Department of Statistics PhD Thesis

2003

Prediction of Adult Stature of Japanese Boys and Girls

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University of Rajshahi

PREDICTION OF ADULT STATURE OF JAPANESE BOYS AND GIRLS

A

thesis

submitted to the

University of Rajshahi,

in fulfillment of the requirements

for the Degree of Doctor of Philosophy

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May 2003

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সহযোগী অধ্যাপক
পরিসংখ্যান বিভাগ
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CERTIFICATE

This is to certify that the thesis entitled "Prediction of Adult Stature of Japanese Boys and Girls" is a record of original research work, for the degree of Doctor of Philosophy in Human Growth and Development, done by my research fellow J.A.M. Shoquilur Rahman, Assistant Professor, Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh. I further certify that the research work has not previously been published or submitted elsewhere for any other degree or diploma.

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DECLARATION

I do hereby declare that the thesis "Prediction of Adult Stature of Japanese Boys and Girls" submitted to the Department of Population Science and Human Resource Development, University of Rajshahi, Rajshahi, Bangladesh for the award of the Degree of Doctor of Philosophy in Human Growth and Development is a record of original and independent research work done by me under the supervision of Dr. Md. Ayub Ali, Associate Professor, Department of Statistics, University of Rajshahi, Bangladesh and it has not been submitted elsewhere for any other degree or diploma.

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TO

MY PARENTS

ACKNOWLEDGEMENTS

I express my hearty thanks, deep sense of gratitude and appreciation to my most respectable supervisor Dr. Md. Ayub Ali, Department of Statistics, University of Rajshahi, Rajshahi, Bangladesh. His active, soft and detailed guidance, efficient advice, sincere help, encouragement and overall cooperation helped me completing the study and to prepare this dissertation. He also sacrificed much of his valuable time in going through the manuscript as well as in correcting the mistakes therein.

I would also like to offer my sincere thanks and deep sense of gratitude to Dr. Fumio Ohtsuki, Professor Emeritus, Graduate School of Science, Tokyo Metropolitan University, Tokyo, Japan, who gave me the permission, through my supervisor, to use a huge amount of longitudinal data as accumulated by him during many years. It helped me a lot in carrying out this valuable research work.

I also wish to express my sincere thanks and high appreciation to Professor M. Korban Ali, Department of Information Technology, Southeast University, Dhaka, Bangladesh for his so many helpful suggestions and valuable comments and encouragement during the entire period of my research.

I would also like to offer my thanks to the Department of Population Science and Human Resource Development, University of Rajshahi, Rajshahi, Bangladesh for giving me the laboratory facilities in order to carry out the research work.

I am thankful to all the teachers and employees of the Department of Population Science & Human Resource Development and the Department of Statistics, University of Rajshahi, Rajshahi, Bangladesh for their cooperation and encouragement.

Finally, I wish to express my gratitude to all members of my family and well-wishers for their forbearance and patience.

May 2003 *J.A.M. Shoquilur Rahman*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The longitudinal growth of individual's stature of the present study was characterized from early childhood to adulthood. The samples used here were 509 males and 311 females. A triphasic generalized logistic model (BTT model) and diphasic growth model (JPA-2 model) applied respectively on the above two sets of data through the software AUXAL for characterizing individual growth of stature. The default values of the population mean and covariance matrix in AUXAL for both the models were substituted by estimated population mean and covariance matrix based on Japanese population. The individuals without mid growth spurt for both sexes show that predicted adult stature (PAS) was significantly positive correlated with stature at onset of adolescent and adolescent growth phases, and for only girls VTO and PHV was positively correlated. The individuals with mid growth spurt for both sexes show that PAS was significantly positively correlated with statures at early childhood minimum, mid-childhood maximum, onset of adolescent and adolescent growth phases. Also positive significant correlations were found between VECM and VMC, VTO and PHV but in case of PHV and VMC, negative significant correlation was found. On the basis of JPA-2 model the mean adult stature were 171.27cm for Japanese boys and 158.51 for Japanese girls. On the basis of BTT model this study demonstrates that, on average, 46.1%, 39.5%, and 14.4% of the total adult stature were completed during early, middle and adolescent phase of growth, respectively, for the Japanese male population. For the female population, these percentages were 42.6%, 44.6%, and 12.8%, respectively. The distributions of predicted stature that do not have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 1 to 5 and 10 to 12, and

then again become shorter than boys. The distributions of predicted stature that have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 8 and 11 to 12, and then again become shorter than boys. Japanese boys who do not have the mid growth spurt are, on average, 13.26 cm taller than their opposite sex. Moreover, Japanese boys who have the mid growth spurt are, on average, 13.77 cm taller than their opposite sex.

Several equations, after removing the problem of outliers and influential data points, are proposed to predict the adult stature of the Japanese based on growth parameters and statures at different ages.

ABBREVIATIONS

AECM	Age at early childhood minimum
AI	Adolescent increment
AMC	Age at mid childhood maximum
APHV	Age at peak height velocity
ATO	Age at takeoff
BTT	Bock-Thissen-du Toit
OLS	Ordinary least square
PAS	Predicted adult stature
PHV	Peak height velocity
SECM	Stature at early childhood minimum
SMC	Stature at mid childhood maximum
SPHV	Stature at peak height velocity
STO	Stature at takeoff
S_t	Stature at the age t
VECM	Velocity at early childhood minimum
VMC	Velocity at mid childhood maximum
VTO	Velocity at takeoff

CHAPTER-1

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 Importance of the Study

The well-behaved growth of children in stature and body weight is the valuable sign of their general health and thriving. For the great stability of this growth, stature is more valuable than body weight, and charts for its comparison with population norms are available in many parts of the world. These norms are often based on samples of children enrolled for the long-term growth studies where stature and body weight are measured at regular intervals. Pediatricians, clinicians, endocrinologists and orthopedic surgeons are feeling much interest to evaluate the present growth status of children and estimate their future growth potentials. Even a good number of families realize the importance of the future adult stature of their individual children. In some other families, however, there is great concern that a child with unusual stature will be a short adult. Family concern with present and future stature can have marked adverse psychological effects, especially near the usual age of puberty when the statures of many short or tall children become increasingly deviant. The management of such adverse type of children should be started with the assessment of present size and maturity should be considered for proper diagnosis. If it becomes possible to predict the final stature of the child with known confidence, the psychological and medical management will be developed to a large extent.

Recently in Japanese society, the living environment and dietary habits of infants and children have changed drastically. After World War II the physical features of the school going children and young adults in Japan appeared to show a conspicuous improvement. The scientific interests in growth and development of human beings arise from the viewpoint of pediatric and adolescent sciences as well as an anthropometry. Now a day the number of overweight children has increased remarkably and constituted a public health problem in Japan. Growth and development are influenced strongly by genetic factors, dietary habits and living environment. In this point of view the information on individual growth is important rather than the average growth of population.

The standard or average growth ought to be characterized after individuality is distinguished for each normal subject when his or her longitudinal measurements are available. This approach is useful and effective for setting up growth standards or optimal growth range, for comparing and predicting growth of stature, and for detecting growth disorders as early as possible.

It is expected that an optimal growth band with boundary warning and abnormal growth bands be constructed for individual growth. With the help of the growth model and his longitudinal measurements the growth bands can be constructed. These growth bands may be of much use in serving as a part of optimal growth care guidance to healthy children and those with diseases or poor environments. So it is important to establish a suitable growth model of stature from a phenomenal point of view as well as to grasp objectively the changes of growth of stature with the times and with regions.

1.2 Aim of the Study

In order to make the right predictions of adult stature are of great anxiety not only for a pediatrician to decide the medical treatment especially for short children, but also for coach of some sports to detect the medical treatment especially for short children, but also for coach of some sports to detect well-suited and/or-talented youths.

In this connection, a good number of researchers have already attempted to estimate the adult stature by adopting various methods (Ali and Ohtsuki, 2001; Bayley and Pinneau, 1952; Khamis and Guo, 1993; Khamis and Roche, 1994; Onat, 1975; Roche et al., 1975a,b; Wainer et al., 1978). Most of them predicted the adult stature through skeletal age. The adult stature can also be predicted the asymptotic curve fitting with the longitudinal individual stature only.

In order to estimate the biological parameters, fitting of parametric and non-parametric growth models were attempted. Fitting curves to individual stature growth records permits the extraction of the maximum amount of information about a child's growth, and the individual curves can, however, be compared and contrasted. Moreover, when fitted growth-curve parameters are available for a large number of children, mean parameters and variation around them are a convenient way of summarizing a large amount of data for comparison of growth patterns between sexes or between populations (Thessen et al., 1976). Thus it is clear that fitting curves provides a convenient means for characterizing individual or group differences in the pattern of growth. Now a days, for the purpose of achieving a great precision with more accuracy, the researchers are manipulating different models (Ali and Ohtsuki, 2001; Berkey and Reed, 1987; Bock et al., 1973; Count, 1943; Jenss and Bayley, 1937; Jolicoeur et al., 1988; Jolicoeur et al., 1992; Karlberg, 1989; Preece and Baines, 1978, etc.) It is necessary to select a suitable model to achieve a good prediction. Jolicoeur et al. (1992) declared that, till then, JPA-2 showed the best fit as compared with other structural growth models. Recently, Ali (2000) pointed out that the average root mean square error for the estimated triphasic generalized logistic model (BTT model), however on average, were smaller than that for JPA-2 model, but their proposed equations for predicting adult stature will provide biased estimates for those individuals who do not have the mid growth spurt due to the problem of triphasic model itself. Hence an improvement is necessary to remove that biasedness and re-estimate the predicted equation for adult stature.

