CHAPTER IV

RESULTS

Participant's demographic data

Thirty-four healthy volunteers (16 men and 18 women), aged 22-38 years, participated in this study. The characteristics of the participants are presented in Table 5. There were no significant differences for age and driving experience between men and women participants ($p>0.05$). Independent student t-test revealed no significant difference of any dependent variable (e.g. mean brake reaction time, heart rate and HFnu) between men and women in each testing condition ($p>0.05$), indicating no gender differences. Therefore, all analysis to follow included both men and women participants.

Table 5 The characteristics of participants

Characteristics	Men (n=16)	Women (n=18)	*p* value
Age (year)	28 ± 4.49	28.5 ± 4.71	0.75
Minimum-maximum age (year)	22-38	25-39	-
Driving experience (year)	5.31 ± 1.66	4.61 ± 1.14	0.15
Minimum-maximum driving experience (year)	4-8	3-8	-

Driving performance

Table 6 Comparison of driving performance between NC, SC and WC condition (Values are mean ± SE)

Variables	Testing condition			*p* value
	NC	SC	WC	
Brake reaction time (ms)	823.13 ± 21.26	867.05 ± 19.48	893.14 ±20.79	0.0001*
Number of lane crosses (time)	3.03 ± 0.75	3.50 ± 0.81	3.62 ± 0.9	0.417
Number of object crashes (time)	0.26 ± 0.12	0.44 ± 0.11	0.50 ± 0.16	0.285

* Repeated measures ANOVA showed significant differences at $p < 0.05$

NC = no phone conversation condition, SC = Simple phone conversation condition, WC = working memory conversation condition

Driving performance of each testing condition is shown in Table 6. Brake reaction time, number of lane crosses and object crashes were lowest in the no phone conversation condition and highest in the working memory conversation condition. Repeated measures ANOVA, however, revealed significant differences between the three testing condition only for brake reaction time ($p = 0.0001$). A post hoc analysis was then conducted to determine the location of the difference. LSD revealed significant differences between the NC and SC condition ($p=0.001$); the NC and WC condition ($p=0.0001$); and the SC and WC condition ($p=0.049$). The comparisons between three testing conditions for brake reaction time are shown in Figure 6.

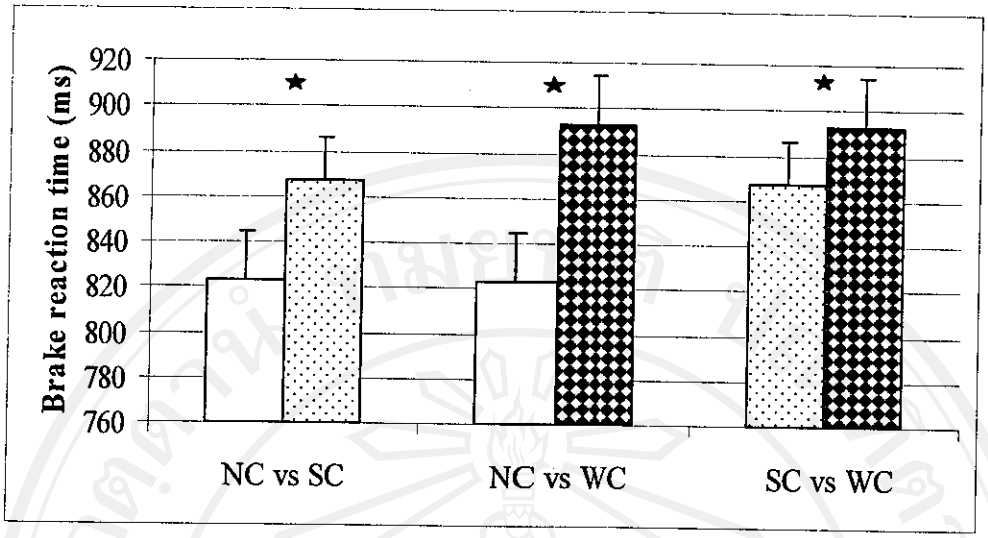

Figure 6 Comparison between each testing condition for brake reaction time.

