

## A Statistical Analysis on Living Together without a Traditional and Legal Marriage

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### ABSTRACT

*Nowadays, western culture has greatly influenced the Thai life style including the economy, society and culture. Moreover, it has affected the Thai culture in such a way that it causes Thai undergraduate students not to care about their virginity. This work was aimed to study the attitudes towards living together without a traditional and legal marriage and to obtain personal data of undergraduate students in the city of Chiang Mai. The factors affecting their living together , the proportion of the ones who agreed and did not agree to this idea and the effects of their behavior were also studied.*

*The 453 undergraduate students were sampled from 15 institutes by using the stratified random sampling method. Each institute was treated as a stratum. The numbers of male and female were approximately equal. The analytical statistics in this study were descriptive statistics, nonparametric statistics, categorical principal component analysis ,categorical regression and a correspondence analysis.*

*Personal data and the attitudes towards living together were variables, occurring together in high correlation coefficient of 0.91. At 5 % level of significance, we found that the important personal data : sex, age, institute, education level, marital status of father and mother, residence, incomes, expenses and family debts affected the attitudes towards living together without a traditional and legal marriage. The marital status of father and mother and residence had the highest effect. Most students thought that sex drive, eagerness, western cultural influence, media influence and spending life together were the most important factors. The proportion of the students agreeing to living together without a traditional and legal marriage was at least 80%. The troublesome effects which they were most concerned were pregnancy, abortion and sexually- transmitted diseases, respectively.*

**Key words:** Nonparametric, Catpca, Catreg, Correspondence

### INTRODUCTION

Nowadays, western culture has many effects on the Thai life style in terms of economy, education and especially, society and culture. Western cultural influences lead Thai teenagers to thinking that it is a common matter to have sex and live as a couple without a legal marriage. These ideas cause social problems such as unwanted pregnancy, abortion and abandoned

child. There are many reasons, besides western cultural influences, why Thai teenagers live together without a marriage registration : not experienced, be anxious to know, want to spend life with each other or derive the idea from surroundings, e.g., media, internet, television, friends, seniors, etc. The objectives of this study were to survey the attitudes about living as a couple without a legal marriage and personal data, analyze the factors of living together and the behavior occurring together with personal data and the attitudes towards being a couple and compare the proportion between students who accept living without a legal marriage and students who disagree. We have studied the results of living together without a marriage registration for students in Muang District, Chiang Mai Province, so as to solve and prevent the problems.

### METHODS OF THE STUDY

This research studied the attitudes of students in Muang District, Chiang Mai towards living together without a traditional / legal marriage. The subjects in this study, by the stratified random sampling in proportional allocation, were 453 students : vocational schools, high vocational schools and universities from 15 institutes in Muang District from a total of 71,980 students in Chiang Mai.

In this study, a questionnaire was used to collect teenagers' ideas about living as a couple without a legal marriage. The questionnaire consisted of four parts as follow:

- **Part 1 : Personal Data**

Subjects were required to complete 16 items which related to : sex, age, domicile, education institute, education level, number of brothers/ sisters and order of birth, residence, having friends who were living as a couple without a legal marriage, satisfaction with family relationships, family monthly income, balancing in income and expenses, family debt, loaning for education, student's food allowance, monthly expenses, marital status of father and mother , relationship with guardian and guardian's marital status.

- **Part 2** : The opinion about being a couple without a legal marriage consists of the point , the factor and the media which affect living together without marriage registration.

- **Part 3** : The opinion about the marriage registration

- **Part 4** : The result of being a couple without a traditional / legal marriage.

This research was conducted by using descriptive statistics, correlation between 2 variables, nonparametric statistics, categorical principal component analysis, categorical regression and a correspondence analysis.

