I. Introduction

The relationships between individual and society have been one of the main interests in Sociology, and many sociologists have tried to explain various human beings' phenomena with social environments. Many studies about health[1] in Sociology can be also understood from this perspective. Sociologists think that even individual's health status is not just given by nature, but influenced by many kinds interactions with social environments through the life. Nevertheless, many studies related to health have not been done in Sociology until the post-war period that medical sociology emerged as a specialty within the sociological discipline (Bird et al. 2000). After that, many sociologists have been interested in the interactions between social environments and personal health problems, and many of them have focused on social inequalities in health. This paper is also in this context, but it focuses on the relation between social networks and mental health more specifically.

To date, many studies have documented that social supports contribute to mental health positively[2]. Through social networks, people get supports or communicate each other. In terms of the types of social networks, the studies are largely classified as three different kinds. First of all, there are many studies that deal with the relationships with family or relatives. They usually emphasized the importance of the relationship with family members (not with relatives[3]). And, as informal networks, some studies concentrated on the relationship with friends or relatives. These social networks are known to associate with psychological well-being, as well. Generally, people who have positive relationships with their networks are better off mentally.

However, most studies have just described the associations of social networks and mental health, rather than suggested social structural explanations. In this study, social factors, especially education is considered as a main control variable. Considering that education affects people's lives in many ways consistently, it is one of the most crucial variables that can show the impact of

education on psychological well-being by social networks. Based on this assumption, this study concentrates on the education effect and age on mental health, especially focusing on gender differences.

II. Previous Studies & Research Questions

Human beings in all societies live coping with the everyday problems. The ways of handling problems are various. Some people may appeal to their religion, or some people may want to rely on their family. According to one study, the shift that had occurred from formal ritualized ways handling difficulties to more informal ways that require more personal initiative has been observed in Americans, recently (Veroff 1981). Informal ways include social supports from social networks such as relationships with friends, or social group activities. It can mean that social networks are getting meaningful for people with regard to mental health.

Social Networks: As a general term, Bryant and Conger (1999) defines social network as a collection of people known by an individual. In many cases, being involved to social activities has the tendency to be explained by personal characteristics or the sex differences. More active people may participate in more social activities than those who are introspective, and some studies reported that men are more involved to social activities than their counterparts. Some studies explored whether social networks were inclined to be determined by gender differences, even though little studies have been done about personal characteristics related to social networks in Sociology.

With regard to gender differences in social network, Moore (1990) argues that women and men are different not in sizes[4], but in networks compositions. That is, women have more relationship with kin, and men have more coworker in their networks. However, this study has

also found that most of these gender differences disappeared or were reduced in network compositions when variables related to employment, family, and age were controlled. Thus it suggests that social networks are closely related with social factors rather than gender differences or personal characteristics.

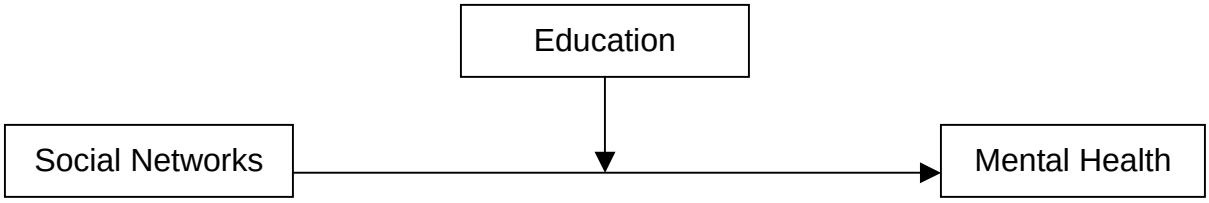
On the other hand, social networks can be explained by family compositions[5] or marital status. Ishii-Kuntz and Seccombe (1989) say that parents whose children have left home are the most involved, while permanently childless adults are found to be the most isolated in the social networks of neighbors and confidants (Ishii-Kuntz and Seccombe 1989). And, with regard to marital status[6], married women have the most informal social support and spouseless men the fewest (Longino and Lipman 1981).

According to previous studies, marital status or family relation seem to play important roles for social networks as social indicators. However, considering that other family formation types such as cohabitation have increased and more and more people get married in later ages compared to earlier generation, marital status or family relation may not be enough explanations for social networks as social indicators. Therefore, more social indicators should be considered for social networks.

