

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents the results of the data analysis in this study and discusses on the findings. The results of data analysis are presented in four sections including demographic data of the sample, study variables, results of testing assumption, and results of testing research hypothesis. The discussion on the results of data analysis is presented in two sections including demographic data of the sample, and results of testing research hypothesis.

Results

Demographic data of the sample

The distribution of demographic data of the sample is presented in Table 1. The age of the sample ranged from 18 to 39 years with a mean age of 24.34 years (SD = 4.42). The age of one-third of the sample was 21-25 years (35.5%). Only 1% (N = 2) in this study had the age more than 35 years. The majority of the sample (76%) was Buddhist. For education, one-third of the sample (34.5%) had completed the junior secondary school and the senior secondary school (29.5%) was respectively. Only 19% (N = 38) had less than a junior secondary school education. Half of the sample was housewife and the other half was in a variety of occupations.

For income, half of the sample had no income and they were housewives. The income of the working sample ranged from 1,600 to 20,000 baht with a mean income of 5066.20 baht (SD = 2416.09). Most of the working sample (72%) had the income less than 5,000 baht. For husbands, the income of husbands ranged from

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For income, half of the sample had no income and they were housewives. The income of the working sample ranged from 1,600 to 20,000 baht with a mean income of 5066.20 baht (SD = 2416.09). Most of the working sample (72%) had the income less than 5,000 baht. For husbands, the income of husbands ranged from 1,600 to 30,000 baht with a mean income of 6644.00 baht (SD = 4245.12). Half of the husbands (50.5%) had the income less than 5,000 baht. Family income ranged from 3,000 to 50,000 baht with a mean income of 9177.10 baht (SD = 5641.43).

Approximately three-quarters (74%) of the sample had been married for two years or less. All of them (100%) lived with their husbands. There were more extended families (58.5%) than nuclear families (41.5%). Most of the relatives in the extended families were more mothers' relatives (50.4%) than husbands' relatives (47%).

Only three women (1.5%) in this study did not attend the antenatal care clinic. Most of the sample (76.1%) started to attend the antenatal care clinic when they were in the first trimester of pregnancy. There were more the sample having experience in infant care (57.5%) than the sample having no experience in infant care

(42.5%). Further, more mothers received their knowledge of infant care from various sources. Most of them received from their grandmothers and relatives (92.5%). In addition, less than half of the sample (44.5%) fed their infants with breast milk substitutes.

Table 1

Frequency, percentage, mean, minimum-maximum, and standard deviation (SD) of demographic of data of the sample (N = 200).

Items		Frequency	Percent
Age (years)			
	18-20	53	26.5
	21-25	71	35.5
	26-30	57	28.5
	31-35	17	8.5
	36-40	2	1.0
Min-Max	18-39	Mean 24.34	SD 4.42
Religion			
	Buddhist	152	76.0
	Islam	47	23.5

Christian	1	0.5
Education		
Elementary school	38	19.0
Junior secondary school	69	34.5
Senior secondary school	59	29.5
Diploma	19	9.5
Bachelor	15	7.5
Occupation		
Housewife	100	50.0
Employee	45	22.5
Farmer, fruit gardener	18	9.0
Own business	16	8.0
Industrial worker	9	4.5
Private business worker	9	4.5
Government officer	3	1.5

Table 1 (Continued)

Items	Frequency	Percent
Mother's income		
No income	100	50.0
Having income	100	50.0
Working mother's income (baht/month)		
1-5,000	72	72.0
5,001-10,000	26	26.0
10,001-20,000	2	2.0
Min-Max 1,600-20,000	Mean 5066.20	SD 2416.09
Husband's income (baht/month)		
1-5,000	101	50.5
5,001-10,000	84	42.0
10,001-20,000	11	5.5

20,001-30,000		4	2.0
Min-Max	1,600-30,000	Mean 6644.00	SD 4245.12
Family income (baht/month)			
1-5,000		46	23.0
5,001-10,000		104	52.0
10,001-20,000		44	22.0
20,001-50,000		6	3.0
Min-Max	3,000-50,000	Mean 9177.10	SD 5641.43
Year of marriage (years)			
1		71	35.5
2		77	38.5
3-5		52	26.0
Living with husband			
Yes		200	100.0
Type of family			
Nuclear family		83	41.5
Extended family		117	58.5

Table 1 (*Continued*)

Items	Frequency	Percent
Relatives in the extended family		
Mother's relatives	59	50.4
Husband's relatives	55	47.0
Both mother's and husband's relatives	3	2.6
Number of relatives in the extended family		
1-3	36	30.9
4-6	63	53.8
7-9	18	15.4
Antenatal care clinic (ANC)		
Yes	197	98.5
No	3	1.5
First time of attending ANC after pregnancy (months)		

1	27	13.7
2	71	36.0
3	52	26.4
4 -6	47	23.9
Experience in infant care		
Yes	115	57.5
No	85	42.5
Sources of infant care knowledge*		
Grandmother and relatives	185	92.5
Health care providers	57	48.5
Reading books	50	25.0
Neighbors	43	21.5
Observation of role model	41	20.5
Friends	26	13.0
Media (TV, radio)	24	12.0
School	13	6.5

* = A sample could answer more than one choice.

Table 1(*Continued*)

Items	Frequency	Percent
Type of infant feeding		
Exclusive breast-feeding	69	34.5
Breast-feeding including water	42	21.0
Breast-feeding and bottle-feeding	81	40.5
Bottle-feeding	8	4.0

The infant characteristics are presented in Table 2. The finding showed that the sex of infant was more female (52.5%) than male (47.5%). The birth weight of infants ranged from 2,500 to 4,430 grams with a mean birth weight of 3,158.53

grams (SD = 405.41). The one month weight of infants ranged from 3,100 to 5,900 grams with a mean one month weight of 4,187.75 grams (SD = 525.85).

Table 2

Frequency, percentage, mean, minimum-maximum, and standard deviation (SD) of infant characteristics (N = 200).

Items	Frequency	Percent
Sex		
Male	95	47.5
Female	105	52.5
Birth weight (grams)		
2,500-3,000	78	39.0
3,001-3,500	89	44.5
3,501-4,000	28	14.0
4,001-4,500	5	2.5
Min-Max 2,500-4,430	Mean 3158.53	SD 405.41

Table 2 (Continued)

Items	Frequency	Percent
One month weight (grams)		
3,001-3,500	26	13.0
3,501-4,000	52	26.0
4,001-4,500	82	41.0
4,501-5,000	26	13.0
5,001-5,500	12	6.0
5,501-6,000	2	1.0
Min-Max 3,100-5,900	Mean 4187.75	SD 525.85

Study variables

The descriptions of study variables are presented in Table 3. The range of score of maternal perception of infant behavior was from 20 to 36 with a mean of 26.81 (SD = 2.35). Social support score was rated by the sample from 51 to 100 with a mean of 77.46 (SD = 9.75). Maternal perception of parenting score ranged from 90 to 125 with a mean of 108.71 (SD = 7.57) and maternal competence score ranged from 50 to 75 with a mean of 64.12 (SD = 5.28). Depression score was rated by the sample from 0 to 23 with a mean of 7.11 (SD = 3.93). Maternal role performance score ranged from 118 to 160 with a mean of 144.97 (SD = 10.90).

For the skewness, social support, maternal perception of parenting, maternal competence, and maternal role performance had negative skewness while maternal perception of infant behavior and depression had positive skewness. Social support (skewness = -0.02) and maternal competence (skewness = -0.12) had the skewness value close to zero indicating close to symmetrical distribution.

Table 3

Possible score, actual score, mean, standard deviation (SD), and skewness of the study variables (N = 200).

Variables	Possible score	Actual score	Mean	SD	Skewness
1. Maternal perception of infant behavior	1-49	20-36	26.81	2.35	0.84
2. Social support	20-100	51-100	77.46	9.75	-0.02
3. Maternal perception of					

parenting	25-125	90-125	108.71	7.57	-0.35
4. Maternal competence	17-85	50-75	64.12	5.28	-0.12
5. Depression	0-60	0-23	7.11	3.93	1.02
6. Maternal role					
performance	32-160	118-160	144.97	10.90	-0.85

The correlation matrix of the study variables is displayed in Table 4. In this study, social support was significantly and positively correlated with maternal perception of parenting ($r = 0.42, p < .001$), maternal competence ($r = 0.31, p < .001$), maternal role performance ($r = 0.45, p < .001$), and was significantly and negatively correlated with depression ($r = -0.15, p < .05$). Maternal perception of parenting was significantly and positively correlated with maternal role performance ($r = 0.43, p < .001$). Maternal competence was significantly and positively correlated with maternal role performance ($r = 0.33, p < .001$). Depression was significantly and negatively correlated with maternal role performance ($r = -0.32, p < .001$). However, maternal perception of infant behavior was not significantly correlated with other study variables including social support, maternal perception of parenting, maternal competence, depression and maternal role performance. Maternal competence was also not significantly correlated with depression.

Table 4

Correlation matrix of the study variables (N = 200).

Variables	MPIB	SS	MPP	MC	D	MRP
MPIB	1					
SS	0.11	1				
MPP	0.04	0.42***	1			
MC	0.09	0.31***	0.16*	1		
D	-0.09	-0.15*	-0.21**	-0.13	1	
MRP	0.06	0.45***	0.43***	0.33***	-0.32***	1

* $p < .05$ ** $p < .01$ *** $p < .001$

MPIB = Maternal perception of infant behavior, SS = Social support,

MPP = Maternal perception of parenting, MC = Maternal competence,

D = Depression, MRP = Maternal role performance

Results of testing assumption

The assumptions underlying multivariate analysis for multiple regression analysis and path analysis were tested.

1. Normal distribution

In multivariate analysis, independent variables and the dependent variable must each have a normal distribution. The distribution of the residual value should be approximately normal (Munro, 2001). In this study, each independent variable and the dependent variable were assessed by using Z test. The findings showed that maternal

perception of infant behavior, maternal perception of parenting, depression, and maternal role performance had significantly skewness as shown in Table 5. Therefore, social support and maternal competence had the normal distribution except the maternal perception of infant behavior, maternal perception of parenting, depression, and maternal role performance.

