A STUDY ON CLASSIFYING PARENTING STYLES THROUGH DISCRIMINANT ANALYSIS

(DİSKRİMİNANT ANALİZİ İLE ANNE BABA TUTUMLARININ SINIFLANDIRILMASINA İLİŞKİN BİR UYGULAMA)

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ABSTRACT

This study was conducted to determine the parenting style of primary and elementary students living in Eskişehir via discriminant analysis. Firstly, the terms of style (attitude), parenting style, and the effects of parenting style on children are explained. In the study, the Parenting Style Inventory developed by Kuzgun (1972) and then revised was administered to 8th grade students. The sample of the study consisted of students from 7 schools in Eskişehir and 685 survey forms were gathered for analyses. As a result, the styles of parents were categorized into four groups (democratic, authoritarian, protective, and neglectful) and the degree of appropriate classifying was determined as very high. At the end of the classification, it was found that the most frequent parenting style was the democratic style, while the least frequent style was the authoritarian style.

Keywords: Attitude, Parenting style, Discriminant analysis.

ÖZ

Bu çalışma Eskişehir'de bulunan ilköğretim çağındaki öğrencilerin anne-baba tutumlarının diskriminant analizi ile belirlenmesi amacıyla yapılmıştır. Bu amaca yönelik olarak öncelikle tutum, anne-baba tutumu ve anne-baba tutumlarının çocuklar üzerindeki etkilerine değinilmiştir. Bu araştırmada, ilk olarak Kuzgun (1972) tarafından geliştirilen ve daha sonra değişikliklerle güncellenen anne-baba tutum envanteri ilköğretim 8. sınıf öğrencilerine uygulanmıştır. Eskişehir'de bulunan 7 okulun öğrencileri örneklem olarak belirlenmiş ve analize tabi tutulmak üzere 685 anket elde edilmiştir. Araştırmanın sonucunda anne ve babaların tutumları diskriminant analizi ile dört gruba (demokratik, otoriter, koruyucu, ilgisiz) ayrılmış ve doğru sınıflandırma oranı oldukça yüksek çıkmıştır. Sınıflandırma sonucunda en çok sıklığa sahip olan anne-baba tutumu demokratik anne-baba tutumu çıkarken en az sıklığa sahip olan anne-baba tutumu ise otoriter anne-baba tutumudur.

Anahtar Sözcükler: Tutum, Anne-baba tutumu, Diskriminant analizi

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INTRODUCTION

Mostly, children are socialised within the family. The developing child acquires the required experiences and opportunities for developing particular knowledge, behaviours and skills enabling him/her to perform successfully in social relationships with the help of his/her family (Maccoby, 1992). Therefore, risk researchers frequently regard the family as a potential source of stress emerging in the development of young people. Based on existing evidence, it is widely acknowledged by researchers interested in the problem behaviours of adolescents and children that the quality of emotional relationships in the family, which are vitally important for the well-being of all family members, are critical for the cognitive and social development of the child and the adolescent.

This was supported by various studies in the last decade on adolescent behaviours and family relationships (Hawkins, Catalano, and Miller, 1992; Patterson, Reid, and Dishion, 1992). In these studies, it was shown conclusively that there was a strong effect of parent-child relationship structures (such as "parent-child conflict" or "parent-child communication") and parent practises on the anti-social behaviours of children and adolescents and substance addiction. For instance, according to Patterson et al. (1992), if parents use oppressive control instruments and get into conflict with their children, if they fail to develop positive contribution patterns and to observe their children's behaviour outside home, they tend even more to trigger aggressive behaviours in the children. High levels of conflict and low levels of family relationships are the determinants of substance abuse among 10-14-year-old children.

One of the recent studies (Bray, Adams, Getz, and Baer, 2001) confirmed that adolescents from families where there is weak communication between members and conflict between parents and children and no emotional ties are under risk of developing problem behaviours. Many researchers have revealed the relationship between the quality of parenthood and autonomy in children and between the development of feelings of achievement and substance abuse and offensive behaviours as depending on parental practises (Cohen and Rice, 1997).

