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Visual Word Recognition Study on Bilingual Groups of Odisha

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Abstract- The current study examined how emotional and neutral words affected during visual word recognition task. The test is measured with two different bilingual groups; Group A (SO) Santali first language (L_1), Odia second language (L_2) and Group B (OS) Odia first language (L_1), Santali second language (L_2). These two groups are considered as subject of the experiment. The test was conducted with two different languages (Santali and Odia).The multivariate ANOVA technique was used to analyze the data generated from experiment for two dependent variables namely, recognition accuracy (RA) and response latency (RL).The factors considered in the ANOVA are visual field (VF) (LVF- Left visual field, RVF- Right visual field), stimulus content (SC) (EW-emotional word, NW- neutral word), word type (WT) (SW- Santali word, OW- Odia word), and presentation mode (PM) (unilateral, bilateral). The result of this study show emotional stimuli were better recognized in LVF than RVF. Unilaterally presented words were significantly better recognized than bilaterally presented words.

Keywords- Bilingualism, Visual-field, Language

1. INTRODUCTION

Contemporary researchers are exploring various cognitive and linguistic benefits of bilinguals. Hence, numbers of studies have conducted to investigate hemispheric involvement of language in various tasks of bilingual (Shimizu & Endo, 1981; Chengappa & Ray, 2007; Ibrahim, Khateb & Taha, 2013) [1, 2, and 3].

Jonczyk's conducted a study with skilled non-native speakers of English with the divided visual-field (DVF) technique. The study was investigated to analyze the effect of emotion words with skilled non-native language users of English. The stimuli are presented unilaterally in a random order. The result showed that, LVF (Left Visual Field) had significant role for processing negative words also a balancing role is observed in two hemispheres during the RA (recognition accuracy) of experimental stimuli [4].

Another study signified that, the RA and Reaction Time (RT) of words are correctly and more accurately read when the words are presented in the Right visual field (RVF) than LVF. The study was conducted with Polish (L1) and English (L2). The study also concluded that participants had greater accuracy in Polish word than English words. In addition, Polish words are significantly recognized faster RL than words in English (Krefta, Michalowski, Kowalczyk & Kroliczak, 2015) [5].

Further study (Lam, & Hsiao, 2014) examined the effect of visual stimulus processing among bilingual groups with different linguistic backgrounds. The study analyzed three groups, (i) English monolinguals, (ii) European-English bilinguals, (iii) Chinese-English bilinguals. The research confirmed that, stronger RVF is found for English sequential matching task in European-English bilinguals than other groups [6].

Another study on English speakers had confirmed that RVF is advantage for words than non-words, also no VF (Visual Field) advantage is observed in English among the Hebrew speakers, but showed RVF advantage in Hebrew (Ibrahim, Israeli & Eviatar, (2010) [7]. The cognitive processes of non emotional and emotional words were examined by Graves, Landis, and Good glass (1981) with visual field paradigm. Emotional words were presented to the LVF or RVF. The study concluded that LVF is advantageous for emotional words [8]. However, the above studies illustrate that RVF is dominant for processing of language, where as LVF is also dominant to some extent with the function of language which is also cited by Lavidor, Johnston, and Snowling 2006 and Lindell, 2006 [9,10].

Bilingualism studies on Tibal or indigenous population in India and Odisha

Subasana, (2015) examined different types of bilingualism as well as the nature of bilingualism of the Nyishi Tribes of Arunachal Pradesh. The study has established the characteristics of Elite

Bilingualism, Folk Bilingualism, Compound Bilingualism, Simultaneous Bilingualism and Sequential Bilingualism among the Nyishi Tribes of Arunachal Pradesh [11]. Deb (2012) marked that Rogmeis (Rogmeis are one of the primitive linguistic groups of North East India) were not only well-versed in Bengali, which is a dominant language of Barak valley but also maintained their own language [12]. Further study by Mohanty and Saikia (2004) revealed that, Bodo students were better in their native language as medium of education in schools than in Assamese medium schools. They show positive attitude towards maintaining their own language and culture and negative attitude towards maintaining the Assamese [13].

Majority of indigenous peoples are found in Mayurbhanj district of Odisha such as, Santals, Kolha, Bhuyan, Bathudi Bhuyan, Gond etc (Odisha tourism) Odisha is the largest home for Indian tribes with 62 tribal communities. Tribes are called as "Advises" (original habitants). Indian tribes are commonly named as *Adivasi* (original settlers), *Girijan* (hill dwellers), *Vanya jati* (forest caste men), *Adimjati* (Primitive castes), and *Anusuchit Janjati* (Scheduled tribes). Studies on bilingualism and culture have reported that Kond bilinguals performed better than Kond monolinguals in language tasks (Mohanty & Babu, 1983) [14]. Studies among Konds in Odisha showed that Kui-Oriya bilingual Konds performed better than the Oriya monolingual Konds in the field of intellectual, cognitive meta-linguistic, meta-cognitive and academic achievement (Mohanty, 2004) [15].