### Data Analysis

According to the attitudes of 453 students in Muang District about living as a couple without a legal marriage, 50.1% of the students were male (227 male students) which was comparable to female (226 female students). It was found that 49.8% were immature students (15-19 years old) and 50.2% mature students (20-25 years old). 51.4% were university students and 48.6% college students. 17.0% were vocational students, 22.3% high vocational students and 60.7% bachelor's degree students. Most students stayed with father and mother who live together or with friends who lived as a couple without a legal marriage. They were satisfied

with their families' friendship. Family income was about 10,000 Baht (\$US250) per month but it was enough for expense and did not owe debt. They did not need loan for education because their families supported fees and their expenses which was between 2,001-3,500 Baht (\$US50 - \$US90) per month. Most guardians who were not father or mother were single. We can analyze the data as the objectives as follow :

**The attitudes about being a couple without a legal marriage of students.**

**1. The analysis of the relationship between 2 variables.**

**1.1 Find the correlation coefficient and test the relationship of 2 variables using Uncertainty Coefficient ( Norusis, 2000 ; SPSS/FW Statistical Algorithms, 2005)**

Uncertainty Coefficient (U) is the statistics which is adapted from the Likelihood-Ratio Chi-square, and used for finding out the relationship of 2 nominal scales. U has a value between 0 and 1. If it is close to 1, it means that these 2 variables are highly correlated. If it is close to 0, it means that these 2 variables are not correlated . This correlation coefficient is directional measure or asymmetric measure and symmetric measure.

Where  $f_{ij}$  is the observed frequency for  $X = i, Y = j$   
 $E_{ij}$  is the expected frequency for  $X = i, Y = j$

$W = \sum_{i=1}^r \sum_{j=1}^c f_{ij}$  is the total of frequency

$c_j = \sum_{i=1}^r f_{ij}$  is the total of observed frequency for  $Y = j$

$r_i = \sum_{j=1}^c f_{ij}$  is the total of observed frequency for  $X = i$

**Asymmetric Measure, where Y is dependent variable having C level, and X is independent variable in r level**

We can calculate correlation coefficient ( $U_{Y/X}$ ) by :

$$U_{Y/X} = \frac{U(X) + U(Y) - U(XY)}{U(Y)}$$

Where  $U(X) = - \sum_{i=1}^r \frac{r_i}{W} \ln \left( \frac{r_i}{W} \right)$

$$U(Y) = - \sum_{j=1}^c \frac{C_j}{W} \ln \left( \frac{C_j}{W} \right)$$

and  $U(XY) = - \sum_{i,i} \frac{f_{ij}}{W} \ln \left( \frac{f_{ij}}{W} \right)$

**Symmetric Measure**

We can calculate correlation coefficient

$$U = 2 \left[ \frac{U(X) + U(Y) - U(XY)}{U(Y) + U(Y)} \right]$$

### Testing hypothesis about the correlation between 2 variables in nominal or ordinal scales

To test whether the independent variable affects the dependent variable or not by using the hypothesis as follow:

$H_0$  : Both variables are independent

$H_1$  : Both variables are dependent

We use : Likelihood-Ratio Chi-square ( $\chi^2_{LR}$ )

$$\chi^2_{LR} = -2 \sum_{ij} f_{ij} \ln \left( \frac{E_{ij}}{f_{ij}} \right) \quad \text{where} \quad E_{ij} = \frac{R_i C_j}{W}$$

The degrees of freedom are  $(r-1)(c-1)$

Tests of significance at 0.05 level

The hypothesis is accepted if p-value or Sig  $\chi^2_{LR} > 0.05$

The hypothesis is rejected if p-value or Sig  $\chi^2_{LR} < 0.05$

#### 1.1.1 Analyze the relationships of 2 variables between the attitudes about being a couple without a legal marriage (dependent variable) and personal data (independent variable).

At the level of significance 0.05, we got the attitudes as follow:

**It is a common matter** : resulted from age, institute, education level, having as a couple friends, debt in families, the guardian relationship and the guardian's status.

**It is a private right** : resulted from sex, institutes, the balance of income and expense and the monthly expense.

**It is easy to break up without problems** : resulted from institute, education level, the satisfaction in families' friendship, having loans for education, receiving fees from family, the guardian relationship and the guardian's status.

**It is a way to prove true love before marriage registration** : resulted from sex, institute, education level, family monthly income and the guardian's status.

**It was contradictory to Thai culture** : resulted from sex, age, residence, family monthly income and the guardian's status.