Disciplinary parental attitude was found to be in relation to the positive developmental outcomes in children (Steinberg, 2001). Therefore, when parents are warm and protective and at the same time raise their children in an autonomy suitable to their age, children and adolescents show more social skills and less problem behaviour indicators than their peers whose parents are authoritarian or loose (Baumrind, 1991; Steinberg, 2001). The significance of family relationship variables in interpreting adolescent behaviour requires reliable measurements such as active research. Uncertainty is not only related

to the structural dimensions of the family structures but also in the agreement by various family members on their perceptions of their family relationships.

Campbell and Fiske (1959) designed the multitrait-multimethod matrix (MTMM) for the evaluation of the structural validity of the psychological measurements. This design, which measures using two or more factors and where each factor is measured with two or more methods, suggests a correlation matrix which is analysed for the method effect, discriminant validity, and convergent degree (Campbell and Fiske, 1959).

At present, confirmatory factor analysis is the most widely-adopted approach used in the evaluation of the MTMM matrix (Marsh and Bailey, 1991). Each factor in the MTMM model in the field of family relationships (which is also known as "multi-dimension-multi double" design; Bray, Maxwell, and Cole, 1995) has separate features for each factor family doubles and each method is the account of another family member. In this way, suitable analyses help take into account the inter-member perception differences in the evaluation of family relationships.

Similar study results (good convergent validity of the measures yet bad inter-factor discriminant validity) were obtained by Greenbaum, Dedrick, Prange and Friedman (1994) during a MTMM study on four types of problem behaviours evaluated by children, mothers, fathers and teachers. In a study by Dishion, Li, Spracklen, Brown and Haas (1998) on the evaluation of parent practises, the convergent's proof of validity was weak due to the lack of meaningful method effect. In brief, measurements of family variables obtained from various sources (family members, teachers, etc.) seem to be converging towards each other as long as the method effect dependent on the differences on perspectives is controlled.

The type of analysis used in analysing research results is very significant in the social sciences. Therefore, it is necessary to be careful in selecting the type of analysis. The researcher should consider whether the available data meets the assumptions on the type of scale used in data collection and the statistical technique to be used in data analysis. The discriminant analysis technique to be used may be different as the technique of discriminant analysis is being applied to the social sciences. If all the data used in the research are quantitative, it means they are measurable at least at interval scale, in which case, it may be possible to calculate measures such as arithmetic mean and standard deviation and the discriminant analysis technique developed by Fisher can be applied to these data (Çakmak, 1992).

In this study, the attitudes of parents towards their children are classified using discriminant analysis, a technique of statistical classification.

In the following part, discriminant analysis to be applied for the identification of parental attitude has been analysed.

DISCRIMINANT ANALYSIS

Discriminant analysis is a multi-variable technique which ensures classification of N individuals or units in two or more groups based on various (p in number) qualities and which offers the relevant functions. It is the whole of operations carried out for the classification of units in their particular groups with minimum error for their considered qualities (Filiz, 2005). In discriminant analysis; it is a must that the dependent variable is categorical and dependent variable is numerical (Allen, Machleit and Klein, 1992; Nakip, 2006). In this analysis, a discriminant function is found to allocate units to groups and this function is determined in a way as to maximise the difference between function group means (Tatlıdil, 2002).

Discriminant analysis serves various purposes, such as:
1) To identify the linear combinations or discriminant functions of the predictive (independent) variables which best distinguish pre-determined groups (dependent). This is done through maximising the rate of intra-group change to inter-group change.
2) To test if there is a difference between groups in terms of independent or dependent variables (Malhotra, 1996; Nakip 2006).
3) To identify the independent variable which best determines the inter-group difference.
4) To identify which group the outside observation belongs to via discriminant function (Aaker, Kumar and Day, 1998: Nakip 2006).
5) To test how correct the assumptions are by re-classifying the available observations according to the available distribution function (Nakip, 2006); in other words, to evaluate the classification accuracy (Yaprak, 2007).
6) To identify how much of the variant of the dependent variable can be explained by independent variables.
7) To identify the contributions and degrees of importance of the discriminant variables (Garson, 2008).

Discriminant functions obtained by discriminant analysis are comprised of the linear components of the predictive variables. Discriminant functions reveal which are the predictive variables affecting inter-group differences. The variables which affect inter-group difference are called "discriminant variables". Another function of discriminant analysis is to identify the group a unit belongs to with the lowest possibility of error.