Table 5

Skewness, Standard error for skewness, and z value of study variables (N = 200).

Variables	Skewness	Standard error	z value
1. Maternal perception of infant behavior	0.84	0.17	4.89*
2. Social support	-0.02	0.17	-0.11
3. Maternal perception of parenting	-0.35	0.17	-2.04*
4. Maternal competence	-0.12	0.17	-0.72
5. Depression	1.02	0.17	5.95*
6. Maternal role performance	-0.85	0.17	-4.99*

* $p < .05$

In addition, the standardized residual value in this study was plotted in the normal probability plot. The plotted value fell closed to the line in the normal probability plot indicating approximately normal distribution as shown in Figure 6. Although maternal perception of infant behavior, maternal perception of parenting, depression, and maternal role performance did not have the normal distribution, the distribution of standardized residual value was approximately normal. Therefore, the assumption of the normal distribution underlying regression analysis and path analysis might not be violated.

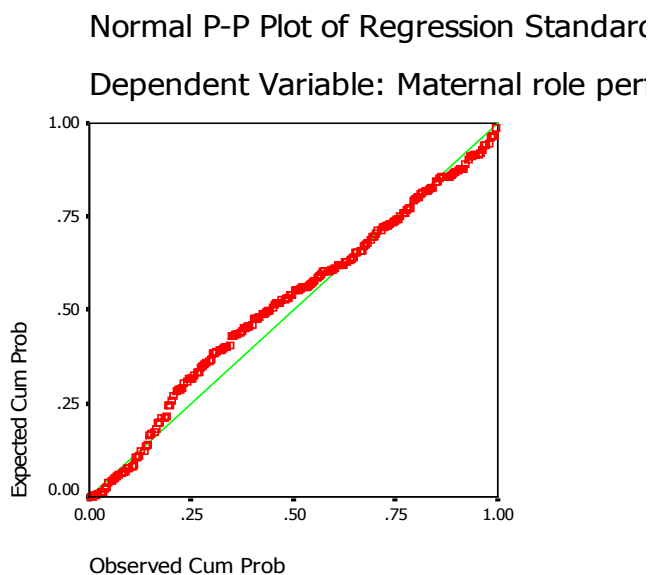
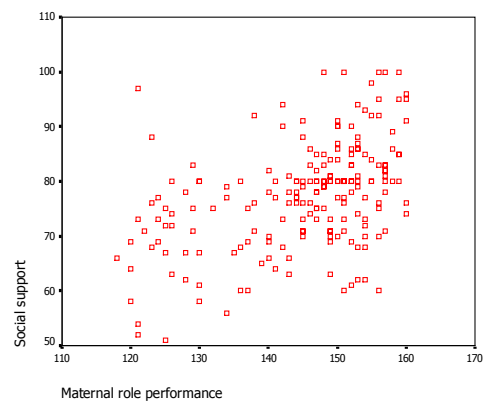
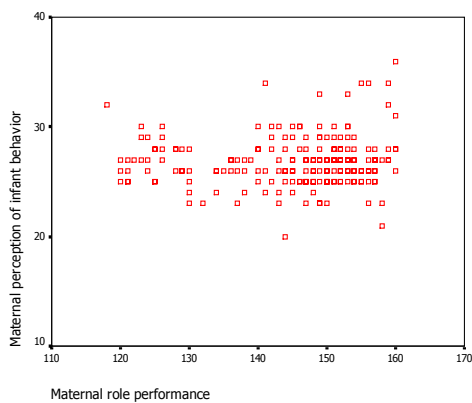


Figure 6. Normal probability plot of standardized residual value

2. Linearity

In multivariate analysis, the relationship between independent variable and dependent variable must be linear. The relationship between residual value and dependent variable should be linear (Hair, Anderson, Tatham, & Black, 1998). In this study, dependent variable, maternal role performance, was plotted against each of independent variables including maternal perception of infant behavior, social support, maternal perception of parenting, maternal competence, and depression in the scatter plot. The scatter plot showed that actual scores clustered around the predictable

line indicating linearity as shown in Figure 7. In addition, the standardized residual value was plotted against the standardized predicted value. The scatter plot showed that actual scores varied around the predictable line indicating the existence of a linear relationship as shown in Figure 8.



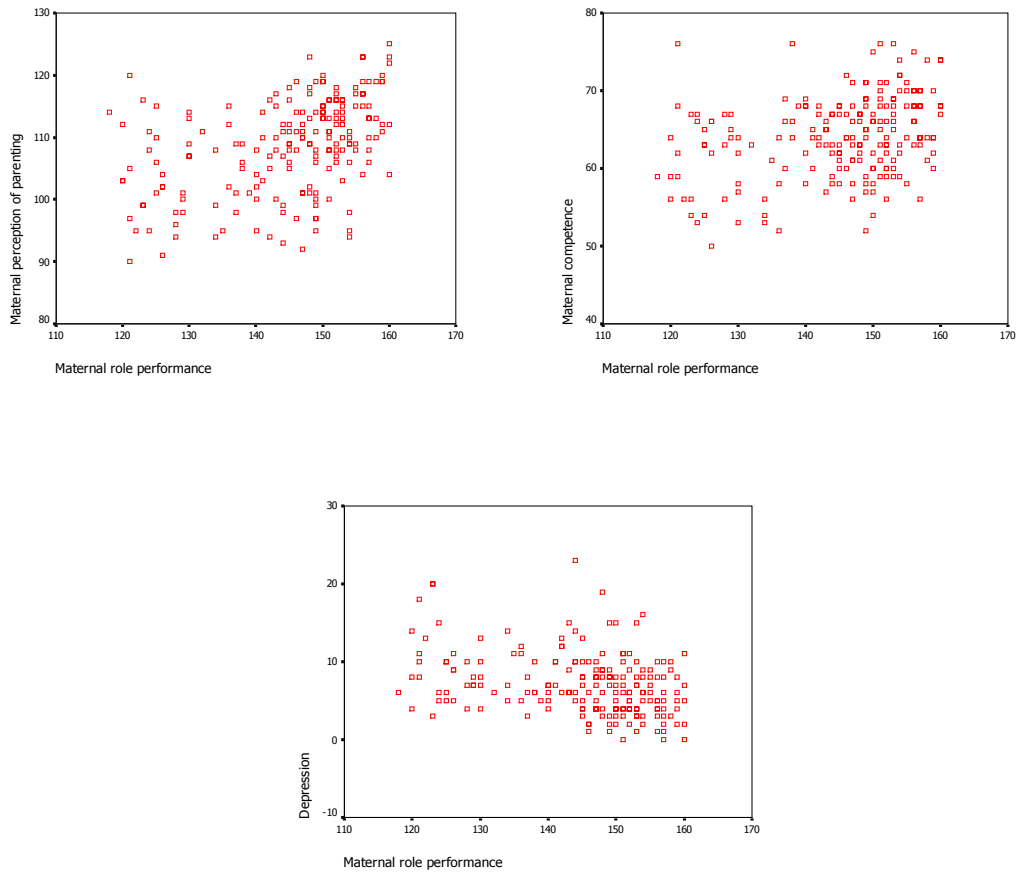


Figure 7. Scatter plot between independent variables and dependent variable

Scatterplot

Dependent Variable: Maternal role performance

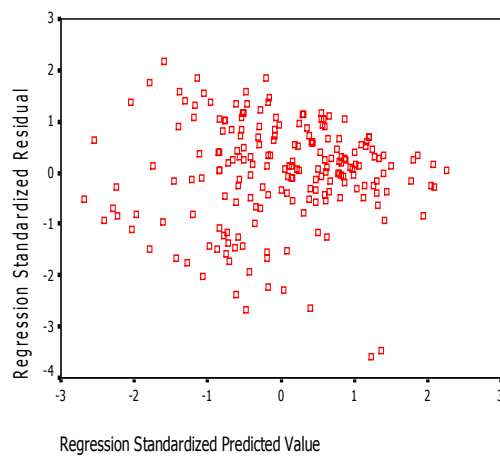


Figure 8. Scatter plot between standardized residual value and standardized predicted value

3. Multicollinearity

Multicollinearity refers to any single independent variable is highly correlated with other independent variables. In multivariate analysis, the high interrelatedness makes evaluation of results problematic (Munro, 2001). From correlation matrix of studied variables in Table 4, there were no any single independent variable being highly correlated with other independent variables: maternal perception of infant behavior and social support ($r = 0.11$), maternal perception of infant behavior and maternal perception of parenting ($r = 0.04$), maternal perception of infant behavior and maternal competence ($r = 0.09$), maternal perception of infant behavior and depression ($r = -0.09$), social support and maternal perception of parenting ($r = 0.42$), social support and maternal competence ($r = 0.31$), social support and depression ($r = -0.15$), maternal perception of parenting and maternal competence ($r = 0.16$), maternal perception of parenting and depression ($r = -0.21$), and maternal competence and depression ($r = -0.13$).

For tolerance, there were no tolerance values closely to 0 in every single independent variable: maternal perception of infant behavior (0.97), social support (0.74), maternal perception of parenting (0.79), maternal competence (0.89), and depression (0.93). For variance inflation factor (VIF), there were no VIF values more than 10 in every single independent variable: maternal perception of infant behavior

(1.02), social support (1.33), maternal perception of parenting (1.26), maternal competence (1.12), and depression (1.06).

4. Outliers

Maternal perception of parenting and maternal competence had no outliers. Other study variables had minor outliers. The score between 1.5 times and 3 times the interquartile range (IQR) is minor outlier, and the score more than 3 times the IQR is extreme outlier. The IQR is the length of box in box plot that begins with the score at the 25th percentile and ends with the score at the 75th percentile (Munro, 2001). Maternal perception of infant behavior had high minor outliers: scores as 36, 34, and 33 being closely to the next high score as 32. Depression also had high minor outliers: scores as 23, 20, 19 and 18 being closely to the next high score as 16. Social support had low minor outliers: scores as 51 and 52 being closely to the next low score as 54. Maternal role performance also had low minor outliers: scores as 118 and 120 being closely to the next low score as 121. Therefore, these outliers were not remedied.