**It is a female disadvantages / destroys female dignity** : resulted from sex, age, residence, family monthly income and expense and the guardian's status.

**It is quite dangerous and unsafe** : resulted from sex and education level

#### 1.1.2 Analyze the relationship of 2 variables between personal data and the most important factor in living as a couple without a legal marriage.

At the significant level 0.05, it was found that

Personal data, which are sex, age, educational level, family's debt and monthly expense were the most important factors in living as a couple without a legal marriage .

### 1.2 Find the correlation coefficient and test the relationship of 2 variables by using contingency coefficient (Norusis, 2000 ; SPSS/FW Statistical Algorithms, 2005).

Contingency coefficient (C) is used to measure the relationship of 2 nominal variables which can indicate the degree of relationship but not the direction .

$$C = \sqrt{\frac{x^2}{x^2 + N}}$$

for  $0 < C < 1$

by 
$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Let  $O_{ij}$  is the observed frequency  
 $E_{ij}$  is the expected frequency  
 $N$  is total sample

The degrees of freedom are  $(r - 1)(c - 1)$

For testing hypothesis about the relationship between 2 variables.

At the significant level 0.05

The hypothesis is accepted if p-value or Sig  $\chi^2 > 0.05$

The hypothesis is rejected if p-value or Sig  $\chi^2 < 0.05$

The most important factors that lead Thai students to be as a couple without a legal marriage were as follow:

Getting to know each other, curiosity, sex drive, love and warmth, imitating western culture, easy to break up without problems, having a couple experience, imitating media action, having no experience, help in studying / working, money benefit, saving, to be ironic to their families, and having a counselor ,respectively.

At the significant level 0.05, we can conclude that

Sex, age,institute, education level, family's debt and family's expense were the most important factors that they chose to live as a couple without a legal marriage.

**Sex : males and females** thought that an eagerness and sex drive were the two most important factors in their decision making which got the same proportion of male and female.

When classified by institution (university and college), the first factor of the university students is learning about each other, and the imitation of western culture, sex drive and the curiosity were the following factors while the college students believed that learning about each other was the most important factor and the curiosity , love and warmth, sex drive and the imitation of western culture followed respectively.

## 2. The analysis of the relationship among several variables ( personal data and the attitudes towards being a couple with optimal scaling using Categorical Principal Components Analysis (Meulman and Hieser, 2003).

This procedure simultaneously qualifies categorical variables while reducing the dimensionality of the data. Categorical principal components analysis is also known by the acronym **CATPCA**.

The goal of the principal components analysis is to reduce an original set of variables into a smaller set of uncorrelated components that represent most of the information found in the original variables. The technique is most useful when a large number of variables prohibits effective interpretation of the relationships between objects (subjects and units). By reducing the dimensionality, we interpret a few components rather than a large number of variables.

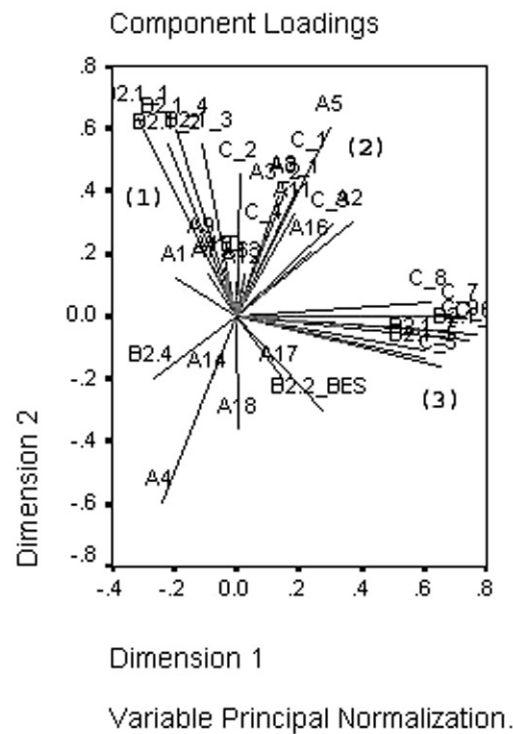
For personal data and the students' attitudes, draw a graph by using CATPCA as Table 1 and Figure 1.