★Post hoc analysis (LSD) revealed significant differences at $p<0.05$

Physiological changes

Heart rate and skin temperature

Table 7 Comparison between NC, SC and WC condition for heart rate and skin temperature (Values are mean ± SE)

Variables	Testing condition			*p* value
	NC	SC	WC	
Heart rate (bpm)	80.61 ± 1.89	84.87 ± 1.89	87.63 ± 2.39	0.0001*
Skin temperature (°C)	34.49 ± 0.08	34.74 ± 0.09	34.73 ± 0.09	0.017*

* Repeated measures ANOVA showed significant differences at $p < 0.05$

NC = no phone conversation condition, SC = Simple phone conversation condition, WC = working memory conversation condition

Heart rate and skin temperature of each testing condition is shown in Table 7. Repeated measure ANOVA revealed significant differences between the three testing conditions for heart rate ($p=0.0001$) and skin temperature ($p=0.017$). Heart rate was highest in the WC, SC and NC condition, respectively. LSD revealed significant differences of heart rate between the NC and SC condition ($p=0.002$) and the NC and WC condition ($p=0.0001$). The comparisons between three testing conditions for heart rate are shown in Figure 7.

Skin temperature was similar between the WC and SC condition. It was lowest in the NC condition. LSD revealed significant differences of skin temperature between the NC and SC condition ($p=0.006$) and the NC and WC condition ($p=0.027$). The comparisons between three testing conditions for of skin temperature are shown in Figure 8.

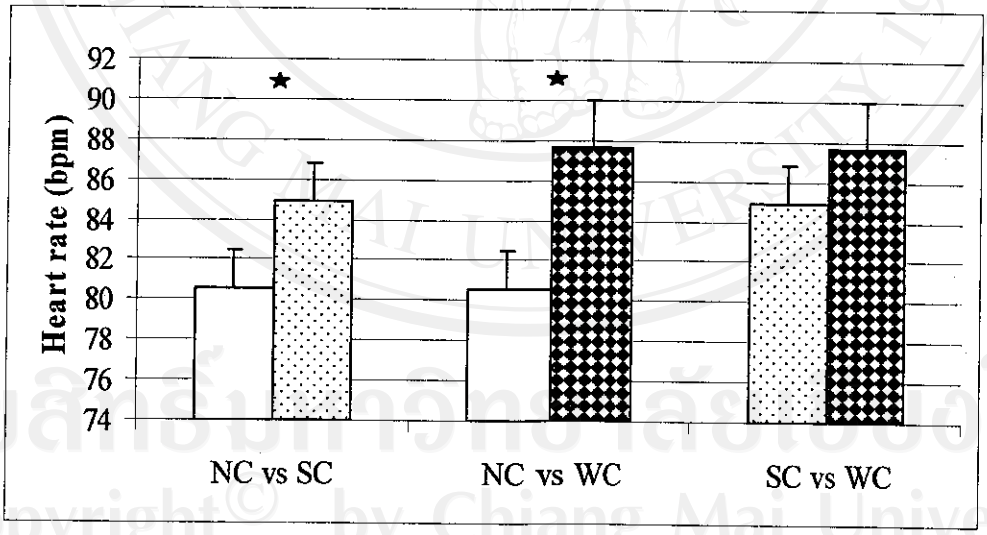

Figure 7 Comparison between each testing condition for heart rate.

★ Post hoc analysis (LSD) revealed significant differences at $p<0.05$.