Results of testing research hypothesis

1. Research hypothesis 1

Research hypothesis 1 stated that the maternal perception of infant behavior and social support had direct and positive effects on maternal perception of parenting. The enter regression analysis as shown in Table 6 revealed that social support ($\beta = 0.43$, $p < .001$) had a significant and positive direct effect on maternal perception of parenting, while maternal perception of infant behavior ($\beta = -0.01$, $p = 0.89$) did not have a significant direct effect on maternal perception of parenting.

Maternal perception of infant behavior and social support significantly accounted for 18% of the variance in maternal perception of parenting ($R^2 = 0.18$, $p < .001$).

Therefore, research hypothesis 1 was partially supported.

Table 6

Enter regression analysis for maternal perception of infant behavior (MPIB) and social support (SS) predicting maternal perception of parenting (MPP) (N = 200).

Variables	R^2	F	b	SE	β	t	
MPP	0.18	22.21***					
			MPIB	-0.02	0.20	-0.01	-0.13
			SS	0.33	0.05	0.43	6.63***

*** $p < .001$

2. Research hypothesis 2

Research hypothesis 2 stated that the maternal perception of infant behavior and social support had direct and positive effects on maternal competence. The enter regression analysis as shown in Table 7 revealed that social support ($\beta = 0.30$, $p < .001$) had a significant and positive direct effect on maternal competence, while maternal perception of infant behavior ($\beta = 0.06$, $p = 0.38$) did not have a significant and positive direct effect on maternal competence. Maternal perception of infant behavior and social support significantly accounted for 10% of the variance in

maternal competence ($R^2 = 0.10$, $p < .001$). Therefore, research hypothesis 2 was partially supported.

Table 7

Enter regression analysis for maternal perception of infant behavior (MPIB) and social support (SS) predicting maternal competence (MC) (N = 200).

Variables	R^2	F	b	SE	β	t	
MC	0.10	11.14***					
			MPIB	0.13	0.15	0.06	0.88
			SS	0.16	0.03	0.30	4.50***

*** $p < .001$

3. Research hypothesis 3

Research hypothesis 3 stated that the maternal perception of infant behavior and social support had direct and negative effects on depression. The enter regression analysis as shown in Table 8 revealed that social support ($\beta = -0.15$, $p < .05$) had a significant and negative direct effect on depression, while maternal perception of infant behavior ($\beta = -0.07$, $p = 0.28$) did not have a significant and negative direct effect on depression. Maternal perception of infant behavior and social support significantly accounted for 3% of the variance in depression ($R^2 = 0.03$, $p < .05$). Therefore, research hypothesis 3 was partially supported.

Table 8

Enter regression analysis for maternal perception of infant behavior (MPIB) and social support (SS) predicting depression (D) (N = 200).

Variables	R ²	F	b	SE	β	t
D	0.03	3.13*				
MPIB			-0.12	0.11	-0.07	-1.06
SS			-0.06	0.02	-0.15	-2.13*

* p < .05

4. Research hypothesis 4

Research hypothesis 4 stated that the social support had a direct and positive effect on maternal perception of infant behavior. The enter regression analysis as shown in Table 9 revealed that social support ($\beta = 0.11$, $p = 0.10$) did not have a significant and positive direct effect on maternal perception of infant behavior. Therefore, research hypothesis 4 was not supported.

Table 9

Enter regression analysis for social support (SS) predicting maternal perception of infant behavior (MPIB) (N = 200).

Variables	R ²	F	b	SE	β	t
MPIB	0.01	2.67				
SS			0.02	0.01	0.11	1.63

5. Research hypothesis 5

Research hypothesis 5 stated that the maternal competence had a direct and negative effect on depression. The enter regression analysis as shown in Table 10 revealed that maternal competence ($\beta = -0.13$, $p = 0.05$) did not have a significant and negative direct effect on depression. Therefore, research hypothesis 5 was not supported.

Table 10

Enter regression analysis for maternal competence (MC) predicting depression (D) (N = 200).

Variables	R ²	F	b	SE	β	t
D	0.01	3.72				
MC			-0.10	0.05	-0.13	-1.92

6. Research hypothesis 6

Research hypothesis 6 stated that the maternal perception of parenting and maternal competence had direct and positive effects on maternal role performance. The enter regression analysis as shown in Table 11 revealed that maternal perception of parenting ($\beta = 0.39$, $p < .001$) and maternal competence ($\beta = 0.26$, $p < .001$) had significant and positive direct effects on maternal role performance. Maternal perception of parenting and maternal competence significantly accounted for 25% of

the variance in maternal role performance ($R^2 = 0.25$, $p < .001$). Therefore, research hypothesis 6 was completely supported.

Table 11

Enter regression analysis for maternal perception of parenting (MPP) and maternal competence (MC) predicting maternal role performance (MRP) (N = 200).

Variables	R^2	F	b	SE	β	t
MRP	0.25	34.10***				
MPP			0.56	0.09	0.39	6.26***
MC			0.54	0.12	0.26	4.27***

*** $p < .001$

7. Research hypothesis 7

Research hypothesis 7 stated that the depression had a direct and negative effect on maternal role performance. The enter regression analysis as shown in Table 12 revealed that depression ($\beta = -0.32$, $p < .001$) had a significant and negative direct effect on maternal role performance. Depression significantly accounted for 10% of the variance in maternal role performance ($R^2 = 0.10$, $p < .001$). Therefore, research hypothesis 7 was completely supported.

Table 12

Enter regression analysis for depression (D) predicting maternal role performance (MRP) (N = 200).

Variables	R ²	F	b	SE	β	t	
MRP	0.10	23.40***					
			D	-0.90	0.18	-0.32	-4.83***

*** p<.001

8. Research hypothesis 8

Research hypothesis 8 stated that the maternal perception of infant behavior and social support had direct effects on maternal role performance and indirect effects on maternal role performance through maternal perception of parenting, maternal competence and depression.

8.1 Goodness of fit of the hypothesized model

The overall model fit of the hypothesized model was judged. The model fit statistics of the hypothesized model are presented in Table 13. The results revealed that the hypothesized model was an acceptable fit to the data: Chi-square test was non-significant ($\chi^2 = 5.75$, $df = 2$, $p = 0.05$), relative Chi-square (relative Chi-square = 2.87) was less than 3, comparative fit index (CFI = 0.97) was more than 0.90, normed Tucker Lewis index (NTLI = 0.81) was less than 0.90, and root mean square error of approximation (RMSEA = 0.09) was more than 0.08 but less than 0.1. Therefore, the hypothesized model had an acceptable model fit.

Table 13

Model fit statistics of the hypothesized model (N = 200).

Test statistics	Values	Criteria of goodness of fit values
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Chi-square (χ^2)	5.75, df = 2, p = 0.05	non-significant (Munro, 2001)
Relative Chi-square	2.87	less than 3 (Munro, 2001)
CFI	0.97	more than 0.90 (Munro, 2001)
NTLI	0.81	more than 0.90 (Hair et al, 1998)
RMSEA	0.09	0.05-0.08 = acceptable fit, > 0.1 = not fit (Hair et al, 1998)

CFI = Comparative fit index

NTLI = Normed Tucker Lewis index

RMSEA = Root mean square error of approximation.

8.2 Hypothesized model

The path analysis for the hypothesized model as shown in Table 14 revealed that social support ($\beta = 0.26$, $p < .001$), maternal perception of parenting ($\beta = 0.24$, $p < .001$), and maternal competence ($\beta = 0.18$, $p < .01$) had significant and positive direct effects on maternal role performance, whereas depression ($\beta = -0.20$, $p < .01$) had a significant and negative direct effect on maternal role performance. However, maternal perception of infant behavior ($\beta = -0.01$, $p = 0.59$) did not have a significant and direct effect on maternal role performance.

Social support had a significant and positive direct effect on maternal perception of parenting ($\beta = 0.43$, $p < .001$) and maternal competence ($\beta = 0.30$, $p < .001$). Social support had a significant and negative direct effect on depression ($\beta = -0.12$, $p < .05$). However, maternal perception of infant behavior did not have significant direct effects on maternal perception of parenting ($\beta = -0.01$, $p = 0.55$), maternal competence ($\beta = 0.06$, $p = 0.13$), and depression ($\beta = -0.07$, $p = 0.21$).

Maternal competence did not have a significant and negative direct effect on depression ($\beta = -0.09$, $p = 0.13$). Social support did not have a significant and positive direct effect on maternal perception of infant behavior ($\beta = 0.11$, $p = 0.05$). Maternal perception of infant behavior, social support, maternal perception of parenting, maternal competence, and depression significantly accounted for 35% of the variance in maternal role performance ($R^2 = 0.35$, $p < .001$).

Therefore, research hypothesis 8 was partially supported. Social support had a significant direct effect on maternal role performance, and had significant indirect effects on maternal role performance through maternal perception of parenting, maternal competence, and depression. Maternal perception of infant behavior did not have direct or indirect effects on maternal role performance. The path standardized coefficients displayed in the hypothesized model are presented in Figure 9.

Table 14

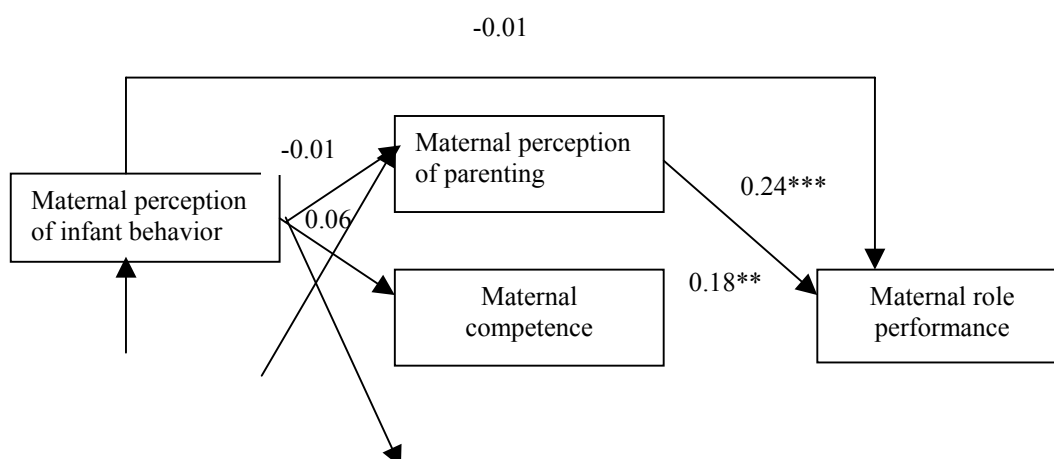
Path analysis for the hypothesized model (N = 200).