Social Networks and Mental Health: Many studies have documented about mental health in Sociology with various topics. With regard to social networks, social networks can have the effects on mental health at three phases: prevention, coping and recovery. People can be relieved their stress or get solutions from social supports when they get stressed or have problems. In general, many previous studies have reported consistently that people who have social support from their networks are better off well-being (Johnson 1991; Umberson et al. 1996; Ross and Mirowsky 2002). However, considering that education affect on people's life in many ways,

surprisingly there are not many studies that have been done to investigate education effect with regard to mental health. In fact, not many sociologists have been interested in mental health related to education until recently. Thus, as a research subject, the topic how education affects on mental health has much space to be filled by studying. For the importance of education in health, Mirowsky and Ross (2003) can be referred. They pointed out that only education correlated positively and consistently with healthy behaviors (2003: 59).

Research Questions: Based on the previous literature, three research questions have been established as follows; 1. Does higher education increase the beneficial effect of social support on psychological well-being? 2. How does education affect psychological well-being by ages? 3. Does education increase the beneficial effect of social support more for women or more for men? And, the basic conceptual model can be drawn as follow.



III. Research Design

According to Mirowsky et al (2000), social status has four main components that can affect health: education, employment, work and economic status (2000: 49). And, in individual level, marital status is also known to affect health significantly. Based on these previous antecedents, several models have been adapted for regression analysis. The first model included five sociodemographic variables such as age, sex, race, and education. And, for the second model,

marital status and economic situation have been included in the first model. Social networks, family relationship, and friend/relatives relationship variables have been contained to the next models, respectively.

Data and Methods: For this study, the data is from a national three-wave panel survey, which is named as "Americans' Changing Lives"[7] surveyed by James House. Using this data set[8], OLS regression analysis methods were adapted for this study. There are two kinds of regression models adapted. To predict the constant value of people's depression and the change of this constant by time, I run one regression analysis with the constant value of CES-Ds of three waves as the dependent variable, and the other regression has the slope net of the constant as the dependent variable. Besides of them, all same independent variables were used to two sets of regression analyses.

Measurements

Confounders: Sociodemographic variables such as age, gender, race, and education, are included in all regression models as confounders. Obviously, gender is dichotomous variable, and race variable is also used as dichotomous variable, because the sample sizes of other races are too small to attain the significant level. Except these two dummy variables, age and education are continuous variables in regression models, but they were used as dummy variables to compare the mean values of variables.

I also used marital status and economic situation variable for control variables. As a dummy variable, marital status was recoded with two values (0=not married, 1=married). For the economic situation variable, I used the constructed variable to explain financial chronic stress, instead of income variable or employment status. Income variable has a problem to be used in

longitudinal data analysis and employment status doesn't explain very well since the mean of respondents' ages is more than 50 at wave I. Economic situation variable has been constructed with three questions. Respondents were asked as follows: how satisfied are you with (your/your family's) present financial situation? How difficult is it for (you/your family) to meet the monthly payments on your (family's) bills? And in general how do your (family's) finances usually work out at the end of the month?

Social Networks & Other Relationships: Social networks are used as the main dependent variables. Social network can be divided into two kinds, such as formal networks and informal networks. Formal social network is related to institutional meeting or religious meeting and, the networks related to friends can be informal. In this study, there are also two questions to be used to construct formal network variable. One is 'How often do you attend meetings or programs of groups, clubs or organizations that you belong to?' and the other is, 'How often do you usually attend religious services?' Secondly, informal relationship also includes two questions as follows: 'In a typical week, about how many times do you talk on the telephone with friends, neighbors or relatives', and 'How often do you get together with friends, neighbors or relatives and do things like go out together or visit in each other's homes?' However, since they show the high levels of collinearity, I combined these two as one social networks variable in regression models.

On the other hand, I used the separated family relationship for the regression models. Family relationship includes the relationships with spouse, children, and their parents. For the family relationship, it is divided into two different kinds of questions. One is positive relationship and the other is negative relationship for respondents' spouse, child, mother/father, and friends/relatives. For each objective, respondents were asked two questions such as 'How much does your (husband/wife/partner) make you feel loved and cared for?' and 'How much is (he/she)

willing to listen when you need to talk about your worries or problems?' and the choices for the questions mean the degree about the questions as follows; a great deal, quite a bit, some, a little, and not at all. And, every constructed variable is based on the mean values of the questions. I also considered the relationship with friends/relatives[9] for this study, and the questions of these relationships have been identified as family relationship.

Mental Health: In this study, to estimate the psychological well-being, depression was used as the outcome variable. Depression is measured with an 11-item revised version of the Center for Epidemiological Studies-Depression[10] (CES-D) index (Radloff. 1977) designed to measure depressive symptoms in community samples, especially the affective component or depressed mood. CES-D includes mostly questions about emotions rather than physical symptoms, such as feeling depressed, fearful, lonely, and sad or not feeling as good as other people, hopeful about the future, or happy, and not enjoying life.