Thus, the purpose of this present study is to find out some better equations, to predict the adult stature of the Japanese, than those of Ali (2000).

For this we are to

(i) fit appropriate parametric growth models using statural data

(ii) estimate the growth parameters, e.g., SPHV, STO, APHV, ATO, etc

(iii) find the relationships between the adult stature and other growth parameters, and

(iv) estimate the equation to predict adult stature of the Japanese boys and girls.

1.3 Concept and Terminology

Stature: The subject should stand on a horizontal platform with his heels together, stretching upward to the full extent, aided by gentle traction by the measurer on the mastoid processes. The subject's back should be as straight as possible, which may be achieved by rounding or relaxing the shoulders and manipulating the posture. The marked Frankfort plane must be horizontal. Either the horizontal arm of an anthropometer, or a counter- weighted board, is brought down on to the subject's head. If an anthropometer is used, one measurer should hold the instrument vertical with the horizontal arm in contact with the subject's head, while another applies the gentle traction. The subject's heels must be watched to make sure they do not leave the ground (Weiner and Lourie, 1969).

Velocity: Velocity is a directed term, it has a direction and a magnitude and is indicated by the letter v. Velocity as a directed term is defined as the ratio of the directed displacement Δr to the required time Δt, i,e.,

$$v = \frac{\Delta r}{\Delta t}$$

The direction of v is the same as the direction of the displacement.

Other Terminology: Let t be the age and f(t) be the function of t (it also be the stature). Then by the definition of velocity we get, velocity = $f^{/}(t)$. Now we draw a figure (Fig. 1.1) taking age (t) at x-axis and, stature and velocity at y-left axis and y-right axis, respectively. According to the figure (Fig.1.1):

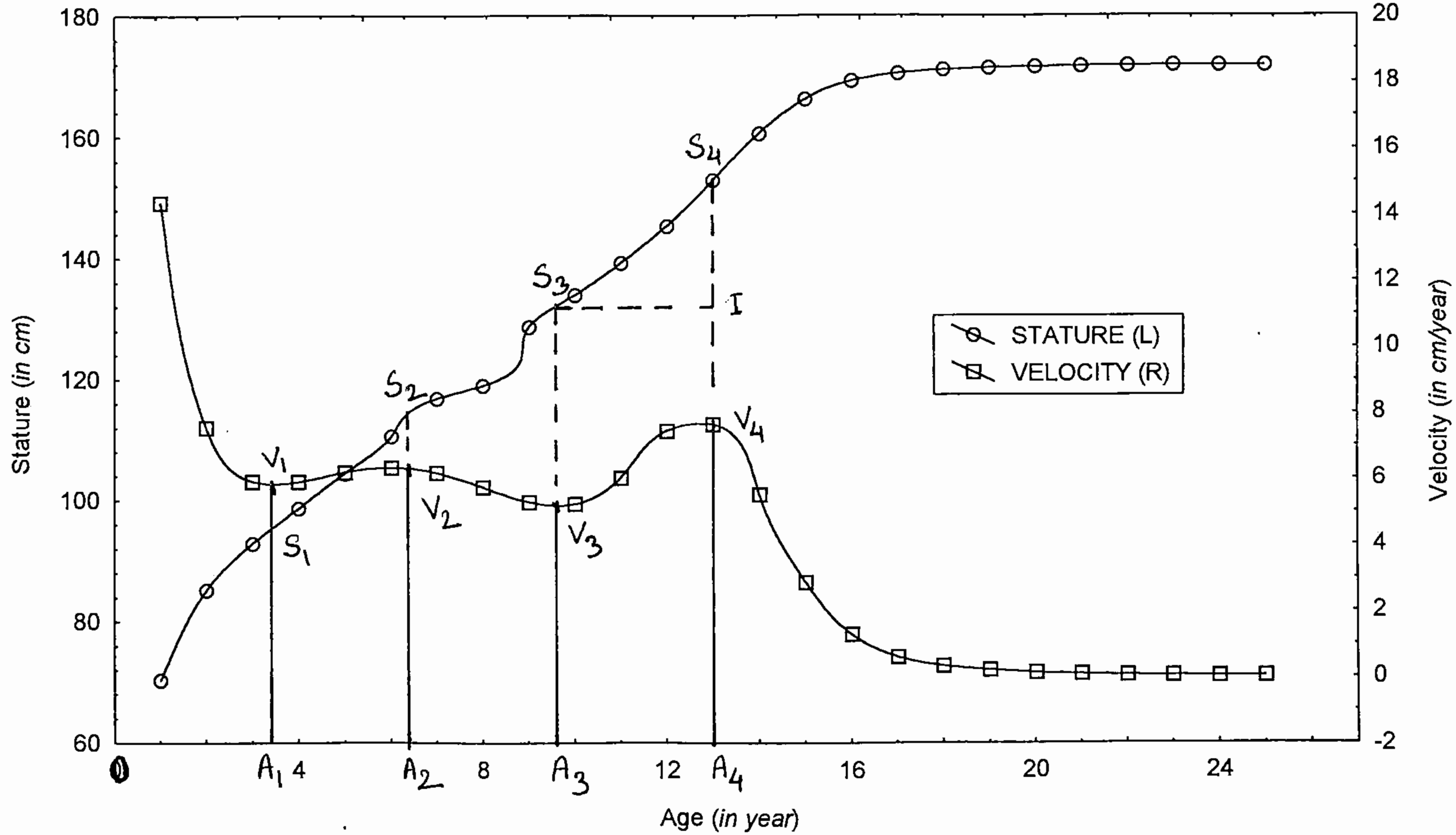

Fig. 1.1 Average distance and velocity curve of Japanese boys to define the different measurement of growth parameters.

OA_1 implies the age at early childhood minimum (AECM).

OA_2 implies the age at mid childhood maximum (AMC).

OA_3 implies the age at takeoff (ATO).

OA_4 implies the age at peak height velocity (APHV).

A_1S_1 implies the stature at early childhood minimum (SECM).

A_1V_1 implies the velocity at early childhood minimum (VECM).

A_2S_2 implies the stature at mid childhood maximum (SMC).

A_2V_2 implies the velocity at early childhood maximum (VMC).

A_3S_3 implies the stature at takeoff (STO).

A_3V_3 implies the velocity at takeoff (VTO).

A_4S_4 implies the stature at peak height velocity (SPHV).

A_4V_4 implies the peak height velocity (PHV).

IS_4 implies the adolescent increment (AI).

1.4 Organization of the Study

There are six chapters in this study. Chapter 1 is *Introduction* which contains importance of the study, aim of the study, concept and terminology, and organization of the study.

Chapter 2 is *Review of the Literature* which contains information on prediction of final stature together with longitudinal curve fitting procedures of earlier studies.

Chapter 3 is *The Materials of the Study* which contains notes on data considered, density of data for different regions studied, and finally the method for the prediction of real age.

Chapter 4 is *The Methods of the Study* which contains a brief description of the JPA-2 and BTT models, their estimation process, estimation of population mean and covariance matrix for the substitution of the default value of population mean and covariance matrix in the software AUXAL, estimating growth parameters, pattern of relationship of adult stature separately on growth parameters and statures at different age, stepwise regression for selecting most influential variables, method of detecting outliers and influential data points, finally a model validation technique.

Chapter 5 is *The Results and Discussion*. This chapter contains results and discussion for the growth parameters, followed by the prediction of adult stature of the Japanese based on growth parameters and statures at different ages after removing the outliers and influential data points, and validation of the fitted equation.

Chapter 6 is *Conclusion* which contains summary and the overall findings of the study, and specifies directions for possible future extensions.

A selected bibliography is presented next. An appendix containing stepwise regression results and other relevant information is provided at the end of the thesis.

CHAPTER-2

REVIEW OF THE LITERATURE

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Predicting Adult stature

Pediatricians, children and their parents are felling much interested to precise predictions of adult stature. Because of exact predictions of adult stature are important for children growing or maturing at usual rates and for children with diseases, as for example hypothyroidism, that can alter their potentials for growth in stature. For considering these ideas, many researchers have used different methods in order to estimate the adult stature, some of which are discussed below:

At initial stage the most widely used technique of Bayley (1946) in predicting adult stature was well known. Bayley and Pinneau revised it, in 1952. In the revised technique it was considered at any particular physiological age a certain percentage (on average) of their adult height are attained by children. The ratio of a child's present stature and the average percentage of adult stature attained at that particular age yields gives an estimate of his adult condition. The percentage values for males, females and for early, average and late matures are presented in separate tables.

Roche et al. (1975a) made an estimate of adult stature through RWT method by using the data of recumbent length, nude body weight, mid-parent stature, and hand wrist skeletal age. In addition to this they also tested that in order to predict the adult stature the Bayley-Penneau tables (Bayley and Penneau, 1952) are very useful though they tend to overestimate the results for girls with skeletal ages of 14 years or more, tend to underestimate the results who are retarded skeletally.

To predict the adult stature of Istanbul girls Onat (1975) observed that, the stature attained at the onset of secondary sexual characteristics were useful in estimating the stature, and he also observed that the standard error in this determination was smaller than standard error obtained from the method based on the stature at chronological age and more or less equal to that based on skeletal age.