We can categorise the aims of the discriminant analysis as being:
1) To identify various features of observations from various known masses in graphical or algebraic terms.

2) To categorise observations into two or more classes (groups) with minimum error and to establish discriminant functions to ensure such categorisation as will also be used in further studies (Ünsal, 2000).

Fundamental assumptions which are the basis for the discriminant analysis include the following:

1) Two or more groups should be found ($g \geq 2$).
2) A minimum of two individuals should be included in each group ($n_k \geq 2$).
3) Variants of p in numbers which are used to categorise units in groups are called "discriminant variables". The number of these variables should be ($0 \leq p \leq N - 2$).
4) Discriminant variables should be measured at least by an equally intervaled scale.
5) A discriminant variable should not be the linear compound of any other discriminant variable.
6) The variance-covariance matrix for each group should be equal.
7) It is assumed that each group is withdrawn from a mass of multi-variable normal distribution (Çakmak, 1992).
8) There should be no multi-linear connection problem among independent variables (Kalaycı, 2005).
9) There should be no edge values (Poulsen and French, 2008).

A STUDY ON IDENTIFYING PARENT ATTITUDES OF PRIMARY SCHOOL STUDENTS

Aim of the Study

This study aims to identify the parent attitudes of students with different socio-economic and cultural backgrounds and to classify these attitudes accurately. To this end, it aims to classify parent attitudes of the students using the "*parents' attitude inventory*" which was developed for this purpose, and try to determine the probability of accurate classification of included variables (survey questions) for each attitude. In this way, it has been attempted to identify which behaviours of the parents fall under which attitude without probing into sub-classes. As a secondary objective, it was attempted to identify through obtaining descriptive statistics which parent attitudes are more widespread, what the underlying variables are, and why they are widespread.

Parent Attitude Inventory Used in the Study

The Parent Attitude Inventory developed by Kuzgun (1972) and modified by Eldeleklioğlu (1996) was used in the study to identify the attitudes of parents. Eldeleklioğlu (1996) also added "protective", "demanding" and "rejecting" to the sub-classes previously identified by Kuzgun (1972) as "democratic", "authoritarian", and "neglectful". A total of five sub-scales were identified and 119 articles were included to describe these, namely, 35 for democratic, 29 for authoritarian, 12 for protective-demanding, 15 for rejecting, and 18 for neglectful. Eldeleklioğlu took some of the articles (10 authoritarian, 7 democratic, 3 neglectful) from the original inventory by Kuzgun and indicated the others on the same form. Inter-consistency and decisiveness coefficients of the reliability of the Parent Attitude Scale were calculated and trialled by Eldeleklioğlu (Eldeleklioğlu, 1996).

It is noted that negative correlation between the sub-scales of Democratic Attitudes and Authoritarian Attitudes is the indicator that these behaviour classes, which are opposites, can be measured by these scales. Another scale which was adapted for Turkish culture by Yılmaz under the title of "Parents Attitude Scale" is the *Parenting Style Inventory* developed by Lamborn et al. (1991).

A parent attitude scale of 40 articles was developed, in which each parent's attitude was related to 10 articles with the latest modifications (authoritarian, protective, neglectful, democratic).

Answers to the Parent Attitude Scale have been ordered in a way as to be graded in according to the 5-choice Likert-type scale. Answers were scaled for each article from 1 to 5. It was requested that the students select and mark one of the following five Likert-type options concerning their parents: non-relevant (1), slightly relevant (2), partially relevant (3), very relevant (4), totally relevant (5) (Eldeleklioğlu, 1996).

Data Collection and Sampling Method

The scale was applied to 8th grade students at 7 primary schools who were considered representative of schools in Eskişehir with the help of their psychological guidance and counselling teachers. Schools were selected from among various districts to comprise the sampling which represents the research universe. The survey form was finalised as demographic questions were also added to the "*parent attitude survey*". According to statistical data from the National Education Directorate of Eskişehir Province for 2005-2006, there are a total number of 8,279 8th grade primary education students in Eskişehir city, consisting of 4,307 boys and 3,972 girls. As the study was in progress, all 8th graders in 7 primary schools in various parts of the city were identified and 800 surveys were applied in an attempt to maximise the

sampling size. After these were applied, the number of analysed surveys was 685.

