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MULTIVARIATE ANALYSIS TOWARDS IDENTIFYING THE FACTORS CONTRIBUTE TO JUVENILES DELINQUENCY IN JORDAN

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May, 2011

Multivariate Analysis Towards Identifying The Factors Contribute To Juveniles Delinquency In Jordan.

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in the Department of Statistics, Yarmouk University, Irbed, Jordan.

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إلى مَن تَعِبوا لأرتاح، وهيَّئوا لي سُبلَ النَّجاح..

أمي وأبي..

إلى مَن عَشِقت تُرابهُ....جِبالَهُ، سُهولهُ ، هِضابهُ ..

وَطني الغالي..

إلى مَن وقفوا بِجانبي ودَعموني، وفي الضَّراء ساندوني..

أُختَيّ، أحبَّائي، زُملائي و أصدقائي..

أُهدي هذا العَمل المتواضع

مروان الشرمان

Acknowledgments

First of all, I would like to thank ***ALLAH***, Most Gracious, Most Merciful, for what I have achieved so far, and for every grace and success in my life.

Also, I would like to express my deepest respect and gratitude to my supervisor, *Prof. Zeyad Al-Rawi*, and thank him from the bottom of my heart for his scientific assistance, generous help, unlimited patience, and huge support. And I would like to thank the discussion committee.

I want to thank all professors in the Department of Statistics in Yarmouk university, and I would like to give special thanks to *Dr. Moh'd AlOdat*, for his scientific assistance and his time. Thanks for *Prof. Mohammad Fraiwan Al-Saleh* , *Prof. Adnan AL Smadi* From Al-Hajjawi faculty for engineering technology, and *Mr. Abdel-Qader Al-Masri*, for their help and support.

A huge thanks to my family for their support especially my father, *Dr. Jamal Al-Sharman*, who also helped me in data collection. Also, a huge thank to all the people who helped me in data collection: *Mr. Hussein Al- Sheqeerat, Mr. Ala'a Al-Abdalla, Mr. Belal Jawarneh, Mr. Mohammad Awawdeh*, and all staff and employers in rehabilitation centers, and in the Ministry of social development.

A lot of thanks to all my colleagues in the Department of Statistics, and all my friends for their support and encouragement. And very special thanks for *Miss. Amenah Qotineh* for her huge support and limitless encouragement.

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ABSTRACT

AL-Sharman, Marwan Jamal. Multivariate analysis towards identifying the factors contribute to juveniles delinquency in Jordan. Master of Science Thesis, Department of Statistics, Yarmouk University, 2011 (Supervisor: Prof. Zeyad R. Al Rawi).

Juvenile delinquency, is one of the serious problems that may face nations. This study aimed to identify the main factors that may cause this problem, analyzing and clarifying them, and then trying to find solutions to treat the problem. A questionnaire has been delivered to 232 juveniles who were founded in 5 juveniles rehabilitation centers, that distributed in different governorates in Jordan, (Amman (2), Irbed, Zarqa, Ma'an). The questionnaire contains selected questions that inquire about specific information about the juvenile and his/her family. Two main multivariate analysis techniques were used in data analysis: factor analysis, and discriminant analysis. Factor analysis is very useful to clarify the main effective variables, that affect juveniles negatively, and contribute to their delinquency. Also, factor analysis grouped them into factors, and sort them according to their importance. While discriminant analysis is useful in classifying juveniles in subject of some selected conditions, and separate them due to specific features and properties. The study found that juveniles' family atmosphere and stability, are the most important factors among all, and have a clear effect on the juveniles behavior. Then other factors came in a different order like the economic situation of the juvenile and his/her family, the education and rectification, and juvenile labor conditions.

Keyword: Juveniles delinquency, Multivariate analysis, Factor analysis, Discriminant analysis, Directorate of social defense, reformatory.

الملخص

الشرمان، مروان جمال،"استخدام التحليل متعدد المتغيرات لتشخيص العوامل المؤثرة في جنوح الأحداث في الأردن" رسالة ماجستير في العلوم ، قسم الإحصاء، جامعة اليرموك، 2011. (المشرف: الأستاذ الدكتور زياد رشاد الراوي).

ظاهرة انحراف الأحداث هي واحدة من أهم المشكلات التي تواجه الدول. تهدف هذه الدراسة إلى التعرف على أهم العوامل المسببة لهذه الظاهرة وتحليلها وتوضيحها، ومن ثم الخروج بتوصيات قد تساعد على معالجتها. تم توزيع إستبيان لـ232 حدث موزعين على 5 مراكز أحداث في عدة محافظات في الأردن (عمان (2)، إربد، الزرقاء، معان). احتوى الإستبيان على أسئلة محددة للتعرف على بعض المعلومات المحددة عن الحدث وعائلته. تم استخدام أسلوبين من أساليب التحليل المتعدد في تحليل البيانات وهما : التحليل العاملي، والتحليل المُمَيِّز. تجلّت فائدة التحليل العاملي في توضيح أهم المتغيرات المؤثرة سلبياً على الأحداث وتسهم في إنحرافهم. وساهم التحليل العاملي أيضا في عملية تجميع المتغيرات ضمن عوامل، وترتيبها من اجل دراسة أهمها. بينما ساهم التحليل المميِّز بالمساعدة في عملية تصنيف الأحداث حسب صفات أو ظروف مختارة، وتمييزهم حسب بعض الصفات والخصائص المحددة. وقد خلصت الدراسة إلى أن المناخ و درجة الإستقرار العائلي هما أهم العوامل تأثيراً على الأحداث وسلوكهم . ومن ثم أتت العوامل الأخرى بترتيب مختلف مثل العامل الإقتصادي للحدث وعائلته، عامل التربية والتعليم، وعامل عمالة الأحداث.

كلمات مفتاحيّة: جنوح الأحداث، التحليل متعدد المتغيرات ، التحليل العاملي، التحليل المُمَيِّز، مديرية الدفاع الاجتماعي، دار رعاية وتأهيل الأحداث (إصلاحية)

Chapter One

Juveniles in Jordan

1.1 Overview:

The population of Jordan is known to be a youth population[1], and most of families in Jordan have at least one child whose age is between 7 and 18 years (who is called a juvenile). So we are talking about our brothers , sisters, sons, and children who are related to us.

Juveniles delinquency, is one of the most disturbing problems that any country can face, especially developing countries, because they have many difficulties to provide welfare for their people, and to reduce the high rates of poverty that may push people (including juveniles) to make mistakes and take the wrong way.

A total of 6,452 cases of deviated juveniles were reported in 2009 in Jordan. Ministry of social development has rehabilitate 2,914 juveniles, 2,543 were arrested and 371 were convicted (Addustour.com 22/2/2010).

In 2008, the number of juveniles cases showed a big jump in comparison with the corresponding number in 2007, and years before (6,277 in 2008 vs. 5500 in 2007).The average of the cases between the year 2000 and 2007, was between 5300 and 5500 cases. This big jump probably caused by the global economic crisis in 2008 (Addustour.com 15/5/2009).

[1] Median age (years) = 20.3 in Jordan and percentage of population under 15 = 37.3% (Jordanian department of statistics DOS (2006))

In our hands, a big number of cases of deviated juveniles in Jordan, which represents a big challenge to dig deeply in this matter in order to recognize main characters that make juveniles delinquency.

So it is important to investigate the influencing factors that causing juveniles delinquency, and try to find the most effective factors, and then finding solutions to help our society to eliminate the juveniles delinquency problem.

1.2 Tools of the study

Multivariate analysis, is based on the statistical principle of multivariate statistics, which involves observation and analysis of more than one statistical variable at a time. In design and analysis, the technique is used to perform trade studies across multiple dimensions while taking into account the effects of all variables on the responses of interest, Feinstein (1996).

Also, multivariate analysis, is one of the most popular and useful ways to analyze social data that have many elements. And so we want to evaluate their effect ,by using some techniques like Factor analysis and Discriminant analysis.

Factor analysis is a statistical method to analyze data that is affected by many factors, and it helps us to select the most effective factors among the many, Härdle & Simar,(2007). While discriminant analysis, is a statistical technique which allows the researcher to study the difference between two or more groups of objects with respect to several variables simultaneously (Klecka,W. 1980) .

1.3 THESIS OUTLINE

In this study we want to focus on the usefulness of multivariate analysis to investigate and analyze one of the most dangerous and important subjects in the society. So our study will to focus on two important sides:

1. Statistical side.
2. Social side.

We want to measure the effect of some variables (social or economical) on the delinquency of the juveniles that we are studying, and how strong was each variable, that affect the juvenile and make him/her deviate.

In general, our work is a social study in a statistical view, with focusing on the use of some multivariate techniques and illustrating it to get results that will be meaningful in both statistical and social side.

This study aims to determine and evaluate factors that may affect juveniles and make them go the wrong way and choose bad selections. A questionnaire has been delivered to juveniles in the 5 rehabilitation centers in Jordan;(two in Amman, one in Irbed, Zarqa and Ma'an); within the period between September and November 2010, in specific days.

This thesis is organized in the following manner: Chapter I introduces general information about juveniles in Jordan, presents the tools of the study, study action plan, and previous studies and reports about juveniles. Chapter II presents the methodology that has been used for analyzing the data. Chapter III presents some descriptive statistics and charts, with comments and interpretation on them. Then the multivariate analysis with interpretation.

And finally Chapter IV states results, conclusions and recommendations of the study.

1.4 Previous studies and reports:

Although there are many studies, projects and plans to solve the juveniles delinquency problem, it is more important to determine the reasons that make the juvenile takes the wrong way. These are some of studies and reports that discus juveniles issue:

1.4-1. Domestic Studies:

1. Khatatneh (2006) : "The factors of juvenile delinquency in Jordan" which aimed to identify the social factors that make juveniles delinquent. In this study, a questionnaire of 150 question has been delivered to a random sample of 238 juvenile ,detainees and convicts, has been taken from the official records of Juvenile Welfare and rehabilitation Centre in Irbed.

   The study discovered that these juveniles have some social and economical properties: Family disintegration, low rates of education and economic level, that make them doing deviated activities. Also media and bad friends have a big effect on the juvenile behavior.

2. Shannaq (2001) : "Juveniles delinquency in Jordan" aimed to identify the spreading of the juveniles delinquency phenomena, types of the delinquent behavior, features of the deviated juvenile, and the factors that may cause him/her to deviate.

   The research depends on a sample from two rehabilitation centers with total of 60 juveniles (14 juvenile from Irbed, and 46 juveniles from Zarqa). An increasing annual rate of juveniles delinquency in Jordan by (8.75%) has been found. Theft took the 1st

place in juveniles crimes with rate of (64.6%). Moreover, (86.7%) of the sample thought that bad friends were the main reason to made them deviate.

3. Toq (1978) : "Juveniles delinquency in Jordan: an exploratory study", also aimed to find the main factors that make the juveniles delinquency, and try to find some solutions to prevent juveniles from being delinquent, like some useful programs and activities.

The study was made for all Juveniles rehabilitation centers in Jordan, and the results found that there is a high correlation between delinquency and low levels of education and economic. Also the family disintegration plays a clear role in the deviation of juveniles. However, most of juveniles think that bad friends made them deviate.

1.4-2. Arabic studies and reports:

1. Al Harthi (2003) "Effect of the social factors in juveniles delinquency in the delinquent juveniles opinion: a survey done in juveniles rehabilitation centers in Riyadh , Dammam and Breda(KSA)" , in this study, a questionnaire has been delivered to 250 juvenile, the returned questionnaire were 197. As a result, the researcher found that 72% of the sample, were charged with theft. And the most important factors were bad friend and the absence of the parents care. Although, 56% of the sample were living in ordinary families. Also the study found that there is a significant evidence that education level and the region of living can affect juvenile delinquency.

2. Dhaw (2002) "Juveniles delinquency ; reasons and cure: a social field study in juveniles department in Aleppo central prison and female juveniles welfare center in Aleppo (Syria)", discus the general factors that may affect juveniles and drive them to deviate, like low education level where 73.6% of the arrested juveniles were illiterate (uneducated) and 19.86% were primary educated. The economic level also took a place in this study which shows that 62.7% of the arrested juveniles living within families with low economic level. Also the number of family members was studied, the study shows that 67.5% of those juveniles live within families with more than 8 members. 65% of the arrested males are living in public blocks around cities and 66% of the females are from countryside.

3. Al- Azzawi (1997), "using factor analysis in studying the effect of economic sanction on the change of characters of youths committed crimes in Iraq" is talking about the effect of the economical sanction imposed on Iraq after first gulf war 1991, on the characters of deviated juveniles. The study indicates some significant change in some of such characters. For example: the education level which was among the principle common factors (characters) for deviated juveniles before the sanction, was no more of being so after the sanction imposed.

4. Mursi (1993) "Crime professionalism", the study aimed to investigate the main social and cultural factors that affected the deviated juveniles, and their features and behavior. A sample of 82 juveniles were taken from the juveniles rehabilitation center in Alexandria (Egypt), and a questionnaire was delivered to them. The study indicates that there is huge effect for bad friend on juveniles behavior especially when they are in

gangs. Moreover, they teach other juveniles how to do crimes, and delinquent behavior. 86% of the sample think that they were deviated by the effect of bad friends or gangs.

1.4-3. Foreign studies and reports:

1. Indiana Department of Correction (IDOC) in the United States (2008), shows that there were a total of 1,493 released juveniles, but 536 returned within 3 years with rate 35.9% and that rate called the (Recidivism Rate).

2. Mann, Emily A. & Reynolds, Arthur J.(2006). (Early intervention and juvenile delinquency prevention: evidence from the Chicago Longitudinal Study) . This study investigated the role of an early educational intervention and child-, family-, peer-, and school-level predictors on court-reported juvenile delinquency. Data were provided from the Chicago Longitudinal Study, an ongoing investigation of the scholastic and social development of more than 1,500 low-income youths (93% of whom were African American). Preschool intervention was associated with reductions in the incidence, frequency, and severity of juvenile delinquency by age 18. Childhood classroom adjustment, special education placement for an emotional or behavioral disorder, and school mobility were also predictive of delinquency outcomes, as were gender and family and environmental risk status. Findings demonstrate the importance of early intervention and schooling factors in reducing delinquency and highlight the benefits of early intervention as one mechanism for delinquency prevention.

3. The UN's world youth report (2003) has expound that "The process of globalization and the greater mobility of large population groups have led to an increase in criminal activity associated with intolerance towards members of other cultures.

The difficulties encountered by immigrants and their descendents in certain countries are sometimes related to the high levels of group crime deriving from the activities of ethnically based delinquent groups.

- In many cases juvenile crimes are linked to less obvious sources of motivation; various actions may reflect, for example, the standards of particular subcultures, teachings or traditions deriving from religious radicalism, or the compulsion to use of violence as a means of constructing gender identity .
- Quite often, aggressive and criminal behavior is positively portrayed in the media, creating a confused picture of acceptable societal norms within some youth subcultures.
- Children and adolescents in difficult circumstances constitute ready reserves for organized crime, participation in armed conflicts, human and drug trafficking, and sexual exploitation.
- The disintegration of families, poverty, and the death of parents in armed conflict or from HIV/AIDS has led to the forced independence of many young people around the world"

Note that, most of the previous studies used descriptive statistics or simple statistical methods in analysis: like t-test, Chi-squared-test, or/and mean deviation. While Khatatneh (2006), used Descriptive statistics, mean deviation, and factor analysis.

