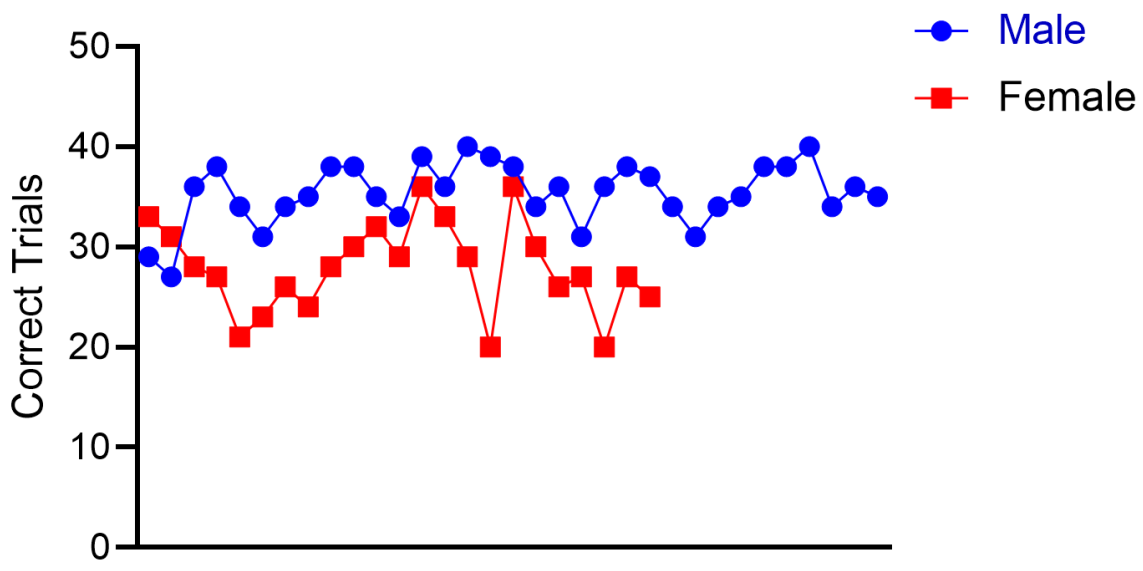


Figure 5: Scattered chart showing the Correct trials distribution in Mental rotation task between Male and Female participants.

3.4. Analysis of Banjara Verbs and their Prototypes

Verbs in any language are the most important grammatical category. Verbs inflect for many times compared to other grammatical categories. Nouns inflect mainly for person and gender whereas verbs inflect for tense, aspect, mood and negation. These inflections are very complex from language to language. When verbs carry these inflections, one has to be very careful with the verbs because they are of different types. For example, motion verbs, communication verbs, consumption verbs, action verbs and so on. In the present study on the analysis of Banjara verbs, we have identified 33 verbs belonging to different semantic domains. All these 33 verbs are selected by studying various sources viz. Beth Levin's verb classification, Princeton WordNet verb classification and Ronald Trail's 1968 The Grammar of Lamani.

Among these three works, verbs discussed in Lamani Grammar are taken into consideration because of their semantic diversity. Though there are umpteen number of verbs discussed in the grammar, only 33 verbs are taken for the study. All these 33 verbs belong to the semantic domains such as communication, contact, social, motion and possession. Also, they carry tense, aspect and mood when they are inflected. The following is the list of verbs selected for the study.

S.No.	Banjara Verb	Gloss	Domain (WordNet)	Domain (Beth Levin)
1	so	sleep	body	fit
2	baḷ	brun	change	hurt
3	wa	be	stative	stative
4	paḍ	fall	motion	motion
5	waḍ	fly	motion	motion
6	dharas	enter	motion	motion
7	aa	come	motion	appear
8	ram	play	motion	performance
9	bheṭ	meet	social	meet
10	khap	consume	consumption	devour
11	la	take	possession	steal
12	kha	eat	consumption	eat
13	siik	learn	cognitive	learn
14	ka	say	communication	say
15	bhaanḍ	tie	contact	tape
16	gaahl	put	contact	alternating
17	rakaaḍ	keep	contact	keep
18	pi	drink	consumption	eat
19	kar	do	social	activity
20	bes	sit	motion	motion
21	maar	hit	contact	contact
22	buur	cover	contact	fill
23	ka	tell	communication	transfer of message
24	da	give	possession	possession

25	bhar	fill	change	fill
26	bala	call	communication	dub
27	hubar	stand	contact	contact
28	pakaḍ	catch	perception	alternating
29	kar	do	social	knead
30	bhanḍ	scold	communication	negative judgement
31	saraap	curse	communication	communication
32	mol	purchase	possession	obtain
33	hangoḷi	bathe	body	caring

Table 5: The verbs list selected from Banjara language

All the 33 verbs are given to the participants for the direct grading test. Direct grading test is one of the tests which has come after a stipulated time of the mental rotation test, especially in the 1980s. This test especially measures the motion verbs. This was implemented in his studies on motion verbs in English by Pulman (1983) and Dusan and Milos (2013). The test is based on a 7-point scale which aims at relevance and salience. The participants are given the verbs to grade on the basis of 1-7 points on the relevance and their daily experience. As part of the test they have to circle one of the points between 1-7 scale. The scale is implemented in the following manner where the points related to relevant, irrelevant and exceptionally relevant. These are ranged between 1-7 based on the Likert scale. So the participants were expected to press one of the buttons that scored between 1-7. This is one of the recent tests that studies the psychological aspects of the participants mind in terms of prototypes. The following section will explain the phenomenon of Direct grading test. This is a robust type of testing in psychology as well as cognitive science during the period.

3.5. Direct Grading Test

The direct grading test was designed for the qualitative results. The verbs are given to the participants to scale on 7 points as per Likert scale. The participants are expected to press one of the buttons 1-7. These 1-7 points are related to either relevance or salience. Initially, this method was used by ancient Greeks for assessment for the formative verbs but not for

evaluation. As discussed earlier, the test mainly looks for the relevance of the verbs in daily communication. In the scale one refers to absolutely irrelevant whereas grade 7 is meant for exceptionally relevant.

Along with this test, there is another test that was implemented for prototypes, which is titled as Free Association Test. The test mainly aims at eliciting the first word that comes to the mind in response to the given word or a concept. These two tests are executed after the mental rotation task for finding out the performance of the participants.

3.5.1. Design of the Direct Grading Test (DGT)

As part of the DGT, 33 verbs are distributed to the participants to grade on the 7-point Likert scale. All these 33 verbs which are related to the daily activities that range from personal to social. Participants are expected to circle one of the nodes from 1-7 for better performance in terms of prototypes. 44 participants were administered in this test.

3.5.2. Participants

All the 44 participants are Banjara native speakers who are aged between 17-60. In all 19 female participants and 24 male participants were selected for the study. The sociolinguistic variables are taken into account while administering the test. Especially, the sex is taken as a major criterion for the test. The following pie chart depicts the phenomenon of the participants and their share.

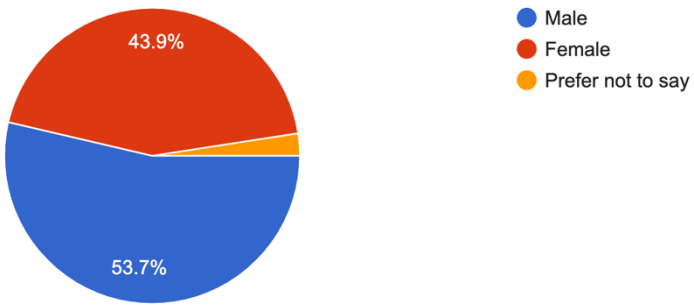


Figure 6: Sex ratio of participants

The above Pie diagram is the representation of biological sex of the participants. The ratio of men and women has been maintained close to equal to have equal representation of the

population. In the total participants, 53.7% were male, 43.9% were female and 2.4% did not prefer to state it. The same phenomenon which is represented through the pie chart above is depicted through bar chart for ready reference.

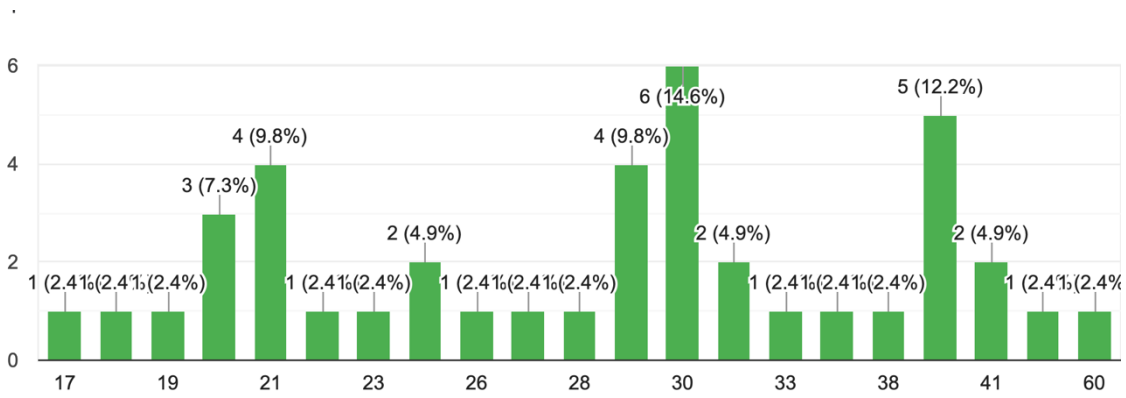


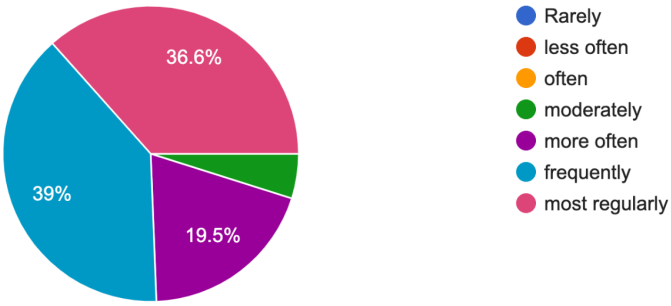
Figure 7: Age representations of the participants

3.5.3. Procedure

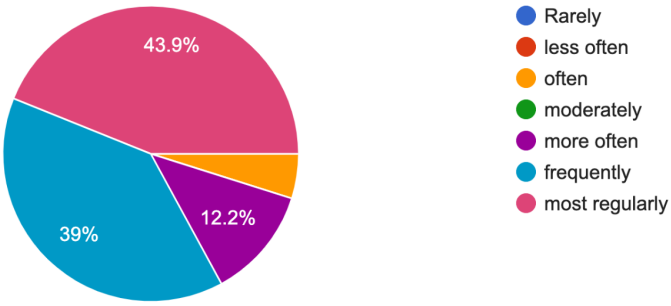
All the 44 participants were distributed 33 verbs belonging to different semantic domains. All of them were asked to grade between 1-7. The respondents in the direct grading test performed differently. Participants who are aged 17 performed very least in the direct grading test and participants who are aged between 30 performed very high in grading. Though they have performed differently according to age-wise, it is very significant in terms of male and female. In the first experiment, i.e. direct grading test. Participants graded the verbs based on their daily experience between 1-7.

3.5.4. Results

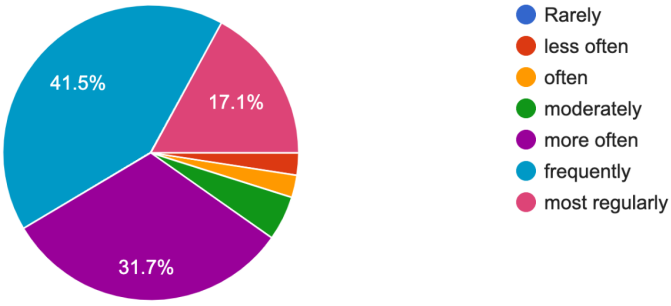
After grading by the participants each verb is explained in terms of 1-7 point scale. The first verb was graded in the following manner where 36.6% of participants graded the verbs as most productive (regular), 39% as rarely used and 19.5% are most often used verbs. The rest of the 32 verbs are explained in the similar manner for better understanding.



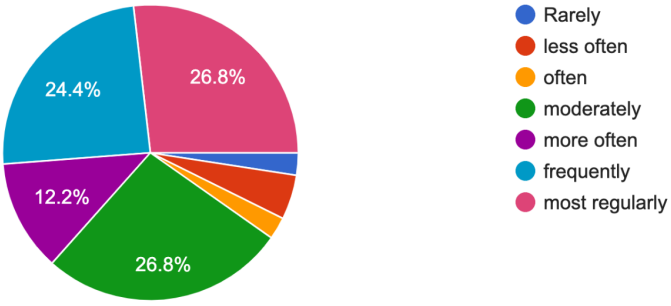
so ‘sleep’ is the most often used verb with highest direct grading of 7.



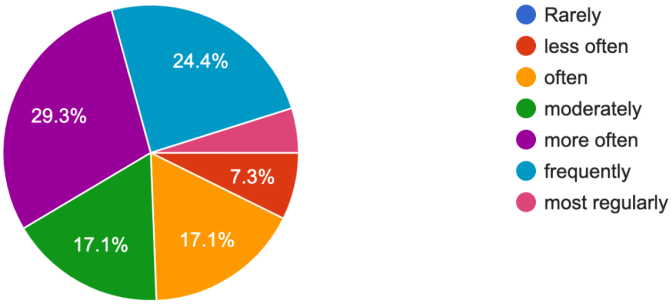
baL ‘burn’ is the second most regularly used verb with 6 direct grading according to the subjects evaluation.



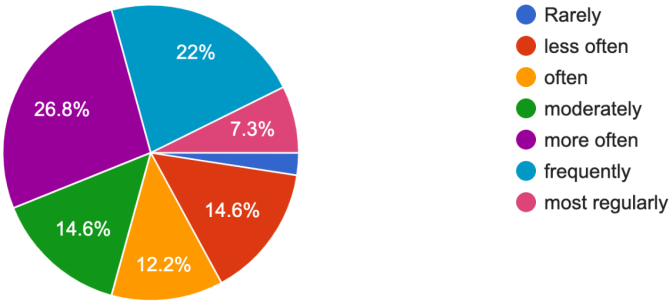
wea ‘to be’ is the third most regular verb with 5.2 direct grading.



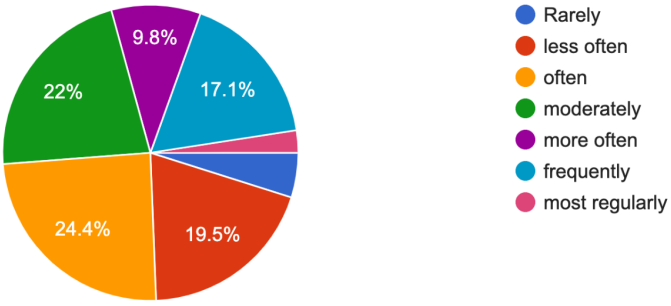
paD ‘fall’ is another most regular verb in Banjara language with 5.22 direct grading evaluation from the native speakers of Banjara.



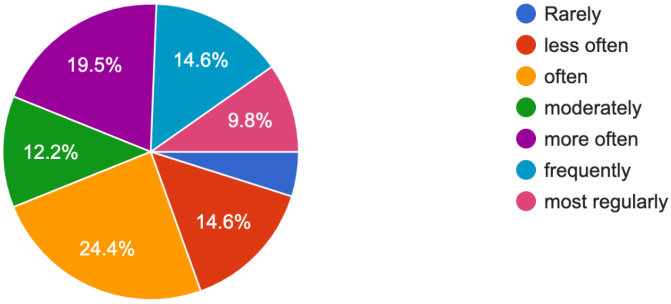
waD ‘fly’ is graded with 5.12 is a commonly used verb in Banjara.



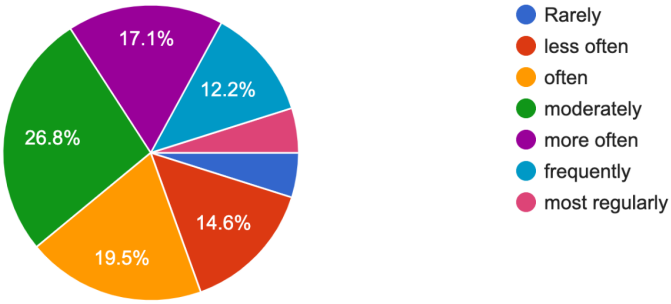
dharas ‘enter’ is graded with 5.05 as a regular verb in Banjara.



ram ‘play’



aa/aajo ‘come’



la ‘get’

By pairing all the 33 verbs and comparing the outcome for the significance of the performance of the participants can be read in the following manner. Among the 33 verbs /so/ `sleep’, /bal/ `burn’, /we/ `be’, /pad/ `fall’, /wad/ `fly’, /daras/ `enter’, /ram/ `play’, /ajo/ `come’ and /la/ `bring’ are graded as the most prototypical verbs than other verbs in the list. After finalizing the DGT, another test was executed, i.e. Free Association Test (FAT). The following section will explain the phenomenon.