Variables	R^2	F	b	SE	β	t	
MRP	0.35	21.17***					
			MPIB	-0.06	0.27	-0.01	-0.25

	SS	0.29	0.07	0.26	3.80***
	MPP	0.35	0.10	0.24	3.52***
	MC	0.37	0.13	0.18	2.80**
	D	-0.57	0.21	-0.20	-2.68**
MPP					
	MPIB	-0.02	0.21	-0.01	-0.13
	SS	0.33	0.04	0.43	7.03***
MC					
	MPIB	0.13	0.12	0.06	1.11
	SS	0.16	0.03	0.30	4.66***
D					
	MPIB	-0.11	0.14	-0.07	-0.79
	SS	-0.05	0.02	-0.12	-1.87*
	MC	-0.06	0.06	-0.09	-1.10
NB					
	SS	0.02	0.01	0.11	1.66

* $p < .05$ ** $p < .01$ *** $p < .001$

MPIB = Maternal perception of infant behavior, SS = Social support,
MPP = Maternal perception of parenting, MC = Maternal competence,
D = Depression, MRP = Maternal role performance



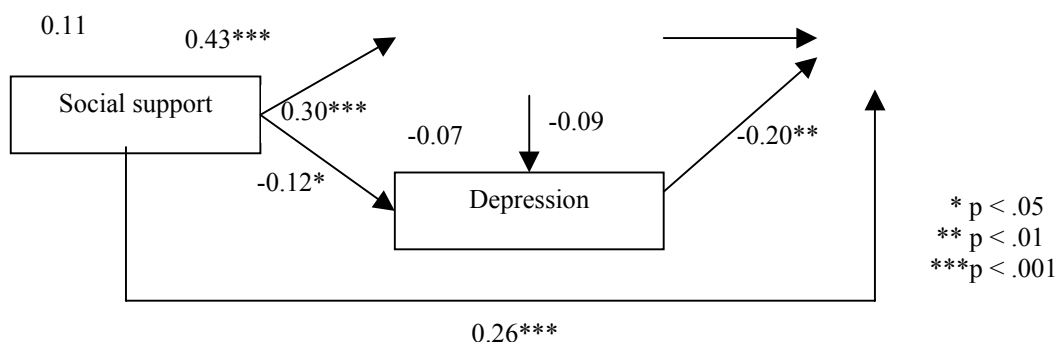


Figure 9. Path standardized coefficients in the hypothesized model

8.3 Goodness of fit of the modified model

Since the goodness of fit of the hypothesized model was acceptable, a model modification was further performed based on the following evidence. There were six non-significant paths in the hypothesized model. The results of these non-significant paths in the hypothesized model were consistent with some Thai and Western studies. Sirikarna (2000) explored the relationships among social support, maternal perception of infant behavior, maternal competence and maternal role adaptation in 150 Thai first time mothers during 4-6 weeks postpartum. Maternal role adaptation in her study referred to integration of the infant care activities, the relationship with the infant, and housewife role activities. Maternal role adaptation was implied to maternal role performance. The results revealed that maternal perception of infant behavior did not explain the variance in maternal role adaptation, and maternal perception of infant behavior was not significantly associated with maternal competence. Therefore, the findings of the non-significant path between maternal perception of infant behavior and maternal role performance, and the non-significant path between maternal perception of infant behavior and maternal

competence in the hypothesized model were consistent with the findings in Sirikarna's study.

Thongsuwan (2000) studied depression in 120 Thai postpartum mothers during 4-6 weeks postpartum. The findings showed that maternal perception of infant behavior did not significantly account for the variance in depression. Social support was the single factor that significantly accounted for the variance in depression. This finding corresponded with the results in the study of Horowitz and Goodman (2004). Horowitz and Goodman examined the depression of the postpartum mothers at four weeks postpartum and found that only lower social support was significantly associated with the higher depression. Maternal competence was not significantly associated with depression. Therefore, the findings of the non-significant path between maternal perception of infant behavior and depression and the non-significant path between maternal competence and depression in the hypothesized model were consistent with the findings in Thongsuwan's study, and Horowitz and Goodman's study.

Jones and Heermann (1992) explored maternal perception of parenting in 342 postpartum mothers at one month postpartum. The results revealed that maternal perception of infant behavior was not significantly associated with maternal perception of parenting. Therefore, the finding of the non-significant path between maternal perception of infant behavior and maternal perception of parenting in the hypothesized model was consistent with the finding in Jones and Heermann's study.

Hankla (2001) studied the relationship between social support and maternal perception of infant behavior in 210 Thai postpartum mothers at six weeks

postpartum. The results revealed that social support was not significantly associated with maternal perception of infant behavior. Therefore, the finding of the non-significant path between social support and maternal perception of infant behavior in the hypothesized model was consistent with Hankla's study.

To achieve a better model fit to the data, model modification by dropping the non-significant paths in the model was suggested (Pedhazur, 1982; Piumsomboon & Sawangnatre, 1992; Singchungchai, 2003). Modification to the model was made by sequentially dropping the least significant paths until the model had a good model fit. Corresponding to the path coefficients, there were six non-significant paths including maternal perception of infant behavior to maternal perception of parenting ($\beta = -0.01$, $p = 0.55$), maternal perception of infant behavior to maternal role performance ($\beta = -0.01$, $p = 0.59$), maternal perception of infant behavior to maternal competence ($\beta = 0.06$, $p = 0.13$), maternal perception of infant behavior to depression ($\beta = -0.07$, $p = 0.21$), maternal competence to depression ($\beta = -0.09$, $p = 0.13$) and social support to maternal perception of infant behavior ($\beta = 0.11$, $p = 0.05$).

The overall model fit of the modified model was judged. The model fit statistics of the modified model are presented in Table 15. The results revealed that the modified model was a good fit to the data: Chi-square test was non-significant ($\chi^2 = 7.34$, $df = 3$, $p = 0.06$), relative Chi-square (relative Chi-square = 2.44) was less than 3, comparative fit index (CFI = 0.97) was more than 0.9, and normed Tucker Lewis index (NTLI = 0.90) was equal to 0.9. For the root mean square error of approximation, the result revealed that the value was an acceptable fit (RMSEA = 0.08). Therefore, the modified model had a good model fit.

Table 15

Model fit statistics of the modified model (N = 200).

Test statistics	Values	Criteria of goodness of fit values
Chi-square (χ^2)	7.34, df = 3, p = 0.06	non-significant (Munro, 2001)
Relative Chi-square	2.44	less than 3 (Munro, 2001)
CFI	0.97	more than 0.90 (Munro, 2001)
NTLI	0.90	more than 0.90 (Hair et al, 1998)
RMSEA	0.08	0.05-0.08 = acceptable fit (Hair et al, 1998)

CFI = Comparative fit index

NTLI = Normed Tucker Lewis index

RMSEA = Root mean square error of approximation.

8.4 Modified model

The path analysis for the modified model is presented in Table 16.

The results revealed that social support ($\beta = 0.26$, $p < .001$), maternal perception of parenting ($\beta = 0.24$, $p < .001$), and maternal competence ($\beta = 0.18$, $p < .01$) had significant and positive direct effects on maternal role performance. Depression had a significant and negative direct effect on maternal role performance ($\beta = -0.20$, $p < .01$). Social support had significant and positive direct effects on maternal perception of parenting ($\beta = 0.42$, $p < .001$), and maternal competence ($\beta = 0.31$, $p < .001$), and it also had a significant and negative direct effect on depression ($\beta = -0.15$, $p < .05$).

Social support, maternal perception of parenting, maternal competence, and

depression significantly accounted for 35% of the variance in maternal role performance ($R^2 = 0.35$, $p < .001$). Therefore, in the modified model social support had a direct effect on maternal role performance and indirect effects on maternal role performance through maternal perception of parenting, maternal competence, and depression. The path standardized coefficients displayed in the modified model are presented in Figure 10.

The modified model had a better model fit than the hypothesized model. Although some non-significant paths were dropped from the model, all remaining paths in modified model were consistent with the theoretical propositions described in the Transition Theory that environmental factors and personal factors influence transition outcome. The social support proposed as an environmental factor, and maternal perception of parenting, maternal competence, and depression proposed as personal factors influence maternal role performance proposed as transition outcome. Therefore, in this study the modified model was selected to present the causal model of maternal role performance in transition to being the first time mother.

Table 16

Path analysis for the modified model (N = 200).