In ACL data, respondents were asked how often in the past week they experienced each of the following: "Feel depressed; Feel that everything I did was an effort; My sleep was restless; I was happy; I felt lonely; People were unfriendly; I enjoyed life; I did not feel like eating. My appetite was poor; I felt sad; I felt that people disliked me; I couldn't get going." To these questions, respondents answered with one of three choices, which are 'hardly ever', 'some of the time', and 'most of the time'. The CES-D scale uses the mean response to the items. The alpha is .83.

IV. Results

Before running regression models, table 1 provides descriptive statistics of variables.

(Table 1 about here)

Depression Differences: Based on these variables, I checked the mean values of each category. It is to know if they show different level of depression compared to their counterparts. Except depression variables, most control variables are from the first panel (Wave I), but marital status and employment status are from the second panel as well.

(Table 2 about here)

First of all, table 2 shows the mean values of depression by each variable. The differences between men and women in depression, women are more likely depressed than men[11]. And black people feel more depressed than white, but 'others' race category, which include Hispanic and Asian shows the highest level of depression compared to white and black people. In terms of education, as expected, the higher educated people are less likely depressed. And marital status and employment status also affect on depression, that is, married people and employed people are the beneficiaries on mental health compared to their counterparts.

These differences of depression exist consistently by time, even though the degrees of depression have changed. In most categories, depressions are getting attenuate, and the gaps among different categories still exist without much difference even across time. However, they appear in education levels differently. Like other categories, generally people feel less depressed as time goes on in all different education levels, but the differences between the lowest educated group and the highest group are getting larger by time. It seems that education affect individuals' mental health more significantly across age than any other social variables such as persons' income or employment opportunities.

Gender Differences in Social Networks and Depression: Table 3 provides the information to know if gender differences exist in social networks and depression. Table 3 and 4 show the

differences of depression by sex and age, respectively. All social networks variables are from wave I, and to know the changes of depressions, I brought depressions from all waves (I, II, and III). These two tables contain three kinds of information for each.

(Table 3 about here)

In Table 3, men are different from women in social networks. Overall, these differences between men and women are significant statistically. According to this table, women are more likely involved to social activities than men except 'negative relationships'. Women have more negative relationships than men in both 'Friend/Relative negative relationship' and 'Family negative relationship'. Women seem to be more dependable on social activities and maintain these relationships better than men. On the other hand, about mental health, the sex differences support previous studies that women feel more likely depressed than men. They are also consistent significantly across time.

Age differences in Social Relations and Depression: To know whether the social networks are different by age, I divided age group into two groups. One group is people who are less than 65 and the other is the rest who are 65 and more. Assuming that social networks are related to working age or employment status, 65 years old that people usually retire from their work was adapted to divide the age groups as a cutting point.

(Table 4 about here)

From the above Table 4, we can see that there is not much difference about informal network between two age groups. But as we can expect, older people are less likely involved to formal networks than younger people. It seems to me that informal networks are not much related to the age but sex, and formal networks are related to working age and sex as well, even though women are more likely having formal networks than men. And, older people have a tendency to be more

dependable to friend/relative and family relationships, compared to younger people, but this is greater in family relationship than friend/relative relationship. Thus, people who are 65 or more seem to be more dependable on the relationship with their family than younger age group. And, younger age group is more affected by family negative relationship on depression than their counterpart. These results confirm to previous studies (Quinn 1983; Dean et al. 1990; Silverstein et al. 1996).

Education Effects in Social Networks and Depression: The next table is about the differences by education. To know if social networks or mental health by education, I adapted two dummy variables out of five by completed education years to compare to others. One is the lowest educated group (8 years or less) and the other is the highest educated group (16 years or more).

(Table 5 about here)

According to the above table, the mean values for variables are different in all education levels, as other variables such as sex and age groups. For each different level, the patterns are consistent, thus I provided two kinds of comparison in Table 5. One is for '8 years or less' and others, which include all education levels, except '8 years or less'. And the other part is for people who are educated for 16 years or more and others, which also contain all education levels, except '16 years or more' itself. The reason why I didn't include every level of educations is that they have almost identified patterns in terms of social networks changing and mental health differences by education. Therefore these two groups, which are the lowest educated and the highest educated, can show the differences by education clearly.

The lower educated people are less likely involved to social activities and on the contrary the higher educated people are more likely having social networks. And also the higher educated people feel less likely depressed compared to the lower educated people. In addition, as I

mentioned earlier in this paper, education levels affect the variables in different ways compared to sex or age. That is, education effects seem to get larger by time.