Data Analysis

Data obtained from the survey results were analysed with the package program SPSS 11.0. First of all, it was decided which survey questions fell under which attitude. Later on, relevant articles were collected for each student and total scores for each attitude were found. The maximum of the attitude scores, whose totals were calculated, was found and it was attempted to identify the dominating attitude of the parents of each student. Finally, discriminant analysis was applied to the attitude scores found, a method which we use when we observe one categorical dependent variable and various independent variables, in an attempt to identify the accuracy of the classification.

Reliability of the model was tested at the end of the analysis and Cronbach Alpha coefficient was found to be 0.7455. Cronbach Alpha coefficient changes between 0 and 1. The evaluation criteria used in the evaluation of Cronbach Alpha coefficient is;

$0.00 \leq \alpha < 0.40$, scale is not reliable.

$0.40 \leq \alpha < 0.60$, scale is of low reliability.

$0.60 \leq \alpha < 0.80$, scale is very reliable.

$0.80 \leq \alpha < 1$, scale is of high reliability (Özdamar, 2004).

Therefore, it was decided that the value obtained in this study was very reliable.

Identification of Attitudes

After the parent attitude inventory had been modified to some extent, it included 40 articles. This scale includes 4 main parent attitudes. There are 10 articles (survey questions) for each attitude. The total of the answers given to each attitude question of the parents attitude inventory survey applied comprised respectively of the values of determinant variables, namely, authoritarian, protective, neglectful, and democratic. As the pre-analysis classification of individuals was carried out, each individual was classified under the group entitled with the variable with the highest value for that individual. This was carried out for each individual and individual scores were thus obtained. Hence, there are 32 individuals in the first group, 145 in the second group, 46 in the third group, and 462 in the fourth group. Table 1 includes the questions as classified under attitudes.

Table 1. Survey Question Numbers under Attitudes

	Survey Question Numbers
Authoritarian	S5, S9, S11, S12, S16, S17, S18, S25, S27, S40
Protective	S2, S4, S6, S10, S19, S21, S22, S30, S32, S33
Neglectful	S3, S8, S23, S24, S26, S28, S31, S34, S35, S38
Democratic	S1, S7, S13, S14, S15, S20, S29, S36, S37, S39

Discriminant Analysis Results

Discriminant functions to be used for the analysis of data and classification of units were found and the probabilities of accurate classifications into these groups were obtained.

First of all, Box M value in Table 2 was calculated to test the hypothesis of the equality (H_0:Σ1=Σ2=Σ3=Σ4) of the averages of the variance-covariance matrix.

Table 2. Chi Square Transition from Box's M Statistics

Box' M Test Scores		
Box'sM		3.883.595
F	Approximate	4.242
	sd.1	820
	sd.2	230128.9
	Significance	.000

As the F value concerning Box M value was very high and its probability value was $p < 0.05$, it was determined that the group variance-covariance matrix was not equal. Therefore, the data were subjected to multiple square discriminant analysis (Bianco, Boente, Pires and Rodrigues, 2008; Dixon and Brereton, 2008; Hua, Xiong and Dougherty, 2005).

It is observed in Table 3 that min(k-1, p)=(4-1, 40)=3 discriminant functions were calculated. Eigenvalues, variance rates and canonical correlation values were calculated for these functions.

Table 3. Eigenvalues

Function	**Eigenvalues**	**Extracted Variance (%)**	**Cumulatively Extracted Variance (%)**	**Canonical Correlation**
1	2.086	72	72	0.822
2	0.561	19.4	91.4	0.599
3	0.250	8.6	100	0.447

Total variance extraction rates of the discriminant functions obtained are given in Table 3. Therefore, function 1 extracts 72% of the total variance, function 2 extracts 19.4% and function 3 extracts 8.6%. It is seen on the Table that cumulatively it is 100%.

From Table 3 and 4 it is clear that all three functions have the power to discriminate, because the probability values for discriminant functions are p<0.05 and it is possible to decide if they can be used for allocating units to groups.