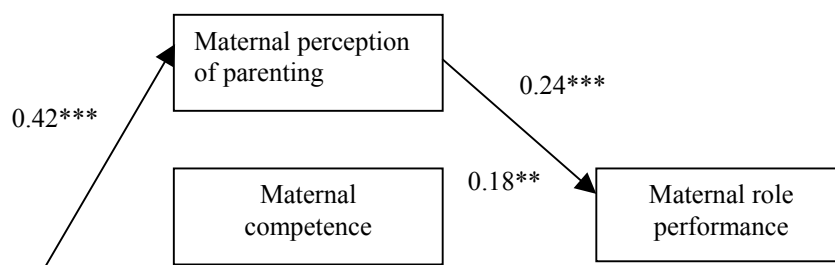
Variables	R^2	F	b	SE	β	t
MRP	0.35	26.58***				

	SS	0.29	0.07	0.26	3.92***
	MPP	0.35	0.09	0.24	3.93***
	MC	0.37	0.12	0.18	3.00**
	D	-0.57	0.16	-0.20	-3.57**
MPP					
	SS	0.33	0.05	0.42	6.71***
MC					
	SS	0.17	0.03	0.31	4.66***
D					
	SS	-0.06	0.02	-0.15	-2.27*

* $p < .05$ ** $p < .01$ *** $p < .001$

SS = Social support, MPP = Maternal perception of parenting,

MC = Maternal competence, D = Depression, MRP = Maternal role performance



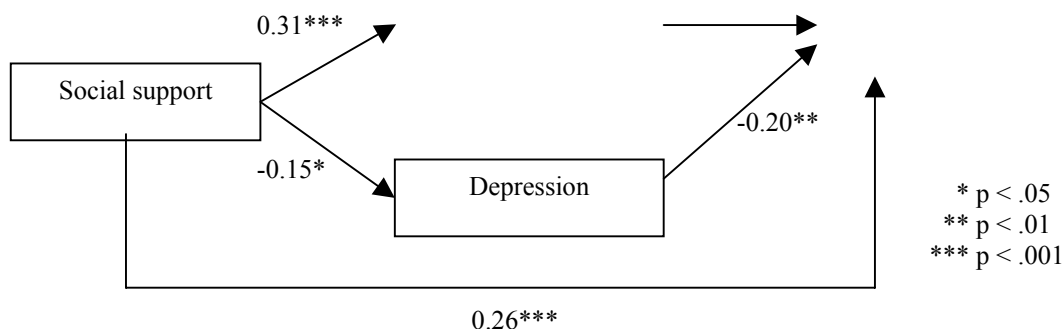


Figure 10. Path standardized coefficients in the modified model

8.5 Direct effect, indirect effect, and total effect in the modified model

The direct effects, indirect effects, and total effects of independent variables on the dependent variable in the modified model are presented in Table 17. The results revealed that social support had a positive direct effect of 0.42 on maternal perception of parenting, a positive direct effect of 0.31 on maternal competence, a positive direct effect of 0.26 on maternal role performance, and a negative direct effect of -0.15 on depression. Maternal perception of parenting had a positive direct effect of 0.24 on maternal role performance. Maternal competence had a positive direct effect of 0.18 on maternal role performance. Depression had a negative direct effect of -0.20 on maternal role performance.

Social support had an indirect effect of 0.10 on maternal role performance through maternal perception of parenting, an indirect effect of 0.06 on maternal role performance through maternal competence, and an indirect effect of 0.03 on maternal role performance through depression. Therefore, in the modified model social support had a total effect of 0.45 on maternal role performance by

having a direct effect of 0.26 on maternal role performance, and an indirect effect of 0.19 on maternal role performance through maternal perception of parenting, maternal competence, and depression.

Table 17

Direct effects, indirect effects, and total effects in the modified model (N = 200).

Paths	Direct effects	Indirect effects	Total Effects
SS → MPP	0.42	-	0.42
SS → MC	0.31	-	0.31
SS → D	-0.15	-	-0.15
MPP → MRP	0.24	-	0.24
MC → MRP	0.18	-	0.18
D → MRP	-0.20	-	-0.20
SS → MPP → MRP	-	0.10	-
SS → MC → MRP	-	0.06	-
SS → D → MRP	-	0.03	-
SS → MRP	0.26	0.19	0.45

SS = Social support, MPP = Maternal perception of parenting,

MC = Maternal competence, D = Depression, MRP = Maternal role performance

Discussion

Demographic data of the sample

Most women in this study fell into categories that were considered most suitable for mothering. Their ages ranged from 18 to 39 years with a mean age of

24.34 years. More than half of the subjects (72.5%) ranged from 21 to 35 years of age, and 26.5% of the subjects ranged from 18 to 20 years of age. There were no young adolescents (age of 11 to 17 years), and few older first time mothers (age >35 years) were included (1%). The general population of Thai women aged 20 to 34 years having their first births was 82.7% (Ministry of Public Health, 2003). This suggested that the women in this study were similar to the general population of Thai women who were first time mothers. A mother is considered to be high risk of being the mother when the mother is a young adolescent (age of 11 to 17 years) or is more than 35 years (Lowdermilk et al., 2000). Numerous studies revealed that young mothers were often psychologically immature and had concrete thinking that might interfere with their ability to be an effective mother (Koniak-Griffin, 1993; Lowdermilk et al., 2000). Young mothers used less verbal interaction and tended to be less responsive with their infants than adult mothers (Barratt & Roach, 1995). Many older mothers reported having a hard time coping, especially with irregular sleep patterns and the fussy periods infants had. These older women were less responsive with their infants than adult mothers (Cain, 1994; Lowdermilk et al., 2000).

Most of the subjects had an adequate level of education that helped them learn and adapt to performing their new maternal role. Eighty-one percent of the subjects in this study had completed education at the junior secondary school or higher. This result was associated with the Thai National Education Plan indicating all Thai people should complete a minimum of nine years of education (Ministry of Education, 1999). Becoming a first time mother creates a period of change and instability for women. These women must use their potential and abilities to adjust their physical, psychological and social states in order to fit the maternal role

(Pridham et al., 1991). The mothers' formal education helps them develop problem solving skills and deal with the challenges of transition to being the first time mother (Koeske & Koeske, 1990). Greater education enhances first time mothers' competency in maternal role including learning mothering, learning about their infants, and developing their skills in infant care (Littleton & Engebretson, 2002).

Half of the subjects were comprised of housewives and another half worked in a variety of occupations. The subjects who were housewives reported that they had no income and the family income came from their husbands. The average incomes/month of the working subject, husband, and subject's family were 5066.20, 6644.00, and 9177.10 baht/month respectively. The report of the Thai National Economic and Social Development Board (2005) showed that national income per capita in the year of 2003 was 67,784 baht/person/year (5648.66 baht/month). Therefore, the average income/month of the working subject was similar to the national income per capita, while the average income/month of husbands was more than the national income per capita. Sanga's (2004) study of Thai families found that the average income/month of southern Thai families was 9558.68 baht/month. Therefore, the average family income/month of the subjects was similar to the average family income in Sanga's study.

Family characteristics were the important social support sources in transition to being the first time mothers of the subjects in this study. More women reported living in extended families (58.5%) than nuclear families (41.5%). All of them (100%) were living with their husbands. In recent years, Thai society has moved from an agricultural to an industrial economy. Extended families have declined, while nuclear families have tended to increase (Chuprapawan, 1996). Sukhapun (2001)

studied first time mothers in Bangkok and found that 54.7% of women were in nuclear families. The type of family found in this study was different from Sukhapun's study. The extended family is the important social support resource. Members of the extended family may give and receive social support, and exchange goods and services. Extended family members will provide additional resources of time, energy, and psychosocial connection to other members of the family (Littleton & Engebretson, 2002). For transition to being the new mother, grandparent and relatives in the family can be involved in infant care or support the new mother in mothering and infant care (Lowdermilk et al., 2000). It was not surprising to find that ninety-two percent of the subjects reported that the source of infant care knowledge was grandmothers and relatives. This finding differed from the typical characteristics of western families. In the year of 2000, the nuclear family including children in two parent families was found to be 69%, and more than one quarter (26%) of all children live with a single parent, usually their mothers (Schor, 2003).

Only three from the total subjects (N=200) did not attend the antenatal clinic suggesting that almost all of the subjects concerned about mothering their first infants and this was important for them in the development of mother-infant attachment. Moreover, mother-infant attachment of the subjects continuously increased after having childbirth. During one month postpartum, more than half of the subjects (55.5%) provided breast-feeding to the infants and 40% provided both breast-feeding and substituted breast milk. Attachment is a process in which an enduring affectional bond to a specific infant is developed through seeking and exchanging gratifying experiences with the infant (James et al., 2002; Gorrie et al., 1998).

Mother-infant attachment is identified as one component of maternal role performance (Mercer, 1985).

Results of testing research hypotheses

1. Hypothesized model

The causal model of maternal role performance in transition to being the first time mother was proposed based on the Transition Theory (Schumacher & Meleis, 1994) that transition conditions influence transition outcome. Transition conditions in this study including maternal perception of infant behavior, social support, maternal perception of parenting, maternal competence, and depression influence maternal role performance which was proposed as the transition outcome. The hypothesized model was examined in this study. The finding revealed that the hypothesized model was an acceptable fit to the data. For the relationships between transition conditions and transition outcome in the hypothesized model, maternal perception of parenting, maternal competence, depression, and social support had significant direct effects on maternal role performance. However, maternal perception of infant behavior did not have a direct effect on maternal role performance. These results partially confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994). Transition conditions including the meaning, the level of knowledge and skill, the emotional state, and the support from environment, had direct effects on transition outcome. Maternal perception of infant behavior proposed as the change in the environment did not have a direct effect on the transition outcome.

For the relationships among transition conditions during transition process in the hypothesized model, social support had significant direct effects on maternal perception of parenting, maternal competence, and depression. However, maternal perception of infant behavior did not have direct effects on maternal perception of parenting, maternal competence, and depression. Social support did not have a direct effect on maternal perception of infant behavior. Maternal competence did not have a direct effect on depression. These results partially confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition conditions during the transition process. Social support proposed as the support from the environment had direct effects on the meaning, the level of knowledge and skill, and the emotional state during the transition process. Maternal perception of infant behavior proposed as the change in the environment did not have direct effects on the meaning, the level of knowledge and skill, and the emotional state during the transition process. Social support proposed as the support from the environment did not have a direct effect on the change in the environment. In addition, maternal competence proposed as the level of knowledge and skill did not have a direct effect on the emotional state during the transition process.

The discussions on the findings of relationships between study variables in the hypothesized model are presented as follows.