Social Network and Mental Health: Table 6 and 7 are the regression coefficients predicting the relations among variables. To know if mental health is associated with social networks, two kinds of regressions analysis were run in this study. First regression analysis is to predict the constant value of depression. Since people's mental health statuses are expected to affect their mental health through their lives, I ran regression models to know whether there are consistent tendencies through time. For the constant value of mental health, I calculated the mean value of CES-Ds from wave I, II and III. And using this value as the dependent variable, 5 regression models were adapted (Table 6). Model 1 includes sociodemographic variables, which mean age, gender, education and race. Marital status and employment status were contained from model 2. From model 3, social networks, friend/relative relationships, and family relationship were included respectively in model 4 and model 5.

As I mentioned earlier, for each model, education variable means 'completed education year', and is continuous variables as age variable. For race, I included 'others' in earlier table to black category, since its proportion was too small to attain the confident level. And social networks variable include informal activities and formal activities, since they show high levels of collinearity for each other. For the same reason, family relationship is also constructed with the different relationships with each family member, such as spouse (or partner), parents (mother/father), and children.

Table 6 is the regression coefficients of variables. According to this table, largely the results support the previous studies, and most coefficients are statistically significant. Women are more likely depressed than men, and the level of depression is decreasing by age. And education seems

to affect on depression significantly through time. However, it doesn't seem to affect consistently. The coefficient of education was decreasing from model 1 to model 3, but from model 4, which includes family relationship and friends/relatives relationship respectively, it is increasing. It suggests that education affects more on social networks than family or friends/relatives relationship, related to depression.

Also, married people and people who don't have financial chronic stress are beneficiaries of depression, compared to those who are not. With regard to social networks, social networks effect on depression negatively. However, family relation and friends/relative relation seem to offset the impacts of social networks on depression, more or less.

(Table 6 about here)

Confirming that depression levels are consistent by time, Table 7 shows the slope net of the constant with variables. For the dependent variable, CES-D at wave I was deducted from CES-D at wave III, and then it was divided by 8, because the interval between wave I and wave III is 8 years. I used this variable as the dependent variable, and the constant, which was used as the dependent variable at Table 6, was included as one of the independent variables. Other independent variables were adapted as the same way of the first regression model (Table 6). This regression models are to predict the change net of the constant by time.

(Table 7 about here)

Basically, the associations of variables with depression show the same direction as Table 6. That is, gender differences exist, and education and economic situations affect on depression consistently by time. However in terms of the degree of influences, table 7 doesn't show much difference. Contrary to them, for the elderly people, marital status and racial ethnicities are getting more important than any other variables are, such as social networks or other relationships with family members, or friends/relatives.

Gender Differences in the Association of Social Networks and Mental Health: As previous studies, table 8, 9, 10 and 11 show that both men and women are beneficiaries of social networks on mental health. Table 8 and 10 are the regression coefficients of the mean values of depression for men and women respectively. And table 9 and 11 are the regression coefficients of changes of depression by time for men and women, for each.

(Table 8, 9,10 and 11 about here)

According to the analysis, those who are more involved to social networks are better off mental health, no matter they are men or women. However, I found that gender differences exist in the relationship between most control variables, except age variable, and depression. Even though the patterns of relations are not different by gender, women are more affected on depression by control variables. That is, the higher educated, white, married women are less depressed than men who are under same conditions. And considering that men are more affected on depression by economic hardship than women, men seem to be more stressed than women do. In terms of social networks, women seem to be more dependent on social networks and the relations with their friends or family members.

V. Discussion

Based on the results, there are some interesting findings in this study. First of all, there are differences of depression and social networks, regardless of other social factors, by gender, age, and education. Women are more likely involved to social networks, and depressed than men. About age differences, elderly people are more likely involved to formal relationship and family contacts compared to people who are less than 65 years old. And elderly people are less likely involved to negative relations with their friends or family and also less depressed.

On the other hand, education differences were also found in social networks and depression. It was clear that the higher educated people have more social networks and relationship with their friends and family members than the lower educated people. However, I found that education effects were getting pronounced by time, contrary to other variables that affected in almost same degree consistently, or influenced getting less by time. And these differences seem to be larger in the relationship between college graduated (or more) and the others, than between 8 year educated (or less) and the others. It can mean that the higher educated people, the more beneficiaries.

With regard to the relation of social networks and mental health, I found that social networks and relationships with friends/relatives and family affected on mental health negatively and sociodemographic variables modified the relationship of social networks and mental health in different ways. Overall, white people, the higher educated, the married and those who don't have financial difficulties are better off mental health. And, these people have a tendency to be more involved to social networks and positive relationships with their friends/relatives or families and less likely depressed.

As the results of regression for the gender differences, I found that men and women feel depressed by control variables differently, even though the patterns are not much different. That is, education year, race, social networks and the relationships with friends or family affect on mental health more for women than for men. However, men are affected on mental health by marital status and economic hardship than women.