**Table 1.** The relation among different variables.

Model Summary		
Dimension	Cronbach's Alpha	Variance Accounted For
		Total (Eigenvalue)
1	.812	4.774
2	.769	3.975
Total	.910(a)	8.748

a Total Cronbach's Alpha is based on the total Eigenvalue.

From Table 1, since the two dimensional solutions account for 91.0% of the variance (Cronbach's Alpha = 0.910), Dimension 1 can explain the variation of these variables better than Dimension 2 or other dimensions because the Eigenvalue is higher. A third dimension probably would not add much more information.

**Figure 1.** Component Loading of different variables in each dimension.

From Figure 1, we can group variables into 3 factors : factor (1), factor (2), and factor (3). The joined variables were as follow:

Factor (1) : The attitudes about living together without a legal marriage. It is common matter (B2.1\_1), it is a private right (B2.1\_2), it is easy to break up without problem. B2.1\_3) and it is better to live together to prove true love before marriage registration (B2.1\_4). These factors always occurred with personal data , sex (A1), number of brothers

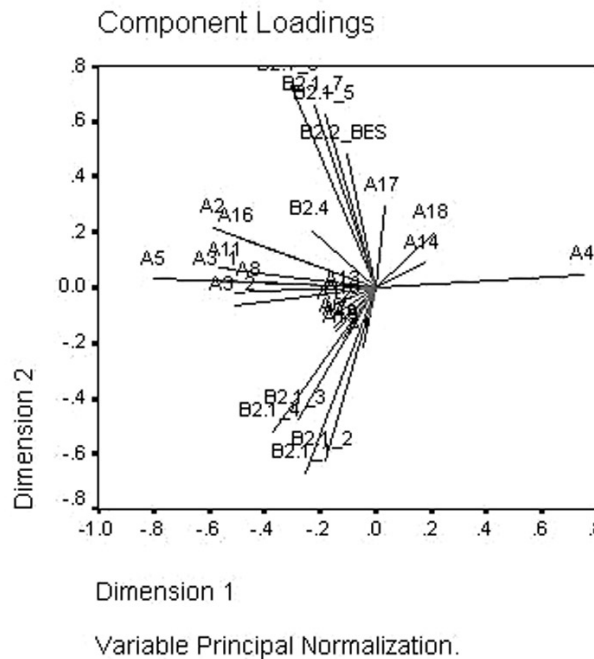


and sisters (A6), order of birth (A7), residence (A8), having friends who are living together without a legal marriage (A9), satisfaction with family relationship (A10), family monthly income (A11), family debt (A13) and receiving fees from family (A15). On the other hand, the variables occurring together which is in negative direction to factor (1) is marital status of father and mother (A17) and the most important factor towards living without a legal marriage (B2.2\_BES)

Factor (2) : The attitudes about legal marriage is as follow: It is bound action (C\_1), a marriage certificate is just a piece of paper, not important. (C\_2), it depends on complete responsibility (C\_3), it is only a legal act, it cannot guarantee long-lasting love (C\_4). These factors always occur together to personal data as follow : age (A2), province (A3\_1), portion (A3\_2), education level (A5), balancing in income and expense (A12) education institute (A4), loaning for education (A14), relationship with guardian (A18) and effective media (B2.4).