Above reviews suggest that, numbers of laterality studies involving bilinguals have been done around the world and very few studies have been conducted in India. However, no studies have been done on hemispheric superiority on tribal languages of Odisha. Moreover, the study makes an attempt to investigate the function of visual field of stimulus content, word type and presentation mode. This study also analyses the hemispheric effect on the performance of bilinguals in terms of recognition accuracy (RA) and response latency (RL).The present study is focused on the visual field superiority (VFS) of both bilingual groups (Group A - SO and Group B - OS). In addition, it analyzes the performance of bilingual groups on comparison of Santali emotional, Santali neutral, Odia emotional and Odia Neutral words.

II. OBJECTIVE

- To find out whether stimulus content (emotional and neutral) has any significant effect on hemispheric superiority for bilingual groups.
- To determine whether presentation mode (unilateral and bilateral) is a function of hemispheric superiority for bilingual groups.
- To examine whether both of languages (Santali and Odia) has any significant effect on hemispheric superiority for bilingual groups.

III. HYPOTHESES

- H1: The emotional words would have more RA and less RL in LVF and neutral words would be processed more accurately and with less RL in RVF for bilingual groups.
- H2: The RA would be more and RL would be significantly less in unilateral presentation than bilateral presentation for bilingual groups.
- H3: The RA of Odia and Santali words would be significantly more in RVF in bilingual groups.

IV. METHOD

A. Tools of the test

The experiment is conducted on a personal computer using Java programming.

B. Development of the material

The test is conducted by presenting the words in orthographically i.e. the original script of both languages. Hence, the words that are used in this test are written in Ol-chiki and Odia script.The materials of this study are constructed by using emotional words and neutral words of both languages (Santali and Odia). Total number of words tested in Likert scale is 148. The words have been categorized as emotional and neutral words. Total number of Odia emotional words is 40, and total number of Odia neutral words is 40. Similarly, total number of Santali emotional words is 40 and total number of Santali neutral words is 28. The words were put under survey for the extent of their use among the native speakers. 5 point Likert scale was used with a response range of (1) If the word is rare word, (2) If the word less

common, (3) If the word is common, (4) If the word is more common, (5) If the word is extremely common.

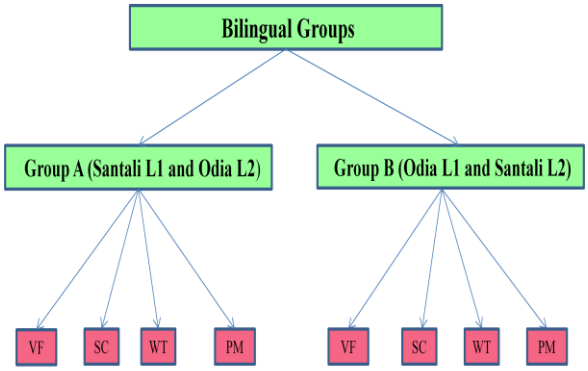
The words which were found more or extremely common (when 3 < score <= 5) rejecting the less common or rare words. Accordingly, total selected words are 132. Total number of selected Odia emotional words is 36 and total number of selected Odia neutral words is 36. Similarly, total number of selected Santali emotional words is 36 and total number of selected Santali neutral words is 24. We kept the rejection rate of words low as limited numbers of Santali words were available for this experiment. The selected words were used in the software for testing the hypotheses

C. Design of the test

Schematic design of the test

Bilingual Groups are treated as between factor and visual field, presentation mode, stimulus content, and word type is taken as within factors, this is a mixed factorial design of ANOVA. See the design.

Design



VF= Visual Field (Left Visual-field, Right Visual-field)

SC= Stimulus Content (Emotional, Neutral)

WT= Word Type (Santali, Odia)

PM= Presentation Mode (Unilateral, Bilateral)

The above figure explained that, Bilingual Groups (Group A and Group B) are treated as between factor and visual field, presentation mode, stimulus content, and word type is taken as within factors, this is a mixed factorial design of ANOVA

The design of the study is 2 (Visual Field: LVF, RVF) x 2 (Presentation Mode: Unilateral, Bilateral) x 2 (Stimulus Content: Neutral, Emotional) x 2 (Word Type: Odia, Santali) x 2 (Groups: Group A, Group B). .