Even though this study has interesting findings, there are still several limitations. That is, I couldn't examine the quality or characteristics of social networks that people are involved. It results from data limitation and quantitative analysis. For the future research, they should be considered as well.

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Appendix

Table 1. Descriptive Statistics of Variables

	Percent Distribution (%)	Unweighted Sample Size
Sex		
Male	37.5	1,358
Female	62.5	2,259
Race		
White	64.2	2,323
Black	32.5	1,174
Others	3.3	120
Education at Wave I		
8 years or less	20.1	726
9 to 11 years	17.2	623
12 years	29.1	1,054
13 to 15 years	19.7	714
16 years or more	13.8	500
Marital Status at Wave I		
Married	57.2	2,068
Not married	49.3	1,783
Marital Status at Wave II		
Married	43.5	1,573
Not married	35.8	1,294
Employment Status at Wave I		
Employed	51.6	1,866
Not Employed	48.4	1,750
Employment Status at Wave II		
Employed	51.4	1,474
Not Employed	48.6	1,393

Table 2. Means of Depression

	Wave I	Wave II	Wave III
Sex			
Men	-0.03	-0.1	-0.23
Women	0.19	0.09	-0.08
Race			
White	-0.02	-0.11	-0.29
Black	0.35	0.28	0.19
Others	0.39	0.36	0.24
Education			
8 years or less	0.39	0.35	0.28
9 to 11 years	0.26	0.25	0.13
12 years	0.02	-0.04	-0.16
13 to 15 years	0.02	-0.11	-0.31
16 years or more	-0.17	-0.3	-0.44
Marital Status at Wave I			
Married	-0.09	-0.11	-0.24
Not married	0.35	0.19	0.03
Marital Status at Wave II			
Married		-0.17	-0.27
Not married		0.25	0.01
Employment Status at Wave I			
Employed	0.01	-0.12	-0.24
Not Employed	0.22	0.19	0.02
Employment Status at Wave II			
Employed		-0.12	-0.25
Not Employed		0.17	-0.01

Table 3. Means and Standard Deviations for Variables by Gender

	Men			Women			T-Test
Variables	Mean	S.D.	N	Mean	S.D.	N	
Social Networks							
Informal network	-0.25	1.06	1,358	0.07	1.01	2,259	-8.83***
Formal network	-0.06	0.99	1,358	0.14	1.02	2,259	-5.75***
Friend/Relative relationship							
Friend/Relative positive relationship	-0.19	1.07	1,358	0.18	0.99	2,259	-6.88
Friend/Relative negative relationship	-0.03	1.01	1,358	-0.08	1.04	2,259	4.01
Family relationship							
Positive relationship	5.14	2.76	1,358	5.85	3.34	2,259	-10.25***
Negative relationship	-0.02	0.85	1,358	-0.14	0.84	2,138	1.54***
Mental Health							
Depression at Wave I	-0.03	0.99	1,358	0.19	1.08	2,259	-6.32***
Depression at Wave II	-0.1	0.97	1,037	0.09	1.04	1,830	-5.02***
Depression at Wave III	-0.23	0.97	880	-0.08	0.99	1,518	-3.58***

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

Table 4. Means and Standard Deviations for Variables by Age

	Less than 65			65 or more			T-Test
Variables	Mean	S.D.	N	Mean	S.D.	N	
Social Networks							
Informal relationships	-0.05	1.1	2,406	-0.05	1.01	1,208	-0.01
Formal relationship	0.02	0.99	2,406	0.16	1.04	1,208	4***
Friend/Relative relationship							
Friend/Relative positive relationship	0.01	1.02	2,406	0.1	1.06	1,208	2.55*

Friend/Relative negative relationship	0.11	1.08	2,406	-0.39	0.84	1,208	-15.09***
Family relationship							
Positive relationship	4.86	2.49	2,406	7.01	3.77	1,208	17.92***
Negative relationship	0.04	0.83	2,365	-0.4	0.79	1,079	-15.02***
Mental Health							
Depression at Wave I	0.14	1.07	2,406	0.06	1.02	1,208	-2.18*
Depression at Wave II	0.02	1.04	1,971	0.04	0.98	894	0.481
Depression at Wave III	-0.14	1.01	1,831	-0.13	0.92	564	0.146