Roche et al. (1975b) examined 78 predictors for predicting adult stature vividly. Most of them were at bone-specific skeletal ages for the hand wrist, knee and foot-ankle or combinations of all these ages. Additionally recumbent length, adult stature and body weight of their parents were also measured. 18 variables were chosen for further testing by using principal component and cluster analysis. Finally, a set of four predictors – recumbent length, body weight and skeletal age (median of Greulich-Pyle bone-specific skeletal ages for the hand wrist) of the child and mid parent stature were chosen by them and it was applicable to both sexes through out the age ranges involved. For each of these predictor variables multiple regression method was used in order to estimate the weightings.

The original RWT method was modified (Wainer et al., 1978) and the modified model was more generally applicable than of RWT method. It was suggested that since the RWT method for predicting adult stature used the predictor's current recumbent length of the child, stature of each parent and the skeletal age of the child, there will be a small increase in the errors of population mean values are substituted in the prediction equation when the father's stature and the skeletal age of the child or both remain unknown.

In order to predict the adult stature Khamis and Roche (1994) applied the Khamis-Roche method where without skeletal age, three predictors viz. current stature, current body weight and midparent stature were used to predict the adult stature. In this method they evaluated the adult stature of white children free of pathological conditions and it differed from the expected values for stature or maturity at an age. Due to the omission of skeletal age, especially, close to 14 year age in males and 11 years in females, a slight deterioration in prediction accuracy was expected, in contras with the modified RWT method.

Three methods (A,B and C) for predicting adult stature were reported by Khamis (1993).

Method A: Adult Stature=2.0×[Stature at age 2]

Method B(Boy): Adult Stature=22.69+1.37×[Stature at age 2]

(Girl): Adult Stature=24.97+1.17×[Stature at age 2]

Method C: Adult Stature=b_0+b_1×[current stature]+ b_2×[current weight]

+b_3×[mid parent stature]

For both boys and girls of 4-8 years of age with six months interval were suggested in order to get the values of b_0,b_1,b_2 and b_3. It was also suggested that the method C was the most precise way to predict adult stature for children of 4-8 years old. Method B gave the best prediction of adult stature for children of two years old and method A was not recommended for use in adult stature particularly the child was a girl.

Almost all of the above researchers predicted adult stature through skeletal age. It is also possible to predict adult stature through the asymptotic curve fitting with longitudinal individual stature only.

2.2 Growth Models

Fitting to parametric as well as non-parametric growth models were exempted in order to get the estimate of the biological parameters. Specific methodological approaches are required by the analysis of longitudinal growth data. To establish individual growth patterns and to estimate, so-called, biological parameters of the growth curve is one of the main interests of longitudinal growth studies, for example, the timing and intensity of the adolescent growth spurt. These appearances are introducing us with information about the shape of the growth curve, rather than informing about the size, which is attained at a particular age. Many researchers tried to fit parametric and also non-parametric growth models for estimating the biological parameters and they were also dealing with different models to get more revising with great accuracy. Some of them are described (according to year published) below:

The Gompertz and the Logistic growth model

In the analysis of growth processes Deming (1957) and Merrell(1931) discussed in detail the properties of the Gompertz and the logistic function. The Gompertz curve equation can be written as :

$$Y = P + Ke^{-e^{a-bt}} \qquad (1)$$

Where:

Y be the depending variable, i.e., stature.

t be the independent variable, i.e., age.

P be the lower asymptote, i.e., stature at the start of the adolescent growth cycle.

K be the adolescent gain, i.e., stature gain during the adolescent growth cycle.

a be the constant of integration; depending on the position of the origin.

b be the rate constant (1/age).

This curve equation may be considered as the individual's constant inherent rate of maturation through the adolescent growth cycle according to Deming (1957). It can be seen that the velocity curve is asymmetrical with a point of inflection at $t^*=a/b$ by differentiating equation (1). This can be considered as the abscissa of the maximum for its first derivative of equation (1) and the ordinates are:

$$Y_{(t^*)} = Ke^{-1} \approx 0.368K \qquad (2)$$

$$\frac{dY}{dt}\left[t = t^*\right] = bKe^{-1} \approx 0.368bK \qquad (3)$$

Equation (2) expresses that about 37% of the adolescent growth is attained at age t^*.

The logistic curve equation, on the other hand is given below:

$$Y = P + \frac{K}{1 + e^{a-bt}} \qquad (4)$$

Here the parameter meanings are the same as stated above in the Gompertz function. From equation (4), the velocity curve is symmetrical about its point of inflection at

$t^*=a/b$. Marubini et al. in 1971 clearly showed the asymmetry of the Gompertz and the symmetry of the logistic curve.

The Jenss Model

Jenss and Bayley (1937) (where credit is given to Dr. Lowell Reed for its development) first described a four-parameter nonlinear Jenss model. This is a negatively accelerated exponential and approaches a linear asymptote having positive slope. This model can be written as:

$$y = a_0 + a_1 t - \exp(c_0 + c_1 t) + \varepsilon$$

Where t is age (years), y is observed stature (cm) or body weight (kg), and ε is random error. a_0, a_1, and c_0 are positive parameters, and c_1 is negative. The $\exp(c_1)$ be the growth or acceleration constant, is independent of scale and measures the ratio of the acceleration of growth at any given age, t, to the acceleration at the preceding age, t_{-1} be noted by Jenss and Bayley (1937). Thus to compare the growth of different characteristics within the child, or to study the growth of the same characteristic in different children can be needed by $\exp(c_1)$. The acceleration's magnitude of the constant $\exp(c_1)$ is what largely determines the shape of an individual curve. Since then the model has been used by others (Berkey, 1982; Deming and Washburn, 1963; Manwani and Agarwal, 1973).

The Count Model

Count (1943) first applied the Count model in human stature of Chinese stature within the age range three month to seven years. Many other researchers (Tanner et al., 1956; Israelsohn, 1960; Wingerd, 1970; and Mata, 1978) has been applied this model. The linear Count model can be written as:

$$y = a_0 + a_1 t + a_2 \ln(t) + \varepsilon$$

Where t is age (years), ε is random error and y is physical measurement (stature or body weight), and $a_0, a_1,$ and a_2 are the parameters of the model. The location of zero age is an implicit fourth parameter in the model. Some authors have used conception, or other points that make the interpretation of parameters especially convenient, for age zero.

<u>The Double Logistic Model</u>

In 1973 Bock, Wainer, Peterson, Thissen, Murray and Roche described that the double logistic model fit the growth data from childhood to adulthood. The double logistic model can be written as,

$$y = \frac{a_1}{1+\exp[-b_1(t-c_1)]} + \frac{f-a_1}{1+\exp[-b_2(t-c_2)]} \qquad (2.1)$$

Where y be the stature (in cm), t be the age (in yrs), and a_1, b_1, c_1, b_2 and c_2 be the five parameters. Mature size (f) has to be inserted in the function in this model. A component of prepubertal growth, which continues in reduced degree until maturity is forcusted by the first term of the right hand side of the above equation and the second term describes the contribution of the adolescent spurt. The explanations of the parameters are as follows (units are shown in the parentheses):

a_1 is the upper limit of the prepubertal component (cm).

b_1 determines the initial slope of the prepubertal component (yrs^{-1}), and is implicit in $v_1=a_1b_1/4$, the maximum velocity of growth of the prepubertal component (cm/yr).

c_1 determines the location in time of the prepubertal component (yrs).

f is adult stature (cm).

$a_2=(f-a_1)$ is the contribution of the adolescent component to adult stature (cm).

b_2 determines the slope of the adolescent component, and is implicit in $v_2=a_2b_2/4$, the maximum velocity of growth of the adolescent component (cm/yr).

c_2 is the age at maximum velocity of the adolescent component (yrs).

The PB1 Model

In 1978 Preece and Baines developed a procedure for fitting individual serial record of stature from age 2 to adulthood and described the properties of biological parameters of the proposed growth model. The model was as follows:

$$H(t,\theta) = h_1 - \frac{2(h_1 - h_2)}{\exp[s_0(t-\delta)] + \exp[s_1(t-\delta)]} \qquad (2.2)$$

where H(t, θ) is the stature (in cm) at age t and θ is a growth parameter vector (h_1, h_2, s_0, s_1, δ). h_1 is the equation parameter, which is the estimated adult stature. The parameters s_0 and s_1 are rate constants, and h_2 and δ are related to the stature and age at take-off of the adolescent growth spurt. Several authors (Billiwicz and McGregor, 1982; Bogin et al., 1990; Bogin et al.,1992; Brown and Townsend, 1982; Byard et al., 1993; Cameron et al., 1982; Guo et al., 1992; Hauspie , 1980; Hauspie et al., 1980a; Hauspie et al., 1980b; Jolicoeur et al., 1988; Jolicoeur et al., 1991; Jolicoeur et al., 1992; Ledford and Cole, 1998; Mirwald et al., 1981; Qin et al., 1996; Tanner et al., 1982; Zemel and Johnston, 1994) were also used the above model.

The ICP Model

In 1987 Karlberg developed the ICP model and this model divides growth into three distinct phases, such as, Infancy, Childhood, and Puberty. These three distinct phases functional form as follows:

An Infancy component: This component assumed to start during fetal life with a rapidly decelerating course ceasing at 3-4 years of age and also it was explained by an exponential function:

$$y = a_I + b_I\left(1 - \exp\left(-c_I t\right)\right)$$

A Childhood component: This component starts during the first year of life (age at onset $=t_C$) having a slowly decelerating course and continuing until end of growth (age $=t_E$). A second-degree polynomial function explained this component and this polynomial function could be written as,

$$y = a_C + b_C t + c_C t^2$$

A Puberty component: This component representing the additional growth induced by puberty and accelerating up to age at peak velocity (PV) (age $=t_V$), then decelerating until the end of the growth (age $=t_E$). A logistic function represented this component and that function was,

$$y = \frac{a_P}{1 + \exp\left(-b_P\left(t - t_V\right)\right)}$$

In all the above three functions y is stature for the relevant component at time t in years from birth, and t_E is the middle of the first one-year-interval after age at PV where the overall gain becomes less than that in the Childhood component.