3.6. Design of the Free Association Test (FAT)

The test mainly aims at remembering the verbs that were carried in the daily routine. For the test participants were given 5 minutes of time to list as many of the verbs they could remember based on their daily routine. The test was expected to be more fruitful in terms of identifying the prototypes from the verbs point of view.

3.6.1. Participants

In the test, 44 Banjara native speakers were involved. Among the 44 participants, 19 participants were females and 25 were male participants. Male participants were aged between 17-60 and female participants were also aged between 17-45. They were equally asked to respond whichever they remembered. All the 44 participants responded differently when they were given the test. The details of each verb are given in the bar chart format below:

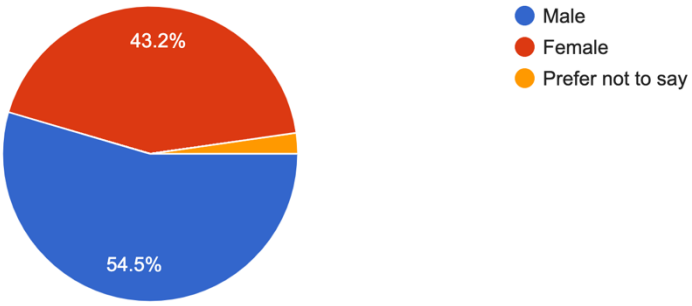


Figure 8: Sex ratio of the participants

The same phenomenon which is explained through the pie chart is also explained in the bar chart below for better understanding of the test.

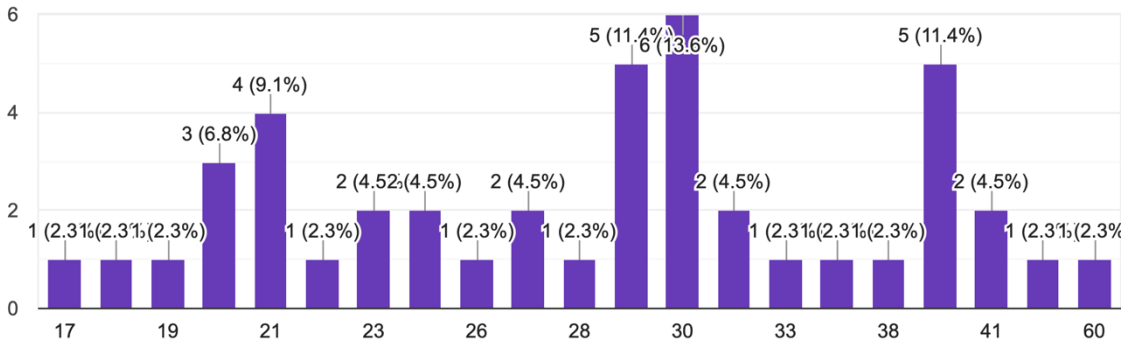


Figure 9: Age ratio of the participants

3.6.2. Procedure

As a process of the test, all the 44 participants were equally asked to list down the verbs that they can remember which are used in their daily routine. For the execution of the test, they were allotted five minutes of time to list down the verbs. Among the 44 participants, people who are aged 17 performed least whereas people who are aged 30 performed better.

3.6.3. Results & discussion

As 44 participants had responded differently in imagining different kinds of verbs. In their responses, the verb da `give' is listed as the most frequently used verb in their daily routine by 40 participants. Next to da `give' , ka `tell' is the second most frequently used in their daily routine which was accounted for by 34 participants. The least one among the listed verbs is mol `buy'. the rest of the verbs can be seen clearly in the following bar chart.

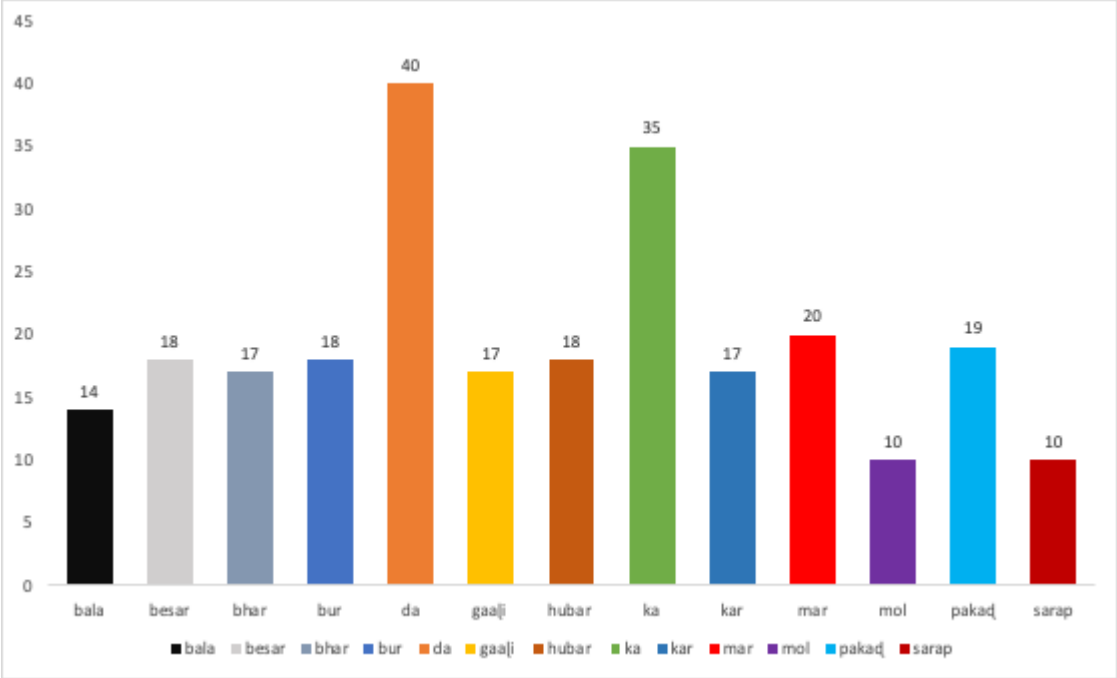


Figure 10: Free Association Test Results

After independent testing of both the tasks, viz. direct grading test and free association test are paired to see the total percentage in sum. The following chart shows the results of both the tests.

S No	Verb in Banjara	Gloss in English	Direct Grading	Free Association	Total
1	so	Sleep	7.00	6.00	**13.00**
2	baḷ	Burn	6.00	5.82	**11.82**
3	wa	Be	5.42	5.00	**10.42**
4	paḍ	Fall	5.22	4.00	**9.22**
5	waḍ	Fly	5.10	3.58	**8.68**
6	dharas	Enter	5.05	3.35	**8.04**
7	aa	Come	5.00	3.02	**8.07**
8	ram	Play	4.59	3.00	**7.59**
9	bheṭ	Meet	4.02	2.50	**6.52**

10	khap	consume	4.00	2.00	**5.00**
11	la	take	5.00	3.00	**8.00**
12	khaa	eat	5.50	3.62	**9.12**
13	siik	learn	4.00	3.00	**7.00**
14	ka	say	5.00	3.00	**8.00**
15	bhaand	tie	3.00	1.50	**4.50**
16	ghaal	put	3.00	2.00	**5.00**
17	rakaaḍ	keep	4.45	2.44	**6.89**
18	pi	drink	5.90	2.56	**8.40**
19	kar	do	4.98	3.63	**8.61**
20	besar	sit	6.02	1.36	**7.38**
21	maar	hit	6.09	4.00	**10.09**
22	buur	cover	2.00	1.00	**3.00**
23	ka	tell	4.00	2.00	**5.00**
24	da	give	5.98	3.50	**9.48**
25	bhar	fill	4.91	1.84	**6.75**
26	bala	call	5.00	1.48	**6.48**
27	hubar	stand	3.90	1.20	**5.01**
28	pakaḍ	catch	5.31	1.52	**6.83**
29	kar	do	4.00	1.16	**5.16**
30	gaaḷi	scold	3.00	1.12	**4.12**
31	saraap	curse	1.00	1.56	**2.56**
32	mol	purchase	1.50	1.32	**2.82**
33	hangoḷi	bathe	1.00	1.16	**2.16**

Table 6: Verb wise results

The comparison of both direct grading test and free association test can be summed up in the following manner, i.e. All the participants have graded and imagined the verb /so/ `sleep' than the other verbs. Following /so/ `sleep', they have identified other verbs as frequent one viz. /baɭ/ `burn', /wa/ `be', /pad/ `fall', /khaa/ `eat' and /maar/ `beat'. These verbs ranged in the total sum from 13% to 10%. The least frequent verb is /hangoɭi / `bathe' which only got 2.16%. Based on the above percentages and frequency of occurrence, one can assume that the community members give more preference for sleeping which can be semantically deciphered and attributed to the alcohol consumption which is prevalent in the community. As a result, bathe has got the least percentage.

3.7. Experimental study for Metaphor Generation Process

Metaphors are the part and parcel of any civilization of the human race. Metaphors vary from language to language based on the geographical condition where they live. They are part and parcel of common man's communication. People always think that only poets use metaphors in their poetry. On the contrary, the common man's speech is full of metaphors. Since the development of various genres of literature, metaphors have become part of figures of speech. These figures of speech serve different purposes for different conditions. In the present study, metaphors are used to generate and identify from the literal sentences to find out the cognitive levels of Banjara community people. For the purpose of the experiment design psychopy software is used.

3.7.1. Earlier works on Metaphors

Abe et.al (2006) research is to develop a computational model of the metaphor generation process. The authors tried to do a statistical analysis of language data through a computational model of the metaphor generation process that was identified based on the statistical analysis of language. For verifying the statistical analysis, the authors conducted a psychological experiment to prove that their claim is correct on the metaphor generation process through the computational model. For this purpose, first, they have identified the "probabilistic relationship between the concepts and the words that was computed using statistics". Secondly, they coined out an analysis for the metaphor generation process using a computation model. The research result examined that the simulations were examined from a comparison of metaphors with the participants.

Chiappe and Chiappe (2006) main motto is to see whether the psychological mechanisms involved in the comprehension and production of metaphors. This paper took inspiration from the prediction model, what it does is it predicts working memory capacity is an important factor in metaphor generation. The authors conducted three experiments for this paper, experiment one conducted in order to see whether WM and inhibitory control forecasted metaphor generation, for that they have conducted listening span task, span score and reporting errors, Stroop interference task was conducted for inhibitory control. Experiments two and three were quite similar to each other, they were conducted to see whether attention plays an important role in metaphor production. If we see individually, the second experiment was designed to see whether the WM is involved in metaphor productions and it also sees whether vocabulary knowledge is connected to metaphor generation. In order to assess, the second experiment was conducted four tests, 1. Listening span task 2. Retrieval fluency task 3. Metaphor generation task 4. The picture vocabulary tests were used. Experiment three was conducted to see the role of working memory and vocabulary knowledge in metaphor generation. In this experiment, there were four tests conducted, listening span and retrieval fluency test to see WM role, Digit span forward and Digit span reverse was conducted to see vocabulary knowledge. The results in this paper indicated that in an experiment one it was found out that "high WM individuals generated better interpretations of metaphors with greater speed that lower WM, for Stroop and inhibition, they are correlated with others. Experiment two results show that high WM individuals produce more apt metaphors than lower WM individuals. Experiment three results indicate that the digit span reverse test had a lot better quality of metaphors than digit span forward test. Overall the results say that "general verbal knowledge and WM functions make unique contributions to metaphor processing".

Terai and Nakagawa (2010) purpose of their article is to understand the metaphor structure computationally viz. Target and vehicle features of metaphors via target based statistical language analysis through computational techniques. The authors identified a metaphor generation model, in this model the output candidates are nouns and whereas adjectives and verbs are presented as input candidates. The metaphor generation system was developed based on knowledge structure and statistical language analysis. This article replicated its results from Abe, Sakamoto and Nakagawa's model of statistical language analysis. This article conducted one experiment, it is a psychological experiment which consists of two sets; one is a transient

hope set and another hope disappearing set. The results show that the metaphor generation process's data was obtained from statistical language analysis, nouns are the most flexible candidates in a category for metaphor generation process, after nouns, adjectives and verbs are the most adequate candidates for metaphor generation process in competitive analysis. At the end the authors described the limitations and future studies on the concern area, viz. The participants in the experiment did not respond pinpoint, due to which the results accuracy got down.

Beaty & Silva (2012), work is one of the most influential and unique ways of studying metaphors. Its primary goal is to explore how Cattell-Horn-Carroll (CHC) model's broader abilities viz. "Fluid intelligence (Gf), crystalized intelligence (Gc) and broad retrieval ability (Gr) influence how people produce both conventional and creative metaphors". Another goal of this paper was to explore how different "cognitive abilities contribute to conventional and creative metaphors", especially, the authors were interested in testing aspects of the Cattell-Horn-Carroll (CHC) model of intelligence. This paper's methodology has been replicated from Chiappe & Chiappe, (2007), their experiments were also replicated in this study (mainly the conventional metaphor generation tasks were replicated). For creative metaphor generation tasks also the authors in this paper used Chiappe & Chiappe's (2007) metaphor generation task. For testing fluid intelligence (Gf), the authors conducted 3 tasks viz. 1. Letter set task 2. Cattell culture fair intelligence task and 3. Paper folding task. For broad retrieval ability, the authors conducted three verbal fluency tasks viz. 1. Prompt task, 2. Synonyms task and 3. Ideational fluency task. For crystallized intelligence (Gc), three tests have been carried out, 1. Vocabulary test, 2. General knowledge tests and 3. Personality test. The results were analyzed detailly for each model of intelligence as discussed above. For intelligence, three models were analyzed, the three models (Gf, Gc, Gr) results were analysed first in the paper, three models are in correlation with each other. Then creative metaphor results were analyzed, the results indicate that they are very similar to Chiappe & Chiappe (2007) results. Later they analyzed the results for conventional metaphors, the results with the intelligence of three models correlating with each other. In conclusion the authors stated that, this paper's results were also replicated with their previous paper (Silvia & Beaty, 2012) that is the reason they were able to achieve accurate results out of this paper. The overall analysis says that, "higher order mechanisms associated with executive processes predicted the quality of creative metaphors, while crystallized knowledge predicted people's ability to generate conventional metaphors", and this study

extend its contribution to “study of creative cognition within the Cattell-Horn-Carroll (CHC) intelligence framework”.

Benedek et.al (2013) study examined the neural correlates of metaphors (figurative language production), it used fMRI to find out the relationship between neural connections, this is the first study in the area of metaphor generation for investigating the neural correlation. This study also provides behavioral studies of creative cognition viz. Ability to generate new creative ideas linked to higher order cognitive abilities (fluid intelligence). The authors conducted one experiment in this paper, for metaphor generation process, they replicated Beaty and Silvia, (2013) & Chiappe and Chiappe, (2007) results, and it also replicated the findings of divergent thinking associated with left inferior frontal gyrus (IFG) by Abraham et al., (2012); Benedek et al., (2013); Fink et al., (2009). Their findings indicated that the novel metaphor generation especially depends on the left angular gyrus (AG) and the PCC, supporting the flexible integration of knowledge for the construction of novel semantic representations. Also for idea generations, the results indicated that the divergent thinking is associated with inferior frontal gyrus (IFG). The authors further explained the results, they found that metaphor generation (production) was associated with the left hemisphere of the brain regions, particularly the left angular gyrus, the left middle and superior frontal gyri along with DMPFC cortex and posterior cingulate cortex. The above finds are related to neuroscientific evidence on metaphor comprehension and etc. in the end the authors concluded that this “study provides a first investigation of the neural correlates of figurative language production, and points to an important role of left prefrontal and lateral parietal brain regions for the generation of new metaphors”.

3.7.2. Method and Design

As a part of executing the metaphor generation task, 35 native Banjara participants were taken from parts of Telangana region. All the 35 participants have their education ranging from postgraduate to school education. They were given 75 sentences each consisting of literal as well as metaphorical sentences that are equivalent to literal sentences. They were requested to use familiarity and interpretability to describe and differentiate the sentences. Apart from familiarity and interpretability to describe a sentence, concluding words of literal sentences and metaphoric sentences were also used. The researcher also took into consideration the average word range of each sentence which ranges between 5-9 words per sentence.

3.7.3. Participants

For the purpose of this experiment, 35 participants in which 16 females and 19 males with a mean age of 18 to 40 were selected from Telangana's Banjara speaking community. They were all right-handed and had no neurological abnormalities or long-term effects from head traumas. Seventy-five conceptual metaphors from the Banjara language were chosen. Seventy-five typical metaphorical sentences were created based on the source term of metaphor. Seventy-five novel metaphorical sentences and seventy-five literal sentences were created using the same analogy. 225 sentences are taken from the common people by interview method. All the 225 sentences were divided into three groups of 75 sentences each, with 25 literal sentences, 25 conventional metaphors, and 25 novel metaphor sentences in each group.