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

Table 5. Means and Standard Deviations for Variables by Education

	8 years or less			Others			T-Test
Variables	Mean	S.D.	N	Mean	S.D.	N	
Social Networks							
Informal relationships	-0.4	1.16	726	0.04	0.99	2,891	-9.52***
Formal relationship	-0.02	1.02	726	0.09	1.01	2,891	-2.58*
Friend/Relative relationship							
Friend/Relative positive relationship	-0.09	1.2	726	0.07	0.98	2,891	-3.31**
Friend/Relative negative relationship	-0.3	0.97	726	0	1.04	2,891	-7.47***
Family relationship							
Positive relationship	2.26	1.26	726	3.89	1.43	2,891	-30.25***
Negative relationship	-0.3	0.79	726	-0.03	0.79	2,891	-8.29***
Mental Health							
Depression at Wave I	0.39	1.17	726	0.04	1.01	2,891	7.45***
Depression at Wave II	0.35	1.11	522	-0.05	0.98	2,345	7.47***
Depression at Wave III	0.28	1.15	333	-0.2	0.94	2,065	7.28***

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

	16 years or more			Others			T-Test
Variables	Mean	S.D.	N	Mean	S.D.	N	
Social Networks							
Informal relationships	0.16	0.94	500	-0.08	1.05	3,117	5.3***
Formal relationship	0.28	0.97	500	0.03	1.01	3,117	5.22***
Friend/Relative relationship							
Friend/Relative positive relationship	0.14	0.89	500	0.02	1.05	3,117	2.68**
Friend/Relative negative relationship	-0.07	0.9	500	-0.06	1.05	3,117	-0.34
Family relationship							
Positive relationship	4.78	1.63	500	3.37	1.44	3,117	10.14***
Negative relationship	-0.04	0.69	500	-0.9	0.81	3,117	2.43*
Mental Health							
Depression at Wave I	-0.17	0.92	500	0.16	1.07	3,117	-7.2***
Depression at Wave II	-0.3	0.81	433	0.08	1.04	2,434	-8.67***
Depression at Wave III	-0.44	0.82	407	-0.07	1.01	1,991	-7.95***

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

Table 6. Unstandardized Regression Coefficients of the Mean Value of Depression

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-value	B	t-Value	B	t-Value	B	t-Value
Gender (Male)										
Female	0.154	4.483***	0.097	2.931**	0.124	3.706***	0.148	4.445***	0.158	4.819***
Age	-0.008	-7.449***	-0.004	-3.712***	-0.004	-3.225***	-0.001	-.986	-0.000	0.223
Education	-0.065	-11.56***	-0.047	-8.479***	-0.042	-7.513***	-0.043	-7.852***	-0.044	-6.615***
Race (Black)										
White	-0.308	-8.386***	-0.210	-5.834***	-0.211	-5.882***	-0.200	-5.694***	-0.201	-5.806***
Marital status (Married)										
Not married			0.141	4.186***	0.144	4.289***	0.138	4.199***	0.142	3.622***
Economic hardship			0.211	12.603***	0.205	12.283***	0.184	11.156***	0.177	10.911***
Social networks					-0.100	-4.622***	-0.087	-4.042***	-0.085	-3.995***
Friend/Relative positive support							-0.058	-3.337***	-0.056	-3.260***
Friend/Relative negative hassles							0.145	8.843***	0.091	5.212***
Family positive support									-0.002	-0.218
Family negative hassles									0.172	8.052***
Intercept	1.251	12.38***	0.734	7.102***	.640	6.102***	.518	5.025***	0.471	4.111***
R square	0.127		0.202		0.210		0.247		0.270	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 7. Unstandardized Regression Coefficients of the Changes of Depression by Time

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-Value	B	t-Value	B	t-Value	B	t-Value
Mean of CES-D I, II, and III	-0.007	-2.065*	-0.003	-0.723††	-0.002	-0.629	-0.001	-0.134	0.001	0.318
Gender (Male)										
Female	-0.018	-3.076**	-0.014	-2.520*	-0.015	-2.642**	-0.016	-2.730**	-0.017	-2.883**
Age	0.001	4.200***	0.001	3.249***	0.001	3.146**	0.001	2.570**	0.0003	1.432††
Education	-0.002	-2.157*	-0.003	-2.710**	-0.003	-2.822**	-0.003	-2.700**	-0.003	-2.411*
Race (Black)										
White	-0.015	-2.339*	-0.019	-3.060**	-0.019	-3.044**	-0.019	-3.070**	-0.019	-3.026**
Marital status (Married)										
Not married			-0.016	-2.787**	-0.016	-2.810**	-0.016	-2.783**	-0.019	-2.667**
Economic hardship			-0.009	-3.158**	-0.009	-3.113**	-0.009	-2.975**	-0.009	-2.945**
Social networks					0.003	0.903††	0.003	0.886††	0.003	0.908††
Friend/Relative positive support							0.001	0.346	0.001	0.314
Friend/Relative negative hassles							-0.006	-2.120*	-0.003	-1.067††
Family positive support									0.001	0.597
Family negative hassles									-0.01	-2.571**
Intercept	-0.015	-0.853††	-0.008	0.445	0.011	0.599	0.015	0.801††	0.022	1.045††
R square	0.021		0.031		0.031		0.034		0.037	