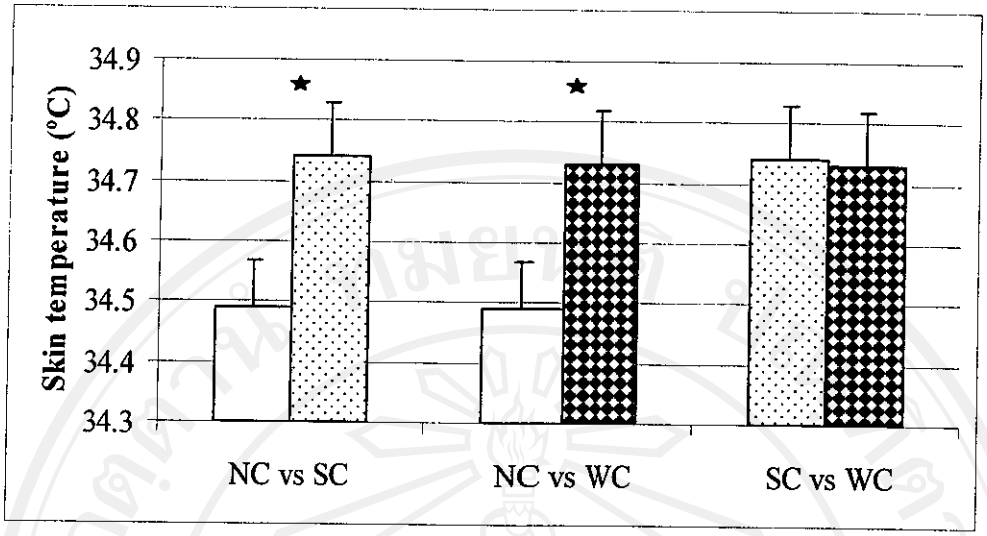

Figure 8 Comparison between each testing condition for skin temperature.

★Post hoc analysis (LSD) revealed significant differences at $p<0.05$.

Heart rate variability

Table 8 Comparison between NC, SC and WC condition for heart rate variability

(Values are mean ± SE)

Variables	Testing condition			*p* value
	NC	SC	WC	
SDNN (ms)	54.83 ± 3.17	56.71 ± 3.12	56.78 ± 3.01	0.76
RMSSD (ms)	41.81 ± 3.83	35.90 ± 2.45	36.09 ± 3.15	0.02*
LFnu (%)	38.68 ± 1.41	47.20 ± 1.16	42.04 ± 1.39	0.0001*
HFnu (%)	45.94 ± 1.42	39.75 ± 1	42.85 ± 1.27	0.0001*
LF/HF ratio	0.90 ± 0.06	1.23 ± 0.06	1.04 ± 0.07	0.0001*

* Repeated measures ANOVA showed significant differences at $p < 0.05$.

NC = no phone conversation condition, SC = Simple phone conversation condition, WC = working memory conversation condition

Heart rate variability of each testing condition is shown in Table 8. Repeated measure ANOVA revealed significant differences between the three testing conditions for RMSSD (p=0.02), LFnu (p=0.0001), HFnu (p=0.0001), and LF/HF ratio (p=0.0001). LSD revealed significant differences of RMSSD between the NC and SC condition (p=0.018), and NC and WC condition (p=0.039).The comparisons between three testing conditions for RMSSD are shown in Figure 9.

LFnu was lowest in the NC, WC and SC condition, respectively. LSD revealed significant differences of LFnu between the NC and SC condition (p=0.0001); the NC and WC condition (p=0.018); and the SC and WC condition (p=0.001). The comparisons between three testing conditions for LFnu are shown in Figure 10. LSD revealed significant differences of HFnu between the NC and SC condition (p=0.0001); the NC and WC condition (p=0.006); and the SC and WC condition (p=0.008). The comparisons between three testing conditions for HFnu are shown in Figure 11. LF/HF ratio was lowest in NC, WC and SC condition, respectively. LSD revealed significant differences of LF/HF ratio between the NC and SC condition (p=0.0001); the NC and WC condition (p=0.011); and the SC and WC condition (p=0.002). The comparisons between three testing conditions for LF/HF ratio are shown in Figure 12.