Chapter Two

Methodology

As it was stated before, multivariate analysis will be used to analyze our data, more precisely Factor analysis and Discriminant analysis.

2.1 Factor analysis

Factor analysis is mainly useful for:

I. Reducing a large number of variables to a smaller number of factors for modeling purposes which leads to the so called a reduction of dimensionality.

II. Creating a set of factors to be treated as uncorrelated variables as one approach to handling multicollinearity in such procedure as multiple regression.

III. Identifying clusters of variables (characters), Härdle & Simar (2007).

Types of Factoring that we want to use is the principle component analysis: which seeks first linear combination of variables such that the maximum variance is extracted from the variables then seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. This leads to the common or principal factor analysis, which seeks the least number of factors that can account for the common variance (correlation) of a set of variables, Klecka (1980).

According to this method, we employ a linear relationship between the variables

$X_1, X_2 \ldots\ldots X_p$ which indicates all the observable variables that may affect the juvenile:

Age, Gender, Leaving education,...etc., and the factors $F_1, F_2 \ldots F_m$,reflecting a number of unobservable variables that explain the covariance of the observable variables $X_1, X_2 \ldots\ldots X_p$. The partial correlation between any pair of X's given the values of F's should be approximately equals to zero.

We can write the relationship between observed variables and factors as follows :

$$X_1 - \mu_1 = l_{11} F_1 + l_{12} F_2 + \ldots\ldots + l_{1m} F_m + \varepsilon_1$$

$$X_2 - \mu_2 = l_{21} F_1 + l_{22} F_2 + \ldots\ldots + l_{2m} F_m + \varepsilon_2$$

. ..... (1)

.

.

$$X_p - \mu_p = l_{p1} F_1 + l_{p2} F_2 + \ldots\ldots + l_{pm} F_m + \varepsilon_p$$

Where

X_i : are the observable variables. , $i = 1,2,\ldots,p$

F_j : are the factors. , $j = 1,2\ldots,m$ note that $p > m$

μ_i : is the mean vector and ε_i : is the residuals vector.

l_{ij} : loading of i-th variable on j-th factor showing how each lij individually depends on the F's, where $i = 1,2 \ldots,p$ and $j = 1,2...,m$. In more details, they are the correlation coefficients between the variables and factors. Factor loadings are the basis for imputing a label to different factors. Analogous to Pearson's r, the squared factor loading is the percentage of variance in the variable explained by a factor, which is called: communality.

We can write the previous model in a matrix notation as follows:

$$\mathbf{X} - \boldsymbol{\mu} = \mathbf{LF} + \boldsymbol{\varepsilon}$$

where $\mathbf{X} = (X_1, X_2, \ldots, X_p)^t$, $\boldsymbol{\mu} = (\mu_1, \mu_2, \ldots, \mu_p)^t$, $\mathbf{F} = (F_1, F_2, \ldots, F_m)^t$, $\boldsymbol{\varepsilon} = (\varepsilon_1, \varepsilon_2, \ldots, \varepsilon_p)^t$,

and

$$\mathbf{L} = \begin{pmatrix} l_{11} & l_{12} & \cdots & l_{1m} \\ l_{21} & l_{22} & & l_{2m} \\ \vdots & \vdots & & \vdots \\ l_{p1} & l_{p2} & \cdots & l_{pm} \end{pmatrix}$$

which is the Loading matrix.

The following assumptions are for the orthogonality of the factor model:

1. $E(\mathbf{F}) = 0$ $\quad\quad$ $\mathrm{cov}(\mathbf{F}) = E(\mathbf{F}\mathbf{F}^t) = I$ (identity matrix)

2. $E(\boldsymbol{\varepsilon}_i) = 0$ $\quad\quad$ $\mathrm{cov}(\boldsymbol{\varepsilon}_i) = E(\boldsymbol{\varepsilon}\boldsymbol{\varepsilon}^t) = \psi_{pxp}$ which is a diagonal matrix.

$\mathrm{var}(\boldsymbol{\varepsilon}_i) = \boldsymbol{\psi}_i$, and $\mathrm{cov}(\boldsymbol{\varepsilon}_i, \boldsymbol{\varepsilon}_k) = 0$, $i \neq k$. $\quad\quad$ $\boldsymbol{\psi}_i$: represents the specific variance relates to the variability in X_i not shared with other variables.

3. F and Ɛ are independent.

The variance of X_i's :

$$Var(X_i) = l^2_{i1} + l^2_{i2} + \ldots\ldots + l^2_{im} + \psi_i = h^2_i + \psi_i$$

Note that $(l^2_{i1} + l^2_{i2} + \ldots\ldots + l^2_{im}) = h^2_i$ which are the communalities, and represents the portion of the variance shared with other variables via the common factors with $0 \leq h^2_i \leq 1$,

When communalities values are close to 1, this indicates the high correlation between the observed variable and the factor, and when communalities values are equal to 0, this means that the loadings for the variable are equal to zero too, and the factors do not explain any part of the variable variance.

Variance- covariance matrix ($\sum$) of variables $X_1, X_2 \ldots\ldots, X_p$, then can be written as:

$$\text{cov}(\mathbf{LF} + \sum) = \text{cov}(\mathbf{LF}) + \text{cov}(\sum)$$

$$= \mathbf{L}\,\text{cov}(F)\,\mathbf{L}^t + \psi$$

$$= \mathbf{L}\,\mathbf{I}\,\mathbf{L}^t + \psi$$

$$\sum = \mathbf{L}\mathbf{L}^t + \psi \ldots\ldots (2)$$

where

$$\mathbf{L} = [\sqrt{\lambda_1}e_1 \quad \sqrt{\lambda_2}e_2 \quad \sqrt{\lambda_3}e_3 \quad \ldots\ldots \sqrt{\lambda_p}e_p]$$

and : $\lambda_1 > \lambda_2 > \lambda_3 \ldots\ldots > \lambda_p$ represent the eigen-values and

$$e_i = \begin{bmatrix} e_{i1} \\ e_{i2} \\ \cdot \\ \cdot \\ e_{ip} \end{bmatrix}$$

represent the eigen vector corresponding to the i-th eigen-value.

The contribution of the common factors Fi is equal to

$$\frac{\lambda_i}{p} \quad \text{for the correlation matrix (R), or}$$

$$\frac{\lambda_i}{S_{11} + S_{22} + \cdots + S_{pp}} \quad \text{for the variance – covariance matrix (S).}$$

2.1-1 Factor Rotations:

The use of factor rotation is mainly because this procedure simplifies the factor structure and therefore makes its explanation easier and more reliable, and to place the axes close to as many points as possible, Rencher (2002). Also, we want to get a rotation in which every point is as near as possible to the axis, so each variable has a high loading on the factor corresponding to the axis and loads less on the remaining factors, the previous result of such process called *simple structure.*

We can identify a simple structure by Thurstone five criteria[see Abdi (2003)], according to these criteria, the loading matrix (**L**) is simple if:

1. each row contains at least one zero;

2. for each column, there are at least as many zeros as there are columns

(i.e., number of factors kept fixed):

3. for any pair of factors, there are some variables with zero loadings on one

factor and large loadings on the other factor;

4. for any pair of factors, there is a sizable proportion of zero loadings;

5. for any pair of factors, there is only a small number of large loadings.

There are two main types of rotations:

- Orthogonal Rotations.
- Oblique Rotations.

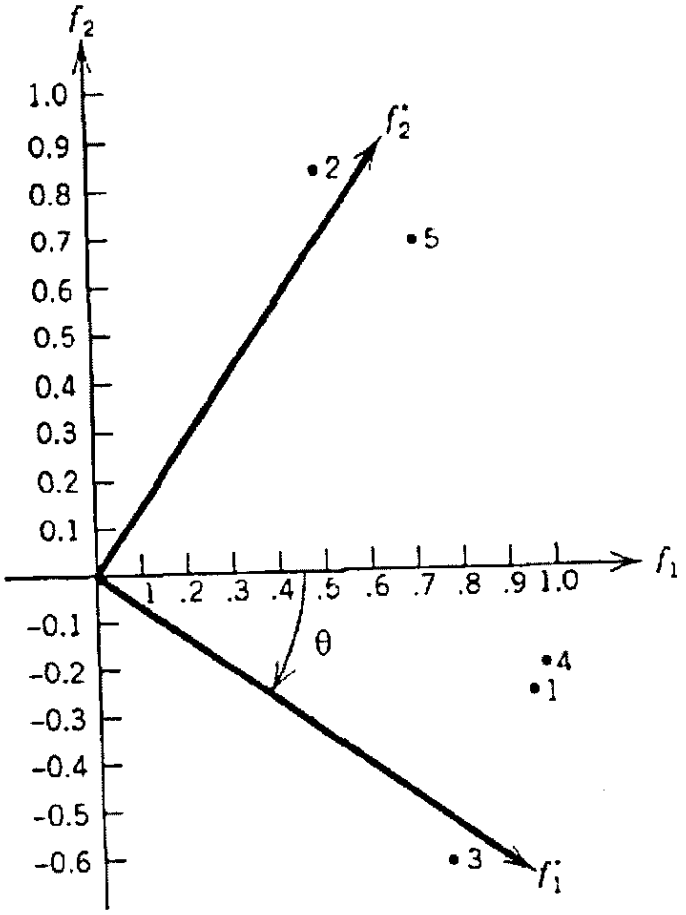
I. *Orthogonal Rotations*:

Which is used for orthogonal Loadings matrix, the original perpendicular axes are rotated rigidly and remain perpendicular. Moreover, angles and distances are preserved, communalities remains the same, Rencher (2002).

In the case of two factors, and therefore two loadings, we chose an angle which when we rotate the axis it will be close to grouping points. The new loadings L* can be measured directly on the graph as coordinates of the axes or we can calculate it from the following formula:

L* =LT

Where $T = \begin{pmatrix} cos\theta & -sin\theta \\ sin\theta & cos\theta \end{pmatrix}$ and θ is the rotation angle.



Figure(2.1): Orthogonal rotation for two factors and five variables . Rencher (2002).

f^*_1 and f^*_2 are the two rotated factors, and points numbered from 1 to 5 represent the loadings.

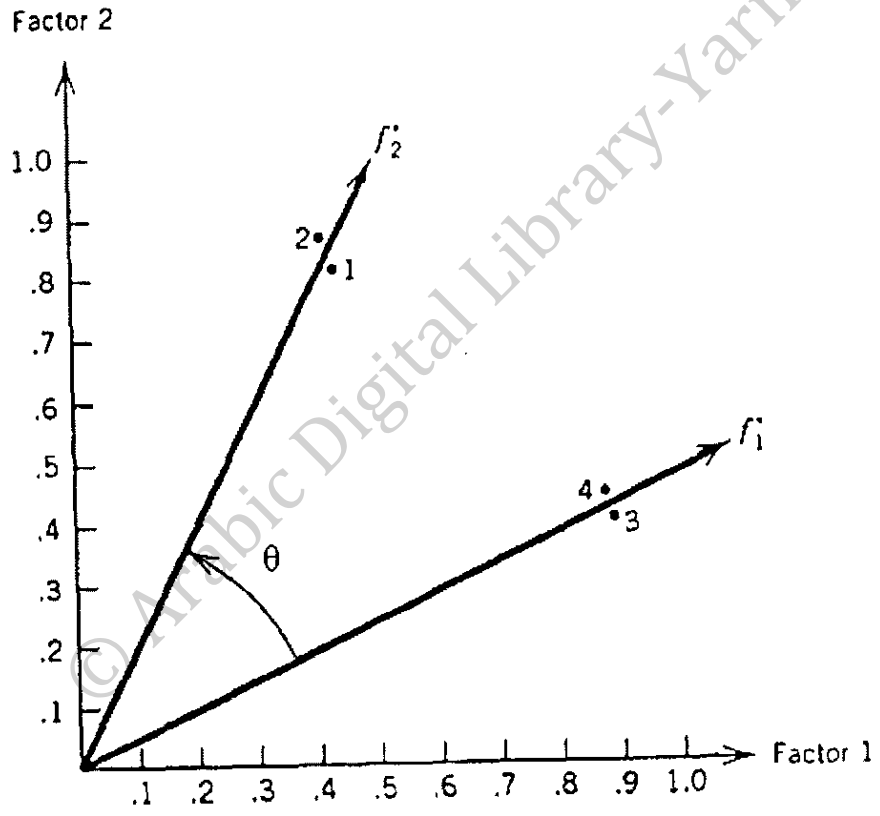
If we have more than two factors we use *Varimax Rotation*, which was developed by Kaiser(1958) [see Abdi (2003)], and the main purpose of this procedure is to make the loadings either large or small to make the interpretation easier, also we want to maximize the variance, of the loadings in order to maximize:

$$V = \sum(l^2_{pm} - \bar{l}^2_{pm})^2$$

Where l^2_{pm} is the squared loading of the p-th variable on the *m* factor, and $\bar{l}^2_{pm}$ is the mean of the squared loadings. Abdi (2003).

II. Oblique Rotations:

In this type of rotation, the new axes do not remain perpendicular, so it is free to take any position in the factor space, and with no constraint on the orthogonality, to make the interpretation simpler.



Figure(2.2): Oblique rotation for two factors and four variables. Rencher (2002).

2.2 Discriminant Analysis

Fisher Discriminant Function(FDF) or Fisher Linear Discriminant

It is a method used to find a linear combination of features which characterize or separate two or more classes of objects or events. The resulting combination may be used as a linear classifier, or, more commonly, for dimensionality reduction before later classification.

I. FDF for two groups:

Assuming a P- random variables (X_1, X_2...X_p) have a joint multivariate normal distribution with same var – cov. Matrix $\sum$ in the two groups but different mean vector μ_1 and μ_2

The FDF is a linear combination of the variables as

$$Z = \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 \ldots\ldots + \hat{\beta}_p X_p \qquad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

With:

$$\hat{\beta} = S^{-1} (\bar{X}_1 - \bar{X}_2)$$

where $\hat{\beta}^t = [\hat{\beta}_1, \hat{\beta}_2, \ldots, \hat{\beta}_p]$ and $\bar{X}_1$ and $\bar{X}_2$ are the group sample mean vectors, and **S** is the pooled within-groups covariance matrix S_1 and S_2, i.e.

$$S = \frac{1}{n_1 + n_2 - 2} [(n_1 - 1)S_1 + (n_2 - 1)S_2] \quad ,$$

where n_1 and n_2 are the sample sizes for the two groups respectively.

The linear combination (1), should maximize the variance between the two groups relative to that within groups.

This means to have a maximum variance between groups and the minimum variance within groups at the same time. This can be done when we deal with maximizing the positive ratio :

$$\frac{between\ groups\ variane}{within\ groups\ variance}$$

The variance between group is given by

$[\mathbf{B}^t(\mu_1 - \mu_2)]^2$

The variance within groups is given by:

$\mathbf{B}^t \sum \mathbf{B}$

So, we want to maximize the ratio $\frac{[\mathbf{B}^t(\mu_1 - \mu_2)]^2}{\mathbf{B}^t \sum \mathbf{B}}$.