3.7.4. Procedure

As a part of the test, psychopy software was used to design the experiment. After the adoption of the software, 225 sentences with clear division of literal and metaphorical usage were made. Experiments were created in Psychopy and data was provided to subjects via the internet. On a scale of 0 to 7, subjects were asked to determine the level of familiarity and then the degree of interpretability of each sentence.

The following are the instructions for determining the level of familiarity:

1. Choose number 5 if you have heard such expressions many times before and the meaning is highly known to you.
2. Choose option 3 if you have heard such words in the sentence many times before and think you know what they imply.
3. Choose number 1 if you have heard the identical expression once or twice before and think you know what it means.

The instructions for determining interpretability are as follows:

1. Select the number 5 if you believe the sentence is simple to understand.
2. Select option 3 if the sentence interpretation takes a short time.
3. Select the number 1 if the sentence interpretation took a lengthy time.
4. If you don't understand what an expression means, choose 0 as your answer.

After clear instructions about the test, the participants were provided with the word task which was displayed in three conditions viz. simple, novel and conventional metaphors. Each word in the sentence is displayed for 2000 milliseconds on the monitor screen. The time between two words was estimated using the following formula: 1000 milliseconds plus 800 milliseconds for every letter in the previous word display. A blank screen shows for 500 milliseconds after the final word before the question mark appears. The individuals pressed one of the four keys on the keyboard (full meaning 5 = d, medium 3 = s, low 1 = l, and without meaning 0 = k) after seeing the question mark and demonstrated the meaning of that sentence in Banjara. The subjects were given brief instructions on how to administer the test after filling out the informed permission form. The test was carried out online, an experiment link was sent to the subject and asked them to participate in a calm environment. The researcher requested them to use the index and middle fingers of both hands to answer the questions. The data (familiarity/interpretability and reaction time) were analysed in SPSS using descriptive statistics and repeated measures Analysis of Variance (ANOVA) at a significance level of 0.05. A few excerpts of the 225 sentences are given below for ready reference:

Literal Sentence	u	chori	khub	aach	cha
Gloss	that	girl	more	beautiful	be
	That girl is beautiful				
Metaphor Sentence	u		Chori	Chand	cha
Gloss	that		girl	moon	be
	That girls is a moon				
Literal Sentence	u		nandi	jari	cha
Gloss	that		river	flow	tense
	That river is flowing				

Metaphor Sentence	u	nandi	bolri	cha
Gloss	that	river	talk	tense

That river is talking

Literal Sentence	under	beta	aacho	cha
Gloss	their	son	good	tense

Their son is a good boy

Metaphor Sentence	under	beta	sono	cha
Gloss	their	son	gold	tense

Their son is a gold

Literal Sentence	or	vaate	aache	cheni
Gloss	her	words	good	negative

Her words are not good

Metaphor Sentence	or	kantenr	vaate	chabr-i-cha
Gloss	her	thorny	words	hurt-pre-be

Her thorny words are hurting

Literal Sentence	hamar	tander	nayak	ghano	chalak	cha
Gloss	our	village	head	very	sharp	tense

Our village head is very sharp

Metaphor Sentence	hamar	tander	nayak	salya	cha
Gloss	our	village	head	fox	be

Our village head is a fox

Literal Sentence	u	chori	ghan	rori	cha
Gloss	that	girl	very	cry	be

That girl is crying so much

Metaphor Sentence	or	hansu-r	kalva	chalro	cha
Gloss	her	tears-pres	river	flow	be

Her tears are rever flow

Literal Sentence	u	chori	patal	cha
Gloss	that	girl	thin	be

That girl is thin

Metaphor Sentence	u	chori	kukdi	cha
Gloss	that	girl	chiken	be

That girl is chicken

Literal Sentence	u	ghano	pisa	kharch	kara-cha
Gloss	he	lot	money	spend	do-be

He is spending lot of money

Metaphor Sentence	u	ghano	pisa	khava-cha
Gloss	he	lot	money	eat-be

He eats lot of money

Literal Sentence	o	chora-r	dimak	ghano	chala-cha
Gloss	that	boy-infl	brain	very	run-be

That boy’s mind works very fast

Metaphor Sentence	o	chora-r	dimak	computer	cha
Gloss	that	boy-infl	brain	computer	be

That boy's brain is a computer

Literal Sentence	u	ghan	barkava	chaa
Gloss	she	lot	scream	be

She creams a lot

Metaphor Sentence	or	Kakla-r	jeeb	cha
Gloss	her	Crow-infl	tongue	be

Her tongue is crows tongue

Literal Sentence	U	Kaam	Kharab	Karna-ki
Gloss	she	work	spoil	do-infl

She spoiled the work

Metaphor Sentence	or	kaam	puro	Pani-veg-o
Gloss	her	work	total	Water-do-past

Her work went into vain

Literal Sentence	u	chora	ghano	chalu	cha
Gloss	that	boy	very	smart	be

That boy is very smart

Metaphor Sentence	U	chora	tidka	cha
Gloss	that	boy	grasshopper	be

That boy is a grasshopper

Literal Sentence	under	Khet-e-ma	santa	ugr-e	cha
Gloss	thair	farm-infl-pres	sugarcane	grow-pres	be

Their farm is growing sugarcane

Metaphor Sentence	under	Khet-e-ma	sono	ugr-e	cha
Gloss	thair	farm-infl-pres	glod	grow-pres	be

Their farm is growing gold

3.7.5. Results on Familiarity

Most of the participants in the study expressed their views on the sentences given to them. Most of the sentences are quite familiar and interpretable, according to the results of these two

pre-tests. In the similar manner, conventional metaphors are highly familiar and interpretable whereas they are significantly less than literal words in terms of familiarity and interpretability. In the case of novel metaphors, participants expressed unfamiliarity and more difficult to understand. The results of the test based on familiarity are given below with mean and standard deviation variations of the three, viz. literal, conventional and novel metaphors.

Sentence Type	Mean	Standard Deviation
Literal	3.5768	0.2098
Conventional Metaphor	3.4563	0.15645
Novel Metaphor	2.1254	0.25465

Table 3.6: Mean and standard deviation of familiarity

Apart from the familiarity, it is also noticed that the measurements of the sentences that repeated at the level of familiarity demonstrated a significant difference across the types of sentences. According to an analysis of variance (ANOVA) F (857.906, 2.876) 3461.487 P =0.00 The P-value is less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences, F (1,35)1952,109 P = 0.00. Between conventional metaphors and novel metaphors, F (1,35) 19567.448 P = 0.00, between novel metaphors. The above table also illustrates the three scenarios viz. literal sentences, conventional metaphorical sentences, and novel metaphorical statements have the highest to the lowest level of familiarity.

3.7.6. Results on Interpretability

In terms of interpretability, most participants in the study expressed that the given sentences are quite familiar and interpretable. Conventional metaphors are easily interpretable whereas in the case of novel metaphors, participants have difficulty in understanding. The results of the test based on interpretability are given below with mean and standard deviation variations of the three, viz. literal, conventional and novel metaphors.

Sentence Type	Mean	Standard Deviation
Literal	3.8330	0.13245
Conventional Metaphor	3.7489	0.16576
Novel Metaphor	2.8976	0.20814

Table 7: Mean and standard deviation of interpretability

In each of the three criteria, literal sentences, conventional metaphorical sentences, and novel metaphorical sentences have the highest to lowest interpretability. Measurements that are repeated, the results of an analysis of variance (ANOVA) revealed that there is a substantial variation in sentence interpretability. F (2.895, 85.456) 1945.103 P = 0.00 The P-value was less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences. F (1,35) 194.404 P =0.00, between conventional metaphors and novel metaphors. F (1,35) 941.435 P = 0.00, between literal sentences and novel metaphors F (1,35) 968.567 P= 0.00.

Both familiarity and interpretability are shown in the chart below:

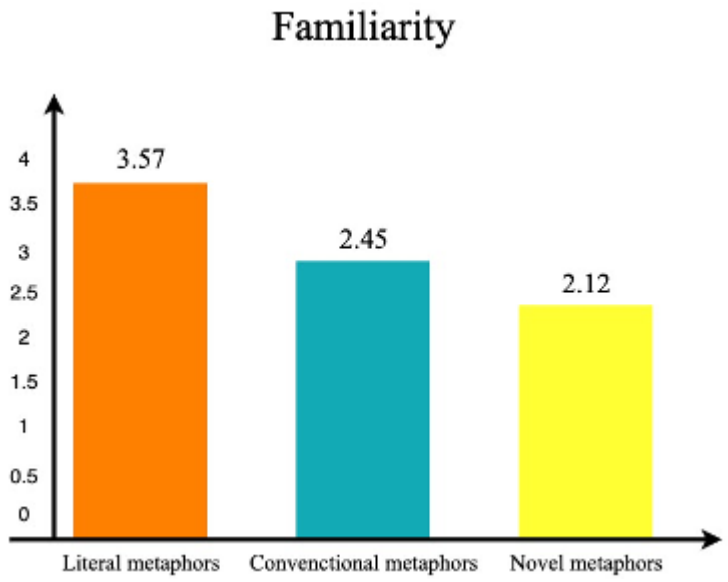


Figure 11: Metaphor familiarity bar diagram results

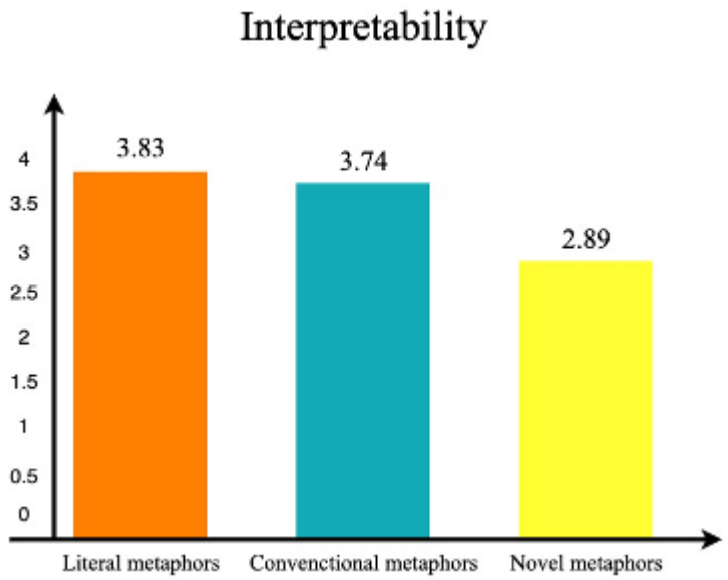


Figure 12: Metaphor interpretability bar diagram results

The familiarity and interpretability of 3 conditions on a scale from 0 to 5

Measurements of both the tests in terms of reaction time demonstrated a significant difference across the conditions, according to the analysis of variance (ANOVA). There was also a substantial difference in familiarity and interpretability between literal sentences and conventional metaphors, conventional metaphors and novel metaphors, and novel metaphors when compared pairwise. Conventional metaphors were more recognizable and interpretable in each of the three structures. The novel metaphors were less known, but they were still easier to understand. In the case of literal sentences, conventional metaphors, and novel metaphors, there was a substantial association between the variables of familiarity and interpretability.

Sentence Type	**Mean**	**Standard Deviation**
Literal	0.6789	0.31689
Conventional Metaphor	0.7990	0.34867
Novel Metaphor	1.1095	0.46756

Table 8: Mean and standard deviation for RT (number of subjects 25)

In three scenarios, the shortest to highest reaction time is found in literal sentences, conventional metaphorical sentences, and novel metaphorical sentences, as shown in the above Table. Measurements that are repeated an analysis of variance (ANOVA) revealed a substantial

difference in reaction time between the two types of sentences. F (2.678,53.567)17.435 P = 0.00. The Pair-wise comparison showed a significant difference between conventional metaphors and literal sentences F (2, 12) 5.543 P = 0.04 between conventional metaphors and novel metaphors F (2.12) 15.785 P = 0.00. There was a significant difference between literal sentences and novel metaphors F (2.12) 25.406 P = 0.00. The results of the reaction time in three conditions are given below:

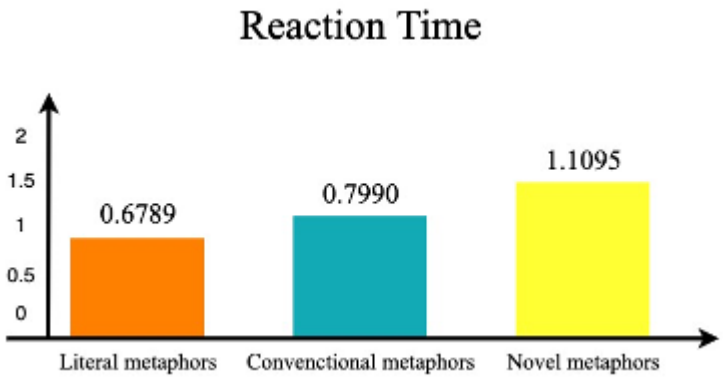


Figure 13: Metaphor RT results in 3 conditions

Based on the above findings, one can conclude that there are different mechanisms involved to generate simple and metaphoric sentences in Banjara language. Though conventional metaphors are easier to generate than novel metaphors, both the metaphors can be processed through the continuation of a single mechanism like conceptual mapping which will help novel metaphors through analogy and conventional metaphors through categorization are understood in conceptual mapping mechanisms. The metaphor generation process can be explained through continuation of saliency features and expectancy.

CHAPTER - 4

SUMMARY AND CONCLUSION

Concept sharing across verb classes is a novel thing in cognitive linguistics. Earlier to this many researchers in this area have worked on other grammatical categories like nouns, adjectives and other classes. Apart from working on these grammatical categories they also have worked on various sub-classes of these grammatical categories especially on major languages. None of the works have made an effort to think from the indigenous or tribal language perspectives. Since the research belongs to an indigenous community called Banjara language, an effort has been made to work on this language by taking inputs from the earlier works. After selecting the language verbs classes and prototypes are considered as the major theme of the present work. Apart from verb classes and prototypes, the study also attempted to look at the metaphors and their generation with the help of various software available in the field of cognitive linguistics.

The word prototype has been derived from the industrial perspective, especially, making a prototype design of a particular instrument or an object. For example, if one takes into consideration the aeroplane, it has various subparts to come to the conclusion of the imaginary in our mind that it is an aeroplane. Now, there is a question which one we call as a prototype, whether the subparts of the aeroplane or the final outcome of the aeroplane is called as a prototype. This was worked extensively by various researchers in the field of cognitive linguistics, especially Elenor Rosch which is prominent work in the field. The same concept is applied for the first time to the English language. The present is a replica of English language carried out by Rosch in 1983.

Rosch (1983) initially worked on the color terms and later researchers in the field extended in the area of noun classes and other grammatical categories except verb classes. The reason for not working on verb classes is that verbs are loaded with various grammatical aspects like tense, aspect and mood. These three aspects of the grammar vary from language to language and language family to language family. The main reason for this variation is languages are classified morphologically from different aspects viz. agglutination, inflectional, synthetic and fusional. Due to this complexity of languages belonging to various families of languages, many

researchers in the field do not make an attempt to work on the verb classes. It was Pulman (1983) who first made a preliminary effort from the verb classes perspective.

Similar attempt is made to work on the Banjara language by taking verbs in consideration. Apart from the verbs, metaphor generation is also the main objective of this study. As part of the study, Banjara language from the Telangana region was selected. The researcher has taken the consideration of equal distribution of the speakers from various districts of Telangana. In addition, the researcher also considered the sociolinguistic variables like age, sex and education. They were given instructions in a detailed manner before the carrying out of the experiments. All the experiments were divided into four tasks, viz. Mental rotation task, direct grading, free association and metaphor generation task. The first three include various types of verbs drawn from the Banjara language. The fourth task is metaphor generation which is a higher level than the verb classes and their prototypes.

The main objective of the study is identification of verbs given by the researcher, expectation of their prototypes based on the different semantic categories such as motion, communication, social, contact, consumption, and so on. Apart from the identification of the verb classes and their prototypes, the study also includes generation of metaphors by looking at the literal sentences. For example in Telugu,

1. jabilli khub acch cha (literal sentence)
   moon very beauty be
   Moon is very beautiful
2. or mundo jabilli niya cha (metaphorical sentence - simile)
   she face moon like be
   Her face is like a moon

When it comes to the metaphor generation, the participants in the research are given literal sentences based on which the participants have to generate metaphorical sentences in which various types of verbs are also involved. Since metaphor is a meta-physical concept and poetic, one has to deal with utmost care while doing research. For this, literal sentences became a prototype for generating the metaphors.

The main objective of this research work was to define and understand the prototype theory and metaphor generation using Banjara language as a replica of Rosch's prototype theory and Goerge Lakoff's metaphors in cognitive linguistics. This specific objective mainly focused on qualitative and quantitative analysis on verb classes and their prototypes and metaphors.