1.1 Social support and maternal perception of parenting

The finding in the hypothesized model revealed that social support had a significant and positive direct effect on maternal perception of parenting ($\beta = 0.43$, $p < .001$) which the parameter estimate was not different from the finding in the enter

regression analysis ($\beta = 0.43, p < .001$). This supported that the subjects who had high social support would have a high maternal perception of parenting. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition conditions during transition process. In transition to being the first time mother, social support proposed as an environmental factor influences maternal perception of parenting proposed as the meaning. This result was consistent with the findings in the studies of Reece (1995) and Cronnenwett (1985). Reece (1995) explored the relationship among variables of the adaptation to maternal role in first time mothers at one month postpartum and found that social support perceived from family and friends was significantly associated with expressing high level of parenting. Cronnenwett (1985) studied the relationship between perceived support and maternal perception of parenting in first time mothers at one month postpartum. The study found that the first time mothers who had greater access to available emotional support expressed higher level in parenting.

Social support had a significant and positive direct effect on maternal perception of parenting because social support has been found to cushion the experience of moving into parenting in first time mothers (Gjerdingen & Chaloner, 1994; McVeigh, 2000). Social support promoted first time mothers to comprehend and perceive in being the parent of the infant and the changes in their personal and interpersonal lives when they move into maternal role (Reece, 1995). There are four important types of social support that first time mothers can receive from persons around them (House, 1981). Emotional support includes providing empathy and trust to first time mothers in their parenting. Appraisal support includes providing a

feedback that accepts or praises them in being the parent. Informational support including providing information and advice about parenting, and instrumental support including providing aid, goods, and time are helpful to first time mothers in perception of parenting (Cronnenwett, 1985; Reece, 1995).

The subjects in this study received fairly high social support. The score of social support ranged from 51 to 100 with a mean of 77.46 (SD = 9.75). The possible score of social support ranged from 20 to 100. Relatives, husbands and health care providers were the important social support resources of the subjects. More than half of the subjects (56.5%) lived in extended families. all of the subjects (N = 200) were living with husbands. The subjects reported that their two highest sources of infant care knowledge came from their grandmothers and relatives (92.5%) and health care provider (48.5%). Members of the extended family may give and receive social support. Extended family members will provide additional resources of time, energy, goods, services, and psychosocial connection to other members of the family (Littleton & Engebretson, 2002). During transition to being the first time mother, grandparents and relatives in the family can assist in infant care or support the first time mothers in parenting. Health care providers can support them in preparation of parenting since antenatal period (Lowdermilk et al., 2000).

The perception of parenting developed in the first time mothers includes perception of being the parent of their infants, infant on the mother's mind, and life change (Koniak-Griffin, 1993; Pridham & Chang, 1989). In this study, subjects rated their perception of parenting highly. The maternal perception of parenting score ranged from 90 to 125 with a mean of 108.71 (SD = 7.57). The possible score of maternal perception of parenting ranged from 25 to 125. Therefore, social support had

a positive direct effect on maternal perception of parenting in transition to being the first time mother.

1.2 Social support and maternal competence

The finding in the hypothesized model revealed that social support had a significant and positive direct effect on maternal competence ($\beta = 0.30, p < .001$) which the parameter estimate was not different from the finding in the enter regression analysis ($\beta = 0.30, p < .001$). This supported that the subjects who had high social support would have high maternal competence. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition conditions during transition process. In transition to being the first time mother, social support proposed as an environmental factor influences maternal competence proposed as the level of knowledge and skill. This result was consistent with the finding in the study of Cutrona and Troutman (1986) which explored the effect of social support on maternal competence in first time mothers at one month postpartum and found that social support had a positive direct effect on maternal competence ($\beta = 0.28, p < .05$).

Social support had a significant and positive direct effect on maternal competence because social support is a strong resource that helps the first time mothers develop and perceive their ability in infant care acquired in maternal role (Cutrona & Troutman, 1986; Lowdermilk et al., 2000). First time mothers need knowledge of infant care and developing the skills of infant care activities, and comfort in infant care for developing their maternal competence (Lowdermilk et al., 2000; Mercer & Ferketich, 1995). Informational support includes advice of infant

care, providing knowledge of infant care, and teaching the skills of infant care activities. Emotional support includes providing empathy and trust to first time mothers in developing maternal competence. Appraisal support includes praising first time mothers when they have more knowledge and increased infant care skills. These supports will help the first time mothers to have increased maternal competence by increasing their knowledge and skills of infant care, and their comfort in infant care (Littleson & Engebretson, 2002).

As mentioned previously the subjects in this study received fairly high social support and had sufficient social support resources. Almost all of the subjects (98.5%) attended the antenatal care clinic. They were promoted about preparation for being a first time mother in antenatal period. During admission in postpartum ward, the first time mothers were taught about infant care by nurses. Various sources of infant care knowledge were reported from subjects to increase their maternal competence including grandmother and relatives (92.5%), health care provider (48.5%), reading books (25%), neighbors (21.5%), observing the role model (20.5%), friends (13%) and media (12%), respectively. The subjects in this study had fairly high maternal competence. The score of maternal competence ranged from 50 to 75 with a mean of 64.12 (SD = 5.28). The possible score of maternal competence ranged from 17 to 85. Therefore, social support had a positive direct effect on maternal competence in transition to being the first time mother.

1.3 Social support and depression

The finding in the hypothesized model revealed that social support had a significant and negative direct effect on depression ($\beta = -0.12$, $p < .05$) which the parameter estimate was a little lower than the finding in the enter regression analysis

($\beta = -0.15, p < .05$). This supported that the subjects who had high social support would have low problem of depression. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition conditions during the transition process. In transition to being the first time mother, social support proposed as an environmental factor influences depression proposed as an emotional state. This result was consistent with the findings in the study of Logsdon et al. (1994) which explored social support in relation to depression in first time mothers at one month postpartum. The study found that social support was significantly correlated with depression and social support could explain 40% of variance in depression.

Social support had a significant and negative direct effect on depression because social support is one resource that has been shown to be effective in helping the first time mothers cope with a range of stressors following childbirth (Cutrona & Troutman, 1986). Becoming the first time mother creates a period of change and instability for women (Pridham et al., 1991; Schumacher & Meleis, 1994). Women who deal with the difficulties associated with being the first time mother may be vulnerable to emotional disturbance and depression is prevalent in postpartum women (Beck, 1995; Logsdon et al., 1994). Approximately 10% to 15% of postpartum mothers experience depression (Wood et al., 1997). In O' Hara et al.'s (1990) study, the results showed that depressed postpartum mothers received insufficient emotional and instrumental support. Emotional support including providing empathy, caring and love to first time mothers during transition period, and instrumental support including providing time, labor, and aid to care for their infants when first time mothers are tired and need some rest are required in new mothers in the first three month postpartum

(Flagler, 1990; McVeigh, 2000). As mentioned previously the subjects in this study received fairly high social support. These social supports can directly reduce levels of maladaptation and hence indirectly improve health such as minimizing interpersonal pressures or tension, promoting affiliation, approval, and accurate appraisal of the self and environment (Diamond & Jones, 1983; House, 1981; Logsdon et al., 1994). The subjects in this study reported that they had low problem of depression. The depression score ranged from 0 to 23 with a mean of 7.11 (SD = 3.93). The possible score of depression ranged from 0 to 60. Therefore, social support had a negative direct effect on depression in transition to being the first time mother.

1.4 Maternal perception of parenting and maternal role performance

The finding in the hypothesized model revealed that maternal perception of parenting had significant and positive direct effects on maternal role performance ($\beta = 0.24, p < .001$) which the parameter estimate was lower than the finding in the enter regression analysis ($\beta = 0.39, p < .001$). This supported that the subjects who had high maternal perception of parenting would have high maternal role performance. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that the meaning in transition conditions influences transition outcome. In transition to being the first time mother, maternal perception of parenting proposed as the meaning influences maternal role performance proposed as transition outcome. This result was consistent with the findings in the studies of Walker et al. (1986) and Curry (1983). Walker et al. (1986) explored the relationship between maternal perception of parenting and maternal confidence in providing the infant care in first time mothers at one month postpartum.

The study found that maternal perception of parenting was associated with maternal confidence in providing the infant care of the first time mothers. Curry (1983) studied adaptation to maternal role of the first time mothers and found that maternal perception of parenting was positively related to maternal confidence in providing the infant care. Maternal confidence in providing the infant care was identified as a component of maternal role performance (Mercer, 1985).

Maternal perception of parenting had a significant positive direct effect on maternal role performance because perception of parenting of the first time mothers will contribute to their confidence in behaviors of maternal role (Curry, 1983; Walker et al., 1986). First time mothers appraise their experiences in parenting including being the mother of a new infant, infant being on the mother's mind, and how much their life change as positive perception will effect on their behaviors of providing the infant care confidently (Koniak-Griffin, 1993; Pridham & Chang, 1989). First time mothers with confidence will have the ability to read the infant cues, and have the behaviors that respond to infant's needs and foster physical, social, and psychological development of the infant (Bullock & Pridham, 1988; William et al., 1987). Social reciprocal interaction between mother and infant or mother- infant attachment occurred (Gorrie et al., 1998; James et al., 2002; Zahr, 1991). When the first time mothers are able to nurture their infants, they will feel satisfied in their tasks of maternal role (Pridham & Chang, 1992; Reece, 1995).

Maternal role performance is the outcome of transition to being the first time mother and presents achievement of maternal confidence in providing the infant care to their infants, having mother-infant attachment, and satisfaction in maternal role (Mercer, 1985). The subjects in this study had high maternal role performance.

The score of maternal role performance ranged from 118 to 160 with a mean of 144.97 (SD = 10.90). The possible score of maternal role performance ranged from 32 to 160. Therefore, maternal perception of parenting had a positive direct effect on maternal role performance in transition to being the first time mother.