D. Sample of the study

The total participants of this study are n = 150. The participants are categorized into two groups, such as, Group A (SO): Santali (L_1)-Odia (L_2), n_1 = 75 and Group B (OS): Odia L_1- Santali L_2, n_2=75, mean age of Group A (*M* = 23.04 yr, *SD*= 3.85) and mean age of Group B (*M* = 23.78 yr, *SD* = 4.04). All Subjects are right-handed. The handedness was measured by 20 items of Handedness questionnaire (Mandal, Pandey, Singh, & Asthana, 1992) [16].

E. Procedure of the study

The test is administered, by using the computer based software. The materials of this study are constructed by using emotional word and neutral words in Santali and Odia language. Total numbers of words are 132. The words of the test were projected in a randomized order in each visual field to each participant, both unilaterally and bilaterally. Each stimulus word is composed of three to eight letters. All the participants are tested individually. They are instructed to give response as soon as the words appeared on the computer screen. Words are presented unilaterally and bilaterally. The test is consisted of 12 series and each series is made of 12 trials. Thus total trials are 144). Forty-eight practice trials were ran before the actual test started.

V. RESULTS

The result examined hemispheric superiority on Stimulus Content (emotional and neutral), Word Type (Santali and Odia), Presentation Mode (unilateral and bilateral), and Groups (Group A and Group B).

The effect of RA (Recognition Accuracy)

The result revealed that, RA of Group (Group A and Group B) is significant, F = 45.627, df = 1, p < 0.001. The accuracy of stimuli in Group B (*M* =10.11) was greater than in Group A (*M* =11.21). The most important effect of Visual Field, Stimulus Content, Presentation Mode and Word Type are also significant. Words were recognized significantly in LVF (*M* = 11.30) than RVF (*M* = 10.08), F = 63.104, df = 1, p < 0.001. Moreover, the stimuli had greater RA in unilaterally presented words (*M* =11.64) than

bilaterally presented words (M = 9.67), F = 146.53, df = 1, p < 0.001. Emotional words were more RA (M = 14.62), in comparison to neutral words (M = 6.70), F = 2375.23, df = 1, p <0.001. Odia words are perceived with greater RA (M =11.77) than Santali words (M = 9.55), F = 185.56, df = 1, p < 0.001.

a) Description of three way interaction and two way interaction of bilingual Groups (RA).

The three way interaction of Stimulus Content x Word Type x Group also significant, F = 11.93, df = 1, p < 0.001. See figure -1

From the graph - 1, it can be seen that Santali and Odia emotional words had higher RA in Group A and Group B in comparison to neutral words. The emotional words of both languages (Santali and Odia) (M = 28.01), reflected superior accuracy than the neutral words of both languages (Santali and Odia) (M = 12.4) in case of Group A. Likewise, The emotional words of both languages (Santali and Odia) (M = 30.48), reflected superior accuracy than the neutral words of both languages (Santali and Odia) (M = 14.36) in case of Group B.

A significant interaction is observed in Word Type x Group, F = 302.28, df = 1, p < 0.001. The two way interaction of Stimulus Content x Word Type is highly significant, F = 458.05, df =1, p < 0.001. The result indicates that, there was a significant interaction between the Stimulus Content and Group.

Figure 1

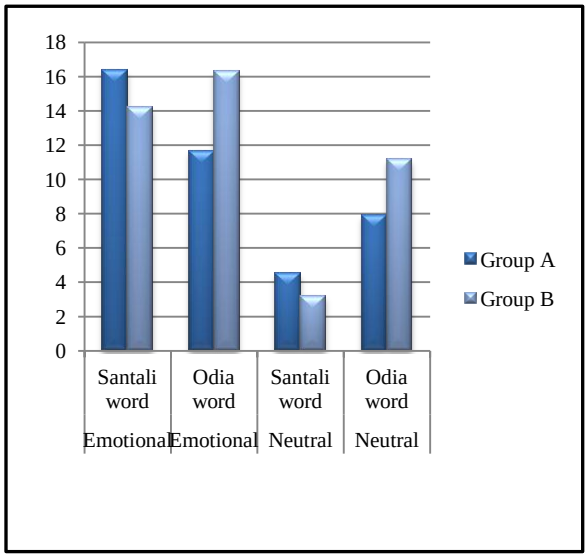


Figure 1. The main effect of Stimulus content, Word type and Group depicts the results for accuracy of corrected words in bilingual groups (Group A and Group B).