The Reed Models

The Reed models are the extension of the Count model. Berkey and Reed (1987) developed these models. The first-order Reed model can be written as,

$$y = A + Bt + C\ln(t) + D/t$$

The first-order Reed model has four parameters and it is more flexible than the Count model since it allows an inflexion point. The second-order Reed model can be written as,

$$y = A + Bt + C\ln(t) + D/t + E/t^2$$

where the fifth parameters allows a second inflexion point. The first-order version was shown to perform well on height between 3 months and 6 years but few children needed the second-order version, which was proposed by Berkey and Reed (1987).

The SSC Model

Shohoji and Sasaki (1987) described a growth model, which has six parameters. It can be written as,

$$y(t) = AW(t) + f(t)[1 - W(t)] + \varepsilon \qquad (2.3)$$

where t is postnatal age, $y(t)$ is stature at age t, A is adult stature, $W(t)$ is a weighting function given by $W(t)=exp[-\exp(B(G-t))]$, $f(t)$ is a function of stature in infancy given by $f(t)=C+Dt+E \log t$, *and* ε *is a error.* The weighted average of adult stature A is the stature at age t and stature predicted from an infancy model $f(t)$. The Gompertz function is the weight $W(t)$ takes the value 0 at t=0, then switches from 0 to 1 at age G, with parameter B controlling the suddenness of the switch. The function $f(t)$ is the Count model for infant stature and body weight. However the Jenss-Bayley function $f(t)=C + Dt - exp(E - Ft)$ is another infant stature model with one extra parameter, combining an exponential and a linear component, which performs appreciably better (Berkey, 1982; Cole, 1993) suggested modifying the Shohoji-Sasaki model to use the Jenss-Bayley rather than the Count model as its childhood component. Another seven-parameter model (KS7) was described by Kanefuji and Shohoji (1990) extending that of Shohoji and Sasaki (1987), replacing the Count model by $f(t)=C + Dt + log\ (E+Ft)$. The combines an exponential infancy, linear childhood and logistic puberty component is the SSC (Shohoji-Sasaki modified by Cole) model, and in this sense is similar to Karlberg's ICP model (Karlberg, 1987; Ledford and Cole, 1998).

The JPPS Model

A seven-parameter model was described by Jolicoeur et al. (1988) and written as:

$$y(t) = A\left\{1 - \frac{1}{1+\left(t'/D_1\right)^{C_1}+\left(t'/D_2\right)^{C_2}+\left(t'/D_3\right)^{C_3}}\right\} + \varepsilon \qquad (2.4)$$

where t' is post-conceptual age, $y(t)$ is stature at age t', A is adult stature, D_1, D_2 and D_3 are positive age scale factors, C_1, C_2 and C_3 are positive dimensionless exponents, and ε is the error. Note that t' is age post-conception, i.e., $t' = t + 0.75$ assuming a constant gestation of 9 months. The *total age*, which is defined as measured from the time of fertilization, and pass through the origin utilize in the above model. It is the practice that, *total age* can be estimated by adding the average duration of pregnancy (0.75 year in humans) to the age after birth, unless pregnancy is actually known to have been shorter or longer than average. Growth models passing through the origin with respect to *total age* are based on the fact that, in placental mammals, the fertilized egg is microscopically small, and its dimensions can be considered as practically null in comparison with those of the adults. Models passing through the origin with respect to *total age* are defined before birth as well as after birth and may be particularly suitable if prenatal data are to be included in the analysis or if prenatal extrapolations are desired. To avoid ambiguity in the parameters, the $\{C,D\}$ pairs are constrained so that $D_1<D_2<D_3$. Moreover, provided the constraint that some parameters are non-negative is respected, the initial section of growth models passing through the origin with respect to *total age* remains realistic even when there are few data concerning young ages (Ledford and Cole, 1998).

The JP-1 and JP-2 Models

Joulicoeur et al. (1992) have described an extension to the model of Jolicoeur et al. (1988) where the age offset is estimated from the data rather than being constrained at 0.75, to improve the fit in infancy. The extended models were as follows:

$$y(t) = A \quad Exp\left\{-\frac{1}{C_1 \log_e\left(1+{t}/{D_1}\right)+\left({t}/{D_2}\right)^{C_2}+\left({t}/{D_3}\right)^{C_3}}\right\}+\varepsilon \qquad (2.5)$$

$$y(t) = A\left\{1-\frac{1}{1+\left(\frac{t+E}{D_1}\right)^{C_1}+\left(\frac{t+E}{D_2}\right)^{C_2}+\left(\frac{t+E}{D_3}\right)^{C_3}}\right\}+\varepsilon \qquad (2.6)$$

JPA-1 is the nickname of the model in equation (2.5) and JPA-2 is the nickname of the model in equation (2.6). The models JPA-1 retains the theoretically desirable quality of passing through the origin with respect to *total age* while, JPA-2 fits human stature data better than all other asymptotic models proposed till 1991 (Jolicoeur et al., 1992).

The modified ICP Model

To convert the non-stationary time series of growth observations into a stationary time series for the Fourier analysis, the modified ICP (Johnson, 1993) model was used. This model described the combined form of two phases such as Childhood and Puberty. The modified form was as follows:

$$y_i = a_C + b_C t_i + \frac{a_P}{1+\exp\left(-b_P\left(t_i - t_V\right)\right)}$$

The BTT Model

The sum of three generalized logistic terms is the Bock-Thissen-du Toit (BTT) model. The form of the logistic term is

$$\frac{a}{[1+\exp(-(bt+c))]^{d}}$$

where t is the time (age) variable, a is the amount of growth contributed by the term, the quantity $z=bt+c$ in the exponential function is the "logit," b and c are its slope and intercept, respectively, and d is a fixed shape constant. In 1994 Bock et al. described the triphasic generalized logistic model by summing up three phases of growth; early, middle, and adolescent. This triphasic generalized logistic model can be written as:

$$y=\frac{a_1}{[1+\exp(-b_1 t)]^{d_1}}+\frac{a_2}{[1+\exp(-b_2 t-c_2)]^{d_2}}+\frac{a_3}{[1+\exp(-b_3 t-c_3)]^{d_3}}$$

where the set of parameters (a_1, b_1, c_1), (a_2, b_2, c_2) and (a_3, b_3, c_3) refer to the parameters of early, middle, and adolescent phases of growth, respectively.

In terms of expressions particular to each model the distance functions can be differentiated to obtain their velocity and acceleration curves, which are described below.

For the PB1 model (Preece and Baines, 1978)

Let

$$L_1=\exp[s_0(t-\delta)]+\exp[s_1(t-\delta)]$$
$$L_2=s_0\exp[s_0(t-\delta)]+s_1\exp[s_1(t-\delta)]$$
$$L_3=s_0^2\exp[s_0(t-\delta)]+s_1^2\exp[s_1(t-\delta)]$$

Then

$$Velocity\,\frac{\partial H(t,\theta)}{\partial t} = \frac{2(h_1 - h_2)L_2}{L_1^2}$$

and

$$Acceleration\,\frac{\partial^2 H(t,\theta)}{\partial t^2} = \frac{2(h_1 - h_2)(L_1 L_3 - 2L_2^2)}{L_1^3}$$

For JPPS model (Jolicoeur et al., 1988)

Let

$$Q_1 = 1 + \sum_{i=1}^{3}\left(\frac{t'}{D_i}\right)^{C_i}$$

$$Q_2 = \sum_{i=1}^{3}\frac{C_i}{D_i}\left(\frac{t'}{D_i}\right)^{C_i - 1}$$

$$Q_3 = \sum_{i=1}^{3}\frac{C_i(C_i - 1)}{D_i^2}\left(\frac{t'}{D_i}\right)^{C_i - 2}$$

Then

$$Velocity\,\frac{\partial y(t)}{\partial t} = \frac{AQ_2}{Q_1^2}$$

and

$$Acceleration\,\frac{\partial^2 y(t)}{\partial t^2} = A\left(\frac{Q_1 Q_3 - 2Q_2^2}{Q_1^3}\right)$$

For JPA-1 model (Jolicoeur et al., 1992)

Let

$$R_1 = C_1 \log_e\left(1 + {t}/{D_1}\right) + \left({t}/{D_2}\right)^{C_2} + \left({t}/{D_3}\right)^{C_3}$$
$$R_2 = \frac{C_1}{D_1}\left(1 + {t}/{D_1}\right)^{-1} + \frac{C_2}{D_2}\left({t}/{D_2}\right)^{C_2-1} + \frac{C_3}{D_3}\left({t}/{D_3}\right)^{C_3-1}$$
$$R_3 = -\frac{C_1}{D_1^2}\left(1 + {t}/{D_1}\right)^{-2} + \frac{C_2(C_2-1)}{D_2^2}\left({t}/{D_2}\right)^{C_2-2} + \frac{C_3(C_3-1)}{D_3^2}\left({t}/{D_3}\right)^{C_3-2}$$

Then

$$Velocity \frac{\partial y(t)}{\partial t} = A \exp\left(\frac{R_2}{R_1^2}\right)$$

and

$$Acceleration \frac{\partial^2 y(t)}{\partial t^2} = A\left(\frac{R_1 R_3 - 2R_2^2}{R_1^3}\right)\exp\left(\frac{R_2}{R_1^2}\right)$$