In the first chapter, the researcher mainly discussed the Banjara language, their distribution across the country and the etymology of the name Banjara and various alternate names of Banjara. Apart from this general discussion, the researcher also discussed the dialectal variation within Banjara language. In addition, the researcher briefed about the ethnolinguistic background of the community like their dwelling patterns, economic conditions, occupation, administrative resolutions, marriage system, food and clothing, religion, lifestyle, etc. In the final part of the chapter, an overview of the phonological sketch of Banjara language was presented. Finally, the chapter ends by discussing the works carried out on Banjara language from a linguistic and non-linguistic point of view. Further, the researcher also put forward his views on how cognitive studies can be extended to indigenous languages, especially Banjara language.

In the second chapter, the researcher mainly aimed to discuss the major theoretical works related to the subparts of the thesis. As a part of this, reviewing various articles and books on the verb classes, prototypes and metaphors, many works are taken into consideration. As a preliminary review, the researcher first tried to understand what is a prototype theory and related works by Rosch (1973) and Pulman (1983) and various classification of verbs by Miller (1972) and Levin (1993) works have been reviewed. Subsequently, the researcher also studied deeply into the reasons for working on prototypes and metaphors and extended the similar work to Banjara language which has less research work from linguistic or non-linguistic point of view. After a preliminary discussion on prototypes of verbs, their classification and using verbs, generation of metaphors were studied. With a good knowledge in these areas, the researcher understood to have an understanding of words, concepts and thoughts. As a part of this, the researcher attempted to study Lawrence and Margolis (1999), Smith (1987), Miller (1979). All these works have given an enormous understanding regarding the concepts.

After deeper understanding of the concepts, the researcher started to understand words and their grammatical categories for which Saussure (1916) was consulted. After Saussure works, Fodor's (1983) works were also studied. Later, to understand the rules for conceptual

development Bruner (1956), Medin et. al. (1984) are thoroughly studied. Subsequently, conceptual features were also studied from various perspectives like concepts as abstracts vs mental representation. Further, other works were also consulted related to cognitive approaches how people have seen concepts from various parts of the world starting from Robert et.al (2012).

In the second part of the theoretical foundation, the researcher mainly concentrated on the verbs and the prototypes, especially Rosch (1973), Evans and Green (2006) are studied at length. Subsequently, conceptual connections and their prototypes were studied by consulting many researchers like Fodor (1983), Bassok (1996), Barslow (1999), Goldstone (2000). In addition, concept and language and their implementation and execution in many languages are understood by various related theories and models. Finally, a general overview of verbs, prototypes and metaphors are discussed.

The third chapter discussed in detail the experiments carried out in this research work. It includes the hypothesis, design of the experiment, the methods involved in them, experimental strategy and experimental procedure, and results. Apart from the main procedural and strategic designs, the chapter also highlighted the method of data collection through qualitative methods, quantifying followed by discussions and by indicating future studies. As a part of experimental strategy and experimental procedure the chapter also included figures and graphs for a better understanding of the experiments that are executed in the research. The following are the four experiments carried out in the research:

1. Mental Rotation Task (prototype effect)
2. Direct Grading Test (prototype effect)
3. Free Association Test (prototype effect)
4. Vocabulary and Reaction Time (metaphor generation).

For each of the experiments in the research a particular technique is followed. Shepherd and Metzler (1971:19-23)) method is used for mental rotation Task, in which sociolinguistic variables are used especially sex for identifying prototypes. In this task of identifying the prototype, three tests are executed viz. mental rotation task, direct grading test and free association test. For all the three experiments, Eleanor Rosch, (1983) and Pulman (1983) models were used. For the fourth experiment i.e. metaphor generation, Lakoff's (1967)

Conceptual Metaphor theory has been adopted. The following paragraphs will discuss in detail about the four experiments carried out for the verb class and their prototypes and metaphor generation:

In the mental rotation task, certain procedures are followed to run the experiment successfully. Primarily, in this part, the researcher discussed earlier studies on verb prototypes and their classification from various sources. Next to the preliminary studies, studies also concentrate especially on mental rotation task. After a clear understanding and application of mental rotation tasks in Banjara language, a proper method and design is planned. For performing mental rotation tasks on Banjara participants, many methods were studied for execution of the task. Among the various methods, the Vandenberg Mental Rotations test, which is a three-dimensional test, is selected for better results. There are innumerable three-dimensional images available in the Vandenberg model. However, only 48 images are extracted for carrying out the experiment on Banjara participants. The reason for selecting 48 is based on the time set for the experiment. Among these 48 images, there are different sizes and angles which are kept in rotation mode. All the images are sent to the participants through a link designed before the experiment.

After a proper design and method, 55 participants were selected from various districts of Telangana state. The researcher took utmost care in selecting the participants by correlating with their sociolinguistic variables like age, sex and education. The researcher has also taken care equal distribution of male and female among the participants. All the participants are aged between 21-40. Among the participants, there are 19 males and 21 females who are aged between 21-30, and within the 31-40 there are 10 males and 5 female participants. All the 55 participants consisted of 48 postgraduate students, 4 graduates and 3 from school background. All these participants are given the mental rotation task with well designed instruction before the experiment that started online.

As a part of the test, a link for sent to the participants along with the instructions. After the thorough explanation of the instructions, a trial run was administered on the participants. In the trial run, the participants were asked to follow the instructions as specified. In this trial, 12 images were shown and they were asked to follow the instructions randomly. The instructions are to identify whether the images are similar or different from each other. During this process,

the time taken by the participants were automatically recorded as per the test design. The trial run also will be validated after the original test is executed.

After the trial run was executed successfully, the main experiment was implemented in which 48 images were loaded in the test. The main test follows certain procedures in the following manner: a) welcome message, b) general instructions, c) preparation for the test by pressing the button, d) original test, e) pressing the button F (for similar) and J (for different) images, f) additional information which consists of age, sex, education, mother tongue, further comments, if any. Once these steps are over, the results will be automatically displayed along with the reaction time taken by each participant. The results were displayed in a tabular format consisting of the trial run results and the original test results. In both the versions, the correctness, reaction time, picture type, expected results, end time and the experiment ID are represented horizontally.

Results from this study replicated the substantial male advantage consistently obtained on the Vandenberg Mental Rotations Test. The finding of an effect size of d = 0.86 is well within the interval (0.75-1.12) reported on this measure. The present findings thus suggest that the magnitude of the male advantage on the Vandenberg test need not be due to better 3-D processing skills. The question arises whether mental rotation ability, as measured by performance on the Vandenberg test, is related to the processing of depth information. One measure of depth processing is performance on tasks of stereoscopic depth perception.

As a part of the test, errors were also taken into consideration by representing correctness and errors. These errors are represented vertically in terms of error rate and corrected trials. On the horizontal axis, the error rates were represented in terms of male, female and analysed using Paired T Test analysis to bring out the significance. The error rate in male participants is 12.57 and errors in female participants is 16.69. In the similar manner, the corrected trials in males is 35.36 and females are 27.86. The standard deviation of male (in terms of error rate) is ±3.05 standard deviation of female is ±4.20. In the similar manner, the standard deviation of corrected trials in terms of male is ±3.04 and females are ±4.52. All the mean and standard deviation in terms of male and female as well as error rates and corrected trials for males and females are paired through T test and analysed for final significance. After the analysis the significance of error rate is $p<0.005$ and corrected trail is <0.001. This shows that the performance of male participants in terms of corrected trials is high and less in error rate compared to female

participants. In terms of error rate and corrected trials it is evident that male participants performed better than female during the test. To summarize, the test yielded that male superiority is identified in mental rotation tasks which can be extended to different rotations.

For the purpose of direct grading and free association test, 33 verbs were given to the participants for the direct grading test. The test is based on a 7-point scale which aims at relevance and salience. The participants are given the verbs to grade on the basis of 1-7 points on the relevance and their daily experience. As part of the test they have to circle one of the points between 1-7 scale. The scale is implemented in the following manner where the points related to relevant, irrelevant and exceptionally relevant. These are ranged between 1-7 based on the Likert scale. So the participants were expected to press one of the buttons that scored between 1-7. This is one of the recent tests that studies the psychological aspects of the participant's mind in terms of prototypes.

The direct grading test was designed for the qualitative results. The verbs are given to the participants to scale on 7 points as per Likert scale. The participants are expected to press one of the buttons 1-7. These 1-7 points are related to either relevance or salience. Initially, this method was used by ancient Greeks for assessment for the formative verbs but not for evaluation. As discussed earlier, the test mainly looks for the relevance of the verbs in daily communication. In the scale one refers to absolutely irrelevant whereas grade 7 is meant for exceptionally relevant.

Along with this test, there is another test that was implemented for prototypes, which is titled as Free Association Test. The test mainly aims at eliciting the first word that comes to the mind in response to the given word or a concept. These two tests are executed after the mental rotation task for finding out the performance of the participants.

The Direct grading test had statistically significant correlations with the second test viz. Free association test. The reliability of the scales for the tests involving respondents was 0.962 and 0.617 for the first and second tests, respectively. In the first and second tests, generic verbs such as *so* 'sleep', *baL* 'burn', and *wea* 'be', and verbs representing direction, such as *paD* 'fall'*, waD* 'fly'*, dharas* 'enter'*, aa* 'come'*, ram* 'play'*,* took the lead in the prototype scale. These tests seemed to quantify various prototype results, which is why they were combined to give the final list. While extracting meaning components or semantic features which tend to be

atomistic and non-prototypical in method, it is nevertheless important to see how features shift from the centre to the periphery of the class or category of verbs. One may say that the number of semantic features applied to the central meaning increases on the way from the middle to the periphery. Generic verbs appear to be closer to the middle (and to the top of the list-verbs such as *jo* 'go', *sarak* 'move', and *dhans* 'run' have very few distinguishing features connected to them), while individual verbs tend to shift towards the periphery-they become more specific in the sense that they represent various modes of movement (such as *mol la* 'purchase', *hangoLi karla* 'bathe'), directions (*chaDh* 'climb', *Dagargi* 'went', or *aayi* 'came'), impediments to movement. As we move from the top to the bottom, it seems that verbs get more difficult to describe or explain. Verbs limited in terms of their usage in particular situations are more likely to find themselves on the periphery. Besides this, irrelevant or negative or derogatory verbs are often on the fringe, and this is possibly due to the fact that their specificity simply restricts them to such situations, but we can also say that they are less prototypic. To get a more comprehensive account of the particular features that shift when we move from the top to the bottom of the list, we need to conduct an individual verb analysis.

Even after the two tests, we cannot say that we have achieved the order of verbs according to the prototyping of verbs, because the prototyping effects of the verb seem to be more difficult to evaluate, particularly when compared to nouns or adjectives. However, we would expect that including a wide range of verbs, within a larger number of native speaking subjects, and three methods of measurement, one would move a step closer to that goal. Unlike nouns, verbs are seldom thought of as belonging to groups, making their classification and discovery more difficult. However, the order we obtained had at least one major tendency: the (most) generic verbs are at the top of the list of possible prototyping, becoming more and more precise as we pass towards the bottom, which means that the number of semantic features increases as we go down the list.

In the last experiment, literal sentences are given as a prototype in order to generate metaphorical sentences to find out the cognitive levels of Banjara community people. For the purpose of the experiment design psychopy software is used. As a part of executing the metaphor generation task, 35 native Banjara participants were taken from parts of Telangana region. All the 35 participants have their education ranging from postgraduate to school education. They were all right-handed and had no neurological abnormalities or long-term

effects from head traumas. They were given 75 sentences each consisting of literal as well as metaphorical sentences that are equivalent to literal sentences. They were requested to use familiarity and interpretability to describe and differentiate the sentences. Apart from familiarity and interpretability to describe a sentence, concluding words of literal sentences and metaphoric sentences were also used. The researcher also took into consideration the average word range of each sentence which ranges between 5-9 words per sentence. In the psychopy software 225 sentences with clear division of literal and metaphorical usage were made. On a scale of 0 to 7, the participants were asked to determine the level of familiarity and then the degree of interpretability of each sentence. Most of the participants in the study expressed their views on the sentences given to them. Most of the sentences are quite familiar and interpretable, according to the results of these two pre-tests. In the similar manner, conventional metaphors are highly familiar and interpretable whereas they are significantly less than literal words in terms of familiarity and interpretability. In the case of novel metaphors, participants expressed unfamiliarity and more difficult to understand.

Apart from the familiarity, it is also noticed that the measurements of the sentences that repeated at the level of familiarity demonstrated a significant difference across the types of sentences. According to an analysis of variance (ANOVA) F (857.906, 2.876) 3461.487 P =0.00 The P-value is less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences, F (1,35)1952,109 P = 0.00. Between conventional metaphors and novel metaphors, F (1,35) 19567.448 P = 0.00, between novel metaphors.

In terms of interpretability, most participants in the study expressed that the given sentences are quite familiar and interpretable. Conventional metaphors are easily interpretable whereas in the case of novel metaphors, participants have difficulty in understanding. In each of the three criteria, literal sentences, conventional metaphorical sentences, and novel metaphorical sentences have the highest to lowest interpretability. Measurements that are repeated, the results of an analysis of variance (ANOVA) revealed that there is a substantial variation in sentence interpretability. F (2.895, 85.456) 1945.103 P = 0.00 The P-value was less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences. F (1,35) 194.404 P =0.00, between conventional metaphors and novel metaphors. F (1,35) 941.435 P = 0.00, between literal sentences and novel metaphors F (1,35) 968.567 P= 0.00.

To summarize, the study focused on the mechanisms involved to help how to generate metaphors in Banjara language and the contributions of cognitive functions like vocabulary and RT (familiarity and interoperability) to metaphor generation. In particular, the main focus was on the differential contribution of familiarity and interoperability to simple, novel and conventional metaphor generation. Our hypothesis was consistent, the main finding that emerged from familiarity and interoperability is that both the metaphors can be processed through the continuation of a single mechanism like conceptual mapping which will help novel metaphors through analogy and conventional metaphors through categorization are understood in conceptual mapping mechanisms. This finding is in line with previous studies showing associations between creativity and saliency features.

The study on verb classes and their prototypes and metaphor generation is confined to only verb category in Banjara language but not to any other grammatical categories. The main concentration was verb classes and their prototypes by using various tests and softwares. Apart from this, using literal sentences the researcher tried to catch hold of the cognitive aspect of the participants minds by giving the task of generating metaphorical sentences based on the given verbs. In future the study may be extended to other grammatical categories like nouns, adjective and adverbs which carry content in the language. In addition, the study also can be extended to proverbs which would depict the perception of the inside world of the indigenous language like Banjara. Finally, the study also can be extended to other indigenous languages belonging to various families of languages. The study can also be carried out onsite unlike this study which was done online due to pandemic. If onsite research on this similar topic may yield better results and can be correlated with the online results.

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APPENDECES

Appendix 1: Questionnaires

Appendix 2: Paper Publications

Appendix 3: Conference Certificates

Appendix 4: Ethics Committee Certificate

Appendix 5: Plagiarism Report

Direct Grading Test

(direct grading using the inverted 1-7 scale aimed at relevance/salience), they were given a list of verbs (as seen in the corpus) to grade from 1 to 7, according to their relevance to their everyday experience. Circling grade 1 meant that the verb was absolutely irrelevant, whereas grade 7 meant that the verb was exceptionally relevant.

*Required

1. Name *

2. Date of Birth *

Example: 7 January 2019

3. Sex *

Mark only one oval.

- Male
- Female
- Prefer not to say

4. Age *

How regularly you see below Banjara verbs everday?

5. 'so' సొ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

6. 'baL' బళ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

7. 'wea' వ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

8. 'paD' పడ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

9. 'waD' వడ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

10. 'dharas' ధరస్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

11. 'aa' ఆజో *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

12. 'ram' రం *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

13. 'bheT' భెట్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

14. 'khap' ఖప్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

15. 'la' లా *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

16. 'khaa' ఖో *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

17. 'siik' సీక్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

18. 'ka' క *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

19. 'bhaand' భాండ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

20. 'ghaal' ఘాల్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

21. 'rakaaD' రకాడ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

22. 'pi' పీ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

23. 'kar' కర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

24. 'besar' బెసార్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

25. 'maar' మార్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

26. 'buur' బూర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

27. 'ka' క *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

28. 'da' ద *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

29. 'bhar' భర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

30. 'balaa' బలా *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

31. 'hubar' హుబర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

32. 'pakaD' పకడ్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

33. 'kaam kar' కాం కర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

34. 'gaaLi da' గాళి ద *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

35. 'waaya kar' వాయ కర్ *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

36. 'saraap da' సరాప్ ద *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

37. 'mol la' మోల్ ల *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

38. 'hangoLi karla' హంగోళి కర్ల *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

39. 'haaT karla' హాట్ కర్ల *

Mark only one oval.

- Rarely
- less often
- often
- moderately
- more often
- frequently
- most regularly

Free Association Test

The respondents will be given 5 minutes to list as many verbs as they could remember.