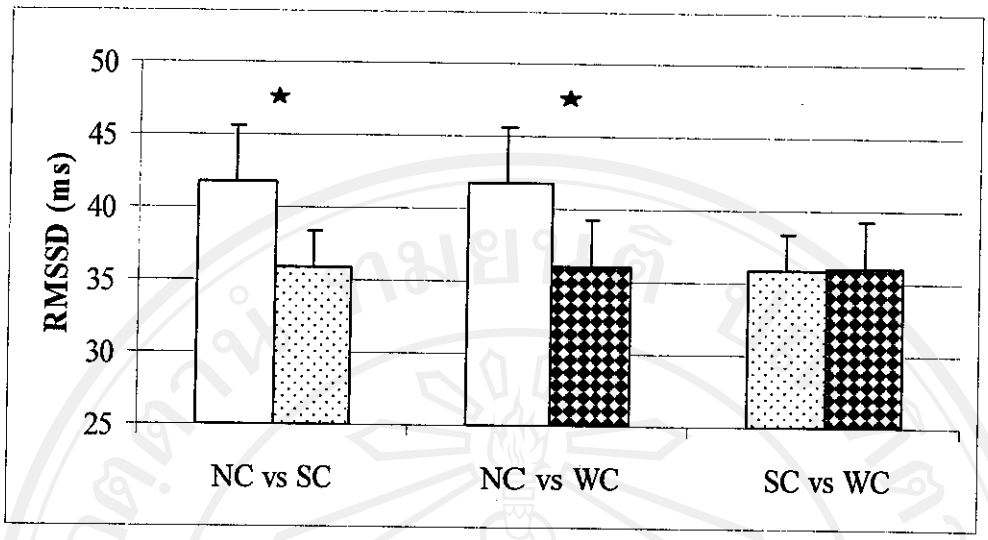

Figure 9 Comparison between each testing condition for RMSSD.

★Post hoc analysis (LSD) revealed significant differences at $p<0.05$

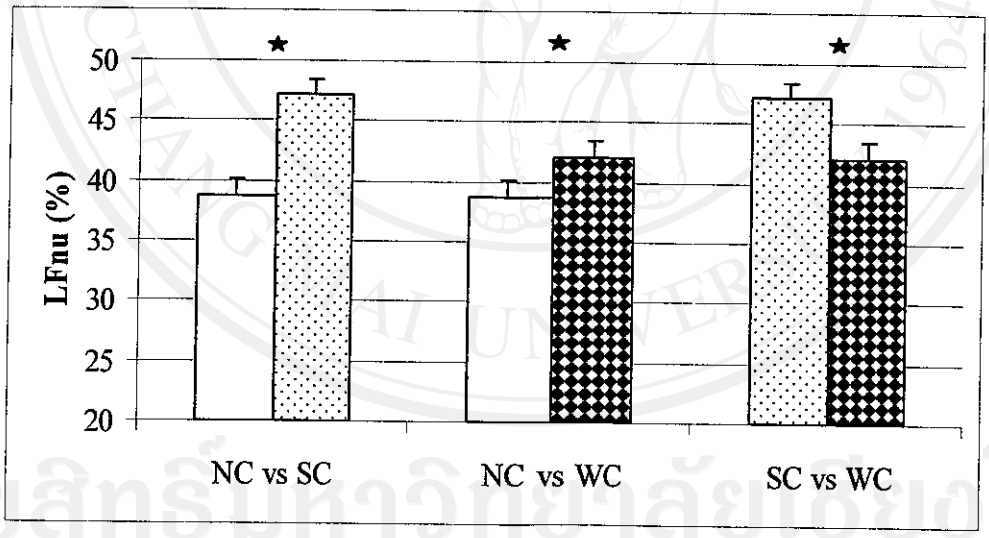

Figure 10 Comparison between each testing condition for LFnu.