We also can determine FDF by using the coefficients ($\hat{\beta}_1$, $\hat{\beta}_2$,....$\hat{\beta}_k$) in the multiple linear regression equation :

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \ldots\ldots + \alpha_k X_k + e$$

$$\hat{\beta}_i = \frac{\alpha_i}{c} \qquad \text{where } c = \frac{(n_1 n_2)/(n_1+n_2-2)}{(n_1+n_2-2)+\frac{(n_1 n_2)D^2}{(n1+n2)}} \quad ,$$

$$D^2 = \frac{(n1+n2)(n_1+n_2-2)K}{n_1 n_2(n_1+n_2-K-1)} F \quad ,$$

n_1, n_2 are the number of variables in groups 1 and 2 respectively, k is the number of columns (vectors) of the variables, and $F = \frac{Mean\ sequare\ regression}{Mean\ square\ error}$ obtained from the ANOVA table that constructed from linear multiple regression data.

In this case, we use the following criterion for adapting the FDF for classification:

i. Determine $\bar{\bar{Z}}_i = B^t\ \bar{X}_i$, $i = 1, 2$ (assuming $\bar{\bar{Z}}_1 < \bar{\bar{Z}}_2$)

ii. Determine $\bar{\bar{Z}} = \frac{\bar{\bar{Z}}_1 + \bar{\bar{Z}}_2}{2}$

iii. Determine Z for any observation in the two groups, and classify such observation into group 1 if $Z < \bar{\bar{Z}}$, otherwise classify it into group 2.

To recognize the importance of any variable (X_i) in the process of discrimination, we use the value of :

$CON_i = \hat{ß}_i \sqrt{S_{ii}}$, $i = 1, 2, 3, \ldots, k.$

Where CON_i the contributions for X_i, and S_{ii} are the diagonal elements for $\mathbf{S}_{pooled}$ within groups variance - covariance matrix. The largest CON_i, regardless of the sign; negative or positive, is the most important among all.

The assumptions under which Fisher's method is optimal are:

(1) The data in both groups have a normal distribution.

(2) The covariance matrices of each group are the same.

II. FDF For more than two groups[2] :

Suppose there are g populations,

$X_1, X_2,\ldots,X_{n_1}$: population 1

$X_{n_1+1}, X_{n_1+2},\ldots,X_{n_1+n_2}$: population 2

$\vdots$

$X_{n_1+\ldots+n_{g-1}+1},\ldots X_{nt}$: population g, where $n_1 + n_2 + \ldots + n_g = n_t$

The sample between matrix :

$B = \sum_{j=1}^{g} n_j (\bar{X}_j - \bar{X})(\bar{X}_j - \bar{X})'$ Where $\bar{X}_j$ is the sample mean for the population j, $j = 1,\ldots,g$,

and $\bar{X} = \dfrac{\sum_{i=1}^{n_t} X_i}{n_t}$ is the grand mean.

Thus,

$$a'Ba = \sum_{j=1}^{g} n_j a'(\bar{X}_j - \bar{X})(\bar{X}_j - \bar{X})'a = \sum_{j=1}^{g} n_j (a'\bar{X}_j - a'\bar{X})(\bar{X}_j'a - \bar{X}'a)$$

$$= \sum_{j=1}^{g} n_j (\bar{Y}_j - \bar{Y})^2 \quad , \quad \text{thus } a \rightarrow \hat{ß}$$

[2] Check the link: *www2.thu.edu.tw/~wenwei/Courses/multivariate/ch11.7.doc*

$Y_i = a' X_i, i = 1,\ldots,n_T$, $\bar{Y}_j$ is the mean for the j'th population, $j = 1,\ldots,g$, for example;

$$\bar{Y}_1 = \frac{\sum_{i=1}^{n_1} Y_i}{n_1} \text{ and } \bar{Y} = \frac{\sum_{i=1}^{n_T} Y_i}{n_T}.$$

The sample within group matrix W is

$$W = \sum_{i=1}^{n_1} (X_i - \bar{X}_1)(X_i - \bar{X}_1)' + \sum_{i=n_1+1}^{n_1+n_2} (X_i - \bar{X}_2)(X_i - \bar{X}_2)' + \cdots + \sum_{i=n_1+\cdots n_{g-1}+1}^{n_T} (X_i - \bar{X}_g)(X_i - \bar{X}_g)'$$

Thus,

$$a'Wa = \sum_{i=1}^{n_1} a'(X_i - \bar{X}_1)(X_i - \bar{X}_1)' a + \cdots + \sum_{i=n_1+\ldots+n_{g-1}+1}^{n_T} a'(X_i - \bar{X}_g)(X_i - \bar{X}_g)' a$$

$$= \sum_{i=1}^{n_1} (Y_i - \bar{Y}_1)^2 + \sum_{i=n_1+1}^{n_1+n_2} (Y_i - \bar{Y}_2)^2 + \cdots + \sum_{i=n_1+\ldots+n_{g-1}+1}^{n_T} (Y_i - \bar{Y}_g)^2 .$$

Note:

$$\frac{a'Wa}{n_T - g} = \frac{\sum_{i=1}^{n_1} (Y_i - \bar{Y}_1)^2 + \sum_{i=n_1+1}^{n_1+n_2} (Y_i - \bar{Y}_2)^2 + \ldots + \sum_{i=n_1+\ldots+n_{g-1}+1}^{n_T} (Y_i - \bar{Y}_g)^2}{n_T - g}$$

$\equiv$ the pooled estimate based on $Y_1, Y_2, \ldots, Y_{n_T}$.

$$S_{pooled} = \frac{W}{n_T - g} = \frac{\sum_{i=1}^{n_1} (X_i - \bar{X}_1)(X_i - \bar{X}_1)' + \cdots + \sum_{i=n_1+\ldots+n_{g-1}+1}^{n_T} (X_i - \bar{X}_g)(X_i - \bar{X}_g)'}{n_T - g}$$

$\equiv$ the pooled estimate based on $X_1, X_2, \ldots, X_{n_T}$.

We now introduce Fisher's linear discriminant method for several populations.

Fisher's discriminant method for several populations is as follows:

1. Find the vector $\hat{a}_1$ maximizing the separation function

$$S(a)=\frac{a'Ba}{a'Wa}=\frac{\sum_{j=1}^{g} n_j\left(\bar{Y}_j-\bar{Y}\right)^2}{\sum_{i=1}^{n_1}\left(Y_i-\bar{Y}_1\right)^2+\sum_{i=n_1+1}^{n_1+n_2}\left(Y_i-\bar{Y}_2\right)^2+\cdots+\sum_{i=n_1+\cdots+n_{g-1}+1}^{n_T}\left(Y_i-\bar{Y}_g\right)^2},$$

subject to $\hat{a}_1' S_{pooled}\hat{a}_1=1$. The linear combination $\hat{a}_1' X$ is called the sample first discriminant.

2. Find the vector $\hat{a}_2$ maximizing the separation function $S(a)$ subject to

$\hat{a}_2' S_{pooled}\hat{a}_2=1$ and $\hat{a}_2' S_{pooled}\hat{a}_1=0$.

3. Find the vector $\hat{a}_s$ maximizing the separation function $S(a)$ subject to

$\hat{a}_s' S_{pooled}\hat{a}_s=1$ and $\hat{a}_s' S_{pooled}\hat{a}_l=0, l<s$.

Note: $\hat{a}_j' S_{pooled}\hat{a}_j$ is the estimator of $Var(\hat{a}_j' X), j=1,\ldots,s$.

$\hat{a}_j' S_{pooled}\hat{a}_l, j\neq l$. is the estimator of $Cov(\hat{a}_j' X,\hat{a}_l' X), j\neq l$.

The condition $\hat{a}_j' S_{pooled}\hat{a}_l=0$ is similar to the condition given in the principal component analysis.

$S(a)$ measures the difference among the transformed means reflected by

$\sum_{j=1}^{g} n_j(\bar{Y}_j - \bar{Y})^2$ relative to the random variation of the transformed data reflected by

$\sum_{i=1}^{n_1}(Y_i - \bar{Y}_1)^2 + \sum_{i=n_1+1}^{n_1+n_2}(Y_i - \bar{Y}_2)^2 + \cdots + \sum_{i=n_1+\ldots+n_{g-1}+1}^{n_T}(Y_i - \bar{Y}_k)^2$. As the transformed observations

$Y_1, Y_2, \ldots, Y_{n_1}$ (*population* 1), $Y_{n_1+1}, Y_{n_1+2}, \ldots, Y_{n_1+n_2}$ (*population* 2), $\ldots, Y_{n_1+\ldots+n_{g-1}+1}, \ldots, Y_{n_T}$ (*population* g)

are separated, $\sum_{j=1}^{g} n_j(\bar{Y}_j - \bar{Y})^2$ should be large even as the random variation of the transformed data is taken into account.

Important result:

Let $e_1, e_2, \ldots, e_s$ be the eigenvector of $W^{-1/2}BW^{-1/2}$ corresponding to the eigenvalues $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_s > 0$. Then, $\hat{a}_j = S_{pooled}^{-1/2} e_j, j = 1, \ldots, s$

The following important result provides another way to obtain the discriminates.

Important result:

Let $e_1, e_2, \ldots, e_s$ be the eigenvectors of $W^{-1}B$ corresponding to the eigenvalues $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_s > 0$. Then, $\hat{a}_j, j = 1, \ldots, s$, are the scaled eigenvectors satisfying $\hat{a}_j' S_{pooled} \hat{a}_j = 1$. That is,

$$\hat{a}_j = \frac{e_j}{\sqrt{e_j' S_{pooled} e_j}}$$

- *Classification:*

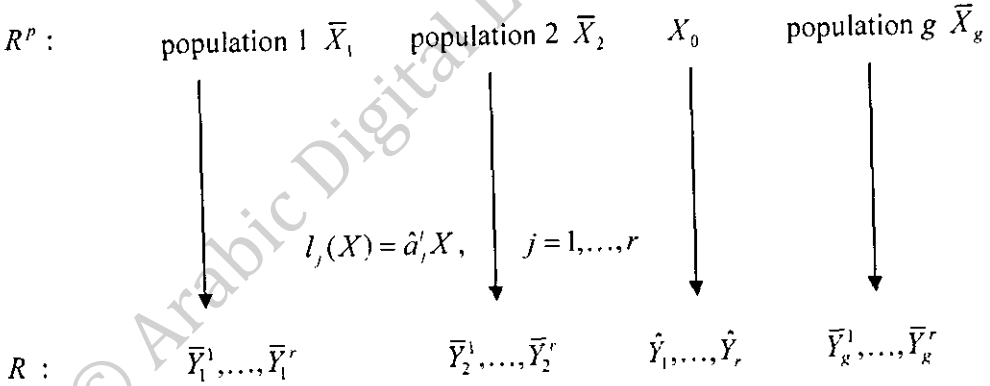
Fisher's classification method for several populations is as follows:

For an observation X_0, Fisher's classification procedure based on the first $r \le s$ sample discriminates is to allocate X_0 to the population l if

$$\sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_l^{\,j}\right)^2 = \sum_{j=1}^{r}\left[\hat{a}_j'\left(X_0 - \bar{X}_l\right)\right]^2 \le \sum_{j=1}^{r}\left[\hat{a}_j'\left(X_0 - \bar{X}_i\right)\right]^2 = \sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_i^{\,j}\right)^2 \quad i \ne l,$$

where $\hat{Y}_j = \hat{a}_j' X_0, \bar{Y}_i^{\,j} = \hat{a}_j' \bar{X}_i, j = 1,\ldots,r; i = 1,\ldots,g$

Intuition of Fisher's method:



$\sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_1^{\,j}\right)^2$: the "total" square distance between the transformed X_0 $(\hat{Y}_1,\ldots,\hat{Y}_r)$ and the transformed mean of the population 1 $(\bar{Y}_1^1,\ldots,\bar{Y}_1^r)$.

$\sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_2^j\right)^2$: the "total" square distance between the transformed X_0 $(\hat{Y}_1,\ldots,\hat{Y}_r)$ and the transformed mean of the population 2 $(\bar{Y}_2^1,\ldots,\bar{Y}_2^r)$.

$\vdots$

$\sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_k^j\right)^2$: the "total" square distance between the transformed $(\hat{Y}_1,\ldots,\hat{Y}_r)$ X_0 and the transformed mean of the population g $(\bar{Y}_g^1,\ldots,\bar{Y}_g^r)$.

$\Rightarrow \sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_l^j\right)^2 \le \sum_{j=1}^{r}\left(\hat{Y}_j - \bar{Y}_i\right)^2, i \neq l$, imply the total distance between the transformed X_0 and the transformed mean of the population l is smaller than the one between the one between the transformed X_0 and the transformed mean of the other populations. In some sense, X_0 is "closer" to the population l than to the other populations. Therefore, X_0 is allocated to the population l.

Chapter Three

Data Analysis

3.1 About the society of the study

There are 5 juveniles' rehabilitation centers (reformatories) in Jordan, with the following descriptive details:

Table (1): Number of juveniles and their distribution in reformatories in Jordan:

Reformatory name	Age interval	Number of Juveniles	Site
Juveniles rehabilitation house \ Irbed	(12 – 18)	64	Irbed / Northern region
Juveniles rehabilitation house \ Arrusaifah	(16 – 18)	87	Al Zarqa / Middle region
Juveniles rehabilitation house \ Amman	(16 – 18)	48	Amman / Middle region
Juveniles rehabilitation house \ Ma'an	(12 – 15)	32	Ma'an / Southern region
Juveniles rehabilitation house for females \ Amman	(12 – 18)	1 Total : 232	Amman / Middle region

Note that (Age interval) category, indicates the age interval of juveniles in each house, and (Number of juveniles) category, indicates the number of juveniles that filled up the questionnaire in total of 232 juvenile. Data were collected in specific days between September and November 2010, so data haven't been collected from all juveniles that entered reformatories for all year, but we can consider the 232 juveniles, who were founded in the reformatories during the delivery of the questionnaire, a population for the period of data collection . As the managers of each house said, the number of juveniles in any house is not constant and changing every day, some are coming in and another are going out each day, so we can find different number of juveniles every day in the rehabilitation houses.

Unfortionatly there were few number of juveniles who did not fill the questionnaire, even they were found in the registries, for different reasons. Some of them refused to fill the questionnaire or eluded from filling it.

Also, there were 4 juveniles who have been charged with more than one accusation, so the total number of 239 cases registered for the 232 juveniles.

3.2 Descriptive statistics:

Juvenile's rehabilitation houses in Jordan are under the supervision of Directorate of Social Defense (DSD) which in turn affiliated to the Ministry of Social Development (MSD).

The last issued statistical report was published in 2009 by DSD[3]. This report gives an overview about juveniles in rehabilitations in the period between 1/1/2008 until 31/12/2008. The following tables show the number and percentages of cases registered for each accusation for our study compared to that of DSD numbers:

[3] To view the report , please check this link: http://www.mosd.gov.jo/images/documents/def/6.pdf.