The three way interaction of Visual Field x Stimulus Content x Word Type was significant, F = 3. 83, df = 1, p < 0.05. RA of SE words in LVF (M= 16.26) were greater than that of RVF (M = 14.25). Similarly, RA of OE words were superior accuracy in LVF (M =15.15) than RVF (M = 12.83). Mean of SN in RVF (M= 4.04) is greater than that of LVF (M = 3.66). Contrary result was found in case of ON words had more accuracy in LVF (M = 10.15) than RVF (M = 8. 94).The two way interaction of Word Type x Visual Field was significant, F = 8.35, df =1, p < 0.01. Santali words had more RA in LVF (M=9.96) than that of RVF (M= 9.14). Similarly Odia words had more RA in LVF (M= 12.65) than that of RVF (M= 10.89).The three way interaction of Visual Field x Presentation Mode x Group are significant, F = 4.24, df = 1, p < 0.05. See figure – 2

The two way interaction of Presentation Mode x Group was significant, F = 5.95, df = 1, p < 0. 01. It signified that in unilateral presentation mode, the response to stimuli are faster (M =10.90) than the bilateral presentation mode (M =9.32) in Group A. Similarly, the stimuli are better recognized in both presentation mode (unilateral presentation mode, (M = 12.39) and bilateral presentation mode, M =10.03) in case of Group B than that of unilateral presentation mode (M = 10.09), and bilateral presentation mode (M = 9.32) of Group A. The two way interaction of Visual Field x Presentation Mode was significant, F = 14.07, df = 1, p < 0.001. The two way interaction of Visual Field x Stimulus Content is significant F =29.06, df = 1, p < 0.001. The two way interaction of Stimulus Content x Word Type is mentioned earlier.

Figure 2

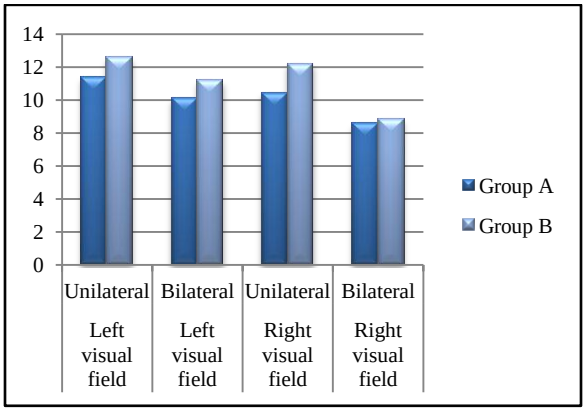


Figure 2. Mean Recognition Accuracy (RA) for presentation mode, as a function of visual field and bilingual Group (A and B).

b) Description of four way interaction of RA

The four way interaction of Visual Field x Presentation Mode x Word Type x Group is significant $F = 3.63$, df = 1, $p < 0.05$. See figure – 3.

In Unilateral presentation mode, Santali words (M= 11.30) are found to have more accuracy in LVF of Group A than Group B (M = 9.87). In LVF, RA of Group B (M=8.28) was not good in recognizing Santali words in bilateral presentation mode than Group A (M= 10.40). Moreover, in RVF it was seen that, during the unilateral presentation mode the Santali words had greater accuracy in Group A (M=11.40) than Group B (M=9.75). Two way interaction of Visual Field x Presentation Mode are being discussed previously.

Similarly, the interaction of Word Type x Group is mentioned previously. The four way interaction of Visual Field x Stimulus Content x Word Type x Presentation Mode was significant $F = 3.63$, df = 1, $p < 0.05$. The two way interaction of Visual Field x Presentation Mode, was significant $F = 14.07$, df = 1, $p < 0.001$. The two way interaction of Visual Field x Stimulus Content was significant $F = 29.06$, df = 1, $p < 0$ .001. The two way interaction of Visual Field x Presentation Mode was discussed earlier.

Figure 3

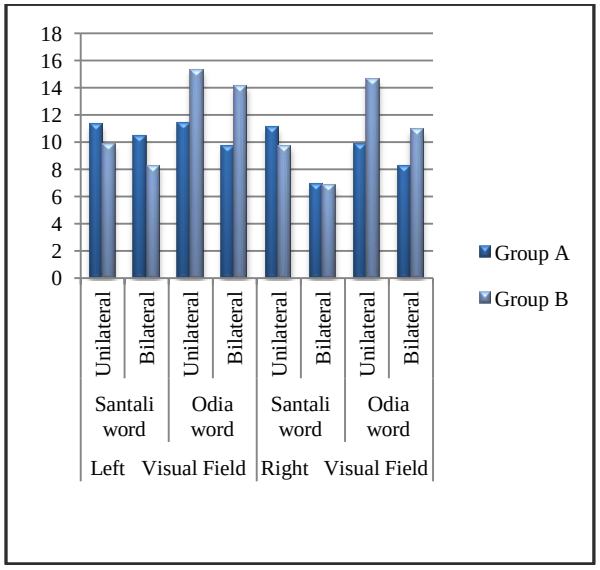


Figure 3. The graph represented performance on RA (mean) of bilinguals' in visual field task as function of visual field, presentation mode and word type.