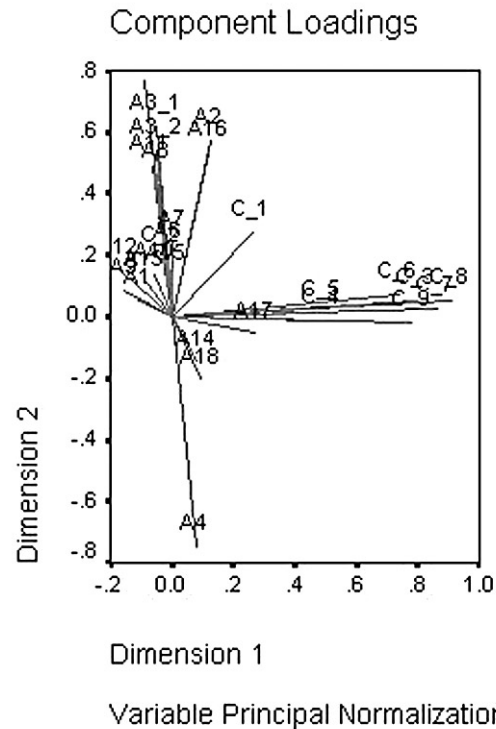
Factor (3) : The attitudes occurring together about being a couple are as follow : It is contradictory to Thai culture (B2.1\_5), it is a female disadvantage / destroy female dignity (B2.1\_6), it is quite dangerous and unsafe behavior. (B2.1\_7), it is better to register a marriage certificate before being a couple (C\_5), it is a responsible action and keeps female's dignity (C\_6), to have mutual confidence (C\_7), it is useful for their children (C\_8) and registering the marriage certificate is a legal act (C\_9), marital status of father and mother (A17) and the most important factor towards being a couple without a legal marriage (B2.2\_BES).

From Table 1 and Figure 1, we found the coefficient of relationships among personal data and the attitudes towards living together to be 0.91 and occurred together. From factors (1) and (2) in Figure 1, it is found that the marital status of father and mother (A17) has an influence on both attitudes: register and not register as in Figures 2 and 3 .



**Figure 2.** The component loading of personal data and the attitudes about marriage without certificate.

From Figure 2, the relation between personal data and attitudes towards being a couple without a legal marriage (Cronbach's Alpha) is 0.888.



**Figure 3.** The component loading of personal data and the attitudes about legal marriage .

From Figure 3, the relation between personal data and the attitudes about marriage registration (Cronbach's Alpha) is 0.897. It is found that the marital status of father and mother (A17) has a strong influence on the attitudes which should register marriage certificate before living together (C\_5) and marriage registration is a legal act (C\_9).

### 3. The relation of several variables by using Categorical Regression (Meulman and Hieser, 2003 ; Norusis,2003).

Categorical regression quantifies categorical data by assigning numerical values to the categories, resulting in an optimal linear regression equation for the transformed variables. Categorical regression is also known by the acronym CATREG, for categorical regression.

CATREG extends the standard approach by simultaneously scaling nominal, ordinal and numerical variables. The procedure quantifies categorical variables such that the quantifications reflect characteristics of the original categories. The procedure treats quantified categorical variables in the same way as numerical variables. Using nonlinear transformations allows variables to be analyzed at a variety of levels to find the best – fitting model. In contrast to the regression coefficients, this measure defines the importance of the predictors additively as follow :

The importance of a set of predictors is the sum of the individual importance of the predictors. Pratt's measure equals the products of the regression coefficient and the zero-order correlation for a predictor.



The standardized coefficients (Beta) : The sign of the coefficient indicates whether the predicted response increases or decreases when the predictor increases, all other predictors being constant.

3.1 Analyze relation of independent variables on the attitudes about registration marriage before living as a couple, we get Table 2.

Table 2. The effective variables about registration marriage before living as a couple.  
1: Strongly Agree 2: Agree 3: Undecided 4: Disagree 5: Strongly Disagree

Independent Variables	Standardized Coefficients		df	F	Sig F (p-value)	Importance
	Beta	Std. Error				
Sex	-0.100	0.047	1	4.580	0.033	0.102
Residence	-0.178	0.047	5	14.332	0.000	0.265
Family's monthly income	-0.110	0.049	2	4.989	0.007	0.068
Balancing of family's income and expense	0.153	0.053	1	8.514	0.004	0.093
Family's debt	0.105	0.051	2	4.265	0.015	0.052
Educational Grade	0.127	0.047	4	7.148	0.000	0.144
Marital status of father and mother	0.166	0.047	4	12.281	0.000	0.191
The relationship with guardian	-0.102	0.047	4	4.697	0.001	0.086

Dependent Variable: C\_5

From Table 2, residence ,marital status of father and mother, educational grade and sex have important effects on the attitudes about registration marriage before living as a couple, respectively. The importance of combining residence and the marital status of father and mother is 45.60% ( $0.265+0.191=0.456$  ). When we compared the relation of all of independent variables in Table 2 to the attitudes about registration marriage before living as a couple ( dependent variable), it is found that family's income and sex have negative relation to the attitudes about registration marriage before living as a couple. For example, if a family has less income and the sex is male, he will disagree with living as a couple with a legal marriage.