*Required

1. Name *

2. Date of Birth *

Example: 7 January 2019

3. Sex *

Mark only one oval.

- Male
- Female
- Prefer not to say

4. Age *

List down the Verbs in Banjara as many as you remember in 5 minutes

5.

PROTOTYPICAL EFFECTS IN THE VERB CATEGORY OF BANJARA LANGUAGE

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Abstract: This paper examines the relevance of prototype theory in the verb categories in Banjara language, from a cognitive linguistic perceptive. Cognitive linguistics has evolved over the last twenty-five years as an influential approach to the study of language, conceptual processes and human cognition. It addresses, within language, the structuring of basic conceptual categories such as space and time, scenes and events, entities and processes, motion and location, force and causation. P.M. Girish (2012) "Prototype effects in Malayalam".
The main objective of this paper is to verify whether the prototype theory can be applied to Banjara language verbal category analysis. More specifically, the paper seeks to add different elements of S.G. Pulman's (1983) model for the semantic analysis of verb categories for prototype effect testing (as defined and selected in Miller 1972 and Levin 1993). Prototypicality rating tests traditionally used by psychologists (Rosch 1975, Rosch and Lloyed 1978. inter alia) are included in the research techniques.

Introduction: Cognitive linguistics establishes that language is governed by general cognitive principles such as memory, perception, attention and categorization and so on, rather than by a special-purpose language module. - George Lakoff (1978). *William Croft and D. Alan Cruse (2004) describe the major hypothesis of cognitive linguistics as: "(i) language is not an autonomous cognitive faculty (ii) grammar is conceptualization (iii) knowledge of language emerges from language use". These are the main components of cognitive linguistics.*

Categorization and Prototype Theory: One of the most basic human cognitive activities is the act of categorization. Our non-linguistic cognition permeates categorization and, in a number of ways, it is also of crucial importance in language. Categorization is not a matter to be taken lightly, according to cognitive linguists. *"There is nothing more basic than categorization to our thought, perception, action and speech" (Lakoff, 1987:5). It means categorization is an essential part of cognition.* Cognitive linguistics therefore finds categorization a relevant field to be studied. From the study developed by Eleanor Rosch, a cognitive psychologist (1973), they borrowed the revolutionary concept of categorization. She has revolutionized the study of categorization within experimental psychology. *Her study on categorization is known as 'Prototype Theory'. In her model, the prototype theory, "all the categories have two types of members: (i) the prototype: it is the best and most prominent and model member of a category.* It is the example or member which comes to mind when a person thinks of that category (ii) several less central members related to the former in a motivated way.
The most representative members of a category are called 'prototypical'."(Lakoff,1987:59).
For example, parrots are considered more representative of the category BIRD than 'hen', 'penguin' and 'ostrich' because it has all the features we associate with typical birds- laying eggs, flying, having two wings and two legs, and building a nest. "But ostriches and penguins are classified as birds because they do have some bird- features, and they are nearer to the prototype bird than they are to the prototype *of any other comparable concept (animal, fish, insect, etc), but they are exceptional"(Hudson, 2001:75).* These examples show how the idea of prototypes applies to the relationship between general concepts (bird) and their sub concepts (penguin, ostrich); but the same is true of concepts and their individual members. *Prototype theory has an account of levels of*

categorization which occur at different levels of inclusiveness. There are three levels of categorization such as basic, superordinate and subordinate.

Rosch 's theory stands against classical theory on categorization. In classical theory, all members share the properties defining the group, and therefore all members have equal status as members in a group. Western classical philosophy, in general, considers that categories are based on shared properties. However, Rosch 's research aims to demonstrate asymmetries within categories among members in a category and asymmetrical structures. Prototype theory is even used to examine linguistic categorization by cognitive linguists.

Prototype Effects in Categories of Linguistics: *George Lakoff (1987) claims that prototype effects can also be used to examine linguistic categories.* He primarily aims at linguistic category asymmetries and gradation away from the category's best example or model. *"Prototype effects have shown up in all areas of language- phonology, morphology, syntax and semantics" (Lakoff, 1987).*

Prototype theory has mostly been concerned with nouns, sometimes with adjectives and prepositions, but very few attempts have been made to apply prototype theory to the analysis of verbs. But the primary reason for first doing verbs in the language of Banjara is that it is a verb-centric language and first doing verbs will make it easier for nouns , adjectives, etc. In a language.

In accordance with two prototypical experiments involving respondents and one frequency experiment, the verbs as defined and selected in Miller 1972 and Levin 1993 are sorted.

I would like to explore the above verb categories in the next section and how they characterise Beth Levin 1993.

Verbs and Prototype Theory: In his book *"Word Meaning and Belief,"* Pulman (1983:107-136) carried out a wide-ranging analysis to show that there are components of verb meaning that can be explored by prototype theory. He noticed graded membership and prototyping effects in categories denoted by the verbs kill, speak, look, walk, deceive, rub, hold and burn. Pulman started his study of the prototyping verb by implementing a taxonomy that starts with a particular beginner and ends with a specific verb.

An example of verb taxonomy based on Pulman 1983: 108

(1) Unique beginners
(2) Life form
(3) Generic level
(4) Specific level

However, he noticed that there are several complicated issues related to particular beginners, as well as to the stage of life type. For example, it is very difficult to determine if the verb DO or the verb BE can be considered to be the hypernym of 'near' in 'John closed the door' and 'the door was closed.' He therefore centred his research on the generic and the unique level, examining only those verbs which appeared to be arranged in "hyponymy sets reminiscent of the distinction between the basic and the subordinate level categories" contained in the nouns (Pulman 1983:109). In the first place, Pulman decided to verify if prototyping results could be obtained for verbs; in order to do so, he tried to replicate one of Rosch 's original experiments-Pulman's subjects were asked to determine which members of the category in question were more representative of the category in question, using a 7-point scale (the lower the number, the more prototypic the verb, just as in Rosch 's tasks). He selected eight sets of hyponymies: kill, speak, look, walk, deceive, rub, hold, and burn and, for each of them, selected a range of six hyponyms to cover most of the meanings of the generic verbs. The findings of this experiment were as follows:

The results of Pulman's (1983:113) prototypicality test.

	1	2	3	4	5	6
look	survey	stare	glance	scan	peer	squint
	2.05	2.80	2.87	3.25	3.91	6.05
kill	murder	assassinate	execute	massacre	sacrifice	commit suicide
	1.10	2.05	2.82	3.28	5.22	5.33
speak	recite	mumble	shout	whisper	drone	stutter
	2.57	3.46	3.51	3.64	3.98	5.35
Walk	stride	pace	saunter	march	stumble	limp
	1.86	2.05	2.41	3.01	5.31	5.37
deceive	lie	cheat	mislead	defraud	hoax	decoy
	1.87	2.20	2.34	3.84	4.10	5.01
hold	grassp	grip	clutch	hug	squeeze	pinch
	2.03	2.03	2.45	3.40	4.36	5.30
burn	scorch	singe	kindle	toast	brand	cauterise
	2.10	2.61	3.90	4.54	4.80	4.83
rub	polish	scour	scrape	file	grate	fray
	1.81	3.80	4.21	4.70	4.76	5.69

Second, Pulman decided to gain more prototype-related data by conducting a test that would give him some kind of 'family resemblance' indicator. He decided to rank the hyponyms of the selected sets in accordance with the number of features they shared (or did not share) with other hyponyms, in this case other members of the category. The results he obtained were quite difficult to determine, since they could be grouped into roughly five very different categories: when asked to provide features for certain verbs, people preferred to list (1) their synonyms (or close synonyms), to provide (2) meanings or (3) the category name itself, often to list (4) connotations and to offer (5) a number of attributes. Third, Pulman edited some of the data in order to achieve greater accuracy in the study , i.e. he omitted a number of attributes that seemed to be irrelevant to some verbs and changed others to make them more consistent. The findings were evaluated in both edited and unmodified form and summarised as follows:

Pulman's (1983:119) result survey for 'kill'.

Kill	**murder**	**assassinate**	**execute**	**massacre**	**sacrifice**	**commit suicide**
Ranked by:						
1 Prototypicality	1	2	3	4	5	6
2 All attributes	1	4	6	2	5	3

3 Shared attributes	2	3	5	4	6	1
4 Edited attributes	2	1	5	4	6	3

Pulman concluded that family similarities do not associate favourably with prototyping, which may lead one to believe that family similarity is not a causal factor in the development of prototypes when it comes to verbs. However, Pulman did not draw a firm conclusion on this point on a variety of grounds: He acknowledged that the number of category members chosen in his analysis was too low and very random, which contributed to the statistical methods he used to generate inaccurate results. Moreover, the number of subjects was much smaller than in Rosch 's experiments (20 compared to 400) and, lastly, verbs proved to be very fragile when it came to listing attributes and required a more detailed experimental design. Overall, Pulman came to the conclusion that verbs, just like nouns, may be treated as more or less prominent, prototypic or representative members of their semantic groups, and that prototyping possibly stems from the semantic closeness between a member and a category. Pulman 's experiments, while primarily directed at pilot studies in this area, show that there are facets of the sense of the verb that can be addressed by means of the Prototype Theory. In addition, we may expect that improved experimental design can provide more relevant data in the future (Stamenkovic 2012:180).

Taylor (1989:105-109) studied prototyping related to the polysemy of verb climbing in order to understand the distinction between the family resemblance approach and the core sense approach. The key issue of the core meaning approach stems from the fact that it is similar to the classical approach to categories, as it implicitly calls for a collection of essential and adequate conditions to govern the nature or stability of a category. Various senses of scaling prove that there is no chance of subordinating all of them in the general context of the heart. Taylor follows Fillmore's (1982/2006) definition of the method in terms of 'ascend' attributes (as in 'The plane ascended to 30,000 feet)' and 'clamber' attributes (as in 'The kid ascended down the tree and over the wall'). The clambering definition of this verb cannot be extended to persons without limbs. Thus, while some of the uses of the clambering sense may seem to be similar to the 'core meaning,' there are others connected to the ascending sense (some of which the former sense cannot be applied) which depart from this kind of middle. Taylor points out that these "multiple senses cannot be combined on the basis of a single semantic denominator [...] the multiple meanings are interconnected by means of 'meaning chains'" (Taylor, 1989: 108). *Thus, any "node in a chain of meanings may be the source of any number of extensions of meaning" (Taylor, 1989: 109).*

Verbs in Banjara: The Banjara verbs can most simply be viewed as consisting of five interrelated systems manifesting tagmemes within a phrase. These are the verbal base system, the modal system. *The verbal base contains such categories as intransitive, transitive, ditransitive, receptor, stative, nominal compound and verbal compound and causative.* It's output is largely semantic and it connects directly into the modal system. The model system yields the categories of indicative, permissive, inceptive, durative and perfect stative modes of action. It connects directly into aspects.

Verbs are perhaps one of the most common concepts we experience in our day-to-day lives- Practically all verbs that identify a member of the syntactic class of words that usually signal events and actions. Constitute, individually or in a sentence, the minimum predicate of a clause. However, this analysis will have a restricted scope when dealing with a certain class of verbs: it will treat those verbs that denote natural human movements (i.e. change of position) along a vertical line, and it will exclude all verbs that refer to movements that include a vehicle or some other device.

S NO	**Banjara Verb**	**Gloss**	**Verb Compound**	**Gloss**
1	so	sleep	so jo	Go to sleep
2	baL	brun	baL jo	Burn up

3	wea	be	wea jo	Become
4	paD	fall	paD jo	Fall down
5	waD	fly	waD jo	Fly off
6	dharas	enter	dharas paD	Enter suddenly
7	aa	come	aa paD	Come suddenly
8	ram	play	ram le	Play self
9	bheT	meet	bheT we jo	meet
10	khap	Be consumed	khap we jo	To die
11	la	take	la jo	Take away
12	khaa	eat	khaa jo	Eat up
13	siik	learn	siik jo	Learn completely
14	ka	say	ke da	Tell out
15	bhaand	tie	bhaand da	Tie it off
16	ghaal	put	ghaal da	place
17	rakaaD	put	rakaaD da	keep
18	pi	drink	pi la	drink
19	kar	do	kar la	Do it yourself
20	besar	Make sit	besar la	Cause to sit
21	maar	hit	maar naak	kill
22	buur	cover	buur naak	Cover completely
23	ka	tell	kar mel	say-send
24	da	give	de mel	give-out
25	bhar	fill	bhar laa	fill-bring
26	balaa	call	balaa laa	Call-bring
27	hubar	stand	hubar rakaaD	Cause to stand
28	pakaD	catch	pakaD la jo	Catch-take
29	kaam kar	work-do		
30	gaaLi da	scold		

31	waaya kar	marry		
32	saraap da	curse		
33	mol la	purches		
34	hangoLi karla	Take a bath		
35	haaT karla	do-marketing		

Simple Verb Stems

S NO	Bnjara Verb	Gloss	Verb Type
1	jo	go	
2	aa	come	**Intransitive Verb Stems**
3	phar	turn	
4	kar	do	
5	la	take	**Transitive Verb Stems**
6	phengk	throw	
7	da	give	
8	lak	write	**Ditransitive Verb stems**
9	ghaal	put	
10	maL	be available	
11	kaL	be known	**Receptor Verb Stems**
12	laag	seem, be required	
13	wa	be	
14	ra	be remain	**Stative Verb Stems**

Research corpus and procedures:

Corpus: The corpus of verbs used in this study was designed to meet the requirement of encompassing all the verbs which denote that typically signal events and actions.it was compiled with the help of a number of previous studies involving "The grammar of Lamaani" book written by Ronald L. Trail (1968). The list of verbs which entered the experiments was the following: *aa, baL, bheT, bhaand, bhar, besar, buur, balaa, dharas, da, ghaal, gaaLi da, hubar, hangoLi karla, haaT karla, jo, khap, khaa, ka, kar, la, laag, lak, maar, mol la, maL, paD, pi, pakaD, phar, phengk, ram, rakaaD, ra, so,saraap da, wea, waD, waaya kar, wa.*

Procedures: Drawing on Pulman's findings, our study attempted to 'measure' the verb prototypicality by combining three different experiments:

(1) Direct Grading,
(2) Free Association Test,
(3) Corpus Frequency Test.

Our respondents in the first two experiments were 45 native speakers of Banjara. In the first test (direct grading using an inverted scale of 1-7 aimed at relevance/salience), a list of verbs (as seen in

the corpus) was given to grades from 1 to 7 based on their relevance to their daily experience. Circling grade 1 meant that the verb was totally meaningless, while grade 7 meant that the verb was extraordinarily relevant. In the second, free association test, the respondents were given 5 minutes to list as many verbs as they could remember. The word frequency test was performed on the data obtained from the Corpus "The grammar of Lamaani" book written by Ronald L. Trail (1968). It turned out that a prototyping analysis focused only on frequency data had a number of disadvantages: since Banjara language does not have its own script, it was difficult to get the data for frequency test in such a sample. Since the study showed that the frequency of verbs was an insufficient factor in determining the prototyping of verbs, we decided to include the respondents and perform a combined analysis. The combined analysis meant that the results of the second and third tests had to be converted to a scale of 1-7 and added to the results of the first experiment.