For JPA-2 model (Jolicoeur et al., 1992)

Let

$$Q_1 = 1 + \sum_{i=1}^{3}\left(\frac{t+E}{D_i}\right)^{C_i}$$
$$Q_1 = \sum_{i=1}^{3}\frac{C_i}{D_i}\left(\frac{t+E}{D_i}\right)^{C_i-1}$$
$$Q_1 = \sum_{i=1}^{3}\frac{C_i(C_i-1)}{D_i^2}\left(\frac{t+E}{D_i}\right)^{C_i-2}$$

Then

$$Velocity\,\frac{\partial y(t)}{\partial t}=\frac{AQ_2}{Q_1^2}$$

and

$$Acceleration\,\frac{\partial^2 y(t)}{\partial t^2}=A\left(\frac{Q_1Q_3-2Q_2^2}{Q_1^3}\right)$$

For SSC model (Cole, 1993)

Let

$$\begin{aligned}P_1&=\exp[(B(G-t))-\exp(B(G-t))]\\P_2&=A-C-Dt+\exp(E-Ft)\\P_3&=D+F\exp(E-Ft)\end{aligned}$$

Then

$$Velocity\,\frac{\partial y(t)}{\partial t}=BP_1P_2+WP_3$$

and

$$Acceleration\,\frac{\partial^2 y(t)}{\partial t^2}=BP_1\{BP_2[\exp(B(G-t))-1]-2P_3\}$$

For BTT model (Bock et al., 1994)

Velocity

$$\frac{\partial y}{\partial t}=\frac{a_1d_1b_1e^{(-b_1t-c_1)}}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)}+\frac{a_2d_2b_2e^{(-b_2t-c_2)}}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)}+\frac{a_3d_3b_3e^{(-b_3t-c_3)}}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)}$$

and

Acceleration

$$\frac{\partial^2 y}{\partial y^2}=\frac{2a_1d_1^2\left(e^{(-b_1t-c_1)}\right)^2b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)^2}-\frac{2a_1d_1e^{(-b_1t-c_1)}b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)}+\frac{2a_1d_1\left(e^{(-b_1t-c_1)}\right)^2b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)^2}$$

$$+\frac{2a_2d_2^2\left(e^{(-b_2t-c_2)}\right)^2b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)^2}-\frac{2a_2d_2e^{(-b_2t-c_2)}b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)}+\frac{2a_2d_2\left(e^{(-b_2t-c_2)}\right)^2b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)^2}$$

$$+\frac{2a_3d_3^2\left(e^{(-b_3t-c_3)}\right)^2b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)^2}-\frac{2a_3d_3e^{(-b_3t-c_3)}b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)}+\frac{2a_3d_3\left(e^{(-b_3t-c_3)}\right)^2b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)^2}.$$

2.3 Summary

Some forms of growth models are very simple and easy to calculate, and some has complicated form with many parameters and constraints. But, as we have the computer facilities, it became easier to estimate growth models having many parameters and constraints. Therefore, in the present situation of the advanced computer world, researchers should consider those growth models which are able to explain most of the growth information rather than those are easy to calculate. Also, accurate explanations of the growth parameters are the vital factors of a good model.

Practically all models for describing individual human growth patterns have interesting features, but at the same time they also have their own limitations. The choice of one approach above another mainly depends on the nature of the longitudinal data at hand (age range, frequency and interval of measurements, type of variables, etc...) and on the kind of problems to be solved (description or interpretation of growth pattern, estimating effect of covariates, etc...).

JPPS model utilize total age which cannot be estimated unless pregnancy is actually known to have been shorter or longer than average.

For a good prediction, it is necessary to select a good model. Jolicoeur et al., 1992 declared that, till then, JPA-2 had the best fit compared with other structural growth models. By the same data-set used in this study, it is found that the average root mean square error of the estimate for triphasic generalized logistic model (BTT model) are smaller than that for JPA-2 model (see in section 4.1), and added that JPA-2 model can't estimate the mid-growth spurt whereas the BTT model can.

Recently, Ali and Ohtsuki (2001) pointed out that the average root mean square error of the estimate for triphasic generalized logistic model (BTT model), however on average, were smaller than that for JPA-2 model, but their proposed equations for predicting adult stature will provide biased estimates for those individuals who do not have the mid-growth spurt due to the problem of triphasic model itself. Hence an improvement is necessary to remove that biasedness.

CHAPTER-3

MATERIALS OF THE STUDY

CHAPTER 3

MATERIALS OF THE STUDY

3.1 Data

Longitudinal data of 820 Japanese children and youth (male 509 and female 311), ranging in age from 0 to 20 years and born from 1967 to 1977, were collected from their personal records. Several universities from Kanto District were selected. Sample of all students of some classes of those selected universities were included except those who had incomplete information. Though the database includes serial data for many variables including stature, body weight, sitting height, and chest circumference, only stature was analyzed in this study.

The selected sample provides individual information applicable to all Japan because the universities that were included do not have entrance criteria based on place of residence. The present sample included children from every prefecture of Japan, but Kanto region is better represented than other regions. The sample of 820 individuals includes 24 from the Hokkaido area, 29 from Touhoku, 466 from Kanto, 87 from Chubu, 37 from Hokuriku, 69 from Kinki, 31 from Chugoku, 17 from Shikoku, 41 from Kyushu, and 19 from other areas.

This type of data is not available in Bangladesh. Therefore, this research work is based on the data of Japanese boys and girls.

3.2 Prediction of Real Age (or, simply age)

Every year, physical examinations of children and youths students were made from April to June in Japan from kindergarten to university. It was possible to collect their longitudinal growth information (including stature), but not the corresponding exact dates of all the examinations. Using their birth dates, the ages at examinations were calculated by taking the date of examination as 1st May (median of April to June) for each year.

CHAPTER-4

METHODS OF THE STUDY

CHAPTER 4

METHODS OF THE STUDY

4.1 Selection of Growth Model

The JPA-2 model (Joulicoeur et al., 1992) was as:

$$y(t) = A\left\{1 - \frac{1}{1 + \left(\frac{t+E}{D_1}\right)^{C_1} + \left(\frac{t+E}{D_2}\right)^{C_2} + \left(\frac{t+E}{D_3}\right)^{C_3}}\right\} + \varepsilon$$

where t is the time (age) variable, $y(t)$ is stature at age t, A is adult stature, D_1, D_2 and D_3 are positive age scale factors, C_1, C_2 and C_3 are positive dimensionless exponents, and ε is the error. To avoid ambiguity in the parameters, the $\{C,D\}$ pairs are constrained so that $D_1<D_2<D_3$. Moreover, provided the constraint that some parameters are non-negative is respected, the initial section of growth models passing through the origin with respect to *total age* remains realistic even when there are few data concerning young ages.

For JPA-2 model,

Let

$$Q_1 = 1 + \sum_{i=1}^{3}\left(\frac{t+E}{D_i}\right)^{C_i}$$

$$Q_2 = \sum_{i=1}^{3}\frac{C_i}{D_i}\left(\frac{t+E}{D_i}\right)^{C_i-1}$$

$$Q_3 = \sum_{i=1}^{3}\frac{C_i(C_i-1)}{D_i^2}\left(\frac{t+E}{D_i}\right)^{C_i-2}$$

Then

$$Velocity\frac{\partial y(t)}{\partial t}=\frac{AQ_2}{Q_1^2}$$

and

$$Acceleration\frac{\partial^2 y(t)}{\partial t^2}=A\left(\frac{Q_1Q_3-2Q_2^2}{Q_1^3}\right)$$

The Bock-This sen-du Toit (BTT) model is the sum of three generalized logistic terms of the form

$$\frac{a}{[1+\exp(-(bt+c))]^d}$$

where t is the time (age) variable, a is the amount of growth contributed by the term, the quantity $z=bt+c$ in the exponential function is the "logit," b and c are its slope and intercept, respectively, and d is a fixed shape constant. Summing up three phases of growth; early, middle, and adolescent, the BTT model becomes as:

$$y=\frac{a_1}{[1+\exp(-b_1t-c_1)]^{d_1}}+\frac{a_2}{[1+\exp(-b_2t-c_2)]^{d_2}}+\frac{a_3}{[1+\exp(-b_3t-c_3)]^{d_3}}$$

where the set of parameters (a_1,b_1,c_1), (a_2,b_2,c_2) and (a_3,b_3,c_3) refer to the parameters of early, middle, and adolescent phases of growth, respectively.