3.2 Analyze relation of independent variables on the marriage registration as legal act. We get Table 3 .

**Table 3.** The effective variables on the marriage registration as a legal act  
1: Strongly Agree 2: Agree 3: Undecided 4: Disagree 5: Strongly Disagree.

Independent Variables	Standardized Coefficients		df	F	Sig F (p-value)	Importance/Importance
	Beta	Std. Error				
Age	0.254	0.060	1	18.012	0.000	0.178
Educational Level	-0.159	0.054	1	8.808	0.003	0.126
Educational Grade	-0.126	0.053	4	5.607	0.000	0.051
Residence	0.092	0.050	5	3.305	0.006	0.004
Family's monthly income	-0.094	0.047	1	3.960	0.047	0.074
Marital status of father and mother	-0.209	0.046	4	20.461	0.000	0.372
The relationship with guardian	0.159	0.049	4	10.302	0.000	0.195

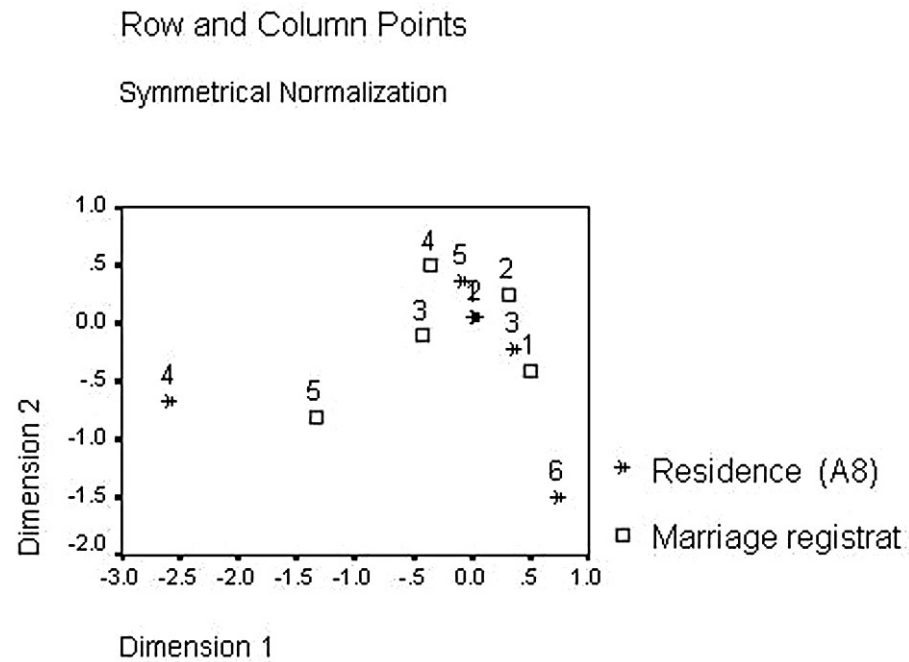
Dependent Variable: C\_9

Table 3 shows that the marital status of father and mother, the relationship with guardian, age and educational level have important effects on the marriage registration as a legal act, respectively. The importance of combining the marital status of father and mother and guardian relationship is 56.70% ( $0.372+0.195=0.567$ ). When we compared the relation of independent variables in Table 3 to the attitudes about the marriage registration as a legal act (dependent variable), the higher education students will more with marriage registration as a legal act.

#### **4. The relationship between the variables towards being a couple with marriage registration and personal data by Correspondence Analysis (Greenacre, 1993; Meulman and Heiser, 2003).**

Correspondence Analysis: One of the goals of correspondence analysis is to describe the relationships between two nominal variables in a correspondence table in a low-dimensional space, while simultaneously describing the relationships between the categories for each variable. For each variable, the distances between category points in a plot reflect the relationships between the categories with similar categories plotted close to each other. Projecting points for one variable on the vector from the origin to a category point for the other variable describe the relationship between the variables.