Table (2): Frequency and percentages for both data (ours and DSD 2008) among all accusations:

Accusation	Frequency Sep. – Nov.(2010)	Percent	Frequency (DSD 2008)	Percent (DSD 2008)
Theft	122	51.0	2116	34.13
Fight and hurting	27	11.3	2495	40.25
Sexual Misdemeanor	26	10.9	154	2.5
Murder	20	8.4	4	.06
Proceed with murder	17	7.1	20	.32
Drugs	9	3.8	9	.15
Damage to third party funds	6	2.5	210	3.4
Behavioral issues	5	2.1	620	10
General Violations	5	2.1	129	2.08
Cause of death	1	.4	7	.11
Traffic violations	1	.4	323	5.21
Intoxication	0	0	112	1.8
Total	239	100.0	6199	100.0

For our data, we notice that" theft" is the most highly frequented accusation among all, then "fight and hurting" and "sexual misdemeanors" respectively. While the DSD data for the year 2008, shows that "Fight and hurting" has the highest percentage among all, and the reason is most likely because it's one of the most common accusation between juveniles, and those whom had charged with fight accusation doesn't last long in the reformatories then they often released even without bail due to different reasons like non-participation. Sometimes, there were many

juveniles being arrested in a fight accusation even if they were just watchers of the fight, and then the investigations show that they are innocents. Although, those juveniles will be registered as accused juveniles. In the 2nd place "Theft" accusation came with a number of 2116 and percentage of 34.13 % versus a percentage of 51.0% for our data. We can't say that the theft rate has been reduced, because of the difference in juvenile's number between the two groups (group size). Also, by comparing the percentage of both data (our data and DSD 2008 data), we can notice that there are some accusation that their percentage are near to each other in both data, like "General violations" (2.1% vs. 2.08%), and "Damage to third party fund" (2.5% vs. 3.4%). One of the remarkable things in the previous table, the number of murder crimes in our data is more than it in DSD data (20 with percentage of 8.4% vs. 4 with percentage of 0.06%) which is a huge increase in the murder rate between juveniles.

Next figure can illustrate more clearly the difference between the numbers of cases for each accusation for our data:

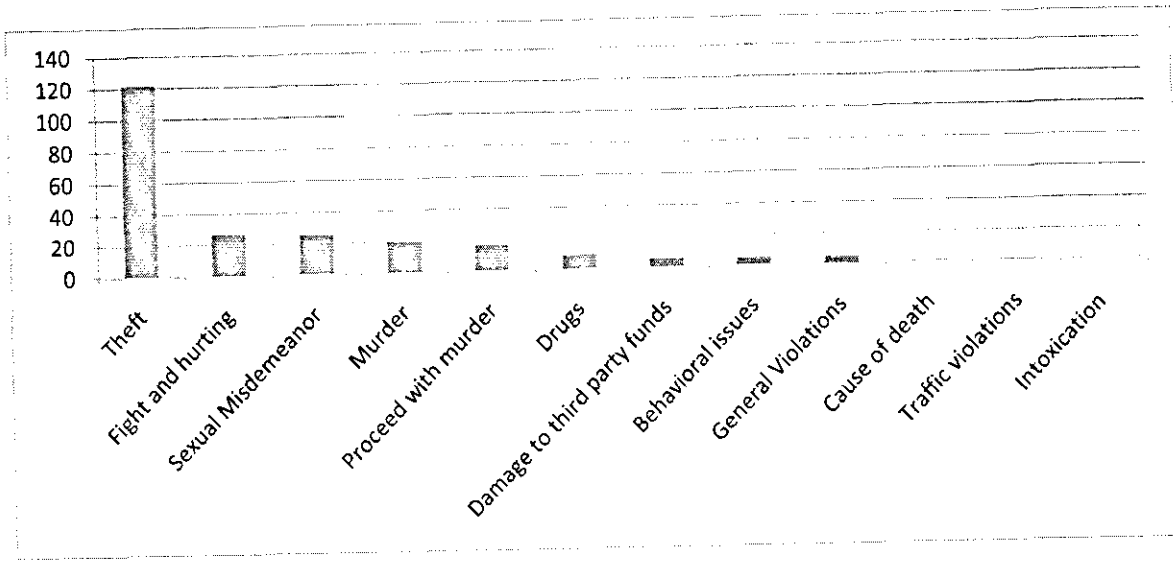


Figure (3.1): Frequency for the number of charges that been accused to juveniles for our data.

Next figure illustrates the difference in percentage between our study data and "DSD 2008" data:

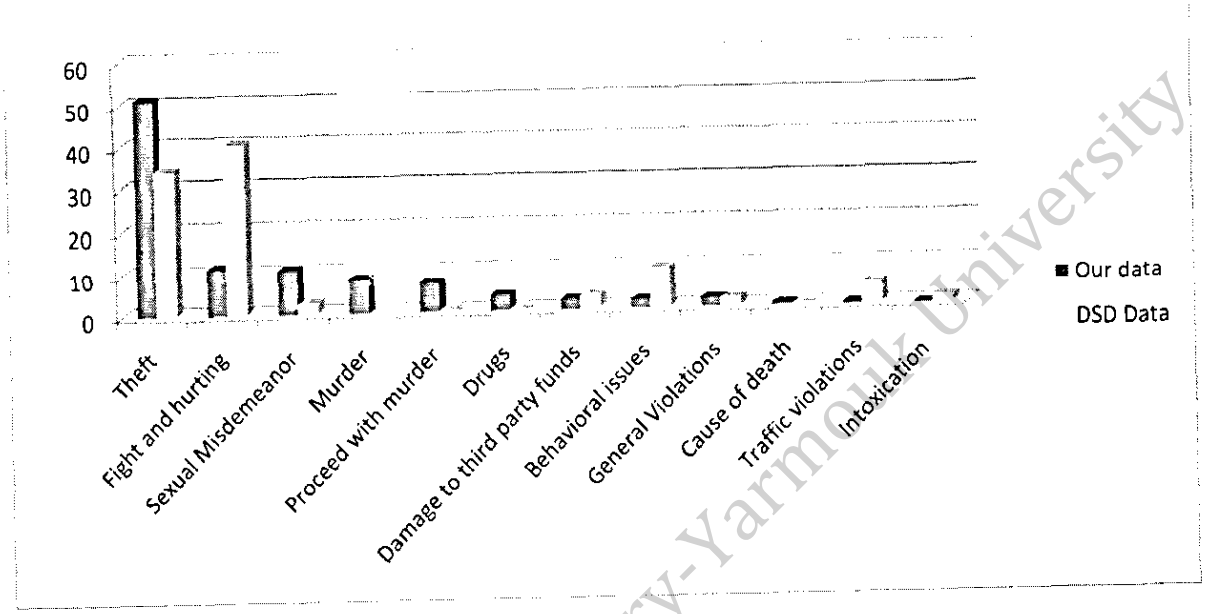


Figure (3.2): Percentages of accusations for our data and "DSD 2008" data.

Features of juveniles in Jordan and some information about them:

We want to focus on some features of the studied juveniles; these features had been asked about in the questionnaire, like: their ages, education level, if they live in an ordinary family, monthly income for the family, etc. Also, it is useful to compare our results with results of DSD.

One of the important features of juveniles is their families and its stability. The following figure shows the percentages of juvenile's family status for our study data, and those for DSD 2008 data:

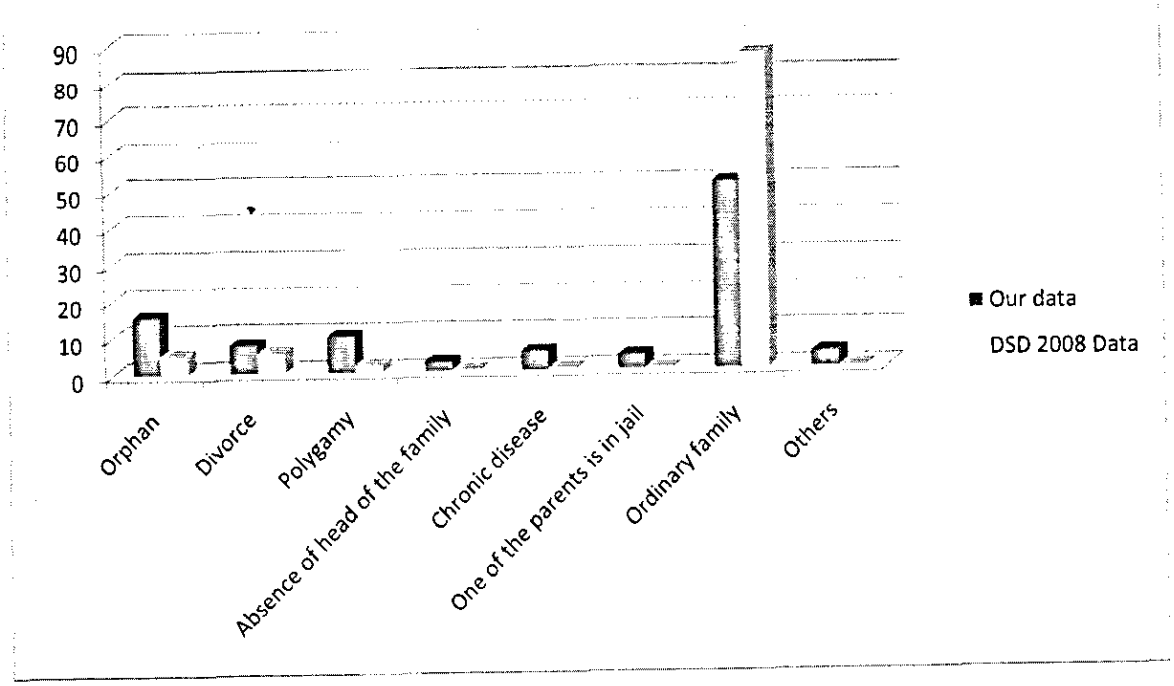


Figure (3.3): Percentages of family status for both data.

We can notice from the figure that the highest percentage of juveniles are living in ordinary families in both data, even if there is a difference in percentage (50.9% for our data against 86% for DSD),

Then juveniles that are orphans came in the 2nd place for our data, but in DSD data they came in the 3rd place after juveniles that live in a family with divorced parents.

One of the major goals of this study, is to find the factors that push a juvenile to deviate. Juveniles have been asked about the reasons of doing an illegal activity.

Next figure illustrates the percentage for every reason for our data and DSD data.

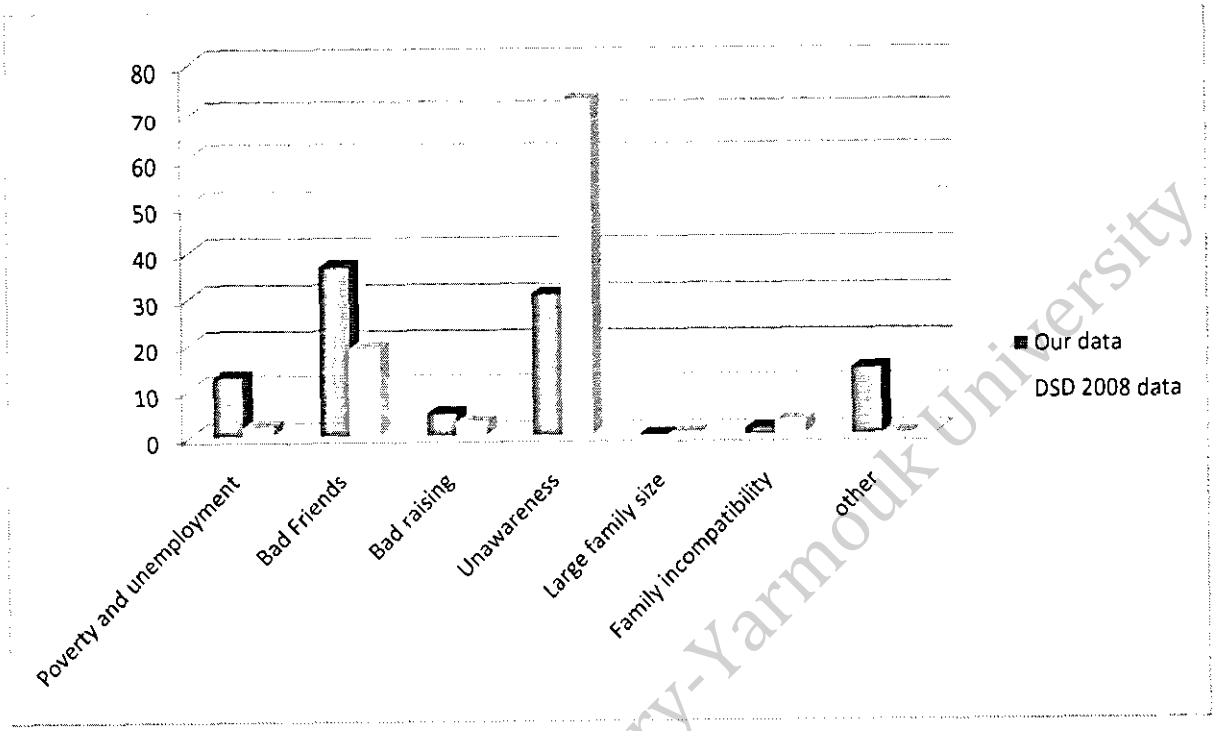


Figure (3.4): Percentages for Motive to commit the offense in the offender opinion for both data.

Notice that "unawareness" is one of the most powerful reasons to make a juvenile doing an illegal activity in both data; it came in first place in DSD data and in the 2nd place in our data after "Bad friends" which came in 2nd in DSD data. Also we can notice a remarkable percentage for the reason "other", which includes many reasons like: self defense or defense a member of a family, or doing something under threat, or non-participation and irresponsibility. Notice that all the reasons above are in the opinion of the juveniles.

The next table shows the rest of the results about other features that have not been descused yet.

Table (3): More results and features about juveniles:

Age intervals for juveniles	Frequency	Percent
12 - 15	52	22.4
15 - 18	180	77.6
Total	232	100.0
Education level	**Frequency**	**Percent**
Without	9	3.9
Primary	83	35.8
Preliminary	95	40.9
Secondary	45	19.4
Total	232	100.0
Education left	**Frequency**	**Percent**
No	73	31.5
Yes	159	68.5
Total	232	100.0

Education left means: juveniles who have stoped giong to school and lef the educational system without finshing it.

Table(3) (continue)

School dropout	Frequency	Percent
No	99	42.7
Yes	133	57.3
Total	232	100.0

Juvenile lives with:	Frequency	Percent
Without both parents	11	4.7
With the father only	20	9.1
With the mother only	36	15.1
With both parents	165	71.1
Total	232	100.0

Monthly income for juveniles family (in JD's)	Frequency	Percent
Less than 150	31	13.4
150 - 300	97	41.8
300 - 500	66	28.4
More than 500	38	16.4
Total	232	100.0

Table(3) (continue)

Smokers among juveniles	Frequency	Percent
No	57	24.6
Yes	175	75.4
Total	232	100.0

Suffering from mental illness	Frequency	Percent
No	216	93.1
Yes	16	6.9
Total	232	100.0

Juveniles guardians profession	Frequency	Percent
Handicraft	23	9.9
Services Worker	67	28.9
Dealer	28	12.1
Retired	33	14.2
Employer	32	13.8
Without	49	21.1
Total	232	100.0

Juveniles job	Frequency	Percent
Handicraft	73	31.5
Services Worker	67	28.9
Student only	45	19.4
Without	47	20.3
Total	232	100.0

Table(3) (continue)

Relatives with a criminal record	Frequency	Percent
No	139	59.9
Yes	93	40.1
Total	232	100.0

Relatives with a criminal record means: if any relatives of the 232 juveniles had ever been recorded as a delinquent person.

Close friends delinquency	Frequency	Percent
No	129	55.6
Yes	103	44.4
Total	232	100.0

Close friend's delinquency means: if any close friend of the 232 juveniles had ever been recorded as a delinquent person.