The velocity and acceleration of the BTT model can be written respectively as:

$$\frac{\partial y}{\partial t}=\frac{a_1d_1b_1e^{(-b_1t-c_1)}}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)}+\frac{a_2d_2b_2e^{(-b_2t-c_2)}}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)}+\frac{a_3d_3b_3e^{(-b_3t-c_3)}}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)}$$

and

$$\frac{\partial^2 y}{\partial y^2}=\frac{2a_1d_1^2\left(e^{(-b_1t-c_1)}\right)^2b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)^2}-\frac{2a_1d_1e^{(-b_1t-c_1)}b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)}+\frac{2a_1d_1\left(e^{(-b_1t-c_1)}\right)^2b_1^2}{\left(1+e^{(-b_1t-c_1)}\right)^{d_1}\left(1+e^{(-b_1t-c_1)}\right)^2}$$
$$+\frac{2a_2d_2^2\left(e^{(-b_2t-c_2)}\right)^2b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)^2}-\frac{2a_2d_2e^{(-b_2t-c_2)}b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)}+\frac{2a_2d_2\left(e^{(-b_2t-c_2)}\right)^2b_2^2}{\left(1+e^{(-b_2t-c_2)}\right)^{d_2}\left(1+e^{(-b_2t-c_2)}\right)^2}$$
$$+\frac{2a_3d_3^2\left(e^{(-b_3t-c_3)}\right)^2b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)^2}-\frac{2a_3d_3e^{(-b_3t-c_3)}b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)}+\frac{2a_3d_3\left(e^{(-b_3t-c_3)}\right)^2b_3^2}{\left(1+e^{(-b_3t-c_3)}\right)^{d_3}\left(1+e^{(-b_3t-c_3)}\right)^2}.$$

The JPA-2 model (Jolicoeur et al., 1992) and the BTT model (Bock et al., 1994) are continuous functions in time and have derivatives of all orders. They are strictly increasing function of age and approach smoothly the horizontal asymptote that defines *adult stature*.

The models JPA-2 fits human stature data better than all other asymptotic models proposed till 1991 (Jolicoeur et al., 1992). Ali (2000) found that the BTT model fits the data better than JPA-2 model when individual children have the mid-growth spurt. The JPA-2 model cannot show any mid-growth spurt, but the BTT model can. It is very true that fitting growth model is always data dependent. Therefore, before fitting any growth model to a data set, it is important to select an appropriate model first. The BTT model through AUXAL 2.01 software can able to declare that the data have the mid-growth spurt or not on the basis of the raw data. Thus, this opportunity is used here to divide the whole data sets into two parts, e.g., one have the mid-growth spurt and the other do not have. It is noted that the individual's data on which the BTT model was not convergent have been considered as the data suitable for the JPA-2 model. Then, for better precision, one would apply BTT model on those data of individual children who have the mid-growth spurt, and apply JPA-2 model on that of individual children who do not have this spurt.

4.2 Estimation Process

The Bayes modal estimation method was considered to estimate the parameters for fitting the growth model. This method of estimation is much better than the conventional least square method, which requires a number of distinct observations equal to or greater than the number of parameters. Even when the number of observations is sufficient for least squares, the parameters may not all be identifiable if the observations are poorly positioned. The Bayes modal estimation process chooses the curve, from a specified population of growth curves, which is most probable given the data (see Bock et al., 1994 for a detailed description of the method of estimation).

4.3 Substitution of Population Mean and Covariance Matrix

The software AUXAL has the default values of population mean vector and covariance matrix in the prior distribution of the Bayes estimation for the parameters of the BTT model. These default values were predicted based on data from the Fels Longitudinal Study. For the present study, it was necessary to substitute mean vector and covariance matrix default values derived from the Japanese population. These were not available, consequently they were estimated through the following steps:

For JPA-2 model

Step 1. Run data for those sample individuals who do not have the mid-growth spurt with the JPA-2 model using the default value and estimate the mean vector and covariance matrix of the parameters.

Step 2. Change the default value of mean vector and covariance matrix to the estimated population mean vector and covariance matrix obtained in Step 1, and then repeat Step 1 to estimate the population mean vector and covariance matrix for the second time.

Step 3. Continue the same process until two successive estimated populations mean vectors

are closely similar.

For BTT model

Step 1. Run data for those sample individuals who have the mid-growth spurt with the BTT model using the default value and estimate the mean vector and covariance matrix of the parameters.

Step 2. Change the default value of mean vector and covariance matrix to the estimated population mean vector and covariance matrix obtained in Step 1, and then repeat Step 1 to estimate the population mean vector and covariance matrix for the second time.

Step 3. Continue the same process until two successive estimated populations mean vectors

are closely similar.

In Bayes estimation, the estimated population mean is an unbiased estimation of the population mean for a large sample. Thus, the value of mean vector, and its corresponding covariance matrix from the ith step, is considered as the final estimate of the population mean vector and covariance matrix, if the mean vector of ith step is close to the mean vector of the (i+1) th step.

4.4 Relationship of Adult Stature on Growth Parameters

To estimate the growth parameters, the JPA-2 and BTT models were applied on the individual longitudinal data of stature as previously described by Rahman et al.(ND). The growth parameters were: age at early childhood minimum (AECM), stature at early childhood minimum (SECM), velocity at early childhood minimum (VECM), age at mid childhood maximum (AMC), stature at mid childhood maximum (SMC), velocity at mid childhood maximum (VMC), age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS) for BTT model and age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS) only for JPA-2 model.

Adult stature of an individual follows their own pattern of growth as well as different phases of growth parameters. The relationships, either linear or nonlinear, between the adult stature and growth parameters help to explain the pattern of adult stature on growth parameters. This can be easily shown from the correlation matrix plot (Figs. 4.1a, 4.1b, 4.2a, and 4.2b). These figures show that the relationships between adult stature and growth parameters are linear.

4.5 Predicting Adult Stature from Growth Parameters

Considering our aim to predict adult stature from growth parameters and, since the relationships between the adult stature and some growth parameters are linear, we can consider multiple linear regressions of adult stature on growth parameters. The problem is to determine how many explanatory variables are needed to explain the maximum percentage of variation in the dependent variable, which is

Correlations between Predicted Adult Stature (PAS) and Growth Parameters
for Japanese Boys

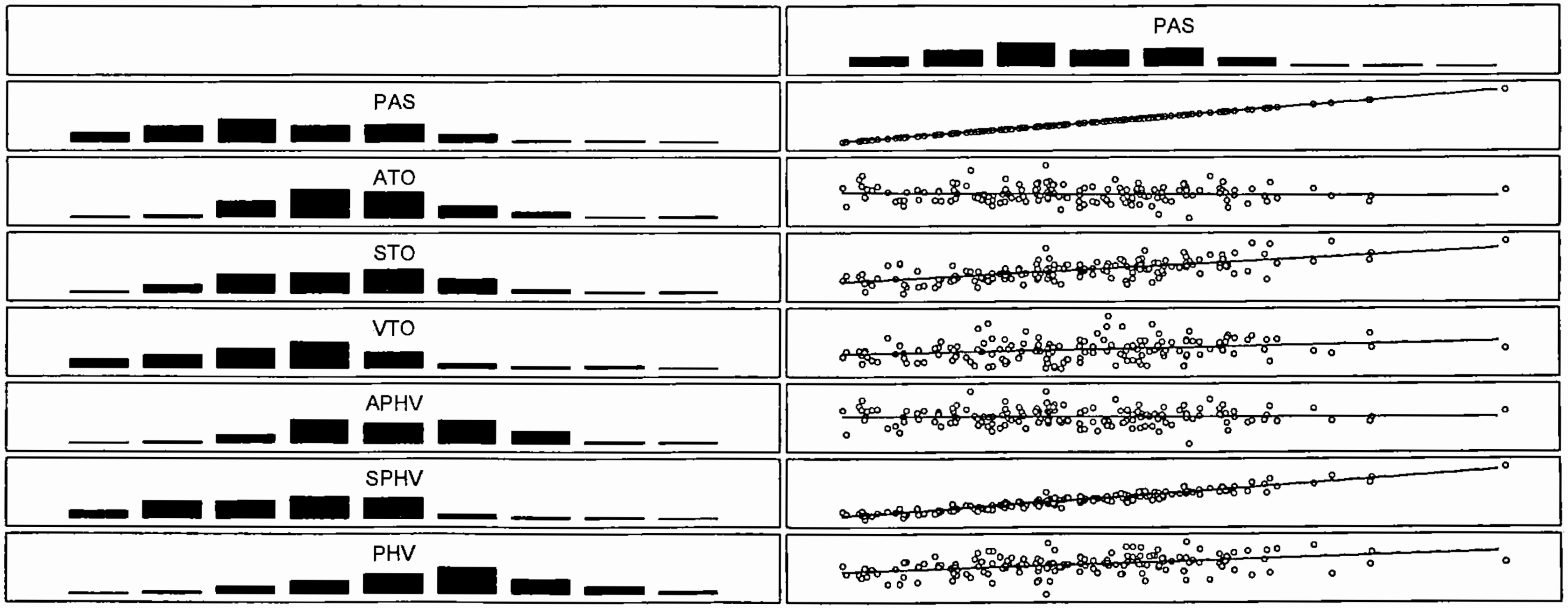

Fig. 4.1a Correlation matrix plot between adult stature and growth parameters for Japanese boys. The Paramet are drawn from the estimated distance and velocity curves of the BTT model. The growth parameters are; age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak hight velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS).
Bar diagram of the graph indicates the distribution of the parameter-variables. In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

Correlations between Predicted Adult Stature (PAS) and Growth Parameters for Japanese Boys