1.5 Maternal competence and maternal role performance

The finding in this study revealed that maternal competence had significant and positive direct effects on maternal role performance ($\beta = 0.18, p < .01$) which the parameter estimate was lower than the finding in the enter regression analysis ($\beta = 0.26, p < .001$). This supported that the subjects who had high maternal competence would have high maternal role performance. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that the level of knowledge and skill in transition condition influences transition outcome. In transition to being the first time mother, maternal competence proposed as the level of knowledge and skill influences maternal role performance proposed as transition outcome. This result was consistent with the findings in the studies of Bullock and Pridham (1988), and Mercer and Ferketich (1994). Bullock and Pridham (1988) explored the relationship between maternal competence and maternal confidence in the first time mothers and found that maternal competence was positively related to maternal confidence in the first time mothers at one month postpartum. Mercer and Ferketich (1994) studied the mother-infant attachment in inexperienced mothers at early postpartum and one month postpartum. The study found that maternal competence was significantly associated with the mother-infant attachment both at early postpartum and one month postpartum. Maternal confidence

and mother-infant attachment were identified as components of maternal role performance (Mercer, 1985).

Maternal competence had a significant positive direct effect on maternal role performance because the mothers with perception of their maternal competence will contribute to their behaviors in providing the infant care confidently (Bullock & Pridham, 1988; Mercer & Ferketich, 1994). Maternal competence is characterized as self-efficacy. Self-efficacy belief influences individual's behaviors. High self-efficacy induces individuals to have confidence in performing behaviors and enhances individual's accomplishment (Bandura, 1982). New mothers with greater maternal competence will have more confidence in providing the infant care to their infants including initiating relationship with infant shortly after the childbirth, understanding infant cues and providing the infant care that effectively responds to infant needs (Reece, 1992; William et al., 1987). Furthermore, those mothers will have a sense of attachment between mother and infant, and provide mutually satisfying mother-infant interaction (Gorrie et al., 1998; James et al., 2002; Zahr, 1991). When they can nurture their infants, they will feel satisfied in their maternal role (Pridham & Chang, 1992; Reece, 1995). Therefore, maternal competence had a positive direct effect on maternal role performance in transition to being the first time mother.

1.6 Depression and maternal role performance

The finding in the hypothesized model revealed that depression had a significant and negative direct effect on maternal role performance ($\beta = -0.20$, $p < .01$) which the parameter estimate was lower than the finding in enter regression analysis

($\beta = -0.32, p < .001$). This supported that the subjects who had low depression would have high maternal role performance. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that the emotional state in transition conditions influences transition outcome. In transition to being the first time mother, depression proposed as an emotional state influences maternal role performance proposed as transition outcome. This result was consistent with the findings in the studies of Beck (1995) and Fowles (1998). Beck (1995) explored the effect of postpartum depression on mother-infant attachment and found that postpartum depression had a moderate to large effect on mother-infant attachment. Fowles (1998) studied the relationship between postpartum depression and maternal role performance in first time mothers and found that postpartum depression had a significant negative effect on maternal role performance.

Depression had a significant and negative direct effect on maternal role performance because emotional disturbance such as depression disrupts transition outcome described in Transition Theory (Schumacher & Meleis, 1994).

Characteristics of postpartum depression have an adverse effect on the developing mother-infant attachment (Beck, 1995; Horowitz et al., 2001; Zuravin, 1989).

Depressed mothers were less attuned and responsive in the vocalizations directed toward their infants and also less attuned to infant needs during feeding and sleeping (Flagler, 1990; Logsdon et al., 1994). When a mother is depressed, every aspect of maternal behavior is compromised especially in less confidence in providing the infant care to the infant, less mother-infant attachment and less satisfaction in maternal role (Fowles, 1998; Panzarine et al., 1995). Moreover, postpartum depression has a major consequence for the infant development and infant outcome

(Bakeman & Brown, 1980; Gorrie et al., 1998; Wallace et al., 1998). Therefore, depression had a negative direct effect on maternal role performance in transition to being the first time mother.

1.7 Social support and maternal role performance

The finding in the hypothesized model revealed that social support had a significant and positive direct effect on maternal role performance ($\beta = 0.26$, $p < .001$). This supported that the subjects who had high social support would have high maternal role performance. This finding confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that the environment in transition conditions influences transition outcome. In transition to being the first time mother, social support proposed as the environment, influences maternal role performance proposed as transition outcome. This result was consistent with the finding in the study of Reece (1995) which explored relationships among variables of the adaptation to maternal role in first time mothers at one month postpartum and found that social support was significantly associated with maternal confidence in providing the infant care. Maternal confidence was identified as a component of maternal role performance (Mercer, 1985).

Social support had a significant and positive direct effect on maternal role performance because social support has been found to cushion the experience of moving into maternal role and is proposed as an essential variable to successful maternal role performance (McVeigh, 2000). Social support promotes the first time mothers to perform their maternal role confidently, having mother-infant interaction and satisfaction in maternal role (Reece, 1995). Families and friends of the first time

mothers form an important dimension of the new mothers' social support resources. The extended family unit is the strongest unit in the lives of most Asians. First time mothers learn the practices of nurturing the infants from relatives in extended families and develop behaviors of providing the infant care confidently to their infants (Lowdermilk et al., 2000). Emotional, instrumental, informational, and appraisal supports received from families, friends, or health care providers are useful environmental resources for new mothers to deal with the change during transition to being the first time mothers (Cronnenwett, 1985; Reece, 1995). First time mothers who progress in transition to being the mother will have mastery in maternal role performance including confidence in infant care, having the mother-infant attachment and satisfaction in the maternal role (Mercer, 1985; Pridham & Chang, 1992). Therefore, social support had a positive direct effect on maternal role performance in transition to being the first time mother.

1.8 Maternal perception of infant behavior and maternal perception of parenting, maternal competence, depression, and maternal role performance.

The finding in the hypothesized model revealed that maternal perception of infant behavior did not have significant direct effects on maternal perception of parenting ($\beta = -0.01$, $p = .55$), maternal competence ($\beta = 0.06$, $p = .13$), depression ($\beta = -0.07$, $p = .21$), and maternal role performance ($\beta = -0.01$, $p = .59$) which did not differ from the findings in the enter regression analysis. The findings in the enter regression analysis revealed that maternal perception of infant behavior did not have significant direct effects on maternal perception of parenting ($\beta = -0.01$, $p = .89$), maternal competence ($\beta = 0.06$, $p = .38$), and depression ($\beta = -0.07$, $p = .28$).

In maternal role, infants are role partners that first time mothers have the relationship with and take care of. Infants have proper behaviors. First time mothers who had no experience of being a mother or of infant care had to learn, understand, and perceive their infant behaviors, so they can respond to their infants' needs suitably. According to Transition Theory (Schumacher & Meleis, 1994), maternal perception of infant behavior was proposed as changes in the environment that constitute or be a part of the event that makes the process of transition to being the first time mother necessary. The environment in transition condition influences transition outcome and can influence another or other transition conditions during the transition process.

The possible explanation why maternal perception of infant behavior did not have direct effects on other study variables was because more than half of the subjects (57.5%) had the experience of infant care. Drummond, McBride, and Wiebe (1993) described the development of perception of infant behavior between inexperienced and experienced mothers at six weeks postpartum. Inexperienced mothers learn and understand infant's cry behavior with operating by trial and error in infant soothing while experienced mothers operated from their experience base. Experienced mothers anticipated a continuum of communication and understood that their task was to discover their infants' nature or behaviors. Rubin (1984) explained that experienced mothers might not involve the extensive reformulation in their perception of infant behavior that occurred with the previous child. Behaviors of caring for an infant had been mastered previously and needed only to be adapted to the uniqueness of a new infant. Experienced mothers used previous experiences in infant care as their role model. In this study, 58.5% of subjects had extended families.

It was not surprising to find that more than half of them had experience of infant care because they could learn from their families. Learning and understanding infant behaviors were involved in experience in infant care. When the subjects had their first own infants, the first time mothers with previous experience of infant care would not initiate to learn, understand, and perceive their infant behaviors the same as first time mothers with no experience of infant care.

Another possible explanation why maternal perception of infant behavior did not have direct effects on other study variables was because the statements of the items in the second part of the Neonatal Perception Inventory did not clearly specify that the subjects should reply according to their perception of their infants' behaviors during the period one month postpartum. The Neonatal Perception Inventory selected for measuring maternal perception of infant behavior was originally developed in English and translated into Thai for this study. The original statements of the items in the second part (your babies) of the Neonatal Perception Inventory contained statements regarding the mothers' perception of their infants' future behaviors, such as "how much crying do you think your baby will do?" During the translation process, the form of the verbs in the statements should have been changed, so that the subjects would provide data about perception of their infants' past behaviors during the period one month postpartum. Thus, the previously mentioned example should have been changed in the Thai version into "how much crying do you think your baby has done?" However, an exact translation of the original statements was made. Therefore, since the subjects could have provided answers about their perception of their infants' future behaviors, the data would not be congruent with the designing measuring of this variable. This problem might induce to the finding that maternal perception of infant

behavior did not have a significant direct effect on the transition outcome of maternal role performance. Moreover, maternal perception of infant behavior was not found to influence other transition conditions including maternal perception of parenting, maternal competence, and depression during the transition process.

The results of these non-significant relationships in the hypothesized model were consistent with several Thai and Western studies. Sirikarna (2000) explored maternal role adaptation in Thai first time mothers during 4-6 weeks postpartum. Maternal role adaptation was implied to maternal role performance because maternal role adaptation in the study referred to integration of the infant care activities and the relationship with the infant. The results revealed that maternal perception of infant behavior did not explain the variance in maternal role adaptation, and maternal perception of infant behavior was not significantly associated with maternal competence. The explanation for the non-significant relationships was that some subjects had prior experience of infant care and they reported receiving high social support. Maternal perception of infant behavior was not the important factor related to the adaptation to their new maternal role and developing their maternal competence. Therefore, the findings of the non-significant relationships between maternal perception of infant behavior and maternal role performance, and the non-significant relationship between maternal perception of infant behavior and maternal competence in the hypothesized model were consistent with the findings in Sirikarna's study.

Thongsuwan (2000) studied depression in Thai postpartum mothers during 4-6 weeks postpartum. The findings showed that maternal perception of infant behavior did not significantly account for the variance in depression. Social support was the single factor that significantly accounted for the variance in depression. The

explanation for the non-significant relationship was that social support was the important factor to decrease depression by reducing the level of maladaptation of the postpartum mothers. Maternal perception of infant behavior did not help them in decreasing emotional disturbance. Therefore, the finding of the non-significant relationship between maternal perception of infant behavior and depression in the hypothesized model was consistent with the finding in Thongsuwan's study.