From the relation of several variables by Categorical Regression in Tables 2 and Table 3, the analysis of sub-relationship between the value of independent variable and dependent variable is shown by the following chart by Correspondence Analysis, the chart is shown in Figure 4.



**Figure 4.** The relationship between the students’ residence and attitudes about the marriage registration before being a couple.

\* Residence (A8)

- 1: father and mother      2: friend      3: consin
- 4: couple                      5: alone      6: other

Marriage registration before being a couple (C\_5)

- 1: strongly agree      2: agree      3: undecided
- 4: disagree              5: strongly disagree

From Fig. 4 , it is obvious that the group with the students’ residence as stay alone (A8 = 5) not agree to this idea (C\_5 = 4). The students’ residence as stay with father and mother (A8=1 and 2) agree to this idea (C\_5=2). The students’ residence as stay with cousin (A8 = 3) strongly agree to this idea (C\_5=1).

Accordingly, it can be concluded as the following details : The students with high monthly income agreed to this idea , senior students did not agree to this idea, the student who got separated and divorced father and mother did not agree to this idea. Most of the students liked to get legal marriage if they were ready to get married.

**5. Comparing the student’s attitude by using the proportion.**

- **Find the proportion of single population by Binomial Test** (Chao, 1974; Norusis, 2000; SPSS/W Statistical Algorithm, 2005).

The consequence of the students’ attitudes towards living without a legal marriage is as follow:

- 1 : Strongly Disagree 2 : Disagree 3 : Undecided 4 : Agree 5 : Strongly Agree

We can divide into 2 groups:

- 1. Disagree with group derived from Strongly Disagree and Disagree.

We did not analyze undecided group.

2. Agree with group derived from Agree and Strongly Agree.

At the significant level 0.05, we can conclude that

- There are more than 80% of students who agree to live as a couple without a legal marriage. The opinion is a common matter, it is a private right, easy to break up without problems, it is a way to prove true love before marriage registration, it is contradictory to Thai culture, it is a female disadvantage / destroy female dignity and it is quite dangerous and unsafe.

- There are more than 80% of the students who agree to live as a couple with a legal marriage, except it is a bound action. A marriage certificate is just a piece of paper, not important, it depends on complete responsibility. It is only a legal act, it cannot guarantee long-lasting love. Male should take responsibility for female. They will have mutual confidence, and it is good for their children. However, there are more than 80% of students that agree to live as a couple with legal marriage.

#### **6. The effect of living as a couple without tradition/legal marriage by Mann-Whitney U Test (Chao,1974; Christopher ,1978; Norusis ,2000).**

We found that both males and females in the universities and colleges have the same opinion that the problems are unprepared pregnancy, abortion and sexually- transmitted diseases, respectively.

### **CONCLUSION**

The subjects for the study were 453 students by using a stratified random sampling method, selected from 15 institutes in Maung District, Chiang Mai. At the significant level 0.05, we can conclude that :

The important personal data in living together without a traditional/legal marriage are sex, age,institute, education level, guardian's status and relationship, balance of income and expense, monthly expense, loaning for education, family debt, receiving fees from family and the satisfaction with family relationship. These variables affected students' ideas as follow: it is a common matter, a private right, easy to break up without problems, a way to prove true love, contradiction to Thai culture, female disadvantage and destroys female's dignity, it is dangerous and unsafe, respectively.

The effective basic variables to affect attitudes of being a couple are sex, residence, having friends who live together without a legal marriage, the marital status of father and mother, satisfaction in family's friendship, family's monthly income, family's debt, etc, with correlation coefficient (Cronbach's Alpha) 0.910 .

The basic variables that have the strongest effect on being a couple without a legal marriage are sex, age, education level, family debt and monthly expense.

The effective variables towards marriage registration before living together are residence, the marital status of father and mother, educational grade, sex, balancing of family's income and expense, the relationship with guardian, family monthly income and family's debt.