Juveniles living places	Frequency	Percent
Village	73	31.5
Camp	30	12.9
City	129	55.6
Total	232	100.0

Places of occurrence	Frequency	Percent
home only	13	5.6
work or school	22	9.5
around home (in the block)	89	38.4
Clubs	31	13.4
inside Cities and in markets	77	33.2
Total	232	100.0

Table(3) (continue)

Juveniles favorite TV shows	Frequency	Percent
Entertainment	30	12.9
Series	41	17.7
Movies	127	54.7
Sports	16	6.9
Documentary	10	4.3
Nothing	8	3.4
Total	232	100.0
Family environment of the juvenile	**Frequency**	**Percent**
Very comfortable	118	50.9
comfortable somehow	65	28.0
Uncomfortable somehow	34	14.7
Tiring a lot	15	6.5
Total	232	100.0
Bond of juveniles families	**Frequency**	**Percent**
Strong	143	61.6
Average	57	24.6
Weak	19	8.2
Disjointed	13	5.6
Total	232	100.0

Table(3) (continue)

Juveniles families disputes	Frequency	Percent
Almost non-existent	93	40.1
Few	84	36.2
Middle	35	15.1
A lot	20	8.6
Total	232	100.0
Results of family disputes	**Frequency**	**Percent**
Discussion and understanding	88	37.9
Sharp altercations	104	44.8
Deuce and the use of obscene words	40	17.2
Total	232	100.0
Corporal punishment	**Frequency**	**Percent**
Without	93	40.1
Light hit	76	32.8
Severely Beaten	63	27.2
Total	232	100.0

Table(3) (continue)

Other Punishments	Frequency	Percent
Without	58	25.0
Reprimand only	107	46.1
Deprivation from pocket money	14	6.0
Mordant Cursing	15	6.5
Detention	31	13.4
Deprivation from pocket money + Mordant cursing	1	.4
Deprivation from pocket money + Detention	1	.4
Deprivation from pocket money + Mordant cursing + Detention	5	2.2
Total	232	100.0

Table (4): Some descriptive statistics for 232 juveniles:

	N	Minimum	Maximum	Mean	Std. Deviation
Daily Pocket money value	232	.000	15.000	4.11509	3.597
Family size	232	2	15	8.22	2.690
Number of Smokers in family	232	0	12	2.55	1.816

Notes and comments on previous tables:

1. The majority of delinquent juveniles are between 15 and 18 years old with a high percentage (77.6%). We can say that in this interval, juveniles are at the height of adolescence, with mental instability and have a big tendency to do violent activities and try something that they are new on it.

2. There are few juveniles who did not receive any education at all (3.9%). On the other hand, there is a good percentage of those who received a secondary education (19.8%), and the rest distributed between primary (35.8%) and Preliminary (40.5%). Note that in the Jordanian educational system, primary classes are from 1^{st} to 7^{th}, preliminary are from 8^{th} to 10^{th}, and secondary the 11^{th} and 12^{th} classes.

3. More than two-thirds of the 232 juveniles (68.5%) have stoped going to school and did not finish their educational system for different reasons like: prefering work on study, or low grades, or fired from school due to bad behaviour. School has a big effect on student behaviour, so refraining from giong to school may cause a lack of moral tention of the juvenile.

4. Most of the 232 (57.8%) juveniles used to escape from school, which is a high and dangerous rate. The reason is most likely that they, simply, hate school because it imposes restriction on their freedom.

5. The majority of juveniles live with their mother and father (71.1%). While the rest are living without one of their parents or without both of them, which means that there might be a lack in parents tention on their children. Note that, there are only 11(4.7%) juvenile living without both mother and father.

6. About 41% of juveniles families have a monthly income between 150 and 300 JD's which is under the poverty line for the jordanian standard family of 6 members which is about 323 JD's, (according to survey data on household income and expenditure for the year 2008, General department of statistics, Jordan). Followed by the interval between 300 to 500 JD's which around the povetry line (28.4%). While (13.8%) of juveniles families recieves less than 150 JD's monthly which are considered to be very poor, so we can say that more than 55% of juvenile families are under the povetry line in Jordan. On the other hand, (16.4%) of juveniles families monthly income is above 500 JD's which considrerd good.

7. About three-quarters of juveniles in our study are smokers, which is a bad habit especially for those under 18 people. Note that in Jordan, cigarettes are not allowed to be sold to them. Moreover, any person can learn smoking by waching the others, being invited from them to try smoking.

8. (93.1%) of the juveniles declared that they are not suffering from any mental illness, but we could not read their medical records due to their privacy.

9. The highest percentage for juveniles guardians job is "service worker" like: truck or bus driver, security guard, painter etc. But in 2nd place came those who are jobless with percentage of (20.7%), and in the 3rd place came Retirees with (14.7%). On the other hand, most of the 232 juveniles are handicraftsmen (31.5%) the service workers (28.9%), the remarkable thing is the percentage of "student only" is the lowest among all (19.4%), and juveniles who are not studying or working have the percentage of (20.3%), which means; that about 60% of these deviated juveniles are workers. If we returned to the table, we would find that 73 juveniles are still going to school and 45 are "students only", so 28 juveniles are studying and working in the same time.

10. About (41%) of the juveniles, have a relative person who have a criminal record, and about 44% of the juveniles have a delinquent close friend, that may make a big effect on the criminal behavior of the juveniles.

11. More than half of juveniles are living in cities, then came those who live in villages then in camps. Meanwhile, the highest percentage of juveniles, spend their times in their neighborhoods or around their homes(38.8%), and the 2nd high percentage of them spend their times inside cities and markets (33.2%). Cities, as we know, are often an open societies and bigger than camps and villages with many thing are available more than camps and villages, like sports and pool clubs, internet cafes, restaurant, etc. So cities are a favorite places for people including juveniles.

12. More than (54%) of juveniles watch different kinds of movies as their favorite TV shows, then (17.7%) of them prefer to watch series more than other shows. Movies may have some effect on juveniles and children behavior, especially movies that contain violent scenes.

13. **About juveniles families:** More than half of the 232 juveniles described their family environment as very comfortable, and 28% of them are feeling comfortable somehow in their families, this might means that juveniles missing their families while they are in reformatories, or they are not having serious family problems that may affect their behavior. Also (61.6%) of them think that the bonds between their families members are very strong, and (24.6%) think that the bonds are average. Moreover, about 40% of the juveniles, answered that disputes in their families are almost not existed, and (36.2%) of them answered that they are few, and when these disputes appears, 44.8% of them choose the answer "Sharp altercations" happens, and "Discussion and understanding" in a lesser extent, and (13.5%) of them choose "Deuce and the use of obscene words".

14. **Punishment:** About 40% of the juveniles said that they were not exposed to any physical punishments, and (32.8%) of them punished with a light hit, and (27.2%) have been severely beaten. On the other hand (47%) of the juveniles punished with reprimand only and 25% of them did not exposed to any punishment, this means that many methods that used to punish a guilty or a wrong juvenile is not deterrent enough to correct their behavior or keep it right.

15. **Comment on Table(3):** According to the last statistical survey done by general statistical department of Jordan for the year 2006, the Average private household size is 5 members to each family and the average annual current income of household member is 1083.7 JD's. Now by looking at table (3), the average of juveniles households is 8 members which is more than the national average, and the daily pocket money is 4.11509 JD's which equals about 1502 JD's which is more than the average annual current income of household member, we can say, even the size of household for the 232 juveniles is bigger than the national average size, the average income of these juveniles is also more than the average.

3.3 Data preparation

One of the important actions for analysis is checking the normality of the data, especially numerical data, like family size and number of smokers. Some transformations have been done to satisfy normality, like Log transformation and Box-Cox transformation, that stated as follows:

$$x(\lambda) = \begin{cases} \dfrac{(x^{\lambda} - 1)}{\lambda} & \lambda \neq 0 \\ \ln(x) & \lambda = 0 \end{cases}$$

Given the vector of data observations $\mathbf{x} = x_1, x_2, \ldots x_n$, one way to select the power λ is to use λ that maximizes the logarithm of the likelihood function:

$$f(x, \lambda) = -\frac{n}{2}\ln\left[\sum_{i=1}^{n}\frac{(x_i(\lambda) - \bar{x}(\lambda))^2}{n}\right] + (\lambda - 1)\sum_{i=1}^{n}\ln(x_i)$$

Where:

$$\bar{x}(\lambda) = \frac{1}{n}\sum_{i=1}^{n} x_i(\lambda)$$

is the arithmetic mean of the transformed data. *NIST/SEMATECH e-Handbook of Statistical Methods*, http://www.itl.nist.gov/div898/handbook/pmc/section5/pmc52.htm, (4/3/2011).

3.4 Analysis and results:

It is important to find the relationship between all the variables that we are dealing with. For the correlation matrix, I have included quantitative variables: *family size, number of smokers in family, and juveniles daily pocket money*. And the rest of the variable have a numerical type that represents degrees (rating) of the answer that related to the variable question, such that the higher rate of the answer, the more negative effect on the juvenile, except the "Education level" variable, which represents the last educational stage that the juvenile is in to, with rate "1" means that the juvenile did not receive education (without), up to rate "4" which means that the juvenile has reached the secondary (high) school. Moreover the "The other punishments" variable, was rated up to nine degrees of rating, the first five, represent five kinds of punishments sorted ascending up to the toughest, and the other four are combinations of these punishment:

Rating	Punishment
1	Without
2	Reprimand only
3	Deprivation from pocket money
4	Mordant Cursing
5	Detention
6	Deprivation from pocket money + Mordant cursing
7	Deprivation from pocket money + Detention
8	Mordant cursing+ Detention
9	Deprivation from pocket money + Mordant cursing + Detention

Table (5): Correlation matrix for selected variables

	Education Level	Family size	Lives With	Family Monthly income	Number of Smokers in family	Juvenile Job	Daily Pocket money value	Family environment	Family bonds	Family disputes	Results of family disputes	Corporal punishment	Other Punishments
Education Level	1.000	-.025	-.240	.220	-.190	.099	-.298	-.231	-.203	-.172	-.184	-.028	-.050
Family size	-.025	1.000	-.210	.183	.431	-.065	.102	.024	.087	.008	.073	.059	-.023
Lives With	-.240	-.210	1.000	-.174	-.027	-.028	.032	.312	.357	.084	.155	.083	.159
Family Monthly income	.220	.183	-.174	1.000	.083	-.024	.091	-.163	-.169	-.171	-.145	-.021	-.091
Number of Smokers in family	-.190	.431	-.027	.083	1.000	-.130	.133	-.024	.085	.194	.174	.054	-.047
Juvenile Job	.099	-.065	-.028	-.024	-.130	1.000	-.499	.013	.014	.022	-.030	-.024	-.029
Daily Pocket money value	-.298	.102	.032	.091	.133	-.499	1.000	.035	.117	.037	.024	-.067	.034
Family environment	-.231	.024	.312	-.163	-.024	.013	.035	1.000	.594	.388	.220	.258	.286
Family bonds	-.203	.087	.357	-.169	.085	.014	.117	.594	1.000	.495	.229	.187	.182
Family disputes	-.172	.008	.084	-.171	.194	.022	.037	.388	.495	1.000	.418	.303	.217
Results of family disputes	-.184	.073	.155	-.145	.174	-.030	.024	.220	.229	.418	1.000	.260	.144
Corporal punishment	-.028	.059	.083	-.021	.054	-.024	-.067	.258	.187	.303	.260	1.000	.377
Other Punishments	-.050	-.023	.159	-.091	-.047	-.029	.034	.286	.182	.217	.144	.377	1.000

By looking at the previous table, we can notice the relationship between variables. These numbers may not necessarily clarify the most effective variables in juveniles delinquency. By using factor analysis, we can learn more about the relations between variables.

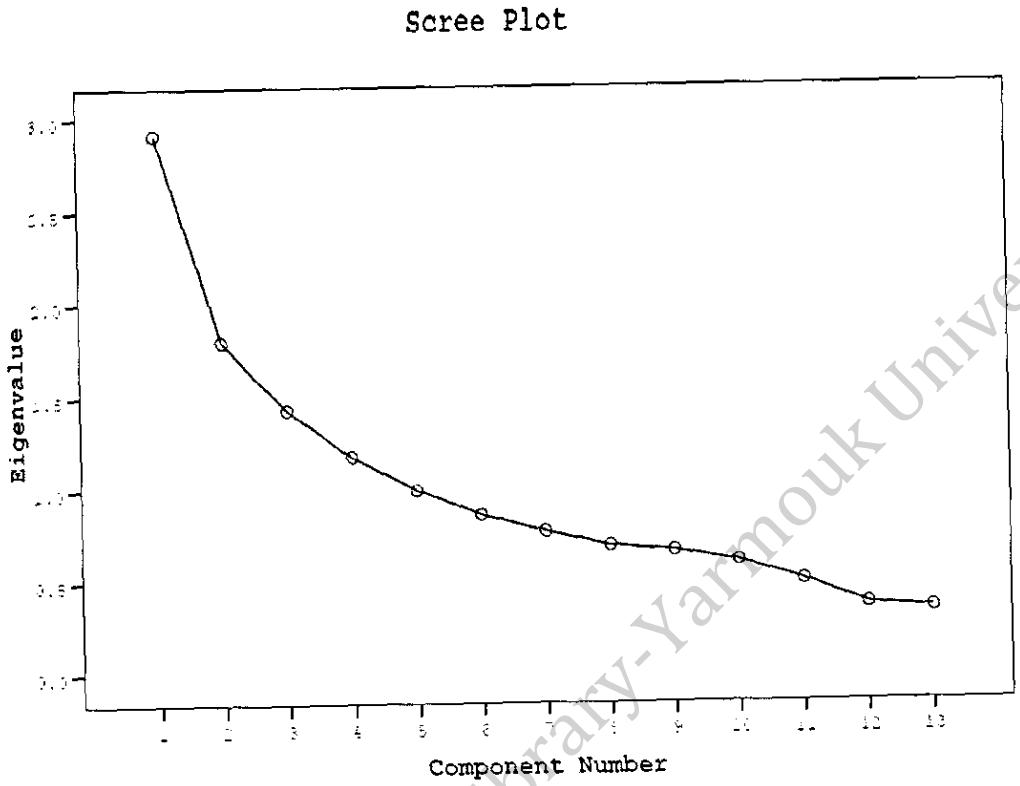
3.4-1 Factor Analysis

Table(6): Eigen values and variance explained:

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total(λ)	% of Variance	Cumulative %	Total(λ)	% of Variance	Cumulative %
1	2.922	22.474	22.474	2.922	22.474	22.474
2	1.813	13.947	36.421	1.813	13.947	36.421
3	1.471	11.318	47.738	1.471	11.318	47.738
4	1.180	9.078	56.816	1.180	9.078	56.816
5	0.993	7.640	64.456	0.993	7.640	64.456
6	0.835	6.426	70.882			
7	0.786	6.045	76.927			
8	0.693	5.334	82.261			
9	0.601	4.624	86.886			
10	0.591	4.545	91.431			
11	0.450	3.461	94.892			
12	0.363	2.789	97.680			
13	0.302	2.320	100.000			

The above table shows the eigen values and variance explained by these eigen values. Note that the first factor has the largest eigen value (2.922) which explains (22.474%) of the variance of the 13 variables that we used. The largest 5 eigen values explain (64.456%) of the variance of the variables, so we have 5 factors that explain about 64.5% of the 13 variables variance.

Next figure illustrate the distribution of the eigen values among all components.



Figure(3.5): Scree plot for component matrix.

As the last plot shows the eigenvalues of each component. If the curve shows an "elbow" at a component number on the x-axis, this is often indicates that higher order principal components contribute a decreasing amount of additional variance and so might not be needed (Landau & Everitt 2004). In this figure we can notice the downward slope with a sharp decline until it reach the fourth or fifth component, so we can say that the first five components can summarize the variation of the 13 variables, with acceptable percentage of total variance.