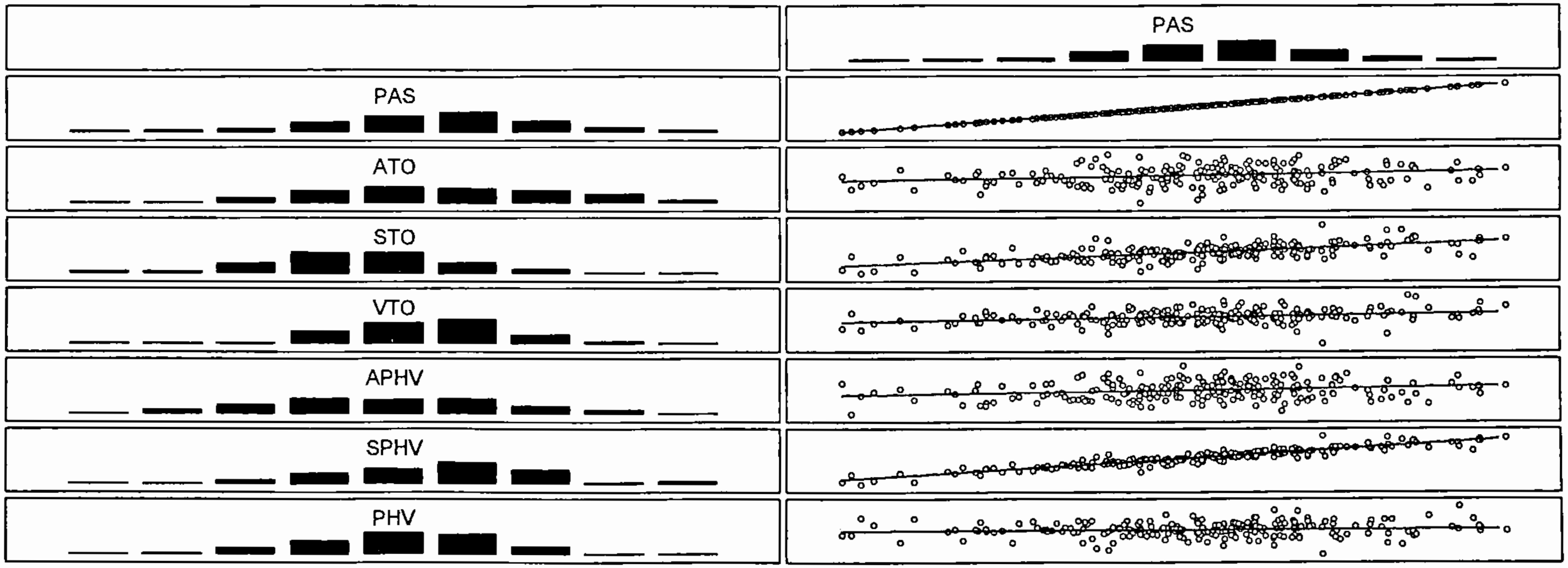

Fig. 4.1b Correlation matrix plot between adult stature and growth parameters for Japanese boys. The Paramet are drawn from the estimated distance and velocity curves of the JPA-2 model. The growth parameters are; age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak hight velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS). Bar diagram of the graph indicates the distribution of the parameter-variables. In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

Correlations between Predicted Adult Stature (PAS) and Growth Parameters for Japanese Girls

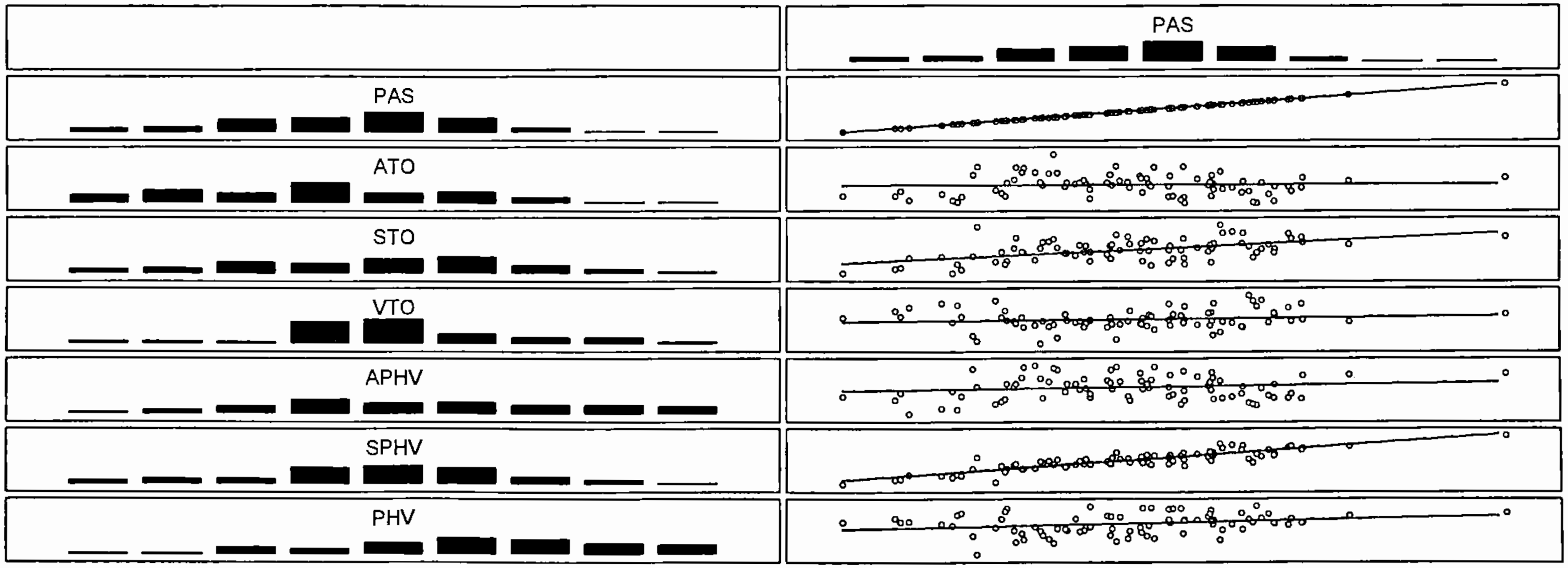

Fig. 4.2a Correlation matrix plot between adult stature and growth parameters for Japanese girls. The Paramet are drawn from the estimated distance and velocity curves of the BTT model. The growth parameters are; age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak hight velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS).
Bar diagram of the graph indicates the distribution of the parameter-variables. In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

Correlations between Predicted Adult Stature (PAS) and Growth Parameters
for Japanese Girls

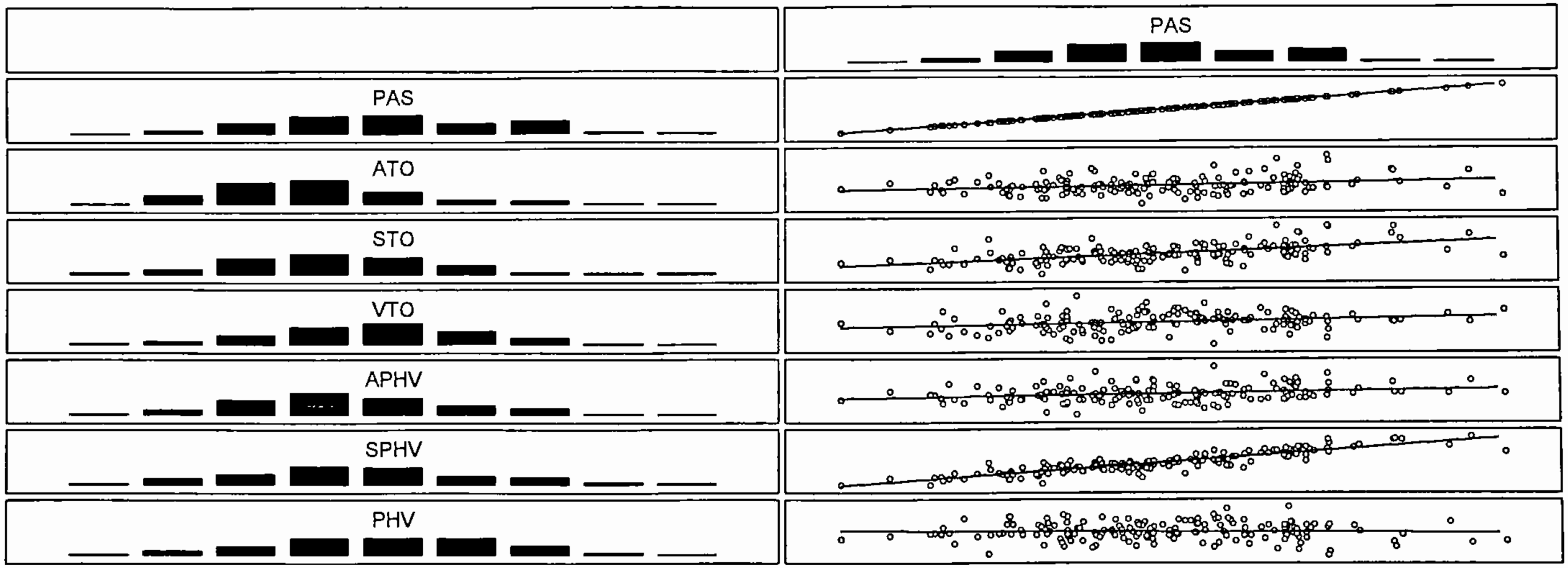

Fig. 4.2b Correlation matrix plot between adult stature and growth parameters for Japanese girls. The Parame are drawn from the estimated distance and velocity curves of the JPA-2 model. The growth parameters are; age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak hight velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS). Bar diagram of the graph indicates the distribution of the parameter-variables. In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

adult stature. In other words, we need an objective method to exclude predictors that are not useful. The screening procedure we present here is known as forward stepwise regression analysis (Draper and Smith, 1966, pp.169-171, and also in Appendix 1). The STATISTICA software was used.