c) The comparison of bilingual groups on stimulus content

i) The performance of group A

Figure 4

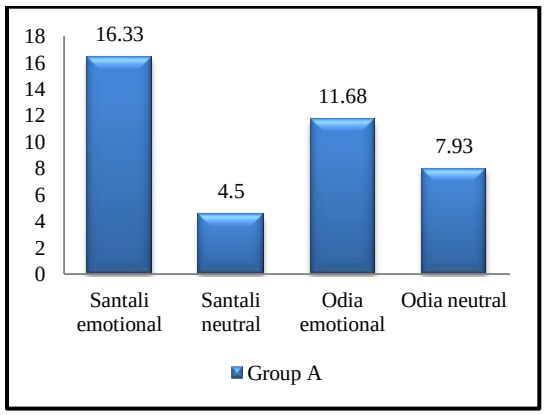


Figure 3. The graph represented performance of group A on emotional and neutral words of both languages.

2. The performance of group B

Figure 5

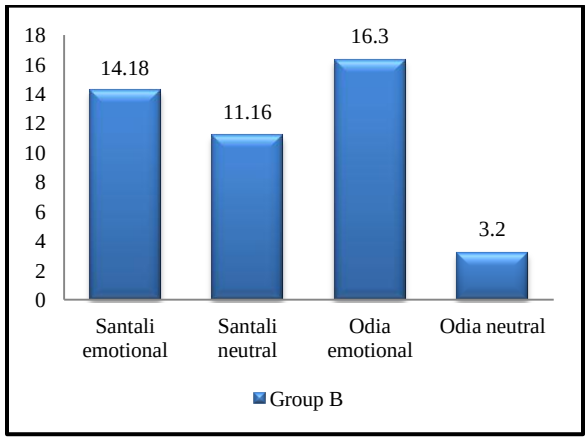


Figure 5. The graph represented performance of group B on emotional and neutral words of both languages.

From 4 and 5, it is found that, The SE words (M= 16.33) have more RA than OE words (M=11.68) of Group A. SN words (M= 4.5) have less RA than ON words (M=7.93) of Group A. OE words (M=11.68) have more RA than ON words (M= 7.93) of Group A. SE words (16.33) words have more RA than ON words (7.93) of Group A. OE words (M=16.30) have more RA than SE words (M=14.18) of Group B. ON words (M=11.16) have more RA than SN words (M=3.20) in Group B. SE words (M=14.18) have more RA than SN words (M=3.20) words of Group B. OE words (M=16.30) have more RA than SN words (M=3.20) of Group B. SE words of Group A (M= 16.33) have more RA than SE (M=14.18) of

Group B. OE words (*M*=11.68) of Group A have less accuracy than OE (*M*=16.30) of Group B. OE words (*M*=11.68) of Group A have less accurate than SE words (M= 14.18) of Group B. SE words (*M*= 16.33) of Group A have relatively more RA than OE words (*M*=16.30) of Group B.

A. The effect of RL (Response Latency)

The result revealed that, RL of Group (Group A and Group B) is significant, F =132.17, df = 1, p<.001.The RL of stimuli in Group A (*M*=1390.67msec) is greater than in Group B (*M*=1131.37msec). The main effect of Visual Field, Stimulus Content, Presentation Mode and Word Type are also significant. Stimuli took less time to respond significantly in LVF (*M* = 1303msec) than RVF (*M* = 1219 msec), F = 13.86, df = 1, p < 0.001. Emotional words took less time to recognize (*M* = 1203.24msec), in comparison to neutral words (*M* = 1318.8 msec), F = 26.52, df = 1, p < 0 .001. Moreover, the words had less RL (*M* =1217.46msec) in unilaterally presented words than bilaterally presented words (*M* = 1304.58msec), F = 14.92, df = 1, p < 0.001. Odia words are perceived with greater RL (*M* = 1367.87msec) than Santali words (*M* = 1154.16msec), F = 89.77, df = 1, p <0.001.

a) Description of three way interaction and two way interaction of bilingual Groups (RL)

The three way interaction of Visual Field x Word Type x Group were also significant, F = 6.16, df = 1, p = .01. See figure – 6.

