

Chapter 4

Results

This chapter presents the results from the experiment with Thai and Japanese subjects. It first shows the cross linguistic aspect from Thai and Japanese subjects. This section includes the choices of frames of reference by Thai and Japanese subjects as regards intrinsically oriented LM, the Volkswagen beetle, and non-oriented LM, the tree. Consistent and inconsistent responses from the experiment are used to confirm the results. The chapter then discusses cross gender aspect to see whether there exists any differences or similarities between Thai males and females as well as Japanese males and females concerning the choice of the spatial frames. The Test of Difference of Proportion of Two Populations is also used to prove whether the data obtained is statistically significant.

4.1 Cross Language Aspect

This section investigates the selection of subspaces between Thai and Japanese groups regardless of the sex of the subjects. The situation tested with the intrinsically oriented LM will be looked at first followed by the non-oriented LM situation.

4.1.1 Intrinsically Oriented LM

The results of the experiment with 30 Thai and 30 Japanese subjects showed that both Thai and Japanese speakers used intrinsic frame of reference when the LM was intrinsically oriented (the Volkswagen beetle),

using the intrinsic asymmetrical parts of the car as the reference point. All subjects of both languages parked the car TR at Subspace 3 upon hearing the instruction with FRONT. Subspace 3 was the area the part of the beetle LM with headlights points to. Subspace 1 was chosen when the instruction containing BACK was heard. Subspace 1 was the area adjacent to where the subjects were seated and the beetle LM's trunk. The data showed that Thai and Japanese subjects were similar in using the intrinsic frame of reference with reference to the FRONT or the BACK of the intrinsically oriented LM. To prove that the Thai and Japanese subjects really used the intrinsic frame with an intrinsically oriented LM, the consistent responses of these subjects regarding the selection of subspaces need referring to.

The consistent responses were from the frequency of subjects' being consistent in their answers for the selection of subspaces when they were asked to park the toy car with respect to the LM. Being consistent therefore means they viewed different subspaces to constitute different concepts of FRONT and BACK. Inconsistency, on the other hand, was derived from the frequency in which the subjects showed that they chose different subspaces for the same concept, or that they chose the same subspace for different concepts of FRONT and BACK. Thus, when the subjects parked the car they assumed they were driving at Subspace 1 for FRONT and again at Subspace 3 for the same concept, they gave an inconsistent response. Likewise, if they parked the toy car they assumed they were driving at Subspace 1 for FRONT and later at this subspace again for BACK, they gave an inconsistent response. To be consistent in a situation, in which the beetle was used as the LM, the subjects must choose Subspace 1 to represent the concept of FRONT and Subspace 3 to represent the concept of BACK or vice versa.

Table 1 below shows the consistency of Thai and Japanese subjects when the Volkswagen beetle was used as the LM. All 15 Thai males, 15

Thai females, 15 Japanese males, and 16 Japanese females showed their consistency, choosing Subspace 1 when the instruction contained BACK and Subspace 3 when it had FRONT. All Thai subjects chose Subspace 3 when they heard the instruction with the word naa and Subspace 1 upon hearing the instruction containing lan. There appears no inconsistency in the responses of all Thai subjects.

| | | | |
|-------------------|-------------|---------------|-------|
| Beetle / Thai | Consistency | Inconsistency | Total |
| Males | 15 | 0 | 15 |
| Females | 15 | 0 | 15 |
| Beetle / Japanese | Consistency | Inconsistency | Total |
| Males | 15 | 0 | 15 |
| Females | 16 | 0 | 16 |

Table 1 Consistency of Thai and Japanese subjects in the situation with beetle LM.

Similarly, Japanese subjects gave similar results when the Volkswagen beetle was the LM, with all subjects showing consistency in their responses. From Table 1, all Japanese males chose Subspace 3 when mae was included in the instruction. Similarly, with ufiro in the instruction, all of the male Japanese subjects chose to park their toy car at Subspace 1. The results for Japanese females were not different from that of their male counterparts. All 16 Japanese females showed that they were very consistent in choosing Subspace 3 for mae and Subspace 1 for ufiro.