†† p ≤ .5 † p ≤ .1 * p ≤ .05 ** p ≤ .01 *** p ≤ .001

Table 8. Unstandardized Regression Coefficients of the Mean Value of Depression (for Men)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-value	B	t-Value	B	t-Value	B	t-Value
Age	-0.008	-4.427***	-0.004	-2.025**	-0.004	-1.966**	-0.002	-0.907	-0.002	-0.854
Education	-0.053	-6.604***	-0.036	-4.300***	-0.032	-3.789***	-0.033	-3.998***	-0.041	-3.946***
Race (Black)										
White	-0.302	-4.942***	-0.230	-3.924***	-0.231	-3.957***	-0.214	-3.731***	-0.203	-3.584***
Marital status (Married)										
Not married			0.186	3.353***	0.182	3.284***	0.177	3.257***	0.153	2.517*
Economic hardship			0.232	8.323***	0.225	8.054***	0.196	7.090***	0.192	6.987***
Social networks					-0.092	-2.676**	-0.082	-2.385*	-0.089	-2.585**
Friend/Relative positive support							-0.044	-1.685	-0.042	-1.626
Friend/Relative negative hassles							0.152	6.000***	0.097	3.468***
Family positive support									0.014	-0.877
Family negative hassles									0.155	4.501***
Intercept	1.092	6.767***	0.585	3.566***	0.524	3.177**	0.424	2.620**	0.468	2.653**
R square	0.100		0.187		0.194		0.237		0.257	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 9. Unstandardized Regression Coefficients of the Changes of Depression by Time (for Men)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-Value	B	t-Value	B	t-Value	B	t-Value
Mean of CES-D at W I, II, and III	0.008	1.323††	0.010	1.597††	0.011	1.718†	0.011	1.803†	0.012	1.897†
Age	0.001	2.114*	0.001	1.799†	0.001	1.775†	0.001	1.668†	0.000	0.568
Education	-0.001	-1.004††	-0.002	-1.151††	-0.002	-1.349††	-0.002	-1.312††	-0.003	-1.709†
Race (Black)										
White	-0.012	-1.148††	-0.013	-1.239††	-0.012	-1.212††	-0.012	-1.202††	-0.013	-1.269††
Marital status (Married)										
Not married			-0.006	-0.612	-0.006	-0.587	-0.006	-0.601	-0.012	-1.118††
Economic hardship			-0.005	-0.925††	-0.004	-0.833††	-0.004	-0.762††	-0.003	-0.681††
Social networks					0.008	1.339††	0.008	1.254††	0.009	1.404††
Friend/Relative positive support							0.001	0.261	0.000	0.053
Friend/Relative negative hassles							-0.002	-0.487	-8.08E-05	-0.016
Family positive support									0.003	1.212††
Family negative hassles									-0.006	-0.960††
Intercept	-0.016	-0.584	-0.007	-0.233	-0.002	-0.063	-0.001	-0.028	0.016	0.500
R square	0.017		0.019		0.021		0.021		0.024	