★ Post hoc analysis (LSD) revealed significant differences at $p<0.05$

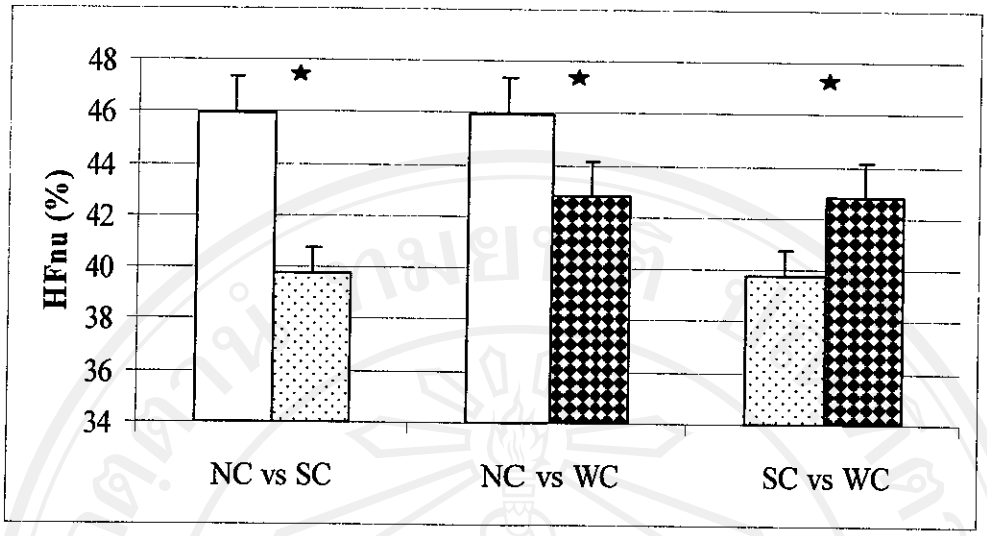

Figure 11 Comparison between each testing condition for HFnu.

★Post hoc analysis (LSD) revealed significant differences at $p<0.05$

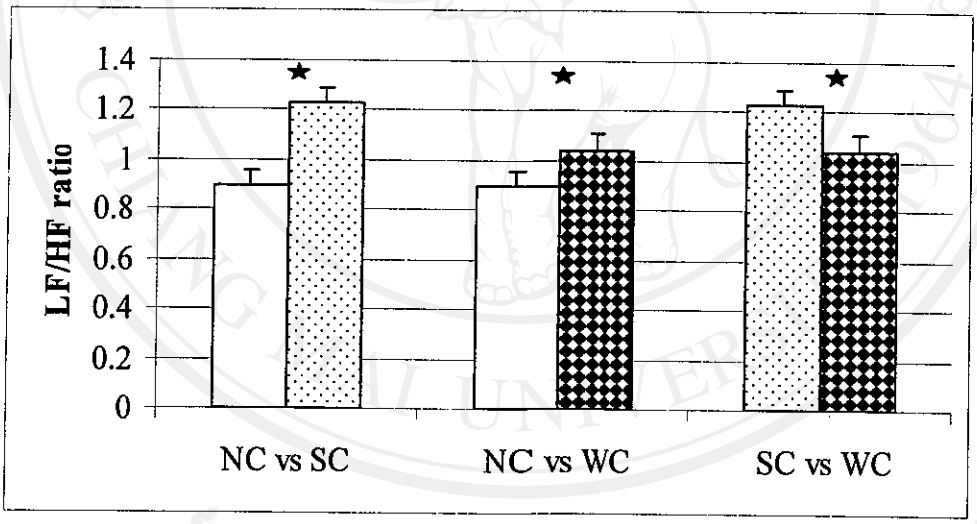

Figure 12 Comparison between each testing condition for LF/HF ratio.

★Post hoc analysis (LSD) revealed significant differences at $p<0.05$