Figure- 6

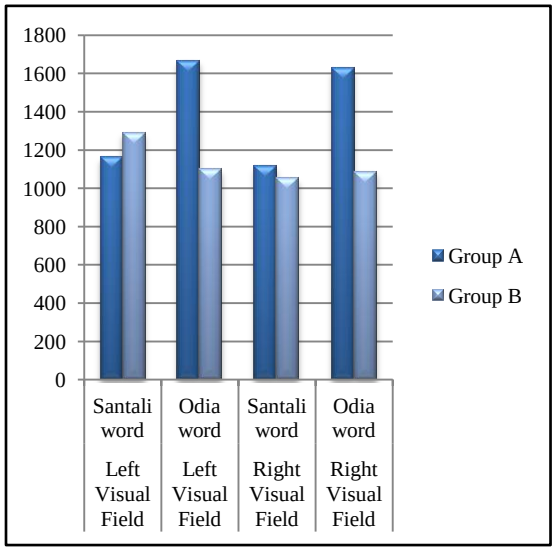


Figure 6. The graph represented performance on RL (mean) of bilinguals' in visual field task as function of word type and Group (A and B

In graph it is displayed that in LVF Santali words took less time (*M*=1158.92msec) in Group A than Group B (*M*=1290.20msec). Likewise, RL, to the Odia words took less time in Group B (*M*=1097.31msec) than Group A (*M* =1665.59msec) in LVF. Moreover, response to the Santali words had significantly less latency (*M*=1052.58msec) in Group B than Group A (*M* =1114.95msec) in RVF. Furthermore, response to the Odia words of Group B had took less time in RVF (*M*=1085.38msec) than RVF of Group A (*M* =1623.22msec). The two way interaction of Visual Field x Word Type was significant, F = 6.34, df = 1, p < 0.01. Santali words were took less time to respond in RVF (*M*= 1083.77) than LVF (M= 1224.56). Similarly, Odia words took less time to respond in RVF (*M*= 1354.30) than LVF (*M*= 1381.45msec). The two way interaction of Word Type X Group was significant, F = 169.62, df = 1, p < 0. 001. The four way interaction of Visual Field x Word Type x Stimulus Content x Group was significant, F = 8.10, df = 1, p < 0 .01. See figure - 7.

From this graph it was observed that in LVF, SE words took less time (*M*=1036.86msec) to respond in Group A than Group B (*M*=1287.83msec). SN words had significantly took less time to respond (*M* =1280msec) in Group A than Group B (M= 1292 msec). Similarly, in LVF, OE words took more time (*M* = 1520msec) to respond in Group A than Group B (*M* = 995.51msec). ON words had significantly took longer time to respond (*M* = 1810.21msec) in Group A than Group B (*M* = 1199.11msec). In RVF, SE words took more time (*M* = 1161.38msec) to respond in Group A than Group B (*M* = 1062. 70). SN words had taken significantly more time to respond (*M* =1068. 52msec) in Group A than Group B (*M* = 1042. 46msec). Similarly, in RVF, OE words took more time (*M*= 1477. 43msec) to respond in Group A than Group B (*M* = 1083.22msec). ON words had taken significantly longer time to respond (*M* = 1769. 02msec) in Group A than Group B (*M* = 1087.53msec). Moreover it also confirmed that, in LVF, SE words took less time (*M*=1036.86msec) to respond than that of RVF (M= 1161. 38msec) of Group A. In RVF of SN words significantly took less time to respond (*M* =1068msec) in Group A. Similarly, in Group B it is found that, OE words took less time to respond in LVF (*M*=995.51msec) than that of the RVF (*M*= 1083.22msec). Moreover, RL of ON word took less time in RVF (*M* =1042.46msec) than that of LVF (*M* = 1199.11msec).

Figure 7

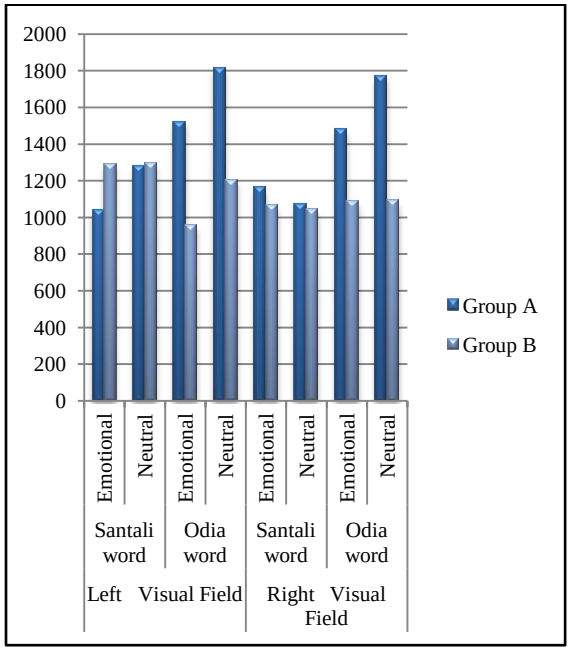


Figure 7. Performance on RL (mean) of bilinguals' in visual field task as function of visual field, word type and stimulus content.