Table(7): Communalities h^2_i

	h^2_i
Family bonds	0.766
Daily Pocket money value	0.750
Juvenile Job	0.710
Family environment	0.708
Family size	0.680
Corporal punishment	0.662
Number of Smokers in family	0.662
Family Monthly income	0.614
Other Punishments	0.600
Results of family disputes	0.583
Family disputes	0.578
Education Level	0.561
Lives With	0.504

The above table shows the portion of the variance of the variables that the common factors explain, and it also represents the "Square Multiple Correlation" . It is clear that the factors

explain a high rate of variance for all variables with (0.766) for "Family bonds" variable; as a maximum, and (0.504) for "Lives with" as a minimum.

Table(8): Component Matrix:

	1	2	3	4	5
Education Level	-0.448	-0.268	0.396	0.324	0.163
Family size	0.056	0.598	0.499	-0.134	0.228
Lives With	0.471	-0.228	-0.420	-0.080	0.218
Family Monthly income	-0.328	0.316	0.296	0.316	0.467
Number of Smokers in family	0.200	0.636	0.335	-0.314	-0.080
Juvenile Job	-0.089	-0.579	0.421	-0.410	0.147
Daily Pocket money value	0.172	0.649	-0.488	0.243	0.048
Family environment	0.726	-0.160	-0.025	0.018	0.393
Family bonds	0.744	-0.045	-0.018	-0.145	0.434
Family disputes	0.698	-0.006	0.252	-0.092	-0.135
Results of family disputes	0.552	0.074	0.216	-0.115	-0.461
Corporal punishment	0.477	-0.091	0.387	0.486	-0.199
Other Punishments	0.458	-0.167	0.111	0.588	-0.071

Table 8, represents the component matrix that contains the Loading for the 5 factors.

The first factor: we notice that the variable "Family bonds" has the largest loading among all the 13 variables, then the "Family environment" variable came in the second place, followed by "Family disputes" and "Results of family disputes" in the 3rd and 4th place, respectively. So we can call the first factor as *The family atmosphere factor,* and we can say that the juvenile family , their stability and its inside atmosphere have a clear effect on the juvenile behavior.

The second factor: We can see that "Daily Pocket money value" has the largest loading, then came "Number of smokers" , "Family size", and in fourth place "Juvenile job" came but with negative correlation. Note that the variable "Juvenile job" was rated in the questionnaire from best to worst. We can say that if we have more smokers, indicates more members of a family. So it is obvious from this factor that family size has an effect on the juvenile behavior, especially with more smokers, so he/she may get less attention than the juvenile may receive in a smaller family. Also we can notice the positive correlation of pocket money with this factor, this means that the more pocket money for the juvenile, the more likely for him/her to deviate. So this factor has nothing to do with poverty. But money may push the juvenile to try illegal different things like alcohol and drugs. I will call this factor: *Juveniles' economical factor.*

The third factor: : The highest loading is for " Family size". In the second place" Daily pocket money" came ,but in the negative direction. So less money, may cause more crimes probability. "Juvenile job" came third. So, juveniles who have worst job (or jobless) are more likely to

delinquent. In the fourth place "Lives with" came. Here we notice that the correlation makes some confusion, because the variable " Lives with" represents the following:

Rating	Status
1	Juvenile lives with both parents
2	Juvenile lives with his mother
3	Juvenile lives with father
4	Juvenile lives without any parent

We can see that the highest rating is the worst condition for the juvenile, but the loading for this variable is negatively correlated with the third factor. In the end I will name the third factor as *Family size factor*.

The fourth Factor: "Other punishments" has the higher loading, followed by "corporal punishment" . It's obvious from this factor that the harder the punishment was, (with different types), the more likely of juvenile delinquency. We can explain that factor, that will be named *Punishment factor*, that some kind of punishment like hitting, mordant Cursing, and other types of punishment, that have been stated in the questionnaire, can give a negative result on the juvenile behavior and psychological state.

The fifth Factor: In this factor, the variable "Family monthly income" has the largest loading, followed by "Result of Family disputes" but with negative sign. We will leave this factor to the monthly income variable, which is positive correlated with this factor. We can't tell that if the monthly income increases, juveniles will deviate more.

As it has been stated before, most of the variable has explained well by the common factors. But some of them are not, because some numbers did not make sense. So we can do a Varimax rotation for the factors in order to have a better interpretation.

Table(9) Eigen values and variance explained with rotation:

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total(λ)	% of Variance	Cumulative %	Total(λ)	% of Variance	Cumulative %	Total(λ)	% of Variance	Cumulative %
1	2.922	22.474	22.474	2.922	22.474	22.474	2.030	15.618	15.618
2	1.813	13.947	36.421	1.813	13.947	36.421	1.644	12.646	28.264
3	1.471	11.318	47.738	1.471	11.318	47.738	1.640	12.614	40.879
4	1.180	9.078	56.816	1.180	9.078	56.816	1.604	12.340	53.219
5	0.993	7.640	64.456	0.993	7.640	64.456	1.461	11.237	64.456
6	0.835	6.426	70.882						
7	0.786	6.045	76.927						
8	0.693	5.334	82.261						
9	0.601	4.624	86.886						
10	0.591	4.545	91.431						
11	0.450	3.461	94.892						
12	0.363	2.789	97.680						
13	0.302	2.320	100.000						

As we notice from the table, that the eigen values somehow changed among the components after the rotation process. And so did the percentage of variance for each component .This will affect the loading matrix (component matrix), but the total amount of the variance that explained by the components remained the same (64.456%). Note that the rotation used is Varimax rotation for all following results of factor analysis.

Table(10) Rotated component matrix:

	1	2	3	4	5
Education Level	-0.311	-0.106	0.173	0.364	-0.539
Family size	0.020	0.798	0.011	-0.041	-0.204
Lives With	0.604	-0.298	-0.038	-0.112	0.191
Family Monthly income	-0.098	0.295	0.026	-0.084	-0.714
Number of Smokers in family	-0.014	0.776	-0.040	-0.136	.0200
Juvenile Job	0.099	-0.025	-0.113	0.829	0.001
Daily Pocket money value	0.114	0.117	-0.054	-0.849	-0.015
Family environment	0.795	0.015	0.269	0.024	0.054
Family bonds	0.843	0.160	0.141	0.014	0.103
Family disputes	0.383	0.274	0.419	0.098	0.413
Results of family disputes	0.073	0.263	0.392	0.025	0.595
Corporal punishment	0.076	0.073	0.804	0.036	0.059
Other Punishments	0.190	-0.172	0.722	-0.109	-0.034

Comparing with Table (8), some changes has been made, the loading values have changed among the 13 variables, this will give another interpretation for the data.

The first factor: "Family bond" and "Family environment" showed up again in the first factor as the highest loadings respectively. In addition the variable "Lives with" has the 3rd place highest loading. We can still name this factor as *Family atmosphere* or *Family stability* factor, because this factor shows that if the family bonds are weaker and its environment is more uncomfortable, it may affect the juvenile and make them feel unstable, so he/she may deviate. Also juvenile who lives with both parents is less likely to do illegal activities.

The second factor: : In this component "Family size" has the largest loading then came "Number of smokers in family". Also these two are somehow far away from the 3rd place "Family Monthly income" and more away from the variable "Daily Pocket money value" that took the first place in the second factor for the un-rotated component matrix, so, we still can name this factor :

Family size factor, that we can say: more smokers, indicates more family members. Or more family members, produces less attention and care, and so more likely to deviate.

The third factor: Obviously we can call this factor; *Punishment factor*, because the two variables that deal with juveniles punishments are highly correlated to the third factor.

As an interpretation, as it was stated in the forth factor of un-rotated component matrix, some kind of punishment can give a negative result on the juvenile behavior and psychological state, that may cause him/her to enter the crime world.

The forth factor: This factor can be named *Juvenile job factor*, because the variable "juvenile job" has the largest loading, then "Daily pocket money" came and it is correlated negatively with this factor. Note that, the source of juveniles pocket money are either form their job or their

parents. So, bad job means less money, and may cause delinquent juveniles. Even juveniles, regardless of their jobs, may do illegal actions, if they receives less money.

The fifth factor: : This factor does not have a clear-cut, we notice that "Family monthly income" has the highest correlation to this factor with a negative correlation. Then "Results of family disputes" and then "Education level" came. But as an interpretation to this factor we can say that bad economic situation for the juvenile family, may cause him/her to delinquent. Also, less education may cause more illegal actions. Moreover, the bad treating between family members may cause a bad family atmosphere that may affect the behavior of a juvenile and make him/her do wrong. We may name this factor *Family economy factor.*

Factor analysis with specified illegal actions:

It is also important to investigate the reasons that make juveniles do a specific kind of illegal actions. Factor analysis will be applied on three groups of juveniles data, each group contains data of juveniles that are charged for selected crimes, and these groups will be as follows:

Group	Charges
Theft	Theft
Violence and Physical assault	Murder, Fight and hurting, Cause of death, Proceed with murder, Sexual Misdemeanor.
Behavior cases	General Violations, Intoxication, Behavioral issues, Damage to third party funds, Traffic violations.

I. Theft group:

Table(11): Rotated component matrix for Theft group:

	1	2	3	4
Education Level	-0.053	-0.019	0.438	0.657
Family size	0.065	0.813	-0.104	0.171
Lives With	0.331	-0.349	-0.062	-0.441
Family Monthly income	0.023	0.068	-0.125	0.603
Number of Smokers in family	0.046	0.809	-0.160	-0.024
Juvenile Job	-0.027	-0.088	0.819	-0.088
Daily Pocket money value	-0.073	0.114	-0.852	-0.078
Family environment	0.762	-0.094	0.002	-0.174
Family bonds	0.633	0.141	0.100	-0.454
Family disputes	0.656	0.306	0.088	-0.301
Results of family disputes	0.446	0.337	0.097	-0.218
Corporal punishment	0.769	0.095	-0.012	0.161
Other Punishments	0.688	-0.196	-0.122	0.271

The first factor: The way to treat and raise the juvenile is important for his/her personality building process. And so is family atmosphere. Its importance is obvious in this factor that shows the effect of punishments on the behavior of the juvenile, how strong is the relationship between the members of his/her family, and how comfort is living with the family.

This factor shows that the juveniles who charged with theft, have probably more unstable family atmosphere and less feeling of comfort with their families. Also, when these juveniles are subject to harder punishments, it is more likely to affect their behavior, and rise the ability for them to do wrong actions including theft. Factor name : *Family's' atmosphere and stability factor.*

The second factor: As it is stated before, larger family size may cause less care and attention for juveniles. Also more smokers may push the juvenile to smoke. We can interpret this factor by stating that juveniles with large families and more smokers, may cause juveniles to do crimes and most likely theft. Factor name : *Family size factor.*

The third factor: From this factor we can conclude that juveniles, who accused with stealing, receive less pocket money and/ or their work is rated less. In another words, a chance for them to steal will be less if they receive more money from their parents or job, or/and if they have a better job. Factor name : *Juvenile Job and money factor.*

The fourth factor: Education level in this factor clearly affects juveniles. And so does the monthly family income. We can't state that the chance for juveniles to steal will increase, if they receive higher education, but is more sense to say that fewer family monthly income, could be a strong effect on the juveniles behavior and push them to steal. Factor name: *Juvenile Education and family income.*

II. Violence and Physical assault group:

Table(12): Rotated component matrix for Violence and Physical assault group:

	1	2	3	4	5
Education Level	-0.259	-0.397	-0.213	0.425	-0.271
Family size	0.086	-0.004	-0.077	0.091	0.823
Lives With	0.677	-0.195	0.056	-0.307	-0.066
Family Monthly income	-0.241	-0.517	0.121	0.206	0.477
Number of Smokers in family	-0.093	0.209	0.149	-0.444	0.546
Juvenile Job	0.149	0.039	-0.817	0.103	0.101
Daily Pocket money value	0.272	-0.006	0.826	0.130	0.148
Family environment	0.844	0.202	-0.048	0.012	-0.043
Family bonds	0.797	0.196	0.086	0.135	0.093
Family disputes	0.193	0.740	-0.035	0.182	0.037
Results of family disputes	-0.052	0.776	-0.003	0.032	0.040
Corporal punishment	-0.108	0.209	-0.199	0.653	0.230
Other Punishments	0.049	0.042	0.229	0.708	-0.052

The first factor: As it is stated before, less comfort family environment, and weaker family bonds, can affect juveniles and may make them more able to delinquent, or be more violent. Moreover the variable "Lives with" has the third highest loading in this factor that make us state that juveniles who live without one of their parents or both of them, have higher chance to be more violent and act wrong will be more. So this factor could be named as *Family atmosphere factor.*

The second factor: The interpretation of this factor, juveniles who live in families with more disputes and with sharper results from it, might be affect badly on their behavior. Also made them more familiar to violent actions. So, it is easier for them to do physical assaults or violent activities. Also, lower monthly income family took a part in this factor and may cause juveniles to deviate especially when their family could not satisfy all their needs. Factor name:

Family disputes factor.

The third factor: Kinds of jobs are good correlated with this factor. Juveniles with more high rated jobs might be more violent and have more ability to do physical assaults, even if they receive more money from their parents or jobs, they may use it to buy banned stuff. Factor name: *Juvenile job and daily income factor.*

The fourth factor: Many kind of punishments like hitting, deprivation from pocket money, mordant cursing, and detention, can affect juveniles behavior and make them more violent. Factor name: *Punishment factor.*

The fifth factor: We can notice that " Family size" and then "Number of family smokers" have the highest loadings respectively. We may name this factor as: *Family size factor.*

This factor shows that juveniles, who have larger size of families and more smokers, have more chance to be violent, due to lack of parents care and attention.

III. Behavior cases group:

Table(13): Rotated component matrix for Behavior cases group:

	1	2	3	4
Education Level	-.013	-0.787	0.105	-0.362
Family size	-0.180	-0.370	0.474	0.651
Lives With	0.802	-0.048	-0.018	-0.330
Family Monthly income	-0.175	-0.105	0.697	0.220
Number of Smokers in family	0.192	0.179	0.134	0.911
Juvenile Job	-0.170	-0.318	-0.740	0.205
Daily Pocket money value	0.107	-0.017	0.664	0.231
Family environment	0.708	0.047	-0.139	0.246
Family bonds	0.930	-0.077	0.068	0.076
Family disputes	0.613	0.500	-0.300	0.202
Results of family disputes	0.681	0.547	0.251	-0.006
Corporal punishment	-0.034	0.906	0.042	-0.242
Other Punishments	0.308	0.230	-0.422	0.021

The first factor: Obviously it can be named *Family atmosphere and completeness factor.* Families have a huge role in building up the personality of juveniles and refining their behavior. Also the presence of both mother and father of the juvenile, can help him/her to learn more about right and wrong.

The second factor: Clearly, Lower education may cause juveniles to act wrong, also hard corporal punishment may cause deviation too, especially in behavior cases . Factor will be named *Education and rectification factor.*

The third factor: That will be named *Juvenile job factor,* it shows a high negative correlation with the "Juvenile job" variable. Also a high loading for "Family monthly income" and "Daily pocket money". So a higher rated juvenile job, might rise the ability of some juveniles to delinquent with behavior accusations. Moreover, if the economic situation for the juvenile and his/ her family is better, it is more likely for him/her to do illegal behavior actions.