In conclusion, the Thai and the Japanese subjects are not different in terms of the choice of spatial frame of reference in relation to the intrinsically oriented LM or the Volkswagen beetle. 100 % of the subjects of both languages showed their consistent responses concerning the selection of the subspaces relating to the beetle LM's intrinsic properties. The Test of Difference of Proportion of Two Populations is not necessary here.

4.1.2 Non-oriented LM

The results obtained from the experiments with Thai and Japanese subjects with reference to using the non-oriented object or the tree as the LM showed that the subjects of both languages used the relative frame of reference. Despite this similarity in using the same frame, there was a very remarkable distinction between these two groups of subjects regarding the concept of FRONT. When FRONT was included in the instruction, a greater number of Thai subjects chose Subspace 3 in preference to Subspace 1 whereas a greater number of Japanese subjects chose Subspace 1 more frequently than they did with Subspace 3. The following tables demonstrate the frequency of parking the toy car of Thai and Japanese subjects in both experiments.

From Table 2 and Table 3 below, it is very clear that the subjects of both languages were different in their selection of subspaces in respect of the concept of FRONT. Most Thai subjects in Table 2 preferred Subspace 3 to Subspace 1 when naa was included in the instruction. This can be seen in 21 out of 30 (70 %) of Thai subjects choosing Subspace 3 while only 9 out of 30 (30 %) of them choosing Subspace 1. When tested by the Test of Difference of Proportion of two Populations with a confidence level at .05, the figure obtained is -3.33 , which is less than the figure shown in the Cumulative Normal Distribution table (1.96). This means that the difference between Subspace 1 and Subspace 3 in relation to FRONT of Thai subjects is statistically significant. It can be concluded that the Thai subjects conceptualized Subspace 3 differently from Subspace 1 when FRONT is the case of testing. In other words, it can be concluded that the Thai subjects viewed Subspace 3 as a more prominent representative subspace than Subspace 1 when naa is the case.

| LM = Tree | | Subspace 1 | | Subspace 3 | |
|-----------------------|-------------------|-------------|---------------|-------------|---------------|
| <i>Concept Tested</i> | <i>Experiment</i> | <i>Male</i> | <i>Female</i> | <i>Male</i> | <i>Female</i> |
| <u>naa</u> | 1 | 2 | 1 | 7 | 5 |
| | 2 | 3 | 3 | 3 | 6 |
| <u>lan</u> | 1 | 4 | 1 | 2 | 8 |
| | 2 | 5 | 5 | 4 | 1 |

Table 2 Parking frequency of the Thai subjects in both experiments in a situation with the non-oriented LM.

This, however, is not true in the case of lan. As seen in Table 2, An equal number (15/15) of Thai subjects chose Subspace 1/Subspace 3, respectively, when they heard the instruction with this preposition. Such equality in number of frequency of subjects in choosing subspaces is therefore not necessarily tested by the Test of Difference of Proportion of Two Populations. This means that there was no difference between Subspace 1 and Subspace 3 for Thai subjects regarding the preposition lan. It can be concluded that the Thai subjects did not see any difference between Subspace 3 and Subspace 1 when lan was used in the instruction.

Japanese are similar to Thai subjects in that they also conceptualized one subspace as more prominent than another subspace for FRONT. However, they did it in a rather opposite manner. In opposition to the Thai subjects, 22 out of 31 of the Japanese subjects (70.97 %) picked out Subspace 1 and only 9 out of 31 (29.03 %) Japanese subjects picked out Subspace 3 when mae was used in the instruction. These figures show a very sharp contrast between Thai and Japanese subjects over the FRONT perception with respect to the non-oriented LM. At a confidence level of .05, the Test of Difference of Proportion of Two Populations suggests 3.33, which is more than the figure obtained from the Cumulative Normal Distribution table (1.96). Therefore, the difference between the

conceptualization of subspaces is statistically significant for the Japanese subjects. This means that the Japanese subjects conceptualized Subspace 1 and Subspace 3 differently or that they viewed Subspace 1 as more significant than Subspace 3 as a manifestation of the postposition mae used in the instruction.