Table 4. Wilks' Lambda Values

Test Functions	Wilks' Lambda	Ki-Kare	Degree of Freedom	p
1-3	0.166	1199.200	84	.000
2-3	0.513	446.502	54	.000
3	0.800	149.187	26	.000

Discriminant coefficients for 3 discriminant functions obtained are included. Discriminant functions are written using these coefficients. The first discriminant function;

$Y(1)= -3.374X1 - 1.428X2 – 2.772X3 + 0.953X4$
Second discriminant function;
$Y(2)= -1.834X1 + 1.223X2 - 0.996X3 – 0.158X4$
And third discriminant function;
$Y(3)=1.486X1 + 0.117X2 - 1.457X3 + 0.005X4$
were obtained as above.

Classification of Attitudes via Discriminant Analysis
Discriminant analysis was used to find out the most effective variant(s) in discrimination among groups and to clarify which new unit for variances will be allocated to which group.

Accurate classification of units in groups and probabilities of erroneous classification in another group are given in Table 5. Therefore; 28 of 32 students were classified as children with authoritarian parent attitudes (probability of accurate classification: 87.5%), 3 as children of protective parents (probability of erroneous classification: 9.4%) and 1 as the child of neglectful parents (probability of erroneous classification: 3.1%).

121 of 145 students with protective parent attitudes were classified as children of protective parents (probability of accurate classification: 83.4%), 6 were classified as the children of authoritarian parents (probability of erroneous classification: 4.1%), 14 were classified as the children of neglectful parents (probability of erroneous classification: 9.7%) and 4 were classified as

the children of democratic parents (probability of erroneous classification: 2.8%).

40 of 46 students with neglectful parent attitudes were classified as children with neglectful parent attitudes (probability of accurate classification: 87.0%), 3 were classified as the children of authoritarian parents (probability of erroneous classification: 6.5%), 2 were classified as the children of protective parents (probability of erroneous classification: 4.3%) and 1 as the child of democratic parents (probability of erroneous classification: 2.2%).

419 of 462 students with democratic parent attitudes were classified as the children of democratic parents (probability of accurate classification: 90.7%), 5 were classified as the children of authoritarian parents (probability of erroneous classification: 1.1%), 30 were classified as the children of protective parents (probability of erroneous classification: 6.5%) and 8 were classified as the children of neglectful parents (probability of erroneous classification 1.7%).

As a result, the probability of the obtained discriminant functions, used in allocation of students to allocate students accurately to the right groups, is 86.7%, which is very high.

Table 5. Classification Results

ATTITUDE		1	2	3	4	Total
Estimated Group Members						
Reel Group	1	28	3	1	0	32
	2	6	121	14	4	145
	3	3	2	40	1	46
	4	5	30	8	419	462
%	1	87.5	9.4	3.1	0	100
	2	4.1	83.4	9.7	2.8	100
	3	6.5	4.3	87	2.2	100
	4	1.1	6.5	1.7	90.7	100

* The rate of cells accurately grouped in their own group is 86.7%.

CONCLUSIONS AND RECOMMENDATIONS

This study aimed to classify the parent attitude of students at primary level via discriminant analysis. To this end, 8th grade students at 7 primary schools in Eskişehir were applied the parent attitude inventory and the obtained findings were evaluated. Discriminant analysis results were particularly reliable, which were applied to classify parent attitudes with

minimum errors, considering that parent attitudes are a significant factor for the child to understand himself and his environment. Discriminant functions which are used in the allocation of students to allocate students accurately to the right groups are 86.7%. Parent attitudes were classified using the discriminant analysis and very little rate of shifting towards other groups was observed. The parent attitudes in which the maximum rate of erroneous classification was observed are democratic and protective parent attitudes. The percentage of accurate classification of students with parents who have a democratic parent attitude is 90.7%, the same percentage with protective parent attitudes is 6.5%, the classification rate for authoritarian parent attitudes is 1.1% and the percentage of classification regarding neglectful parent attitudes is 1.7%. Therefore, it is observed that students failed to clearly distinguish between questions representing democratic parent attitudes and those representing protective parent attitudes.

The most frequent parent attitude among the 685 surveys analysed was the democratic parent attitude (462 students). The least frequent parent attitude was the authoritarian parent attitude (32 students).

In this study, an attempt has been made to state that "Multi Discriminant Analysis", which is a multi variant analysis technique, can be used as a convenient analysis technique in psychology.

Also, further use of psychological scales to make the students acquire the skills to analyse themselves, their families, and their environment better will not only contribute to the personal development of the student but also facilitate the students to familiarise themselves with scales used in statistical research such as that in this study and ensure more reliable answers to questions.