Results and discussion: The following table presents the order of the top 35 verbs in accordance with the result of the three experiments:

S NO	Verb	Gloss	Direct Grading	Free Association	Total
1	so	sleep	7.00	6.00	**13.00**
2	baL	burn	6.00	5.82	**11.82**
3	wea	be	5.42	5.00	**10.42**
4	paD	fall	5.22	4.00	**9.22**
5	waD	fly	5.10	3.58	**8.68**
6	dharas	enter	5.05	3.35	**8.04**
7	aa	come	5.00	3.02	**8.07**
8	ram	play	4.59	3.00	**7.59**
9	bheT	meet	4.02	2.50	**6.52**
10	khap	Be consumed	4.00	2.00	**5.00**
11	la	take	5.00	3.00	**8.00**
12	khaa	eat	5.50	3.62	**9.12**
13	siik	learn	4.00	3.00	**7.00**
14	ka	say	5.00	3.00	**8.00**
15	bhaand	tie	3.00	1.50	**4.50**
16	ghaal	put	3.00	2.00	**5.00**
17	rakaaD	put	4.45	2.44	**6.89**
18	pi	drink	5.90	2.56	**8.40**
19	kar	do	4.98	3.63	**8.61**

20	besar	Make sit	6.02	1.36	**7.38**
21	maar	hit	6.09	4.00	**10.09**
22	buur	cover	2.00	1.00	**3.00**
23	ka	tell	4.00	2.00	**5.00**
24	da	give	5.98	3.50	**9.48**
25	bhar	fill	4.91	1.84	**6.75**
26	balaa	call	5.00	1.48	**6.48**
27	hubar	stand	3.90	1.20	**5.01**
28	pakaD	catch	5.31	1.52	**6.83**
29	kaam kar	work-do	4.00	1.16	**5.16**
30	gaaLi da	scold	3.00	1.12	**4.12**
31	waaya kar	marry	2.25	1.20	**3.45**
32	saraap da	curse	1.00	1.56	**2.56**
33	mol la	purches	1.50	1.32	**2.82**
34	hangoLi karla	Take a bath	1.00	1.16	**2.16**
35	haaT karla	do-marketing	0.50	1.00	**1.50**

The first two experiments had statistically significant correlations with the third experiment 0.726 (Pearson Correlation, significant at 0.01), while the second experiment had no correlations with the other two. The reliability of the scales for the tests involving respondents was 0.962 and 0.617 (Cronbach's Alpha) for the first and second tests, respectively. In the first and third experiments, generic verbs such as *so, baL, and wea*, and verbs representing direction, such as *paD, waD, dharas, aa, ram*, took the lead. These experiments seemed to quantify various prototype results, which is why they were combined to give the final list. While extracting meaning components or semantic features which tend to be atomistic and non-prototypical in method, it is nevertheless important to see how features shift from the centre to the periphery of the class or category of verbs. One may say that the number of semantic features applied to the 'core meaning' increases on the way from the middle to the periphery. Generic verbs appear to be closer to the middle (and to the top of the list-verbs such as jo, sarak, and dhans have very few distinguishing features connected to them), while individual verbs tend to shift towards the periphery-they become more specific in the sense that they represent various modes of movement (such as mol la, hangoLi karla), directions {chaDh, Dagargi, or aayi), impediments to movement. As we move from the top to the bottom, it seems that verbs get more "difficult" to describe or explain. Verbs limited in terms of their usage in particular situations are more likely to find themselves on the periphery. Besides this, irrelevant or negative or derogatory verbs are often on the fringe, and this is possibly due to the fact that their 'specificity' simply restricts them to such situations, but we can also say that they are less prototypic. To get a more comprehensive account of the particular features that shift when we travel from the top to the bottom of the list, we need to conduct an individual verb analysis, which will be our next mission.

Conclusion: Even after the three experiments, we cannot say that we have achieved the order of verbs according to the prototyping of verbs, because the prototyping effects of the verb seem to be more difficult to evaluate, particularly when compared to nouns or adjectives. However, we would expect that including a wide list of verbs, an average number of native respondents, and three methods of measurement, would move us a step closer to that goal. Unlike nouns, verbs are seldom thought of as belonging to groups , making their classification and discovery more difficult. As we can see from Pulman 's experiments, it seems difficult to quantify and define verb components, which is why we have not included another experiment that would split these verbs into constituents. The individual verb study that follows is likely to give us more information about the relationship between the features of the verb and the prototyping. However, the order we obtained had at least one major tendency: the (most) generic verbs are at the top of the list of possible prototyping, becoming more and more precise as we pass towards the bottom, which means that the number of semantic features increases as we go down the list. This tendency should be tested in other languages in order to provide additional information on the relation between the semantic features of the verbs and their prototyping across languages.

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METAPHOR GENERATION PROCESS IN BANJARA LANGUAGE

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Abstract:
The metaphor processing interns of comparison with literal sentences has been the main focus from various fields includes linguistics, psychology and cognitive science. This study aims to investigate the processing of literal sentences and metaphors (novel & conventional) in Banjara language. Cognitive functions like vocabulary and RT were used. The results indicate there are different mechanisms are involved to generate simple and metaphor sentences in Banjara language. Though convectional metaphors are more easier to generate than novel metaphors, both the metaphors can be processed through the continuation of a single mechanism like conceptual mapping which will help novel metaphors through analogy and convectional metaphors through categorization are understood in conceptual mapping mechanism. Though both novel and conventional metaphor generation are linked to attentional resources, the novel metaphor generation is more complex in nature compared to conventional metaphors because conventional metaphors need just working memory in the brain, which is already stored as a mental lexicon; they are fixed and frozen metaphors. So whoever has a good working memory/lexicon, they may be better at conventional metaphor generation. Whereas novel metaphors are more creative in nature, and you can see them a lot in poetry and literary terms. Novel metaphors are more imaginative/poetic metaphors in nature; that is why the novel metaphor generation process is more complex than conventional metaphor generation. In this paper, 45 native speakers of Banjara participants are involved; they have used a metaphor generation task that assesses novel and conventional metaphor generation for the Banjara language.
Keywords: Metaphor generation, Conventional and Novel Metaphors, Banjara language, Reaction Time, Vocabulary, Familiarity, Interpretability.

Introduction:

Figurative language or metaphoric language is basically a very powerful tool or method to evaluate generation of new ideas and linguistic innovation (Levorato and Cacciari, 2002). Metaphoric language is considered as a verbal form of creative thinking (Ricoeur, 1981, 2003) which results in an individual to describe a wide range of emotions and experiences in real life (Beaty and Silvia, 2013).

Metaphor: In the first place, what are metaphors? And how they evolved from time to time and how metaphors revolutionized in cognitive science?. When we talk about metaphors in cognitive linguistics/cognitive science, George Lakoff & Mark Johnson revolutionized metaphors in cognitive science with their book titled *"Metaphors We Live by"* written in the 1980s. This book revolutionized how we understand language and how we use the experiences of the world around us. But what are metaphors? Metaphors are not just poetry but a fundamental part of our brain's conceptual system that is central to the way we perceive ourselves, others, and the world. Lakoff & Johnson writes that the essence of metaphors is understanding the experience of one kind of thing in terms of another. The common example is "the world's a stage," which draws that acting as an audience and life in general. Metaphors are not just rhetorical, autistics or creative they help us understand the structure and communicate our everyday experience. Experience is difficult to communicate literally. George Lakoff says that "the concepts that govern our thoughts are not just matter of intellect, they also govern our everyday functioning down to the most mandate details." "Our concepts structure what we perceive, how we get around in the world, and how we relate to other people." In other words, we can say that the conceptual system is largely metaphorical.

For example, "an argument is war" is the most common example of war metaphors, and it is partly abstract in parts of human minds. If we can discuss more "war" metaphors

a. Your claims are indefensible
b. There is a weak point in my argument
c. Her criticisms are on target
d. She shot down and destroyed my argument
e. He attacked my argument

So, why do we do this? Because there is a "war" and an "argument" is systematic, both are structured in a recognizable/common nature that has sides, positions, wins, and losses. There are similarities so that we can describe the way people can easily understand. We borrow from pre-existing something, and we describe something conceptual. Let's take another example: "time is money" time and money have structural similarities so that we can use one to describe another. If we can see some more related examples:

f. You are wasting my time
g. This gadget will save you hours
h. I didn't have the time to give you
i. How do you spend your time these days
j. That flat tire costed me an hour
k. Your running out of time

They also say that metaphors change from time to time as we think further about the situations, generation by generation, they change.

Recently the University of Nottingham published an article called "metaphors in the time of coronavirus" they have argued in the article that why look at metaphors in the time of coronavirus? Because metaphors have creative meaning, they have been tools for meaning-making as long as humans have been able to talk and watch others. Metaphors are essential for the development of language, cognition, and culture. They also play an important role in how we think and talk about health, illness, and medicine, and they shape how we act individually and collectively. So, if we can see, some of the examples related to coronavirus metaphors are mostly "war metaphors" because it is happening in all kinds of reporting around the world currently. We hear a lot of "fight, battle, combat, attack, defend, etc." in the media reports.

l. It is people's war against the covid-19 epidemic
m. The government declared war on coronavirus with a battle plan to kill the deadly virus.

On the other hand, some of the people opposing the "war" metaphors used in the media reports because they argue that by using "war" metaphors during a pandemic will actually panic the people and win the obedience to authorities of the governments across the world.

If we can see some more pandemic metaphors below,

London is a coronavirus reactor, and it has to be cut off, China is Chernobyl!, Cases are flattening the curve, Break the chain of infections, Starving the virus of fuel, Slow it in tracks and push it back, Send the virus packing, Shut down the borders, Fight against coronavirus is on, One step ahead of the virus and Covid is the disease of stoppage of social distancing of self-isolation.

Metaphor Generation Process: Metaphor generation processing (comprehension/ generation is linked to linguistics, computational and various cognitive functions in general. The word association between base words (vehicle) and target words (topic) this cooccurrence relationship between words defines the processing of metaphor in a language (Kameya & Sato 2005). Metaphoric language is a powerful tool that assesses linguistic innovation and it helps to generate new ideas. Metaphors can be described based on their novelty and familiarity (Beaty & Silvia 2013) conventional metaphors are clear and easy to compare between a particular topic and the formed metaphor (Tourangeau & Stern berg 1982) whereas novel metaphors are linguistically original and unique (Beaty & Silvia 2013). The cognitive tools like vocabulary, selective attention, executive functions and working memory could contribute to the generating process of metaphors.

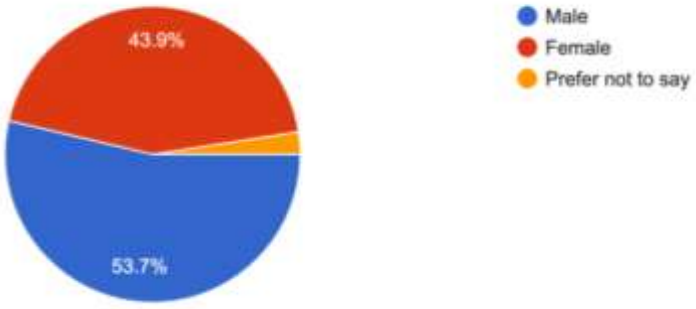
Banjara Language: According to Grierson (1967), Banjara is a Rajasthani language spoken by nomadic Banjara people across India. The Banjara language is known by various other names, including Lamani, Lambadi, Lambani, Labhani, Lemadi, Lamalade, and Banjara, Banjari, Bangala, Banjori, Banjuri, Vanjuri, Vanji etc. The Banjara tribe primarily belongs to the Gypsy tribe of South Africa. Banjara language belongs to the Indo-European, Indo-Iranian, Indo-Aryan, Central zone Rajasthani unclassified. The unmarked word order in Banjara is Subject Object Verb (SOV), verb final language. (Sunder B 2020)

Regional dialects of Banjara are divided between the Banjara of Telangana and Andhra Pradesh which is written in Telugu script, Banjara of Karnataka written in Kannada script, and that of Maharashtra written in Devanagari script. In other words, Banjara speakers are bilinguals of either Telugu, Kannada, or Marathi (besides their mother tongue), according to the states they are settled in. (Sunder B 2020)

Significance: Basically, metaphors are figurative speech in a language such as the use of metaphors is considered a verbal form of thinking, that enables people to describe emotions and experiences. This process basically leads to linguistic innovation and the generation of new ideas. Metaphor processing depends on the ability to link different conceptual domains and to find similarities between two apparently unrelated concepts. Metaphors can be described based on their novelty and familiarity. For example, conventional metaphors represent the comparison between particular topics and the formed metaphor. Ex: “This lawyer is a shark” these are coded in the mental lexicon. Whereas novel metaphors are linguistically unique and original. The generation of novel metaphors exposes obvious patterns of thinking to adopt creativity or think conceptually and abstractly.
Let us see how cognitive mechanisms underlying creative thinking and metaphor generation. Previous studies say that metaphor generation relies on cognitive executive processes, such as WM, Vocabulary, and divergent thinking. Some of the scientists found that divergent thinking contributes to the novel metaphor generation. Divergent thinking is defined as the ability to generate various responses to an open-ended problem. A recent neuroimaging study found that metaphors generation was associated with activation in predominantly left-hemispheric brain regions, including the left angular gyrus (AG), the left dorsomedial prefrontal cortex (DMPFC), and the posterior cingulate cortex (PCC) that were involved in both comprehension and generation of metaphors. When these areas of the brain activate and share the semantic information between remotely associated concepts required for metaphor comprehension and generation.

Methods

Participants: The RT experiment included 35 subjects (15 females and 15 males, with a mean age of 15/60) from Telangana's Banjara-speaking community. They were all right-handed and had no neurological abnormalities or long-term effects from head traumas.



Stimuli: Seventy-five conceptual metaphors from the Banjara language were chosen. Seventy-five typical metaphorical sentences were created based on the source term of metaphor. Seventy-five novel metaphorical sentences and seventy-five literal sentences were created using the same analogy. A conventional metaphorical sentence was first produced by selecting the source word (for example) "war" from the conceptual metaphor "The arguments are wars" (*George Lakoff)*, “ War against COVID-19 is on” Then, by analogy, new metaphorical and literal sentences were created. There were 225 sentences divided into three groups of 75 sentences each, with 25 literal sentences, 25 conventional metaphors, and 25 novel metaphor sentences in each group. A final goal phrase was used in all literal, conventional, and novel conditions in a triple framework. (See Table 1 for examples of source and goal words in sentences.)

Table1. Example sentences with source and goal domains

Sentence type	Sentence	Source	target

literal	The virus is the enemy in war against COVID-19.	War	War
Conventional metaphor	Time is running out controlling the virus.	War	Argument
Novel metaphor	The consciousness of the people was attacked.	War	property

Familiarity and interpretability were used to describe and differentiate the sentences of the above three situations from one another. This examination included 35 native Banjara speakers from Telangana. In all literal, conventional, and novel situations, a concluding word was used. Under literal sentences, the average number of words per sentence was 5, 5.5, 5.8 and 5.9 in literal, conventional, and novel metaphorical sentences, respectively. For the Banjara language, experiments on metaphor generation and reaction time were conducted. Because of the epidemic, the data was collected online. Experiments were created in Psychopy and data was provided to subjects via the internet. On a scale of 0 to 7, subjects were asked to determine the level of familiarity and then the degree of interpretability of each sentence. The following are the instructions for determining the level of familiarity: Choose number 5 if you have heard such expressions many times before and the meaning is highly known to you. Choose option 3 if you've heard such terms many times before and think you know what they imply. Choose number 1 if you've heard the identical expression once or twice before and think you know what it means. The instructions for determining interpretability are as follows: Select the number 5 if you believe the sentence is simple to understand. Select option 3 if the sentence interpretation takes a short time. Select the number 1 if the sentence interpretation took a lengthy time. If you don't understand what an expression means, choose 0 as your answer. The literal sentences are quite familiar and interpretable, according to the results of these two pre-tests. Conventional metaphors are likewise highly familiar and interpretable, but they are significantly less so than literal words in terms of familiarity and interpretability. Novel metaphors are metaphors that are unfamiliar and more difficult to understand.

The word display task in the above three conditions was conducted. Each word in the sentence is displayed for 300 milliseconds on the monitor screen. The time between two words was estimated using the following formula: 100 milliseconds plus 37 milliseconds for every letter in the previous word. A blank screen shows for 500 milliseconds after the final word before the question mark appears. The individuals pressed one of the four keys on the keyboard (full meaning 5 = d, medium 3 = s, low 1 = l, and without meaning 0 = k) after seeing the question mark and demonstrated how much the meaning of that sentence in Banjara. The subjects were given brief instructions on how to administer the test after filling out the informed permission form. The test was carried out online, an experiment link was sent to the subject and asked them to participate in a calm environment. Ask them to use the index and middle fingers of both hands should use to answer the questions. The data (familiarity/interpretability and reaction time) were analysed in SPSS using descriptive statistics and repeated measures Analysis of Variance (ANOVA) at a significance level of 0.05

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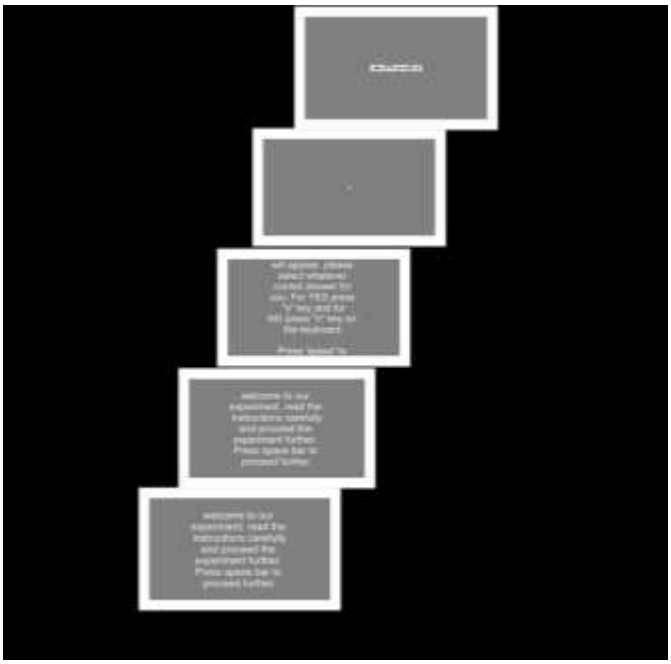
The word display task in the above three conditions was conducted. Each word in the sentence is displayed for 2000 milliseconds on the monitor screen. The time between two words was estimated using the following formula: 1000

milliseconds plus 800 milliseconds for every letter in the previous word display. A blank screen shows for 500 milliseconds after the final word before the question mark appears. The individuals pressed one of the four keys on the keyboard (full meaning 5 = d, medium 3 = s, low 1 = l, and without meaning 0 = k) after seeing the question mark and demonstrated the meaning of that sentence in Banjara. The subjects were given brief instructions on how to administer the test after filling out the informed permission form. The test was carried out online, an experiment link was sent to the subject and asked them to participate in a calm environment. Ask them to use the index and middle fingers of both hands to answer the questions. The data (familiarity/interpretability and reaction time) were analysed in SPSS using descriptive statistics and repeated measures Analysis of Variance (ANOVA) at a significance level of 0.05



Results
Familiarity

Table 2: Mean and standard deviation of familiarity (number of subjects 35)

Sentence Type	Mean	Standard Deviation
Literal	3.5768	0.2098
Conventional Metaphor	3.4563	0.15645
Novel Metaphor	2.1254	0.25465

Table 2 illustrates that in three scenarios, literal sentences, conventional metaphorical sentences, and novel metaphorical statements have the highest to the lowest level of familiarity. Measurements that are repeated The level of familiarity demonstrated a significant difference across the types of sentences, according to an analysis of variance (ANOVA). F(857.906, 2.876) 3461.487 P =0.00 The P-value is less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences, F(1,35)1952,109 P = 0.00. Between conventional metaphors and novel metaphors, F(1,35) 19567.448 P = 0.00, between novel metaphors.