†† p ≤ .5 † p ≤ .1 * p ≤ .05 ** p ≤ .01 *** p ≤ .001

Table 10. Unstandardized Regression Coefficients of the Mean Value of Depression (for Women)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-value	B	t-Value	B	t-Value	B	t-Value
Age	-0.008	-5.938***	-0.004	-3.009**	-0.003	-2.454*	-0.001	-0.461	-0.001	0.819
Education	-0.073	-9.903***	-0.054	-7.372***	-0.049	-6.575***	-0.050	-6.809***	-0.048	-5.480***
Race (Black)										
White	-0.312	-6.745***	-0.204	-4.472***	-0.205	-4.510***	-0.197	-4.421***	-0.205	-4.675***
Marital status (Married)										
Not married			0.121	2.833**	0.127	2.979**	0.117	2.802**	0.131	2.554*
Economic hardship			0.201	9.542***	0.196	9.330***	0.179	8.647***	0.173	8.456***
Social networks					-0.105	-3.741***	-0.092	-3.298***	-0.083	-3.013**
Friend/Relative positive support							-0.067	-2.883**	-0.066	-2.894**
Friend/Relative negative hassles							0.141	6.576***	0.090	3.998***
Family positive support									-0.006	-0.607
Family negative hassles									0.181	6.613***
Intercept	1.506	11.929***	0.927	7.006***	0.843	6.315***	0.732	5.568***	0.652	4.413***
R square	0.129		0.199		0.208		0.243		0.268	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 11. Unstandardized Regression Coefficients of the Changes of Depression by Time (for Women)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	t-Value	B	t-Value	B	t-Value	B	t-Value	B	t-Value
Mean of CES-D I, II, and III	-0.015	-3.386***	-0.009	-2.045*	-0.009	-2.015*	-0.007	-1.477††	-0.005	-0.985††
Age	0.001	3.607***	0.001	2.787**	0.001	2.735**	0.001	2.011*	0.000	1.169††
Education	-0.003	-2.052*	-0.003	-2.604**	-0.003	-2.598**	-0.003	-2.434*	-0.003	-2.011*
Race (Black)										
White	-0.016	-2.109*	-0.024	-3.014**	-0.024	-3.010**	-0.024	-3.019**	-0.023	-2.876**
Marital status (Married)										
Not married			-0.021	-2.867**	-0.021	-2.871**	-0.021	-2.792**	-0.022	-2.352*
Economic hardship			-0.011	-2.966**	-0.011	-2.957**	-0.011	-2.866**	-0.011	-2.858**
Social networks					0.001	0.187	0.001	0.222	0.001	0.132
Friend/Relative positive support							0.001	0.162	0.001	0.186
Friend/Relative negative hassles							-0.009	-2.333*	-0.006	-1.391††
Family positive support									0.000	0.200
Family negative hassles									-0.013	-2.608**
Intercept	-0.027	-1.250††	0.005	0.222	0.006	0.246	0.010	0.445	0.014	0.525
R square	0.027		0.042		0.042		0.046		0.051	

†† $p \leq .5$ † $p \leq .1$ * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Endnotes

[1] Health is defined as two different levels, which are physical and mental health. And, many sociologists have documented the relationships between social environments and individuals' health status in either level. According to the previous studies, both of physical health and mental health are closely related to each other (for more details, see Mirowsky et al. 2000: 48).

[2] In fact, there are also some studies that show inverse effects of close social relations on happiness. Antonucci et al found that not all aspects of close relationships were positive and that women might not be necessarily advantaged by having more people with whom they feel close (Antonucci et al. 1998).

[3] According to Waite and Harrison (1992), relatives and friends seem to provide different services within social exchange networks, with family acting as a source of financial and housekeeping aid and friends preferred for companionship (Waite and Harrison. 1992:639).

[4] In terms of the sizes, Booth (1972) has found that male had more friends than females, but female friendship relations to be affectively richer. And it also says no evidence to support the claims that male bonds are stronger than women's.

[5] Family composition is also known as one of the important factors to explain physical health or mortality as well as psychological well-being. For example, Rogers et al shows how family composition is associated to mortality (Rogers, Richard G, Robert A. Hummer, and Charles B. Nam.2000). But, in this study, this variable was not included as a control variable.

[6] However, social networks don't seem to be just influenced by marital status. Social networks are also influential in long term marital relationships for both husbands and wives (Bryant and Conger. 1999).

[7] House, James S. AMERICANS' CHANGING LIVES: WAVE I, II, AND III, 1986, 1989, 1994 [Computer file]. ICPSR version. Ann Arbor, MI: University of Michigan, Institute for Social Research, Survey Research Center [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2003

[8] The survey was designed to investigate the ways in which a wide range of activities and social relationships of American adults. There are three panel data in this data set and each wave was conducted in 1986, 1989, and 1994. Wave I was interviewed with 3,617 persons ages 25 and older. The attritions in Wave I and Wave II are 21% (2,867) and 29% (2,562) of those in Wave I, respectively.

[9] In fact, relatives can be considered as the part of family, but many studies reported that relationship with relatives didn't show the effect as those of family. Since it is close with friends' relationship, I consider this relationship as the part of friends' relationship.

[10] The Center for Epidemiological Studies-Depression Scale (CES-D) is a 20-item instrument that was developed by the National Institute of Mental Health to detect major or clinical depression in adolescents and adults. The CES-D has 4 separate factors: Depressive affect, Somatic symptoms, Positive affect, and Interpersonal relations. The questions are easy to answer and cover most of the areas included in the diagnostic criteria for depression. It has been used in urban and rural populations, and in cross-cultural studies of depression. Studies using the CES-D indicate that it has very good internal consistency, acceptable test-retest stability, and construct validity. The CES-D takes approximately 10 minutes to administer during a client interview or via self-report and is effectively used in a variety of mental health areas including primary care, psychiatric, and related clinical and forensic settings. (For more detail, see Radloff. 1977)

[11] For more details about gender differences in depression, see Table 3.