Finally, Jones and Heermann (1992) explored maternal perception of parenting in postpartum mothers at one month postpartum. The result revealed that maternal perception of infant behavior was not significantly associated with maternal perception of parenting. The explanation for the non-significant relationship was that postpartum mothers concerned primarily with parenting. They were responsible for parenting and maternal perception of infant behavior was not an important issue for them. Therefore, the finding of the non-significant relationship between maternal perception of infant behavior and maternal perception of parenting in the hypothesized model was consistent with the finding in Jones and Heermann's study.

1.9 Social support and maternal perception of infant behavior

The finding in the hypothesized model revealed that social support did not have a significant direct effect on maternal perception of infant behavior ($\beta = 0.11$, $p = .05$) which was not different from the finding in the enter regression analysis ($\beta = 0.11$, $p = .50$). The possible explanation why social support did not have a direct effect on maternal perception of infant behavior was because more than half of the subjects (57.5%) had experience of infant care. The first time mothers with experience of infant care would not initiate to learn, understand, and perceive their infants'

behaviors the same as the first time mothers with no experience of infant care. The social support that first time mothers with experience of infant care received during one month postpartum might not help them much in perceiving their infants' behaviors.

Another possible explanation why social support did not have a direct effect on maternal perception of infant behavior was because the statements of the items in the second part of the Thai version of the Neonatal Perception Inventory measuring maternal perception of infant behavior, were not congruent with the purpose of asking the first time mothers about their perception of their infants' behaviors in the period one month postpartum as previously mentioned. The first time mothers could provide answers about their perception of their infants' future behaviors. Thus, the data obtained from the first time mothers would pertain to the future. This problem might induce to the finding that social support did not have a significant direct effect on maternal perception of infant behavior.

The result of this non-significant relationship in the hypothesized model was consistent with the Thai study. Hankla (2001) studied the relationship between social support and maternal perception of infant behavior in Thai postpartum mothers at six weeks postpartum. The result revealed that social support was not significantly associated with maternal perception of infant behavior. The explanation for the non-significant relationship was that some postpartum mothers had experience of infant care. Social support did not help them much in perception of infant behavior. Therefore, the finding of the non-significant relationship between social support and maternal perception of infant behavior in the hypothesized model was consistent with Hankla's study.

1.10 Maternal competence and depression

The finding in the hypothesized model revealed that maternal competence did not have a significant direct effect on depression ($\beta = -0.09$, $p = .13$) which did not differ from the finding in the enter regression analysis ($\beta = -0.09$, $p = .05$). The possible explanation why maternal competence did not have a direct effect on depression was because more than half of the subjects (57.5%) had experience of infant care. First time mothers with some experience of infant care would not initiate to learn, develop and perceive their maternal competence the same as the first time mothers with no experience of infant care. Moreover, one month infants did not have complicated behaviors for the first time mothers with experience of infant care to deal with. The principle areas of infant behaviors for one month infants are sleep, wakefulness, and activities such as crying for hunger, anger and discomfort (Pillitteri, 1999; Wong, 1999). Developing in perception of maternal competence of the subjects might not be the child care stress that caused emotional disturbance as depression. Therefore, maternal competence was not found to have a negative direct effect on depression in transition to being the first time mother in this study.

The result of this non-significant relationship in the hypothesized model was consistent with a Western study. Horowitz and Goodman (2004) examined the depression in the postpartum mothers at four weeks postpartum and found that only lower social support was significantly associated with higher depression. Maternal competence was not associated with depression because social support helped postpartum mothers feel stability during the transition process. Therefore, the finding of the non-significant relationship between maternal competence and depression in

the hypothesized model was consistent with the finding in Horowitz and Goodman's study.

2. Modified model

The model fit of the modified model was examined. The finding revealed that the modified model was a good fit to the data. The modified model had a better model fit than the hypothesized model. Therefore, in this study the modified model was selected to present the causal model of maternal role performance in transition to being the first time mother. For the relationships between transition conditions and transition outcome in the modified model, maternal perception of parenting ($\beta = 0.24$, $p < .001$), maternal competence ($\beta = 0.18$, $p < .01$), depression ($\beta = -0.20$, $p < .01$), and social support ($\beta = 0.26$, $p < .001$) had significant direct effects on maternal role performance. These results confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that transition conditions including meaning, level of knowledge and skill, emotional state, and support from environment, had direct effects on transition outcome. The discussions of the relationships between maternal perception of parenting and maternal role performance, maternal competence and maternal role performance, depression and maternal role performance, and social support and maternal role performance, were previously mentioned.

For the relationships among transition conditions during the transition process in the modified model, social support had significant direct effects on maternal perception of parenting ($\beta = 0.42$, $p < .001$), maternal competence ($\beta = 0.31$, $p < .001$), and depression ($\beta = -0.15$, $p < .05$). These results confirmed the theoretical

proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition conditions during the transition process. Social support proposed as the support from the environment had direct effects on meaning, level of knowledge and skill, and emotional state in transition conditions. The discussions of the relationships between social support and maternal perception of parenting, social support and maternal competence, and social support and depression, were previously mentioned.

In addition, the findings in the modified model revealed that social support had significant indirect effects on maternal role performance through maternal perception of parenting, maternal competence, and depression. The highest indirect effect was from social support through maternal perception of parenting ($\beta = 0.10$), followed by the indirect effect from social support through maternal competence ($\beta = 0.06$), and the lowest indirect effect was from social support through depression ($\beta = 0.03$). These findings confirmed the theoretical proposition described in the Transition Theory (Schumacher & Meleis, 1994) that one transition condition can affect another or other transition condition during transition process. Social support was proposed as the environmental factor in transition conditions. Maternal perception of parenting, maternal competence, and depression were proposed as the meaning, level of knowledge and skill, and emotional state in transition conditions respectively. These can be considered to be personal factors. Therefore, social support proposed as an environmental factor would enhance transition outcome of the first time mothers through personal factors including maternal perception of parenting, maternal competence, and depression in transition to being the first time mother.

The discussions on the findings of the indirect effects between study variables in the modified model are presented as follows.

2.1 Indirect effect between social support and maternal role performance through maternal perception of parenting

Social support had a significant indirect effect on maternal role performance through maternal perception of parenting because social support has been found to cushion the experience of moving into parenting in the first time mothers (Gjerdingen & Chloner, 1994; McVeigh, 2000) and the high perception of parenting in first time mothers will enhance their maternal confidence in performing maternal role (Curry, 1983; Walker et al., 1986). Social support including emotional, appraisal, informational, and instrumental support are useful to and will help the first time mothers to have a high perception of parenting including being the parent of a new infant, infant being on the mother's mind, and how much their life changes (Cronnenwett, 1985; Reece, 1995). First time mothers appraise their experiences in parenting as high perception will effect on performing the maternal role including providing the infant care confidently, having mother-infant attachment, and satisfaction in maternal role (Koniak-Griffin, 1993; Pridham & Chang, 1989). Therefore, social support has an indirect effect on maternal role performance through maternal perception of parenting.

This result was consistent with the finding in the study of Sadler and Cowlin (2003). Sadler and Cowlin examined the effects of the Moving into Parenthood Program on maternal role behaviors of new adolescent mothers. The program comprised of providing the parenting information and role models of

positive parenting behaviors. The results revealed that new adolescent mothers showed a significant improvement in maternal role behaviors from before the intervention to after the intervention. Therefore, the finding in the study of Sadler and Cowlin confirmed that social support had an indirect effect on maternal role performance through maternal perception of parenting in transition to being the first time mother.

2.2 Indirect effect between social support and maternal role performance through maternal competence

Social support had a significant indirect effect on maternal role performance through maternal competence because social support is a strong resource that helps first time mothers to have increased ability to care for their infants acquired in maternal role (Cutrona & Troutman, 1986; Lowdermilk et al., 2000) and maternal competence will encourage the first time mothers to have maternal confidence in her behaviors of maternal role (Bandura, 1982; Bullock & Pridham, 1988). Social support received from families, friends, and health care providers will help the first time mothers to perceive their maternal competence including having knowledge of infant care and skills of infant care activities (Cutrona & Troutman, 1986; Littleson & Engebretson, 2002). First time mothers with greater perception in their maternal competence will have more confidence in providing the infant care to the infants (Reece, 1992; William et al., 1987), provide mutually satisfying interaction between mothers and infants (James et al., 2002, Gorrie et al., 1998; Zahr, 1991), and feel satisfaction in maternal role (Reece, 1995). Therefore, social support had an indirect effect on maternal role performance through maternal competence.

This result was consistent with the finding in the study of Leitch (1999). Leitch examined the effects of the Caregiving Program on maternal confidence in providing the infant care and mother-infant interaction of the first time mothers. The program comprised of teaching infant care using a 45 minutes video tape and counseling the first time mothers about infant care. The results revealed that the mothers in the experimental group showed a significant increase in maternal confidence in providing the infant care and mother-infant interaction from before the intervention to after the intervention, whereas the increase of maternal confidence in providing the infant care and mother-infant interaction in the control group was not significant. Therefore, the finding in the study of Leitch confirmed that social support had an indirect effect on maternal role performance through maternal competence in transition to being the first time mother.

2.3 Indirect effect between social support and maternal role performance through depression

Social support had a significant indirect effect on maternal role performance through depression because social support is one resource that has been shown to be effective in helping the first time mothers cope with a range of stressors following childbirth (Cutrona & Troutman, 1986) and postpartum depression has an adverse effect on the maternal behaviors especially in developing mother-infant attachment of mothers (Beck, 1995; Horowitz et al., 2001; Logsdon et al., 1994). Emotional support and instrumental support are helpful supports for new mothers in transition period (Flagler, 1990; McVeigh, 2000). These social supports can directly reduce levels of maladaptation and hence indirectly improve health such as