Interpretability

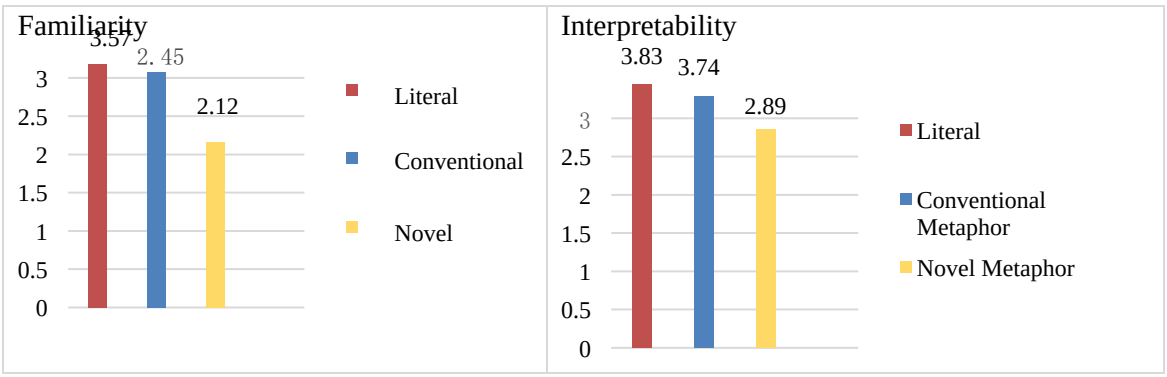
Table 3: Mean and standard deviation of interpretability (number of subjects 35)

Sentence Type	Mean	Standard Deviation

Literal	3.8330	0.13245
Conventional Metaphor	3.7489	0.16576
Novel Metaphor	2.8976	0.20814

In each of the three criteria, literal sentences, conventional metaphorical sentences, and novel metaphorical sentences have the highest to lowest interpretability. Measurements that are repeated, the results of an analysis of variance (ANOVA) revealed that there is a substantial variation in sentence interpretability. F (2.895, 85.456) 1945.103 P = 0.00 The P-value was less than 0.05. The pair-wise comparison showed a significant difference between conventional metaphors and literal sentences. F (1,35) 194.404 P =0.00, between conventional metaphors and novel metaphors. F(1,35) 941.435 P = 0.00, between literal sentences and novel metaphors F(1,35) 968.567 P= 0.00.

Fig. 1. The familiarity (left) and interpretability (right) of 3 conditions on a scale from 0 to 5



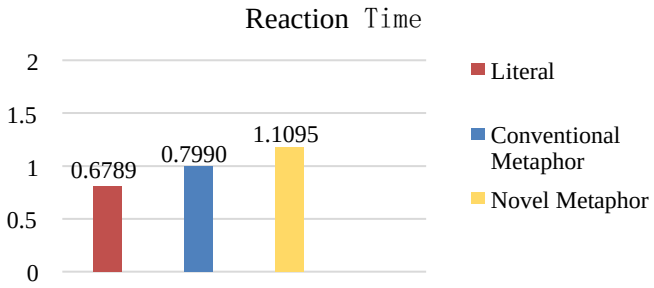
Measurements that are repeated The degree of familiarity and interpretability demonstrated a significant difference across the conditions, according to the analysis of variance (ANOVA). There was also a substantial difference in familiarity and interpretability between literal sentences and conventional metaphors, conventional metaphors and novel metaphors, and novel metaphors when compared pairwise. Conventional metaphors were more recognizable and interpretable in each of the three structures. The novel metaphors were less well-known, but they were still more understandable. In the case of literal sentences, conventional metaphors, and novel metaphors, there was a substantial association between the variables of familiarity and interpretability.

Table 4: Mean and standard deviation (number of subjects 25)

Sentence Type	**Mean**	**Standard Deviation**
Literal	0.6789	0.31689
Conventional Metaphor	0.7990	0.34867
Novel Metaphor	1.1095	0.46756

In three scenarios, the shortest to highest reaction time is found in literal sentences, conventional metaphorical sentences, and novel metaphorical sentences, as shown in Table 4. Measurements that are repeated An analysis of variance (ANOVA) revealed a substantial difference in reaction time between the two types of sentences. F(2.678,53.567)17.435 P = 0.00. The Pair-wise comparison showed a significant difference between conventional metaphors and literal sentences F (2, 12) 5.543 P = 0.04 between conventional metaphors and novel metaphors F (2.12) 15.785 P = 0.00. There was a significant difference between literal sentences and novel metaphors F (2.12) 25.406 P = 0.00.

Fig. 2. The reaction time in 3 conditions



Discussion: This study focused on the mechanisms involved to help how to generate metaphors in Banjara language and the contributions of cognitive functions like vocabulary and RT (familiarity & interoperability) to metaphor generation. In particular, the main focus was on the differential contribution of familiarity and interoperability to simple, novel and conventional metaphor generation. Our hypothesis was consistent, the main finding that emerged from familiarity & interoperability is that both the metaphors can be processed through the continuation of a single mechanism like conceptual mapping which will help novel metaphors through analogy and conventional metaphors through categorization are understood in conceptual mapping mechanisms. This finding is in line with previous studies showing associations between creativity and saliency features.

Limitations & future Studies: Some limitations of this study are that since pandemic is going on couldn't able to collect the data physically, the subjects were asked to present their data online mode and submit the data online itself. In the future, the subjects may present in the lab and collect the data physically, so that the accuracy of the data will be better we feel. In future research it would be worthwhile to consider assessing cognitive tools like Executive functions, selective attention etc through neuropsychological ("performance-based tasks") tests as well as self-report questionnaires. Such examinations will allow us to do neurophysiological in depth creativity of metaphors in the particular language.

Conclusion: Based on the above findings, we can conclude that there are different mechanisms involved to generate simple and metaphoric sentences in Banjara language. Though conventional metaphors are easier to generate than novel metaphors, both the metaphors can be processed through the continuation of a single mechanism like conceptual mapping which will help novel metaphors through analogy and conventional metaphors through categorization are understood in conceptual mapping mechanisms. The metaphor generation process can be explained through continuation of saliency features and expectancy.

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Science

SUFFIX NEGATIVES OF BANJARA LANGUAGE

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ABSTRACT This paper presents an overview of negation and how negation works in Banjara language. It is noted that negatives in Banjara are suffixes and they cannot occur independently. Negative particle, identified as ni in Banjara, always occurs with a verb/verb complex as an affix. In this study, the negation in Banjara has been tested with all the paradigms such as tense, phi-features (person, number, and gender), interrogatives etc. with both affirmative and negative sentences. Yes-No interrogative test in Banjara also shows that there is no occurrence of any independent negative form as an answer and a verb must occur with the negation. This behavior is different, compared to the languages of the same family. Banjara belongs to Indo-Aryan language family and though negatives in most languages from this family can occur independently without the support of the verbs/auxiliaries, Banjara is an exception as negation cannot occur independently in it. Types of negatives and negative principles are discussed in details. Standard principles of negation have also been applied and thoroughly tested to find out the negation system in Banjara language for the first time.

KEYWORDS : Negation/negatives, Banjara Language, affixation.

INTRODUCTION

According to Grierson (1967), Banjara is a Rajasthani language spoken by nomadic Banjara people across India. The Banjara language is known by various other names, including Lamani, Lambadi, Lambani, Labhani, Lemadi, Lamalade, and Banjara, Banjari, Bangala, Banjori, Banjuri, Vanjuri, Vanji etc. The Banjara tribe primarily belong to the Gypsy tribe of South Africa. Banjara language belongs to the Indo-European, Indo-Iranian, Indo-Aryan, Central zone Rajsthani unclassified. The unmarked word order in Banjara is Subject Object Verb (SOV), verb final language as can be seen from the following example.

1. u-n kutra pasand
   She-pos the dog likes
   'She likes the dog'

Regional dialects of Banjara are divided between the Banjara of Telangana and Andhra Pradesh which is written in Telugu script, Banjara of Karnataka written in Kannada script, and that of Maharashtra written in Devanagari script. In other words, Banjara speakers are bilinguals of either Telugu, Kannada, or Marathi (besides their mother tongue), according to the states they are settled in.

Types Of Negatives And Principles Of Negation

In simple propositional logic, negation is an operator that reverses the truth value of proposition(unclear). Thus, when 'p' is true, not 'p' is false and vice versa (Miestamo 2003). In this section, we look at the literature pertaining to definition of negation, standard negation and types of negatives which will be elaborated accordingly with the help of suitable examples.

If we look into standard negation, language complexity can provide us with identification about negation. According to Miestamo (2007), the term standard negation originates from Payne (1985). Negation can be characterized as a basic means that languages have for negating declarative verbal main clauses. Thus negation can be identified on the basis of the complexity of a language. The criteria for cross-Linguistics comparison are found in McWhorter (2001) and Kusters (2003). McWhorter and Kusters both proposed criteria for identifying language complexity. Further language complexity can be viewed from two different points of views, (i) absolute and (ii) relative (Miestamo; 2003). The absolute view looks at language complexity in terms of the number of parts in a system or in information. The relative point of view pays attention to the users of the language and defines as complex what makes processing acquisition or learning more difficult. Then two proposals for measuring or identification of language complexity by McWhorter (2001) and Kusters (2003), both have different strategies for measuring a language complexity.

Miestamo (2003-2007) and McWhorter (2001) propose a metric for measuring the overall grammatical complexity of languages, paying attention to the different levels of languages. A grammar is more complex than another to the extent that; (i) its phonemic inventory has more marked members and (ii) its syntax requires the processing of more rules etc. McWhorter states that his metric for measuring grammatical complexity is ultimately about the length of the descriptions that grammars require, thus intended to be based on as absolute definition of complexity. Further, Miestamo (2007), points out some of the problems with McWhorter's (2001) metric system. He suggested that it is very difficult to study the overall complexity from a general typological perspective. One must concentrate on the complexity of specific grammatical domains.

Another proposal was made by Kusters (2003). In his view, he pointed out the complexity of negation in relative terms taking the difficulties experienced by adult learners of languages. Central to his view are the following principles: (i) Economy (restrictions of the number of overtly signaled categories), (ii) Transparency (clarity of the relation between meaning and form) or (one meaning-one form) and (iii) Isomorphy (identity of the order of elements in different domains). These three principles are explained by Miestamo (2007) as follow: The principle of Economy is relevant when addressing questions such as whether the verbal inflection overtly signals agreement or are like tense, aspect, or mood categories. The principle of Transparency is evoked when dealing with phenomena like allomorphy, when ordering of inflectional affixes expressing given verbal categories.

Using the standard negation definition and two proposals of complexity of language we now turn to explain standard negation and its strategy. Miestamo (2003) defines the standard negation strategy in English with the help of the example given in (2) 'In English, we can identify the constructions that adds 'not' after the first auxiliary verb as the standard negation strategy" (Miestamo; 2003).

2. (a) Affirmative sentence
   John went to school
   Pro N verb P N
   'John went to school'

   (b) Negative sentence
   John did not go to school
   Pro N Aux NEG V P N
   'John did not go to the school'

The above examples (a) is an affirmative sentence and (b) is a negative sentence in English. The negating strategy here is, simply adding 'not' to an affirmative sentence.

The complexity of standard negation is another topic in negation. Miestamo (2003), explains this complexity with the help of examples from Swedish and Finnish languages. On the basis of sample of 297 Languages, he proposes a classification of standard negation in the world's languages. The basic definition in the classification is 'symmetric' and 'asymmetric' negation.

According to Miestamo (2003-2004), for symmetric negative constructions, there are no structural differences in comparison to the corresponding affirmatives in addition to the presence of (a) negative

marker (s). In other words, symmetric negative constructions, simply add a negative marker to an affirmative sentence. As can be seen from the Swedish example in (3) below.

3. [2](a) An affirmative sentence
Fred fyll-er 60 ar
Fred fill-PRES 60 year PL
'Fred is turning 60'

(b) Negative sentence
Fred fyll – er inte 59 ar
Fred fill-PRES NEG 59 year PL
'Fred is not turning 59'

As we can see symmetric negatives simply adds a negative maker to an affirmative sentence. In the Swedish example 3 (b) above, the negative marker is *inte* 'not'.

Miestamo also discusses symmetric negative constructions and according to him, additional structural differences can be found in the asymmetric negative construction compared to the symmetric negative constructions. He explained these negative contractions with the help of examples from Finnish represented in the following.

4. (a) An affirmative sentence
Fred tayt-ta-a 60 vuot-ta
Fred fill-PRES-3SG 60 year-PART
'Fred is turning 60'

(b) Negative sentence
Fred ei tay -ta 59 vuotta
Fred NEG 3SG fill-CNG 59 year-PART
'Fred is not turning 59'

In the Finnish sentence above, 4(a) is an affirmative sentence and 4(b) negative. As we can see in asymmetric negative constructions we find additional structural differences compared to the symmetric negative constructions. In an affirmative sentence we have *ta* 'PRES' and a '3SG', and an additionally *ta* 'PART' added at the end of the sentence 4 (b) in which a negative sentence, *ei* which is a 'NEG+3SG' is prefixed before the verb *tay* and the verb carries CNG suffix 'a'.

On the basis of symmetric and asymmetric negative constructions, elaborated above we will now discuss negative constructions in terms of Kusters' (2003) proposed 3 principles to these whether symmetric and asymmetric negative constructions follow or violate the principles. Symmetric negative constructions explained with the help of Swedish example 3(b), simply adds a negative marker to an affirmative sentence. According to Kusters' principles, the principle of Economy (principle-1) says that the numbers of overtly signaled categories that can occur are restricted. In 3(b) we can see that since only *inte* 'not' has been added, therefore can be claimed to follow this principle. The Transparency principle (principle-2) deals with the clarity of the relation between meaning and form. In 3(b) since there is a clear-cut distinction of meaning to the form, we can say that this principle is also followed. The principle of Isomorphy (principle-3) deals with the identity of the order of elements in different domains. In 3(b), there is no fusion (joining two or more entities from a single entity) or allomorphy (a unit of meaning can vary in sound without changing the meaning) that would constitute violations of this principle. Thus, we can conclude that symmetric negative constructions do not violate any principles proposed by Kusters.

With regard to asymmetric negative construction, explained with the help of Finnish examples in 4(a) and (b) above, we can see that for the description of negation, one must also take in to account the change in the finiteness of the lexical verb. Applying Kusters' principles, we find that in example 4(b), there is only one morphological overtly signaled category which signals both negation and agreement which can be said to violate the economy principle. The relationship between *ei* which is a NEG+3SG and the verb *tayta* which is verb+CNG- *ei* is prefixed before the verb *tayta*. According to principle-2 (clarity of the relation between meaning and form), we can see that in 4(b), there are no relation between form and meaning, thus violating the principle. Further, in 4(b), there is no clear-cut separation of the order of elements in different domains which is a violation of principle-3. Therefore, we can conclude that asymmetric negative constructions violate all the principles which Kusters proposed. Moreover, we can say that, since asymmetric negative constructions are more complex than symmetric negative constructions, they violate the principles while symmetric negative constructions follow the principles.

Another important aspect of negation is the types of negatives. Dahl (1979), Payne (1985), Dryer (2005) independently proposed the classification of negative contractions which are largely overlapping with a shared focus on the status of the negative marker only. There are three negative types as identified by Dahl (1979), Payne (1985) and Dryer (2005), although the terminology varies to some extent. The following are the types of negatives.

1. Morphological or Affixal negatives
2. Negative particles
3. Negative verbs

All these types are summarized in the following paragraphs with the help of examples.