The effective variables towards the marriage registration as a legal act are the marital status of father and mother, the relationship with guardian, age, educational level, family's monthly income, educational grade and residence.

The opinion of being a couple without a legal marriage is the common matter, it is private right, easy to break up without problems, and a way to prove true love, has the proportion of agreed students more than those who disagree.

In the opinion of the marriage certificate being bound, just a piece of paper, not important because depending on complete responsibility and being only a legal act, has the proportion of agreed students more than those who disagree.

Most of the students like to get a legal marriage, if they are on complete responsibility.

Both males and females have the same idea that the unprepared pregnancy is the first problem, and the followings are abortion and sexually-transmitted diseases, respectively.

As for institute, we found that the students in both universities and colleges have the same idea that the unprepared pregnancy is the first problem, and followings are abortion and sexually-transmitted diseases, respectively.

The relation between personal data and attitudes towards being a couple without a legal marriage (Cronbach's Alpha) is 0.888 and the relation between personal data and the attitudes about marriage registration (Cronbach's Alpha) is 0.897.

The students' residence, marital status of father and mother, educational grade and sex have importance to the attitudes about registration marriage before living as a couple, respectively. The marital status of father and mother, the relationship with guardian, age and educational level have importance to the marriage registration as a legal act, respectively.

## RECOMMENDATION

There are many advantages and disadvantages about living together without traditional / legal marriage. These choices depend on the individual. However, if you are still a student and want to learn more about your lover's behavior, the researchers think that you should pay more attention to your education because you cannot return to correct your mistake in the past as in the research's result. The first problem is the unprepared pregnancy which can upset your beautiful dream for the future.

## REFERENCES

- Chao, L.L. 1974. Statistics methods and analyses, McGraw-Hill Kogakusha, Ltd..
- Christopher, C. 1978. Statistics for technology, A course in applied statistics. London, Chapman and Hall, A Halsted Press Book, John Wiley & Son, New York.
- Greenacre, M. 1993. Correspondence analysis in practice. New York: Academic Press.
- Hempisut, P., and S. Saimuk. 2003. The expense behavior of students in the Faculty of Sciences, Chiang Mai University. Independent Study, Chiang Mai University, Chiang Mai.
- Inmamai, T. 1999. The attitude in finding a mate of Chiang Mai University's students. Independent Study, Chiang Mai University, Chiang Mai.
- Johnson, R.A., and D.W. Wichern. 1992. Applied multivariate statistical analysis, New Jersey.
- Khumpong, N. 2004. Lisa Weekly: (39<sup>th</sup> Ed), Siri Wattana Publishing, Bangkok.
- Meulman, J. J., and W.J. Hieser. 2003. SPSS Categories 10.0. SPSS. Inc. Chicago, Illinois.

- Michailidis, G., and J.D. Leeuw. 2004. The Gifi system of descriptive multivariate analysis, Available:<http://www.stat.ucla.edu>.
- Mookaew, S. 2002. Being a couple without marriage of universities' students. Unpublished Master's thesis, Thammasat University, Bangkok.
- Norusis, M. J. 2000. SPSS Base 10.0 User's Guide, SPSS. Inc, Chicago, Illinois.
- Norusis, M. J. 2003. SPSS Regression Models 10.0. SPSS. Inc. Chicago, Illinois.
- Pattamasingh, W. 2004. Lisa Weekly : (39<sup>th</sup> Ed), Siriwattana Publishing, Bangkok. SPSS/FW Statistical Algorithms (2005), SPSS. Inc. Chicago, Illinois. [www.spss.com/tech/stat/algorithms.htm](http://www.spss.com/tech/stat/algorithms.htm).
- Sripunpreecha, N. 2004. Lisa Weekly : (39<sup>th</sup> Ed), Siriwattana Publishing, Bangkok.
- Woradilok, Warongchanok. 2004. Lisa Weekly : (39<sup>th</sup> Ed), Siriwattana Publishing, Bangkok. [www.dusitpoll.dusit.ac.th](http://www.dusitpoll.dusit.ac.th), [www.elib-online.com](http://www.elib-online.com).