| LM = Tree | | Subspace 1 | | Subspace 3 | |
|-----------------------|-------------------|-------------|---------------|-------------|---------------|
| <i>Concept Tested</i> | <i>Experiment</i> | <i>Male</i> | <i>Female</i> | <i>Male</i> | <i>Female</i> |
| <u>mae</u> | 1 | 10 | 11 | 4 | 5 |
| | 2 | 1 | 0 | 0 | 0 |
| <u>ufiro</u> | 1 | 0 | 0 | 1 | 0 |
| | 2 | 9 | 10 | 6 | 4 |

Table 3 Parking frequency of the Japanese subjects in both experiments in a situation with the non-oriented LM.

As for ufiro, the Japanese subjects are like the Thai subjects in that they did not see any significant difference between Subspace 1 and Subspace 3. 19 out of 30 (there was one Japanese female subject who gave her response for mae but refused to park the car when ufiro was used in the instruction.) or 63.33 % of the Japanese subjects chose Subspace 1 for ufiro. 11 out of 30 (36.67 %) of them chose Subspace 3 for the postposition ufiro. It seems that, from the figures, the Japanese speakers showed their preference over Subspace 1 to Subspace 3 again in the case of ufiro. But when these figures were tested using the Test of Difference of Proportion of Two Populations, it revealed an insignificant difference. At a significance level of .05, the figure obtained is 1.86, which is less than 1.96 or more than -1.96. Thus it suggests that the difference between Subspace 1 and Subspace 3 is not statistically significant when ufiro is in the

instruction. This means that Japanese did not conceptualize Subspace 1 and Subspace 3 differently for BACK concept.

Now, it is clear that FRONT has brought different ways of conceptualization in Thai and Japanese subjects. To see whether Thai and Japanese subjects are really different in terms of the selection of the subspaces in regards to FRONT, it is good to consider consistent and inconsistent responses when FRONT was used in the instruction. The following table presents the results of consistency and inconsistency of both groups of subjects choosing Subspace 1 and Subspace 3 when FRONT was added in the instruction.

| Thai | | | | Japanese | | | |
|-------------|------|---------------|------|-------------|------|---------------|------|
| Consistency | | Inconsistency | | Consistency | | Inconsistency | |
| Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 |
| 2 | 12 | 5 | 11 | 9 | 8 | 11 | 3 |
| Total = 14 | | Total = 16 | | Total = 17 | | Total = 14 | |

Table 4 Consistency and inconsistency of the Thai and Japanese subjects in conceptualization of FRONT in connection with non-oriented LM.

Table 4 shows that the Thai subjects consistently chose Subspace 3 to represent FRONT more frequently than they took Subspace 1. 12 out of 14 (85.71 %) Thai subjects consistently chose Subspace 3 when they heard naa from the instruction. Only 2 out of 14 (14.29 %) Thai subjects consistently took Subspace 1 for FRONT. The Test of Difference of Proportion of Two Populations confirms that there is a statistically significant difference between FRONT and BACK among the Thai

consistent subjects. The figure obtained from the statistics is -5.54 , which is less than -1.96 from the Cumulative Normal Distribution table. The consistent Thai speakers thus conceptualized Subspace 3 and Subspace 1 differently. Subspace 3 is more significant than Subspace 1 for the consistent Thai speakers. This therefore confirms the data found earlier in Table 2.

Considering the Japanese subjects, the results obtained from the consistent answers are quite different from what was previously discussed in Table 2. There seems to be an equal number of subjects choosing Subspace 1 and Subspace 3 for the concept of FRONT although there is one more subject choosing Subspace 1. 9 Japanese subjects out of 17 (52.94 %) picked Subspace 1 while 8 of them (47.06 %) preferred Subspace 3, like the Thai subjects. From the figures of the consistent Japanese subjects, it cannot be concluded that Japanese subjects chose Subspace 1 in preference to Subspace 3. The frequency obtained from the consistent Japanese subjects does not support the data found earlier that Japanese chose Subspace 1 more than they did Subspace 3. The Japanese subjects, thus, did not show any statistically significant difference between the two concepts. The figure obtained from the Test of Difference of Proportion of Two Populations is at 0.35, which falls within the bound of -1.96 and 1.96 . This means that the difference between Subspace 1 and Subspace 3 is not statistically significant for the consistent Japanese when mae was used in the instruction. This does not confirm the fact that Subspace 1 is more significant than Subspace 3 for Japanese subjects as found in Table 3. This might result from the system of data collection, which will be explained, later in Chapter 5.