Children receive their initial and most critical education from the family, therefore the significance of parent attitudes should not be neglected and parents should be very careful about their attitude towards their children for the upbringing of healthier individuals.

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APPENDIX 1

SURVEY FORM
Here is a list of statements representing by which methods parents educate their children and how they act as they help children acquire social behaviours. You are asked to read these statements, consider how far do they resemble your parents' behaviour as they educate you, and mark the relevant option on the form.

1. Non-relevant 2. Slightly relevant 3. Partially relevant 4. Very relevant 5. Totally relevant

Please be sincere as you mark these, because your answers will only be used for research purposes and not be notified to any institution or person. If you wish to know about the result, you will be informed.

1) Has always given me confidence and made me feel loved.	1	2	3	4	5
2) Has supported me as much as possible to develop in many ways.	1	2	3	4	5
3) Has always focused on negative sides of anything I do rather than positive sides and criticised me.	1	2	3	4	5
4) Always tries to protect and save me as if anything may go wrong anytime.	1	2	3	4	5
5) Our relationship is always too official for me to open up.	1	2	3	4	5
6) Has always let me invite my friends home and treated them nice whenever they came by.	1	2	3	4	5
7) Tries to take my opinion as much as possible.	1	2	3	4	5
8) Has always compared me with other children around and commented that they were better than me.	1	2	3	4	5
9) Has tried to rule me.	1	2	3	4	5
10) Even today tries to accompany me in shopping lest I may be misled.	1	2	3	4	5
11) Has always expected achievement far beyond my capacity.	1	2	3	4	5
12) Has always acted cold and aversive whenever I needed to be physically and emotionally close.	1	2	3	4	5
13) I can easily discuss my problems with him/her.	1	2	3	4	5
14) Explains me why I should or should not do things.	1	2	3	4	5
15) We are on friendly terms when we are together.	1	2	3	4	5
16) Has forced me prefer the profession that s/he wants.	1	2	3	4	5
17) Would make me eat food I do not like thinking that it would be good for me.	1	2	3	4	5

18) Has always wanted me to do very well in the exams.	1	2	3	4	5
19) Always takes me places which I can manage to go all by myself at this age and is concerned that I will be home alone.	1	2	3	4	5
20) Encourages me to state my opinion when there is a discussion at home.	1	2	3	4	5
21) Has helped me acquire studying and reading habits since I was young.	1	2	3	4	5
22) Would spend a lot of time with me when I was younger and take me to the park or movies.	1	2	3	4	5
23) I think s/he feels sorry to have a child like me.	1	2	3	4	5
24) Would force me to do well at school and punish me if I failed an exam.	1	2	3	4	5
25) Would use me as a tool to make her/him accomplish her/his goals.	1	2	3	4	5
26) Always forced me to do more than I could.	1	2	3	4	5
27) Strictly controls where I spend my money.	1	2	3	4	5
28) Always believes that I should be perfect in everything.	1	2	3	4	5
29) Always responds to me warmly whenever I want to approach.	1	2	3	4	5
30) Has given me the belief that I am important and valuable.	1	2	3	4	5
31) Has always been indifferent whenever I needed to talk about my problems about sex.	1	2	3	4	5
32) Always tells me that s/he wants my own good and s/he can only know what is good for me.	1	2	3	4	5
33) Is always concerned about where I am and what I am doing.	1	2	3	4	5
34) When I accomplish something, always tells me that I should do better rather than praising me.	1	2	3	4	5
35) I cannot pay interest to sexual matters in her/his presence as s/he is very conservative in such issues.	1	2	3	4	5
36) Likes to hear about my opinion when a family decision is being taken.	1	2	3	4	5
37) Has accepted me as I am.	1	2	3	4	5
38) Pays more attention to others than me and acts them kind.	1	2	3	4	5
39) Listens to what I've got to say about daily events carefully and gives me explanatory replies.	1	2	3	4	5
40) Usually talks to me with a strong and commanding voice.	1	2	3	4	5

<u>Mother</u>   <u>Father</u>

Education background of the parent:………………………………………………………….
His/her occupation: ....
Number of siblings: ……………………………………………………………………
Sex: girl ( )   boy ( )