The fourth factor: Large Family size and more smokers mean a higher chance for behavior delinquency. Factor name: *Family size factor.*

3.4-2 Discriminant analysis

Now, another type of analysis will be used, which is discriminant analysis, to find that if juveniles are following a specific type of properties, in subject of some features.

I. Discriminant analysis subject to juveniles address : village, camp , city.

It is more important to suit the discriminant function so that we can recognize the effect of each variable on the model, and so on the classification process. Now for all discriminant functions that will be estimated, variables (X's) will be ordered as follows:

X_1	Education Level
X_2	Family size
X_3	Lives With
X_4	Family Monthly income
X_5	Number of Smokers in family
X_6	Juvenile Job
X_7	Daily Pocket money value
X_8	Family environment
X_9	Family bonds
X_{10}	Family disputes
X_{11}	Results of family disputes
X_{12}	Corporal punishment
X_{13}	Other Punishments

Discriminant function for previous classification is stated as follows (using SPSS):

$$0.158X_1 + 0.262X_2 - 0.213X_3 - 0.293X_4 + 0.033X_5 + 0.764X_6 - 0.001X_7 - 0.151X_8 - 0.287X_9$$
$$+0.121X_{10} - 0.048X_{11} + 0.251X_{12} - 0.277X_{13}$$

Notice that $\hat{ß}_6$,("Juvenile job" coefficient), is the highest among all ßs'. Moreover, it is larger than the second highest value, which is $\hat{ß}_4$.This may allow us to say that juvenile job has the biggest effect on classifying juveniles due to their address's. As an interpretation on the above, juveniles job has a clear effect on identifying features of juveniles who live in city, village, or camp, and so separate them from each other. On the other hand, $\hat{ß}_7$ has the lowest value. So, Pocket money has the lowest effect in the address classification.

The classification using the previous discriminant function will be as follows:

Table(14): Classification results for village, camp, city

Address		Classified groups			
		Village	Camp	City	
Original Groups	Village	***36***	15	22	73
	Camp	5	***18***	7	30
	City	35	31	***63***	129
					232

Notice that total correct classification (36 + 18 + 63) = 117, and the proportion of total correct classification =

$\frac{117}{232} = 50.4\%$.

So it's an acceptable classification. This means that we can't totally separate juveniles due to their address, because of the mixture of them from different places. Regarding to this, we can tell that juveniles living areas can really affect their delinquent behavior.

Next table can give some help to clear the effective of juveniles job on the classification process:

Table(15): Juveniles job distribution by address:

	Village		Camp		City	
	Frequency	Percent%	Frequency	Percent %	Frequency	Percent%
Handicraft	10	13.7	13	43.3	50	38.8
Services Worker	22	30.1	8	26.7	37	28.7
Student	18	24.7	2	6.7	25	19.4
Without	23	31.5	7	23.3	17	13.2
Total	73	100.0	30	100.0	129	100.0

As we can notice from the above table, the highest percentage of juveniles, who lives in villages, are jobless and are not students. Also village juveniles, who have a job, are service workers. Meanwhile, most of juveniles who lives in camps and cities, are handicraftsmen, then service workers. The table above shows the diversity of jobs between juveniles due to their address, and this diversity affected the juveniles classification process.

Now we want to evaluate the importance of the variables by finding the contribution for each variable.

Table(16): The factors contributions in discriminating between living Areas of juveniles:

Variable		Contribution
X_1	Education Level	0.127
X_2	Family size	0.703
X_3	Lives With	-0.178
X_4	Family Monthly income	-0.271
X_5	Number of Smokers in family	0.059
X_6	Juvenile Job	2.205
X_7	Daily Pocket money value	-0.004
X_8	Family environment	-0.141
X_9	Family bonds	-0.247
X_{10}	Family disputes	0.114
X_{11}	Results of family disputes	-0.034
X_{12}	Corporal punishment	0.204
X_{13}	Other Punishments	-0.458

The largest contribution (2.205) is for the 6th variable (Juvenile job). So it is the most important variable among all in the previous classification process.

II. Discriminant analysis subject to Hang around places

Discriminant function for hang around places classification:

$$0.167X_1 + 0.126X_2 - 0.4X_3 - 0.411X_4 - 0.099X_5 - 0.374X_6 + 0.239X_7 + 0.439X_8 - 0.589X_9 - 0.556X_{10} - 0.157X_{11} + 0.169X_{12} - 0.281X_{13}$$

From the above equation, it can be stated that family bonds has the biggest effect on juveniles classification due to the places that they usually be founded on. Then the coefficient of the "Family disputes" variable. On the other hand, "number of smokers in family" has the lower effect on classification process. In general, the family atmosphere has a clear role toward identifying and separating juveniles due to the places that they mostly be founded in.

The classification using the previous function will be as follows:

Table(17) : Classification results for Hang around places:

Hang around Places		Classified groups					
		home only	work or school	around home (in the block)	Clubs	inside Cities and in markets	
Original Groups	Home only	*7*	0	3	2	1	13
	Work or school	2	*11*	5	2	2	22
	Around home (in the block)	14	6	*38*	13	18	89
	Clubs	4	6	5	*12*	4	31
	Inside Cities and in markets	15	9	13	11	*29*	77
							232

We meant by Hang around places, the places that the juveniles mostly spend their time in.

By looking at table 17, the proportion of total correct classification = $\frac{97}{232} = 41.8\%$.

Somehow, not good classification. We can say that we can't totally recognize juveniles via the places that they spend their times in. All the places mentioned in table (17) is not exclusive to some juveniles without other.

Table(18): The factors contributions in discriminating between juveniles hang around places:

Variable		Contribution
X_1	Education Level	0.135
X_2	Family size	0.340
X_3	Lives With	-0.034
X_4	Family Monthly income	-0.377
X_5	Number of Smokers in family	-0.177
X_6	Juvenile Job	-1.086
X_7	Daily Pocket money value	0.369
X_8	Family environment	0.399
X_9	Family bonds	0.494
X_{10}	Family disputes	-0.519
X_{11}	Results of family disputes	0.112
X_{12}	Corporal punishment	0.137
X_{13}	Other Punishments	-0.465

The largest contribution (-1.086) is for the 6th variable (Juvenile job). So it is the most important variable among all in the previous classification process. Then family disputes and family bonds came respectively in the importance.

III. Discriminant analysis subject to juveniles' close friend delinquency.

Discriminant function for juveniles' close friend delinquency classification:

$$-0.019X_1 + 0.292X_2 - 0.552X_3 + 0.129X_4 + 0.211X_5 - 0.032X_6 + 0.482X_7 + 0.598X_8 - 0.085X_9 + 0.082X_{10} - 0.235X_{11} + 0.021X_{12} + 0.027X_{13}$$

As we can see in the previous relationship, family environment has the biggest effect on this classification. Then "lives with" variable came. The variable with the lowest coefficient was "Education level". Here we can say, that family environment has a good and the biggest effect on the classification process among juveniles who have delinquent close friends, and this has nothing to do with the education level of the juveniles.

Table(19) : Classification results for Close friends delinquency:

Close friends delinquency		Classified groups		
		No	Yes	
Original Groups	No	*77*	52	129
	Yes	36	*67*	103
				232

The proportion of total correct classification = 62.1%

A good classification. This make us separate juveniles that have been affected by their delinquent friends more clearly.

Table(20): The factors contributions in discriminating between juveniles' close friends delinquency:

Variable		Contribution
X_1	Education Level	-0.015
X_2	Family size	0.776
X_3	Lives With	-0.461
X_4	Family Monthly income	0.119
X_5	Number of Smokers in family	0.381
X_6	Juvenile Job	-0.095
X_7	Daily Pocket money value	0.747
X_8	Family environment	0.553
X_9	Family bonds	-0.074
X_{10}	Family disputes	0.078
X_{11}	Results of family disputes	-0.168
X_{12}	Corporal punishment	0.017
X_{13}	Other Punishments	0.045

The largest contribution is (0.776) for family size variable and then for daily pocket money. Thus those two variables are the most important among all variables in the previous classification process.

IV. Discriminant analysis subject to juveniles' relatives delinquency.

Discriminant function for previous classification:

$$0.099X_1 + 0.359X_2 + 0.226X_3 - 0.261X_4 + 0.149X_5 - 0.345X_6 + 0.168X_7 - 0.07X_8 - 0.094X_9$$

$$+0.339X_{10} + 0.202X_{11} + 0.364X_{12} + 0.257X_{13}$$

Corporal punishment and then family size, have the highest correlation among all, then "family disputes" come next. In the opposite of close friend classification, Family environment has the lowest coefficient among all. We can state that , corporal punishment and family size can give us better assistant than other variables in recognizing juveniles who have delinquent relative(s).

Table(21) : Classification results for Juveniles' relatives delinquency:

Relatives delinquency		Classified groups		
		No	Yes	
Original Groups	No	***95***	44	139
	Yes	31	***62***	93
				232

The proportion of total correct classification = 67.7%.

Similar to "juveniles close friend delinquency", we got a good classification. This make us be able to separate juveniles that have been affected by their delinquent relatives more clearly.

Table(22): The factors contributions in discriminating between juveniles delinquent relatives:

Variable		Contribution
X_1	Education Level	0.080
X_2	Family size	0.958
X_3	Lives With	0.190
X_4	Family Monthly income	-0.240
X_5	Number of Smokers in family	0.268
X_6	Juvenile Job	-1.008
X_7	Daily Pocket money value	0.262
X_8	Family environment	-0.065
X_9	Family bonds	-0.081
X_{10}	Family disputes	0.313
X_{11}	Results of family disputes	0.141
X_{12}	Corporal punishment	0.288
X_{13}	Other Punishments	0.418

The largest contribution (-1.008) is for the 6th variable (Juvenile job). So, it is the most important variable among all in the previous classification process. Then family size came second in the importance.

V. Discriminant analysis subject to juveniles address in condition of Crimes groups.

Now, we will classify juveniles due to their address, but this time under the condition of crimes groups (Theft, Violence and Physical assault ,and Behavior cases) that it were stated previously in page 56.

V-1 Classification for Address in condition of Theft group:

Discriminant function for the theft group classification:

$$0.535X_1 + 0.108X_2 + 0.433X_3 + 0.088X_4 + 0.151X_5 - 0.067X_6 + 0.406X_7 + 0.119X_8 + 0.705X_9 - 0.307X_{10} + 0.097X_{11} - 0.855X_{12} + 0.499X_{13}$$

Corporal punishment and then family bonds have the highest correlation, and so the strongest effect on the classification process. While "Juvenile job" variable, has the weakest effect on the classification. We can state that, the effect of corporal punishment and the strength of the family bonds, have the strongest effect on classifying juveniles, who accused with theft, regarding to their addresses.

The next table shows the classification subject to address due to theft group.

Table(23): Classification for Address in condition of Theft group:

Address		Classified groups			
		Village	Camp	City	
Original Groups	Village	***21***	4	7	32
	Camp	3	***11***	3	17
	City	15	18	***40***	73
					122

The proportion of total correct classification $= \frac{72}{122} = 59\%$.

Good classification that we can separate juveniles whom have been accused for theft crime.

Table(24): The factors contributions in discriminating between juveniles living areas due to theft group:

Variable		Contribution
X_1	Education Level	0.489
X_2	Family size	0.339
X_3	Lives With	0.381
X_4	Family Monthly income	0.082
X_5	Number of Smokers in family	0.363

X_6	Juvenile Job	-0.220
X_7	Daily Pocket money value	0.577
X_8	Family environment	0.105
X_9	Family bonds	0.537
X_{10}	Family disputes	-0.312
X_{11}	Results of family disputes	0.073
X_{12}	Corporal punishment	-0.669
X_{13}	Other Punishments	0.680

As we can notice from the previous table, Punishments have the largest contributions among all variables. So, they are the most important variables in the previous classification process.

V-2 Classification for Address in condition of Violence and Physical assault group:

Discriminant function for the violence and physical assault group classification:

$$0.348X_1 - 0.098X_2 + 0.782X_3 + 0.034X_4 - 0.011X_5 - 0.724X_6 + 0.096X_7 + 0.003X_8 - 0.245X_9 + 0.275X_{10} + 0.272X_{11} + 0.041X_{12} - 0.052X_{13}$$

"Lives with" variable has the strongest effect on the function. Then "juvenile job" come next. The weakest is "family environment. We can state that, the effect of the completeness of the

family and the goodness of the juvenile job, have the strongest effect on classifying juveniles, who accused with violence and physical assault , regarding to their address.

Table(25) : Classification for Address in condition of Violence and Physical assault:

Address		Classified groups			
		Village	Camp	City	
Original Groups	Village	***19***	7	9	35
	Camp	1	***7***	1	9
	City	7	8	***30***	45
					89

The proportion of total correct classification = $\frac{56}{89}$ = 62.9% .

Also a good classification to separate juveniles with Violence and Physical assault, than others due to their living areas.

Table(26): The factors contributions in discriminating among juveniles' living areas due to Violence and physical assault group:

Variable		Contribution
X_1	Education Level	0.271
X_2	Family size	-0.244
X_3	Lives With	0.472
X_4	Family Monthly income	0.032
X_5	Number of Smokers in family	-0.018
X_6	Juvenile Job	-2.004
X_7	Daily Pocket money value	0.139
X_8	Family environment	0.003
X_9	Family bonds	-0.185
X_{10}	Family disputes	0.260
X_{11}	Results of family disputes	0.189
X_{12}	Corporal punishment	0.033
X_{13}	Other Punishments	-0.062

The largest contribution is (-2.004) for the 6th variable (Juvenile job). So, it is the most important variable among all in the previous classification process.

V-3 Classification for Address in condition of Behavior cases group:

Discriminant function for the behavior cases group classification:

$$0.044X_1 - 0.684X_2 + 1.563X_3 - 0.482X_4 - 0.543X_5 + 0.695X_6 + 0.687X_7 + 1.211X_8 - 2.212X_9 + 0.047X_{10} + 0.282X_{11} + 0.192X_{12} - 0.873X_{13}$$

The biggest coefficient belongs to "Family bonds", then "Lives with" came second. While "Education level" came last with the lowest coefficient. We can state that, the effect of the family bonds, and the completeness of the family , have the strongest effect on classifying juveniles ,who accused with behavior cases , regarding to their address.

Table(27) : Classification for Address in condition of Behavior cases:

Address		Classified groups			
		Village	Camp	City	
Original Groups	Village	*5*	1	0	6
	Camp	1	*3*	0	4
	City	1	1	*13*	15
					25

The proportion of total correct classification = 84% .

Which is an excellent classification that gives a good separation of those who accused with behavior cases.

Table(28): The factors contributions in discriminating among juveniles living areas due to Behavior cases:

Variable		Contribution
X_1	Education Level	0.031
X_2	Family size	2.131
X_3	Lives With	1.111
X_4	Family Monthly income	-0.528
X_5	Number of Smokers in family	-1.265
X_6	Juvenile Job	1.404
X_7	Daily Pocket money value	0.826
X_8	Family environment	1.162
X_9	Family bonds	-2.358
X_{10}	Family disputes	0.053
X_{11}	Results of family disputes	0.188
X_{12}	Corporal punishment	0.133
X_{13}	Other Punishments	-1.533

Family bonds, and then family size have the largest absolute value of contributions. So those two variable are the most important among all in the previous classification process.