When considering inconsistent subjects among Thai and Japanese, it is again found that the Thai subjects preferred Subspace 3 to Subspace 1 in

respect of FRONT, and vice versa in the case of the Japanese subjects. According to Table 4, 11 out of 16 (68.75 %) of Thai inconsistent subjects chose Subspace 3 while only 5 out of 16 (31.25 %) chose Subspace 1. When using the Test of Difference of Proportion of Two Populations, it appears that -2.24 is lower than -1.96 from the Cumulative Normal Distribution table. This means that the inconsistent Thai subjects conceptualized Subspace 1 and Subspace 3 differently when naa was the instruction. This also confirms the data found in Table 2 which shows that the Thai subjects in general conceptualized Subspace 3 as a more prominent than Subspace 1 for FRONT. In the case of the Japanese subjects, 11 out of 14 (78.57 %) of the inconsistent Japanese subjects chose Subspace 1 but only 3 out of 14 (21.43 %) chose Subspace 3. The figure suggested by the Test of Difference of Proportion of Two Populations is at 3.87 . The figure is more than 1.96 observed from the Cumulative Normal Distribution table so there is a statistically significant difference between Subspace 1 and Subspace 3 with respect to the concept of FRONT for the Japanese inconsistent subjects. This data confirms what is found in Table 3 above that the Japanese conceptualized Subspace 1 and Subspace 3 differently, with the former subspace being more prominent than the latter when mae was heard from the instruction.

In summation, as presented in the above tables for the non-oriented LM or the symmetrical tree, the Thai and Japanese subjects were similar in the selection of the relative of frame of reference. The only difference lies in the fact that these two groups of subjects depended on different reference points. The Thai subjects used the car TR they are asked to imagine they were driving to give a friend a ride home as the reference point in space. When naa was heard from the instruction, more Thai subjects thus chose Subspace 3 than Subspace 1. The Japanese subjects

used the tree LM as a reference point in space. They conceptualized the tree turning its face toward them. When mae was used in the instruction, Japanese people preferred Subspace 1 to Subspace 3. Speakers of both languages thus seem to see the different spaces when the adpositions suggesting FRONT are used. The adpositions lan and uhiro, however, do not show a big statistically significant difference in frequency for the speakers of two languages. This means that, in the case of BACK, the Thai and the Japanese subjects did not see any difference in Subspace 1 and Subspace 3.

4.2 Cross Gender Aspect

In this section, the comparison within the Thai and Japanese groups will be considered. This section will investigate whether there are significant difference between Thai males and Thai females as well as between Japanese males and Japanese females in the selection of subspaces. Firstly, the results will be shown in relation to the intrinsically oriented LM or the Volkswagen beetle, then from the non-oriented LM or the tree.

4.2.1 Intrinsically Oriented LM

The Thai and Japanese males and females used intrinsic frame of reference when the LM is intrinsically oriented, the beetle car. They depended on the intrinsic orientedness of the asymmetrical Volkswagen beetle. All males and females of both designated languages parked the car TR at Subspace 3 and at Subspace 1 upon hearing the FRONT and the BACK concepts respectively.

All Thai male subjects and Thai female subjects as well as all Japanese male and female subjects were consistent in their responses with respect to both FRONT and BACK. Table 1 in 4.1.1 shows that males and females were not different in choosing the subspaces when the LM was the beetle car. Therefore, in a situation with intrinsically oriented object as a reference object, both males and females among the Thais and Japanese used the intrinsic properties of the beetle car LM to assign FRONT and BACK areas.