Figure – 8

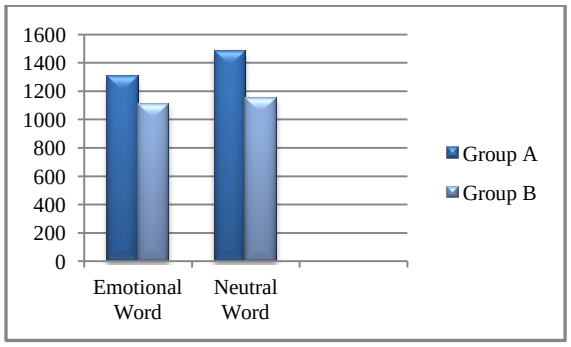


Figure 8. The graph represented the mean of RL on stimulus content, in case of bilingual groups.

The two way interaction of Visual Field x Word Type is mentioned earlier. The two way interaction of Word Type x Stimulus Content was significant, $F = 13.06$, df = 1, $p < 0.001$. The two way interaction of Stimulus Content x Group is significant, $F = 8.94$, df = 1, $p < 0.01$. See figure – 6.The two way interaction of Visual Field x Stimulus Content was significant, $F = 9.59$, df = 1, $p < 0.01$.

C. The comparison of bilingual groups on stimulus content

a) The performance of group A

Figure 9

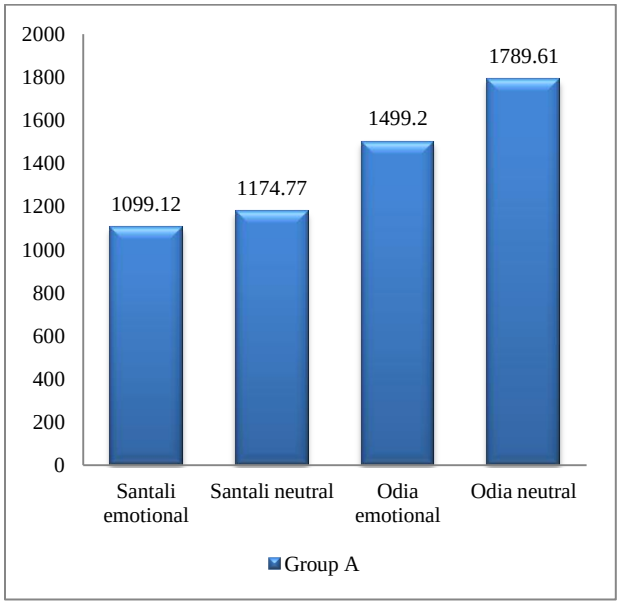


Figure 9. The graph represented Response latency of group A on emotional and neutral words of both languages.

Figure 10

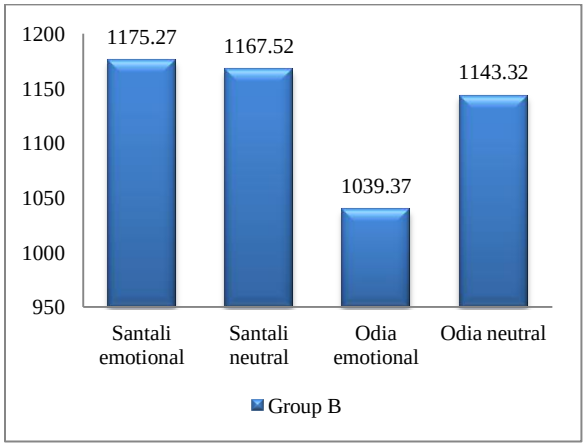


Figure 10. The graph represented Response latency of group B on emotional and neutral words of both languages.

The SE words (*M*= 1099.12 msec) have less RL than OE words (*M*= 1499.2 msec) of Group A. SN words (M= 1174. 77 msec) have more RL than ON words (M=1789.61 msec) of Group A.OE words (M=1499.2 msec) have less RL than ON words (M= 1789.61 msec) of Group A. SE words (*M*=1099.12 msec) words have less RL than ON words (1789.61 msec) of Group A. OE words (*M*=1039.37 msec) have less RL than SE words (*M*= 1099.12 msec) of Group B. ON words (*M*=1143.32) have less RL than SN words (*M*= 1167.52) in Group B. SE words (*M*=1175.27 msec) have more RA than SN words (*M*= 1167.52 msec) words of Group B. OE words (*M*=1039.37

msec) have less RL than SN words (*M*=1167.52 msec) of Group B.

SE words of Group A (*M*= 1099.12 msec) have less RL than SE (*M*=1175.27 msec) of Group B. OE words (*M*=1499.2 msec) of Group A have more response time than OE (*M*=1039.37 msec) of Group B. OE words (*M* =1499.2 msec) of Group A have less response time than SE words (M= 1175.27 msec) of Group B. SE words (*M*= 1099.12 msec) of group A have relatively more RL than OE words (*M*=1039.37 msec) of Group B.