If we look into Morphological or Affixal negation, according to Dahl (1979), in morphological negation, negation expressed morphologically most often as an affix (suffix, prefix, or infix), normally on a verb or auxiliary. For the explanation Dahl (1979) have taken an example from Turkish as shown in the following.

5. [4](a) Affirmative sentence
oku – your- um
Read -PROG -1SG
'I am reading'

(b) Negative sentence
oku - mu-your -um
Read –NEG-PROG -1SG
'I am not reading'

In the Turkish sentences above, 5(a) is an affirmative sentence and 5(b) a negative construction. As we can see, negation is affiliated with the negator affix mu 'not', this kind of negator affix is called 'Affixal negation', in other words, we can also say that the negator affix mu in Turkish is morphological. Thus, the above example comes under the morphological or affixal negation.

According to Dahl (1979), morphological or affixal negation is further divided into 5 types. They are (i) priffixal negation, (ii) suffixal negation, (iii) circumfixal negation, (iv) prosodic negation, (v) reduplicative negation. These sub-types of morphological or affixal negation are explained with the help of examples.

The second types of negatives are negative particles, according to Dahl (1979), negative particles are characterized by two features, (i) they are independent words rather than affixes and (ii) they are not inflected. These two features of negative particles are explained with the help of examples from Indonesian as can be seen in the following.

6. [5]Negative sentence
Saya - tidak - tidur
I - NEG- asleep
'I am not asleep'

In sentence 6 above, the negative particle is an independent word rather than affix and is not inflected. Thus, we can say that the negator tidak 'not' is a negative particle in Indonesian.

The third type of negatives is negative verbs, according to Dahl (1979). Negative verbs are of two types: (i) higher negative verbs (in which negation is expressed by a verb with a sentential compliment), and (ii) auxiliary negative verbs (are more common types but less frequent than the negative particles).

Higher negative verbs are explained with the help of the following examples from Tongan taken from Payne (1985).

7. [6](a) Affirmative sentence
Na'e'alu'-'a Siale
ASP go-ABSOLUTE Charlie
'Charlie went'

(b) Negative sentence
Na'e ikaike 'alu - a'

ASP NEG ASP go -ABSOLUTE
'Charlie did not go'

In the Tongan sentence (7) (b) above, ke is an 'aspect' marker which shows up subordinate clause only. Therefore, we can say that the aspect marker ke expresses a verb with a sentential complement.

For auxiliary negative verbs, Dahl (1979), uses an example from Tongan.

8. (a) Affirmative sentence
pekka lukee
PRO read-PRES-3SG
'Pekka is reading'

(b) Negative sentence
Pekka ei-lu-e
PRO NEG-3SG read
'Pekka is not reading'

In examples, 8(b) above, ei is a negative auxiliary which agrees with the subject, but it does not have more than one tense, and lue 'read' is the verb stem. Therefore, we can conclude that ei is an auxiliary negative verb, which agrees with the subject in Tongan.

In the literature review of negation, there are some more sub-topics in negation, which I have not discussed in this paper, they are: negated quantifiers, inherently negated quantifiers, negated adverbials, inherently negated adverbials. For these definitions and examples one can refer to Payne (1985), page no 212-237.

Negation In Banjara Language

In this section, I would like to discuss negation in Banjara language with the help of examples. According to Miestamo (2003), 'negation is a simple propositional logic and it reverses the truth value (when 'p' is true, then 'not p' is false vice versa). Now let us consider this definition of negation in Banjara.

9. (a) Affirmative sentence
chori – en kutra pasand
The girl-NOM the dog likes
'The girl likes the dog'

(b) Negative sentence
chori – en kutra pasand che-ni
The girl-NOM the dog like NEG
'The girl did not like the dog'

The above example (9) (a) in Banjara, is an affirmative sentence. According to negation definition, it contains a 'p' truth value the girl likes the dog; according to propositional logic, an affirmative sentence must be true. Let us mark it as 'p'.9(b) is a negative sentence. According to propositional logic, it contains a false value and a negative sentence must be false. Therefore let us mark it as 'not p'. By these two examples 9(a) is an affirmative sentence, and 9(b) is a negative. Therefore, we can say that the definition of negation works in Banjara language.

Another important topic in Negation is standard negation. The following are the examples of standard negation in Banjara.

10. (a) Affirmative sentence
man kutr- e kato dar
I dog-PL of scared
'I am scared of dogs'

(b) Negative sentence
Man kutr- e kato dar- ce-ni
I dog-PL of scared NEG
'I am not scared of dogs'

As we can see in the above examples in Banjara, standard negation is achieved by just adding a negative marker *ni* 'NEG' to an affirmative sentence.

Table 1. Negation Test In Tenses In Banjara Language.

S No	Word	Gloss	Present –Neg	Past -Neg	Future -Neg
1	dhans	Run	dhas-ro-koni	dhans-o-koni	dhans-u-ni
2	bhaDak	Chase	bhaDak-ro-koni	bhaDk-o-koni	bhaDak-u-ni
3	kho	Eat	kha-ro-koni	khad-o-koni	kha-u-ni
4	So	Sleep	so-ro-koni	sut-o-koni	so-u-ni
5	kuudh	Jump	kud-ro-koni	kud-o-koni	kud-u-ni
6	phar	Travel	phar-ro-koni	phar-o-koni	phar-u-ni
7	chaal	Drive	chala-ro-koni	chalay-o-koni	chala-u-ni
8	teer	Swim	ter-ro-koni	ter-o-koni	ter-u-ni
9	dekh	See	dekh-ro-koni	dekh-o-koni	dekh-u-ni
10	lakh	Write	lakh-ro-koni	lakh-o-koni	lakh-u-ni

Observations: The data in above table 1 in Banjara shows that,
1. *ni* –Neg occurs accompanied with {*ko/che*} preceding it.
2. Wherever *koni* precedes *ro* it is a negative present tense sentence in Banjara.
3. Whenever *koni* precedes *o* it is negative past tense sentence in Banjara.
4. Whenever *ni* preceding *u* it is a negative future tense sentence in Banjara.

If we see person, number, gender negation in Banjara below in the table.

Table 2. Person, Number Negation Test In Banjara Language

S No	PNG	Word	Gloss	Present -Neg	Past -Neg	Future –Neg
1	1st P	dhans	Run	dhas-ro-koni	dhans-o-koni	dhans-u-ni
2	2nd P	dhans	Run	dhas-ro-koni	dhas-o-koni	dhas-u-koni
3	3rd P	dhans	Run	dhas-re-koni	dhas-ye-koni	dhas-ye-koni

Observations: The data in above table 2 in Banjara shows
1. For the 1st and 2nd person, tenses are not changing when applied Negation in the sentence.
2. For 3rd person, *ro* becomes *re* in present tense, o becomes *ye* in paste tense, and *u* becomes *ye* in future tense.

In Banjara, only negative particle *ni* is found and it has to occur with verb(not clear, prob. occur with a verb). It cannot occur independently. V –neg is the only expression of negation in Banjara. In Banjara, negation occurs as inflection on the verb. It has not evolved into an independent word. Banjara has only morphological/ affix negatives.

This phenomenon is also tested with interrogatives or yes/no questions in Banjara. In the case of the answer to an interrogative question, the negation cannot stand on its own, and will always occur as an affix to the verb it is negating. This a very unusual case in Banjara language because, lot of Indo-Aryan languages has negation which can stand/occur on its own ex: Hindi, Punjabi, Gujarati, Marwari etc. Therefore once again we can say that Banjara is a very complex and very rich in morphology. If we can see the examples in Banjara.

Table 3. Interrogatives Test In Banjara Language

S No	Interrogative	Gloss	Negative
1	Dhas-o-ka/ga?	Did you run?	Dhans-o-ko-ni
2	Teer-o-ka/ga?	Did you swim?	Teer-o-ko-ni
3	Ram aay-o-ka/ga?	Did Ram came?	Aay-o-ko-ni

Table 3 shows that the negator in Banjara is *ni*. Where interrogative sentence occurs, the negator cannot stand on its own as the answer but it has to occur with an affix *dhans-o-ko-ni*, the structure of the word being V + GEN + PAST +NEG.

As discussed in section-2, the complexity of standard negation can be determined by the grammatical complexity of languages. According to Miestamo (2007), there are two types of negative constructions depending on the language complexity- symmetric and asymmetric negative constructions. Similarly, Kusters (2001), proposed 3 principles to determine the same. In the paragraphs that follow, we will test whether these principles hold or are violated in Banjara language. The following examples in (11) show the affirmative and negative constructions in Banjara according to the tense paradigm.

11. (a) Present Tense:
(i) Affirmative sentence
man kutr-a pasand- cha
For me dog-PL like-PRES
'I like dogs'
(ii) Negative sentence
man kutr-a pasand - che-ni

For me dog-PL like-PRES-NEG
'I do not like dogs'

(b) Past Tense:
(i) Affirmative sentence
ma kutr-a-n pasand ki-do PST-
I dog-PL-NOM like-do-PAST
'I liked dogs'
(ii) Negative sentence
ma kutr-a-n pasand ki-do-koni
I dog-PL-NOM like-do-PAST-NEG
'I did not like dogs'

(c) Future Tense:
(i) Affirmative sentence
ma kutr-a-n pasand- kar-uchu
I dog-PL-NOM like-do-FUTR
'I will like dogs'
(ii) Negative sentence
ma kutr-a-n pasand-kar-u-ni
I dog-PL-NOM like-do-FUTR-NEG
'I will not like dogs'

According to Miestamo (2007), a symmetric negative construction is one which is achieved by just adding a negative marker to an affirmative sentence. If we can see the above examples 11(a) (b) (c) in Banjara. (a)(i) is present tense affirmative sentence, (a)(ii) is present tense negative sentence, (b)(i) is past tense an affirmative sentence, (b)(ii) is past tense negative sentence and (c)(i) is future tense affirmative sentence, (c)(ii) is a future tense negative sentence. It can be seen that negative constructions are complex, e.g., in the present tense (a)(ii), negation is marked with ni, in the past tense (b)(ii) with koni and for the future tense (c)(ii) with ni. That is, the negation is marked with the bound morpheme *ni* and therefore seems to change its form according to the tense of the sentence.

According to Miestamo's concepts, asymmetric negative constructions are complex in that they are not simple markers that specifically denote negation. In Banjara too, *ni* cannot stand on its own. It can only occur in a sentence when attached to the tense/aspect marker, thus making a complex of the tense/aspect and negation applying the complexity test we can say that the type of negation that Banjara has in terms of complexity is that of asymmetric negative constructions. The following are more examples to explain the asymmetry of negative constructions. These examples differ from those in (11) in terms of the type of predicate. Also, in (11), the subject is in the nominative, whereas in (12), it is a dative subject.

12. (a) Present Tense:
(i) Affirmative sentence
man kutr-a dar-cha
For me dog-PL scared-PRES
'I am scared of dogs'
(ii) Negative sentence
man kutr-a dar- che-ni
For me dog-PL scared-PRES-NEG
'I am not scared of dogs'

(b) Past Tense:
(i) Affirmative sentence
man kutr-a dar- ra
For me dog-PL scare-PAST
'I was scared of dogs'
(ii) Negative sentence
man kutr-a dar-ra-koni
For me dog-PL scare-PAST-NEG
'I was not scared of dogs'

(c) Future Tense:
(i) Affirmative sentence
me kutr-a-n dar-u-chu
I dog-PL-NOM scare d-FUTR
'I will be scared of dogs'
(ii) Negative sentence
me kutr-a-n dar-u-ni
I dog-PL-NOM scared-FUTR-NEG
'I will not be scared of dogs'

As we can see in above sentences (a) (ii) *ni* is 'present+ not', (b) (ii) *koni* is 'past +not' and in (c) (ii) *u-ni* 'future+ not'. Since asymmetric negative constructions are very complex phenomenon as Miestamo has shown using examples from Finnish, in Banjara too, we can see the complex nature of a negative sentence. Therefore we can say that, in Banjara language we have asymmetric negative constructions. This is further supported by testing the data against Kusters' (2003) three principles (Economy, Transparency & Isomorphy) for explaining the complexity of negative constructions in Banjara.

Let us apply Kusters' three principles to examples (11) and (12)(a)(b) and (c), In 11&12(a)(ii) *che-ni* 'not' is a complex that include information about both negation and the present tense, (b)(ii) *ko-ni* 'not' is a complex for negation and past tense, and in (c)(ii) *u-ni* 'not' is a negation and future tense. Therefore even though it can be claimed that, there are no restrictions for the overtly signaled category (Tense+ Negation in this case), still the principle of Economy is violated because *-ni* being a bound morpheme cannot stand on its own. Kusters' Principle 2 talks about the clarity of the relation between meaning and form. In 11(a) (b) and (c) since there is a complex relation between meaning and form, we can say that the Transparency principle is not violated, because even though we have a complex formation, each bound morpheme can be split and the meaning of each is transparent. Principle 3 deals with the identity of the order of elements in different domains. If we apply this principle to negatives in Banjara, we see that there is both fusion and allomorphy due to the language complexity and therefore not a violation of the principle of Isomorphy.

Another important topic in negation is the types of negatives. There are three major types of negatives. In this section, we will discuss these types with reference to the Banjara language.

The type one of the negative is (i) morphological or affixal negation. Banjara has morphological negation, as can be seen them in the following examples.

13. (a) Affirmative sentence
u keLa khad – o
He banana eat – PAST
'He ate banana'

(b) Negative sentence
u keLa khad – o – ko-ni
He banana eat-PAST-NEG
'He did not eat banana'

In the above examples in the negative sentence 13(b), *-ni* is an affixal negation because the negative marker is affixed/attached to the verb. This negative marker cannot stand on its own. Therefore a proof that negation in Banjara is affixal.

The second type is negative particles. Banjara does not have negative particles because there are no independent negative particles that can occur and negated particles are not inflected for PNG. In the following, we can see why negative particles not applicable/work in Banjara with the help of examples.

14. (a) An affirmative sentence
kutra mankyan kat – o
The dog the man bite-PAST
'The dog bit the man'

(b) Negative sentence
kutra mankyan kato – ko-ni
The dog the man bite-PAST-NEG
'The dog did not bite the man'

According to negative particle definition, they should be independent words as a negative particle and have the possibility to be inflected. But in the above example 14(b), we can see there is no independent word as negative particle rather it is an affix, it attached to the main verb. And the negating category which attached to the main verb is not inflected. Thus, we can conclude that, in Banjara language, there are no negative particles are available.

The third type is the negative verbs. As we know, negative verbs are of two varieties/features- (i) higher negative verbs and (ii) auxiliary negative verbs. Both these varieties/features of negative verbs are not available in Banjara language. Because Banjara language does not

have a higher verb as a negative verb or auxiliary verb as a negative auxiliary verb.

Apart from these two types of negative verbs, there is another type of negative verb called prohibitive. The following is an example of the same in Banjara.

15. Prohibitive Sentence:
Beedi -pakder eta mana-kare
Smoke-PROG here prohibit-PAST
'Smoking is prohibited in this area'

The above example (15) in Banjara is a prohibitive sentence. Prohibitive are negative verbs which do not add 'not' in a sentence but still express negation. In the above sentence *'mana'* 'prohibit' is a negative verb. Therefore, we can conclude that Banjara language has prohibitive as well and like other languages of this languages family, this verb does not occur as an affix.

Payne (1985) and Dahl (1979) also discuss negated quantifiers, inherently negated quantifiers, negated adverbials, and inherently negated adverbials. I have chosen not to discuss these in this work.

SUMMARY AND CONCLUSION

In this preliminary work on negation in Banjara, I have attempted to find out about negation and how negation works in Banjara language. As discussed in this paper, the negative construction in Banjara is *ni*, it precedes with auxiliary verbs. Adopted various points of views of Miestamo (2003, 2007), Payne (1985) and Dahl (1975) to find out about negation in Banjara language. I learned negation, standard negation, and types of negatives in the literature of negation. For Banjara language introduction I referred to Grierson's (1967) Linguistic Survey of India (LSI). At the end Kusters (2001) 3 principles are also used to test the language complexity of Banjara language. Finally, I conclude that I have found interesting findings, 1. There are only asymmetric constructions are there in Banjara. 2. Banjara has only morphological/affixal negatives such as *ni*. 3. Banjara also has negative verbs like preventives and prohibitive such as *mana.*

ABBREVIATIONS USED IN THE GLOSSES

1	ASP= aspect	11	PRO = pronoun
2	NEG= negation	12	CNG = conjunction
3	NOM= nominative	13	1SG= 1st person singular
4	PROG= progressive	14	POS = possessive
5	PAST= past tense	15	PRE = preposition
6	FUTR= future tense	16	V = verb
7	PL = plural	17	N = noun
8	SG = singular	18	ART = article
9	3SG= 3rd person singular	19	DET = determiner
10	PRES = present tense	20	ABSLT = absolute

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