In this respect, sex is not a factor in the selection of subspaces because there was not any difference between male and female subjects in both groups concerning the selection of space in an intrinsically oriented object or the Volkswagen beetle as the LM.

4.2.2 Non-oriented LM

When the situation was switched back from the intrinsically oriented LM (the beetle) to the non-oriented one (the tree), data obtained still revealed that sex was not a significant determinant in choosing the subspaces with respect to FRONT and BACK. This section first compares Thai males and females in their selection of subspaces relating a non-oriented LM. Then it compares Japanese males and females with reference to their selection of subspaces in a situation with the non-oriented LM. Consider the following Table 5. According to the data obtained in 4.2.1, it is known by the fact that the Thai and Japanese subjects in general did not see any difference in Subspace 1 and Subspace 3 when BACK was uttered in the instruction. Consequently, this section only investigates the difference between male and female subjects of both languages in relation to FRONT and the non-oriented LM or the tree.

| <i>Thai males</i> | | <i>Thai females</i> | |
|-------------------|-------------------|---------------------|-------------------|
| <i>Subspace 1</i> | <i>Subspace 3</i> | <i>Subspace 1</i> | <i>Subspace 3</i> |
| 4 | 11 | 4 | 11 |

Table 5 Frequency of Thai males and females in choosing subspaces with non-oriented LM. with respect to naa

Table 5 shows that there was no difference between Thai males and Thai females in choosing the subspaces in reference to non-oriented object. Thai males and females generate an equal number of subjects, 11 (73.33 %), choosing Subspace 3 with only 4 (26.67 %) choosing Subspace 1 for naa. They did not show any difference and the Test of Difference of Proportion of Two Populations is not necessary to test the difference between Thai male and female. Again for the Thai subjects, Subspace 3 is more significant with FRONT concept.

Considering only the consistent male and female groups, it is still apparent that there is no difference in choosing the subspaces between them. The following Table 6 also only reveals that 7 out of 8 consistent Thai males (87.5 %) and 4 out of 6 consistent females (66.67 %) choose Subspace 3 when they hear naa in the instruction. This confirms that both Thai male subjects and Thai female subjects showed their preference over Subspace 3 to Subspace 1 for FRONT, as was previously mentioned. They are thus not different in selecting the subspaces in the case of naa when used in the instruction. The Test of Difference of the Proportion of two Populations is again not necessary when gender is not the factor for determining the selection of the subspaces in the Thai subjects.

| Males | | | | Females | | | |
|--------------------|------|----------------------|------|--------------------|------|----------------------|------|
| <u>Consistency</u> | | <u>Inconsistency</u> | | <u>Consistency</u> | | <u>Inconsistency</u> | |
| Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 |
| 1 | 7 | 2 | 5 | 2 | 4 | 2 | 7 |
| Total = 8 | | Total = 7 | | Total = 6 | | Total = 9 | |

Table 6 Consistent and inconsistent Thai males and females hearing naa in the instruction with non-oriented LM.

From Table 6, inconsistent Thai males and females also confirm the fact that both males and females speakers of Thai are not different in making Subspace 3 more significant than Subspace 1 when naa is heard from the instruction. We can see a big difference between the selection of Subspace 1 and Subspace 3 in both male and female groups. 4 out of 6 of Thai inconsistent males (66.67 %) and 7 out of 9 of Thai inconsistent females (77.78 %) choose Subspace 3 for FRONT. Only 2 from each group (33.33 % of Thai inconsistent male subjects and 22.22 % of Thai inconsistent female subjects) choose Subspace 1. The figures confirm that the Thai subjects of both sexes showed no difference in the selection of subspaces.