VI. DISCUSSION

This paper, examined the language processing of Santali and Odia bilinguals. The experiment signified that the main effect of visual- field, stimulus content, presentation mode and word type are significant in Group A as well as Group B in relation to RA and RL. Testing all hypotheses on visual-field, we found significant interaction of stimulus content, presentation mode and word type of both bilingual groups (A and B). The stimuli or words used in the study are classified as, SE (Santali Emotional), OE (Odia Emotional), SN (Santali Neutral), and ON (Odia Neutral). The test concluded that emotional words have higher RA in Group A as well as Group B than neutral words in both languages (Santali and Odia). The result also confirmed that, emotional words of both languages (OE and SE) have stronger advantage over neutral words of both languages (ON and SN). The finding of the test supported that bilingual participants might have familiarity and more comfortable with recognizing emotional words than neutral words. Moreover emotional words have additional distinctive features such as, personal feeling and physiological responses than neutral words (Kensinger and Corkin 2003) [17]. The result also support emotional than neutral words (Ayc¸ic¸egi & Harris, 2004; Ferre, Garcia, Fraga, Sanchez-Casas, & Molero, 2010) [18, 19]. The result may be associated with the structure of limbic system, that amygdale played important when emotional words presented (Abbassi and Kahlaoui, 2011) [20]. Taken together, Group A has higher RA in Santali (L1) and Odia (L2) emotional words than neutral words of both languages. Similar information is found in case of Group B that, Odia (L1) and Santali (L2) emotional words have higher RA than neutral words of both languages.

Mostly, participants are recognized SE words in L_1 (Santali) faster than to those in OE words in L_2 (Odia) of group A. Likewise, participants are recognized OE words in L_1 (Odia) faster than to those in SE words in L_2 (Santali) of group B. This indicates that, they are more skilled in their L_1 in both groups. The finding suggested that, bilingual participants of the present study are more dominant towards their native language (L_1) than second language (L_2). Besides, bilingual group of A and B are belongs to their respective native land of Odisha district. Thus, the variation of result is associated with the same language environment of the participants. Previous studies on bilingualism have established that bilinguals' are stronger in L1 than in L2 during the processing of words (Dewaele, 2004; Harris et al., 2006) [21, 22]. The result also found that participants accurately responded more quickly to emotional words in L1 than neutral words reflecting the nature of emotional closeness in their native language (Schacht & Sommer, 2009a; Chen, Lin, Chen, Lu and Guo, 2015) [23, 24]

Furthermore, SE words have greater accuracy in LVF than that of RVF and SN words are recognized better in RVF than that of LVF. Likewise, OE words have identified better in LVF than that of RVF. In general, bilingual participants have better RA of emotional words in LVF than RVF in both languages during the task. This result reported that emotional words are recognised better in LVF than RVF and this might lead to the better performance of words in LVF of both languages of bilingual groups. Besides, more studies are required to substantiate the above finding on LVF. Nague and Moscovitch (2002) also previously cited that, emotional words are better recognized in LVF than RVF [25]. Moreover, it is well known that, RVF (LH) is associated with cognitive processes and LVF (RH) is involved with the emotion (Graves, Landis, & Goodglass, 1981; Alves, Fukusima, & Aznar-Casanova, 2008) [8, 26]. Consistency with the earlier result the (Banich & Bulger 1990) present study reflected that in unilateral presentation mode the stimuli had faster accuracy than the bilateral presentation mode [27]. Perhaps the specialized hemisphere gets chance on the presented stimuli without having any competition in unilateral presentation mode, but it happens in bilateral presentation mode (Basu & Mandal, 2004; Basu, 2009; Ibrahim, & Eviatar, 2012) [28,29]. Therefore, unilaterally words are better recognized than bilaterally presented words.

VII. CONCLUSION

The present study result examined the language processing of both bilinguals groups (A and B). The result confirmed that Visual field, Stimulus content, Presentation mode and Word type are significant. The result indicated that, Santali emotional and Odia

emotional words are accurately recognised than Santali neutral and Odia neutral words in both bilingual groups. In addition, emotional words are correctly recognised in LVF than in RVF in Santali as well as Odia Languages. Moreover, both bilingual groups revealed, unilaterally presented words have faster accuracy and less RL than the bilateral presentation mode. In summary, here we concluded that hemispheric asymmetries in bilinguals are affected by the visual field presentation mode, stimulus content, word type and presentation mode.

VIII. FUTURE WORK

The finding of the present study is necessary to investigate the role of LVF and RVF on other languages to explore the language processing of multilingual groups. The paradigm used in this study can be used in other attributes of stimuli such as, lexical task, sentences, priming test, cross linguistic task and other linguistic tasks. More studies should explore the language processing of minority as well as tribal groups around the globalised world.

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