VI. Discriminant analysis subject to Education left:

Discriminant function for Education left classification:

$$-0.642X_1 + 0.129X_2 + 0.267X_3 - 0.148X_4 + 0.010X_5 - 0.014X_6 + 0.488X_7 + 0.114X_8 - 0.011X_9 - 0.040X_{10} + 0.079X_{11} - 0.258X_{12} + 0.187X_{13}$$

We can see that the education level has the strongest effect on the discriminant function, then daily pocket money. While the "Other punishment" variable is the lowest among all coefficients.

We can say that the education level has a clear effect to recognize juveniles who have left the education system, more than any other variables.

Table(29) : Classification results for Juveniles who have left the education system:

Education left		Classified groups		
		No	Yes	
Original Groups	No	***59***	14	73
	Yes	26	***133***	159
				232

The proportion of total correct classification = 82.8% .

Which is an excellent classification that gives a good separation of those who have stoped giong to school and lef the educational system without finsh it.

Table(30): The factors contributions in discriminating among juveniles who have left the education system:

Variable		Contribution
X_1	Education Level	-0.452
X_2	Family size	0.348
X_3	Lives With	0.218
X_4	Family Monthly income	-0.135
X_5	Number of Smokers in family	0.018
X_6	Juvenile Job	-0.041
X_7	Daily Pocket money value	0.712
X_8	Family environment	0.104
X_9	Family bonds	-0.009
X_{10}	Family disputes	-0.038
X_{11}	Results of family disputes	0.056
X_{12}	Corporal punishment	-0.209
X_{13}	Other Punishments	0.308

The variable "Daily pocket money" has the largest contribution, so it is the most important variable among all in the previous classification process.

VII. Discriminant analysis subject to School drop-out:

Discriminant function for previous classification:

$$-0.111X_1 - 0.290X_2 + 0.381X_3 + 0.038X_4 + 0.387X_5 - 0.068X_6 + 0.357X_7 - 0.103X_8$$

$$+0.543X_9 - 0.201X_{10} + 0.267X_{11} + 0.113X_{12} - 0.057X_{13}$$

The highest coefficient is that for the family bonds and then for the variable "lives with". On the other hand, Family monthly income has the lowest among all. We can say that, the completeness of the family and the strength of its bonds, clearly effect the classifying process for the juveniles who used to drop-out from school.

Next classification is to classify juveniles who used to drop-out from school:

Table(31) : Classification results for Juveniles who have dropped out from school:

School drop-out		Classified groups		
		No	Yes	
Original Groups	No	*73*	26	99
	Yes	57	*76*	133
				232

The proportion of total correct classification = 64.2%

We got a good classification. This make us separate juveniles who used to drop-out from school.

Table(32): The factors contributions in discriminating among juveniles who used to drop-out from their schools:

Variable		Contribution
X_1	Education Level	-0.089
X_2	Family size	-0.782
X_3	Lives With	0.316
X_4	Family Monthly income	0.035

X_5	Number of Smokers in family	0.699
X_6	Juvenile Job	-0.201
X_7	Daily Pocket money value	0.555
X_8	Family environment	-0.095
X_9	Family bonds	0.461
X_{10}	Family disputes	-0.190
X_{11}	Results of family disputes	0.190
X_{12}	Corporal punishment	0.092
X_{13}	Other Punishments	-0.094

As we notice, the variable "Family size" has the largest contribution (-0.782), so it is the most important variable in the previous classification process. Then "Number of smokers in family" came as the second most important variable.

Chapter four

General results, Conclusions, and Recommendations

4.1 General Results and Conclusions

A big assistance was given by multivariate analysis in this study. It helped us to figure out and find the probably most effective variables that paved the way for juveniles to delinquent, and that was satisfied by using factor analysis. The importance of factor analysis was clear in showing up the most important effects among all variables that have been involved in the analysis. In other words, the importance of data reduction has been demonstrated. Also, the usage of the factor rotations was very important to simplify the factor structure and therefore makes its explanation easier and more reliable. On the other hand, discriminant analysis gave us a big assistance in separating juveniles in subject of some features, and identifying the most effective variables in the classification process, that helped us to recognize juveniles properties under some conditions. Here are some results and conclusions and can be drawn from the analysis of the data:

- The Family is the base of the society, and the first school for the sons. Moreover, it has the biggest effect on juveniles behavior and on their personality building. As it was found by the analysis, juveniles with unstable families and uncomfortable atmosphere, are more likely to deviate. Also weaker family bonds with more disputes with sharper results of it, may rise the probability for the juvenile to do illegal activities, especially violence and physical assaults. Also families with more members, may reduce the juvenile share of parents attention and care.

- The economic situation of the juveniles and their families can also be a reason for them to deviate, especially when their families can't satisfy all their needs, due to bad economic situation of the family. If they don't receive enough money from their jobs or families, the probability for them to steal will be higher. On the other hand, more money for the juvenile through the job or the family, may also push him/her to do violent crimes or illegal behavior issues. Sometime, juvenile labor, could also be a reason for juveniles delinquency regardless of the goodness of their jobs.
- Juveniles education and rectification, have also a clear effect on juveniles. Harder punishments, including corporal and incorporeal, may affect juveniles negatively and push them to do illegal actions, especially behavior issues and violence and assault crimes. Also lower education is an important reason for juveniles to act wrong, especially doing behavior crimes. In addition, school drop-out, may rise the ability for juveniles to deviate. Less care and attention on juveniles situation, and more disintegration in their families, may help them to get used to escape the school, and then learning bad habits or activities in the street.
- Juveniles in reformatories, came from cities, camps, and villages. This mixture was hard to be separated by the juveniles properties and then recognize them, in subject of their address. Although, juveniles jobs, differs from a place, (city, camp, village), to another. Also the places that juveniles usually used to be found in, aren't so different between juveniles. Because of the transportation providing, and the ease of transporting between cities, camps, and villages.
- People who have committed a misdemeanor, can affect their close friends or relative, and lead them to the world of crime. We have been able to separate and recognize juveniles

with delinquent relatives or close friends. That lead us to state that some juveniles could be pulled to the world of crime by their close friends or relatives. Also, juveniles who are not living with both parents, or not so comfortable with their families, may seek for this with their friends, even if these friends are bad guys.

- We can't ignore some other reasons to commit crimes, like unawareness, self or honor defense, doing something under threat, or non-participation and irresponsibility. Many juveniles are charged for illegal activities due to their unawareness of the laws, or someone had took advantage of them, like using juveniles to move or buy stolen goods. Also, some of juveniles, have been charged for violent and/or physical assault crimes, trying to defend themselves or their families from different assaults. Some of them charged with murder for avenging their breached honor.

4.2 Recommendations

- Increase social awareness with regard to the institution of the family and its atmosphere. Also work to increase parents awareness in strengthen family ties, communication skills, and dealing with family members techniques. Parents also should give juveniles sufficient attention and care, and monitor their behavior and their relations with others, and try to know more about their friends and people who they are used to deal with.
- Increase the interest in the education and the rectification of juveniles. And work on increase their desire and interest in the education and the school. Also, improve the followed educational system, and work on preventing school drop-out. Also, use types of punishments that do not harm juveniles or offend their dignity. In another words, use disciplinary sanctions not torture sanctions.
- Put an end to child and juvenile labor and stop taking advantage on juveniles in this sector. And fill their leisure time with beneficial activities whether it is educational, cultural, sports, etc.
- Increase religious morals and increase knowledge of the law among juveniles. Also, draw their attention to the consequences of committing crimes on them, on their families and on their society.

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Appendix

Code used for Box-Cox transformation using SPSS syntax, Osborne J.W. (2010):

```
COMPUTE var1=(variable that you want to transform).
execute.
VECTOR lam(31) /x1(31).
LOOP idx=1 TO 31.
- COMPUTE lam(idx)=-2.1 + idx * .1.
- DO IF lam(idx)=0.
- COMPUTE x1(idx)=LN(var1).
- ELSE.
- COMPUTE x1(idx)=(var1**lam(idx) - 1)/lam(idx).
- END IF.
END LOOP.
EXECUTE.
FREQUENCIES VARIABLES=var1 x11 x12 x13 x14 x15 x16 x17 x18 x19 x110 x111 x112
x113 x114 x115
x116 x117 x118 x119 x120 x121 x122 x123 x124 x125 x126 x127 x128 x129 x130
x131
/format=notable
/STATISTICS=MINIMUM MAXIMUM SKEWNESS
/HISTOGRAM
/ORDER=ANALYSIS.
```

ر أ /108/ ٣١٦١
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١٨ / آب / 2010 م

معالي وزير التنمية الاجتماعية

الموضوع:تسهيل مهمة.

السلام عليكم ورحمة الله وبركاته

أرجو التكرم بالموافقة والإيعاز لمن يلزم به لتسهيل مهمة طالب الدراسات العليا / ماجستير **مروان جمال الشرمان** ورقمه الجامعي (**2007107008**) من قسم الإحصاء بكلية العلوم في جامعة اليرموك بالسماح له بتدوين المعلومات المطلوبة بالمقابلات الشخصية أو السجلات المعتمدة عن شريحة الأحداث حيث يقوم بإجراء بحث بعنوان :-

" استخدام التحليل المتعدد لتشخيص العوامل المؤثرة في جنوح الأحداث في الأردن "

واغتنم هذه المناسبة لابارك لكم قدوم شهر رمضان المبارك ولأعرب لكم عن بالغ الشكر والثناء لتعاونكم المستمر مع جامعة اليرموك ولأعرب لشخصكم الكريم عن صادق المودة.

وتفضلوا بقبول فائق الاحترام

رئيس جامعة اليرموك

أ.د. سلطان أبو عرابي

نسخة/ العلوم

المملكة الأردنية الهاشمية

وزارة التنمية الاجتماعية

١٢٧١٩

د/ع

الرقم ..... / / ١٤٣١ هـ

التاريخ .....

الموافق ..... / / ٢٠١٠م

السيد مدير مديرية التنمية الاجتماعية /اربد
السيد مدير التنمية الاجتماعية / الرصيفة
السيد مدير التنمية الاجتماعية / عمان الشرقية- بالوكالة
السيد مدير التنمية الاجتماعية / بيادر وادي السير
السيد القائم باعمال مدير التنمية الاجتماعية / معان

الموضوع: الدراسات

تحية طيبة وبعد،،،

اشارة الى كتاب رئيس جامعة اليرموك رقم رأ / ٢١٦١/١٠٨ تاريخ ٢٠١٠/٨/١٨ ، بخصوص تسهيل مهمة الطالب مروان جمال الشرمان / قسم الاحصاء بكلية العلوم ، لزيارة دور تربية وتأهيل الاحداث التالية لأجراء دراسة بعنوان (استخدام التحليل المتعدد لتشخيص العوامل المؤثرة في جنوح الاحداث في الاردن) ، ومقابلة الاخصائيين الاجتماعيين فيها وهي:

١- دار تربية الاحداث / الرصيفة .
٢- دار تربية وتأهيل الاحداث / عمان .
٣- دار تربية وتأهيل الاحداث / اربد.
٤- دار تربية وتأهيل الاحداث / معان .
٥- دار تربية وتاهيل الفتيات / عمان .

للأيعاز لمدراء الدور المذكورة لتسهيل المهمة شريطة التقيد التام بالانظمة والتعليمات .

مع الاحتـــــــــــرام،،،

هاله بسيسو لطـــوف

مدير التنمية الاجتماعية

مساعد الأمين العام لشؤون الادارة والتطوير

نسخة / عطوفة رئيس جامعة اليرموك
نسخه /عطوفة الامين العـــام
نسخه/ مدير الدفاع الاجتماعي
نسخة /رئيس قسم المؤسسات
رو/رو
٢٠١٠/٩/١

المملكة الاردنية الهاشمية
وزارة التنمية الاجتماعية
مديرية التنمية الاجتماعية - اربد
الرقم ..... د ع / ١٣ / ٢٧٢٢
التاريخ ٢٠١٠ / ٩ / ٢

بسم الله الرحمن الرحيم

إستبانة دراسة إحصائية

الجنس: ☐ ذكر ☐ أنثى العمر: ☐ دون12 ☐ من 12 إلى اقل من 15 ☐ من 15 إلى دون 18

مستوى التعليم: ☐ أساسي ☐ إعدادي ☐ ثانوي ☐ بلا

خروج من التعليم : ☐ نعم ☐ لا هروب من المدرسة: ☐ نعم ☐ لا

عدد أفراد الأسرة:

يعيش مع: ☐ الوالدين ☐ الأب لوحده ☐ الأم لوحدها ☐ بدون الاثنين

أحوال أسرة الجانح : ☐ اليتم ☐ طلاق او هجر ☐ تعدد الزوجات ☐ غياب رب الأسرة

☐ مرض مزمن ☐ احد الوالدين في السجن ☐ أسرة طبيعية ☐ أخرى

معدل دخل الأسرة الشهري: ☐ اقل من 150 ☐ 150 – اقل من 300 ☐ من 300 – 500 ☐ أكثر من 500

التدخين: ☐ نعم ☐ لا عدد أفراد الأسرة المدخنين:

نوع الجنحة المرتكبة: ☐ سرقة ☐ قتل ☐ مشاجرة أو إيذاء ☐ جنحة جنسية

☐ مخالفات عامة ☐ السكر ☐ قضايا مسلكية ☐ إتلاف أموال الغير ☐ مخالفات السير

☐ تشرد و تسوّل ☐ التسبب بالوفاة ☐ شروع بالقتل ☐ مخدرات ☐ محتاجين لحماية ورعاية

إصابة الحدث الجانح بأمراض نفسية ☐ نعم ☐ لا

السبب الدافع لارتكاب الجنحة (باعتقاد الجانح): ☐ فقر وبطالة ☐ رفاق السوء ☐ سوء تربية ☐ الجهل

☐ كبر حجم الأسرة ☐ عدم التوافق الأسري ☐ أخرى

مهنة ولي الأمر:

العمل: ☐ حرّفي ☐ عامل خدمات ☐ طالب مدرسة ☐ تسول ☐ بلا عمل

المصروف : ☐ من الأهل ☐ من العمل مقداره يوميا:

هل سبق لأحد الوالدين أو احد الأشخاص المقربين (أخ، أخت ، صديق مقرب ، عم ، قريب..) أن سجن لارتكابه جنحة؟

☐ نعم ☐ لا

إذا كانت الإجابة (نعم) اذكر من هو:

منطقة السكن : ☐ قرية ☐ مخيم ☐ وسط المدينة .

الأماكن التي يرتادها غالبا:

هل ارتكب اقرب أصدقاء الجانح جنحة ؟ ☐ نعم ☐ لا

نوعية برامج التلفاز التي يتابعها غالبا: ☐ ترفيهية ☐ مسلسلات ☐ أفلام ☐ رياضية ☐ وثائقية

البيئة الأسرية: ☐ مريحة جدا ☐ مريحة نوعا ما ☐ غير مريحة نوعا ما ☐ متعبة جدا

الترابط والتقارب بين أفراد الأسرة: ☐ قوي ☐ متوسط ☐ ضعيف ☐ مفكك

الخلافات الأسرية: ☐ شبه معدومة ☐ قليلة ☐ متوسطة ☐ كثيرة

ينتج عن الخلافات داخل العائلة : ☐ شجار عنيف و استخدام ألفاظ بذيئة ☐ مشادات كلامية حادة ☐ نقاش وتفاهم

العقوبات البدنية الأسرية التي مورست بحقك: ☐ ضرب مبرح ☐ ضرب خفيف ☐ عدم الضرب

العقوبات النفسية والمادية : ☐ حجز ☐ شتم جارح ☐ حرمان من المصروف ☐ توبيخ ☐ بدون