As for Japanese males and females, the data show that Japanese males and females are also not different in choosing the subspaces. From Table 7, the figures show that Japanese males and females are not different in choosing the subspaces. 11 Japanese males (68.75 %) and 11 Japanese females (73.33 %) chose Subspace 1. Only 4 out of 15 of male subjects (26.67 %) chose Subspace 3, and only 5 out of 16 of Japanese females (31.25 %) chose Subspace 3. The data shown in Table 6 still proves that

the Japanese subjects, both male and female, are not different in that they preferred Subspace 1 to Subspace 3 in relation to a non-oriented LM when mae was heard from the instruction.

| <i>Japanese males</i> | | <i>Japanese females</i> | |
|-----------------------|-------------------|-------------------------|-------------------|
| <i>Subspace 1</i> | <i>Subspace 3</i> | <i>Subspace 1</i> | <i>Subspace 3</i> |
| 11 | 4 | 11 | 5 |

Table 7 Frequency of Japanese males and females in choosing subspaces with non-oriented LM. with respect to mae

Consider the Table 8 on consistent and inconsistent Japanese males and females. The Japanese inconsistent males and females in the selection of the subspaces are not different. They still showed that their preference was for Subspace 1 to Subspace 3 upon hearing mae in the instruction. From Table 8 below, 6 out of 7 of the Japanese inconsistent males (85.71 %) and all 6 of the Japanese inconsistent females are similar in taking Subspace 1 as more prominent than Subspace 3 as a representative of mae. Japanese inconsistent males and females also showed that they prefer Subspace 1 for mae when only 1 (14.29 %) of the Japanese inconsistent males and none of the Japanese inconsistent females chose Subspace 3. .

However, when considering the data from the consistent Japanese male and female subjects, it seems that there is difference between the Japanese male subjects and the Japanese female subjects. This is so because the consistent Japanese females did not show their clear-cut preference for any subspace. 5 out of 8 consistent Japanese males (62.5 %) chose Subspace 1 while only 3 out of the similar group (37.5 %) chose Subspace 3. The Japanese consistent male subjects thus confirm the result previously discussed. The consistent Japanese female group, however, shows an

equivalent figure (5:5) for Subspace 1 and Subspace 3, respectively, although the inconsistent female group confirmed that they still prefer Subspace 1 to Subspace 3 for the concept of FRONT they heard in the instructions. This will be discussed later in Chapter 5.

| Males | | | | Females | | | |
|--------------------|------|----------------------|------|--------------------|------|----------------------|------|
| <u>Consistency</u> | | <u>Inconsistency</u> | | <u>Consistency</u> | | <u>Inconsistency</u> | |
| Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 | Sub1 | Sub3 |
| 5 | 3 | 6 | 1 | 5 | 5 | 6 | 0 |
| Total = 8 | | Total = 7 | | Total = 10 | | Total = 5 | |

Table 8 Consistent and inconsistent Japanese males and females hearing mae in the instruction with non-oriented LM.

Statistics is not necessary since it is clear that gender is not a factor for determining the choices of the subspaces. All the males and females do not show any difference in choosing the subspaces in both languages although there is not consistent result in the case of Japanese females.

4.3 Conclusion of the Results

From the data presented in this chapter, it can be concluded that both the Thai and Japanese subjects used the intrinsic spatial frame of reference when the LM was intrinsically oriented or the Volkswagen beetle. This was proved by their selection of Subspace 3 when they heard naa or mae in the instruction. On the contrary, they chose Subspace 1 when they heard lan or ufiro in the instruction.

In the case of non-oriented LM, even though both Japanese and Thai speakers used the relative frame of reference, these two groups showed a very sharp contrast in choosing the subspaces, which reflects the difference in the dependence on different reference points. The Thai subjects depended on the car TR while the Japanese depended on the tree LM when they heard FRONT in the instruction. The Thai subjects associated Subspace 3 with naa while Japanese subjects associated Subspace 1 with mae. For the concept of BACK, both the Thai and the Japanese did not show any difference in Subspace 1 and Subspace 3.

Although there was a distinction between the Thai and Japanese subjects concerning the use of the reference point for the relative frame of reference, they were very similar in terms of gender. There was no difference between the males and females of both languages as regards the selection of subspaces. Thai males and Thai females still showed a preference for Subspace 3 for naa while with the Japanese subjects both males and females showed their preference for Subspace 1 mae. This is, however, problematic in the case of the Japanese female group in that they did not show a clear-cut difference in the selection of subspaces.