Zero Intercept: Sometimes it is necessary to specify a regression equation with an intercept or without an intercept (intercept forced to zero, regression through the origin). Regression without the intercept is often used in analyses of economic data in cases when, by definition, the regression line describing the relationship between some variables would be predicted to have a zero intercept. For example, if one were to correlate tax revenues with gross national product (GNP) then it is obvious that, if there is zero GNP, there is zero tax revenue. However, in the majority of applications (in particular in the social and natural sciences) variables of interest are measured on more or less arbitrary scales where the zero points have no special meaning. For example, if we consider PAS is a function of different stature growth parameters e.g., SPHV, APHV, PHV, ATO, STO, and so on, the intercept term is meaningless because one cannot think of PAS when those growth parameters are zero. In such a situation, inclusion of an intercept term result low value of R^2.

Checking Outliers and influential data points: Because multiple regression is a mathematical maximization procedure, it can be very sensitive to outliers and influential points. There are various statistics for identifying outliers on dependent variable and influential data points. Some of them are considered in this study, e.g., Mahalanobis distance (Stevens, 1996, pp.111-115, and also in Appendix 1) and Cook's distance (Cook, 1977, and also in Appendix 1). Cook and Weisberg (1982) have indicated that a Cook distance > 1 would generally be considered large, implying an influential point.

Remedies for outliers: Particularly with small n (less than 100), multiple regression estimates are not very stable. In other words, single extreme observations can greatly influence the final estimates. Therefore, it is advisable always to use formal statistical procedures to identify outliers, and to repeat the analyses after omitting any outliers. Another alternative is to repeat the analyses using absolute deviations rather than least squares regression, thereby reducing the effects of outliers.

4.6 Predicting Adult Stature from Stature-variables

To estimate statures at different ages, the BTT model was applied on the individual longitudinal data of stature to get the distance curve as previously described by Ali and Ohtsuki (2001). Stature at age i (denoted by S_i), i=2,3, ..., 13, drawn from the predicted distance curve for each individual, are then considered for further analysis to predict the adult stature of the Japanese. According to Bock et al. (1994), adult stature has been considered in this study as S_{25} (i.e., stature at age 25 years) for each individual. However, the definition of age at adult stature differs among the researchers (Kato et al., 1998). Adult stature of individuals follows their growth pattern as well as different statures at their previous age. The function of stature on age of every individual is monotonically increasing over the period of birth to adult age. The correlation matrix plots in Figs. 4.3a, 4.3b, 4.4a and 4.4b also show linear relationships between adult stature and statures at different ages from 2 to 13. Therefore, multiple linear regression with forward stepwise method (described above) is also applicable to find out the most influential stature-predictors to predict adult

Correlations between Predicted Adult Stature and Stature at Different Ages of Japanese Boys

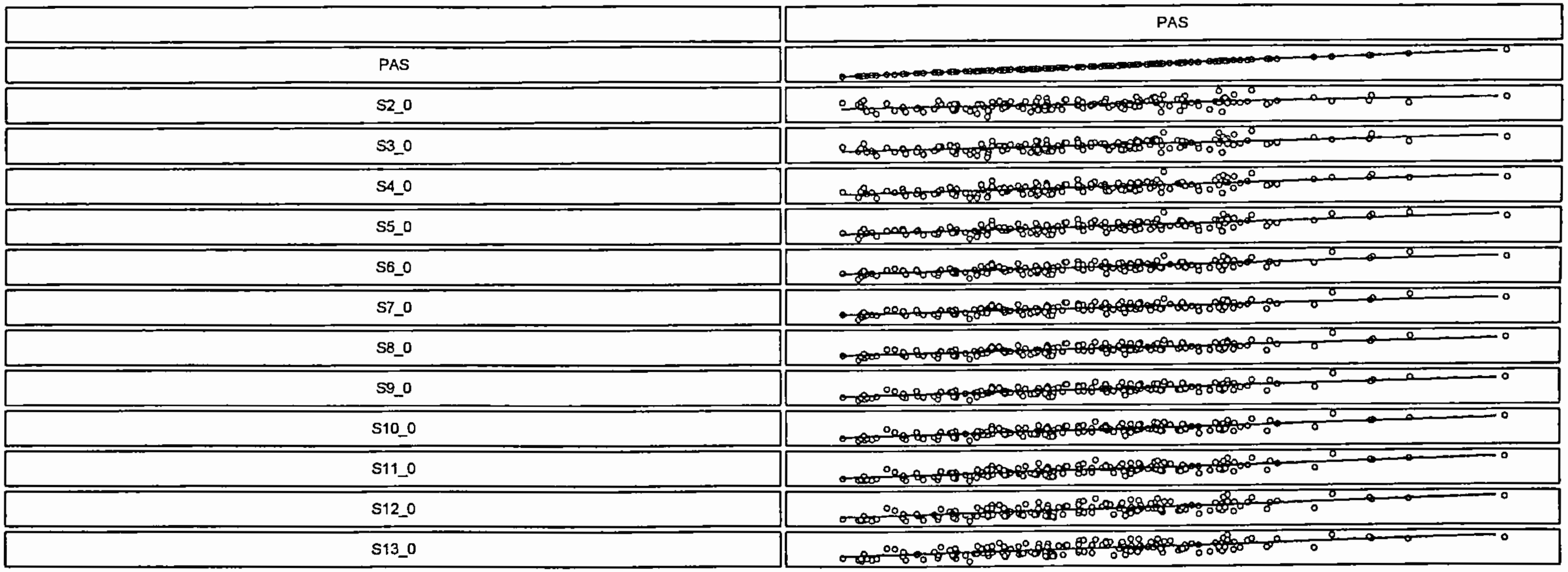

Fig. 4.3a Correlation matrix plot between adult stature and stature at different ages for Japanese boys. The statures are drawn from the estimated distance curves of the BTT model. The predicted statures considered in this study are: stature at age 2 (S2), stature at age 3 (S3), stature at age 4 (S4), stature at age 5 (S5), stature at age 6 (S6), stature at age 7 (S7), stature at age 8 (S8), stature at age 9 (S9), stature at age 10 (S10), stature at age 11 (S11), stature at age 12 (S12), stature at age 13 (S13) and predicted adult stature (PAS). In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

Correlations between Predicted Adult Stature (PAS)and Stature at Different Ages of Japanese Boys

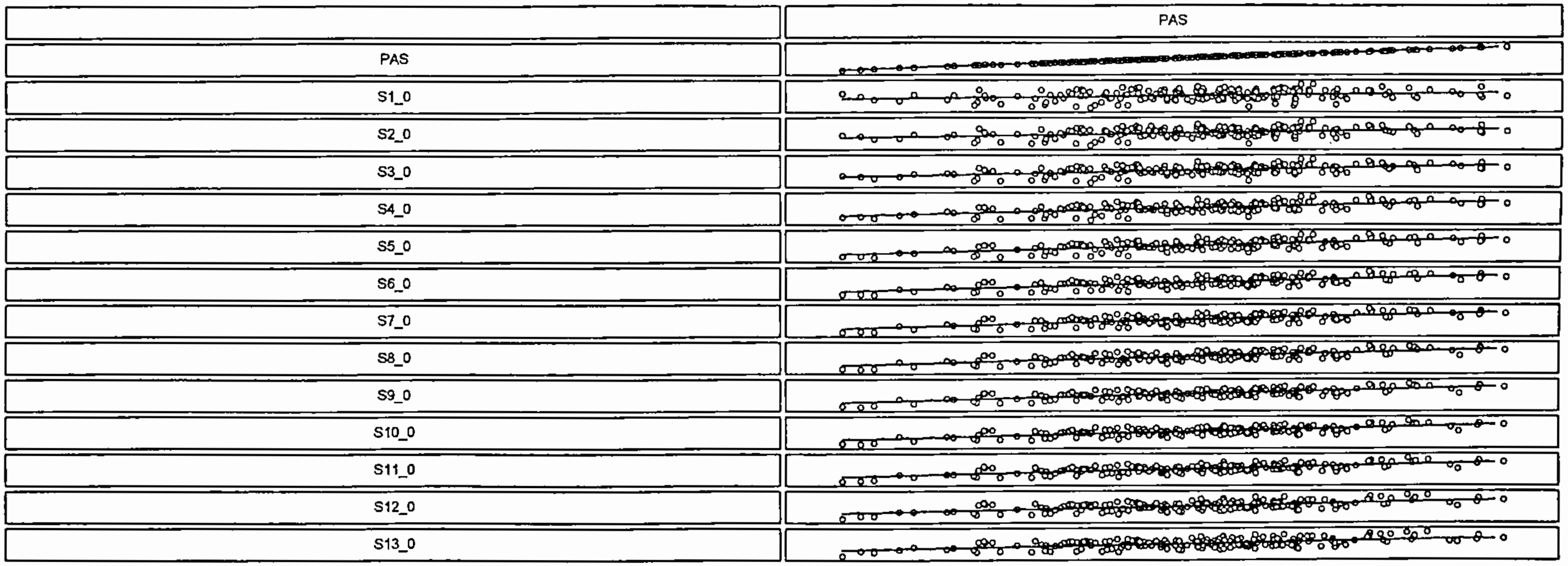

Fig. 4.3b Correlation matrix plot between adult stature and stature at different ages for Japanese boys. The statures are drawn from the estimated distance curves of the JPA-2 model. The predicted statures considered in this study are: stature at age 2 (S2), stature at age 3 (S3), stature at age 4 (S4), stature at age 5 (S5), stature at age 6 (S6), stature at age 7 (S7), stature at age 8 (S8), stature at age 9 (S9), stature at age 10 (S10), stature at age 11 (S11), stature at age 12 (S12), stature at age 13 (S13) and predicted adult stature (PAS). In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

Correlations between Predicted Adult Stature (PAS) and Stature at Different Ages of Japanese Girls

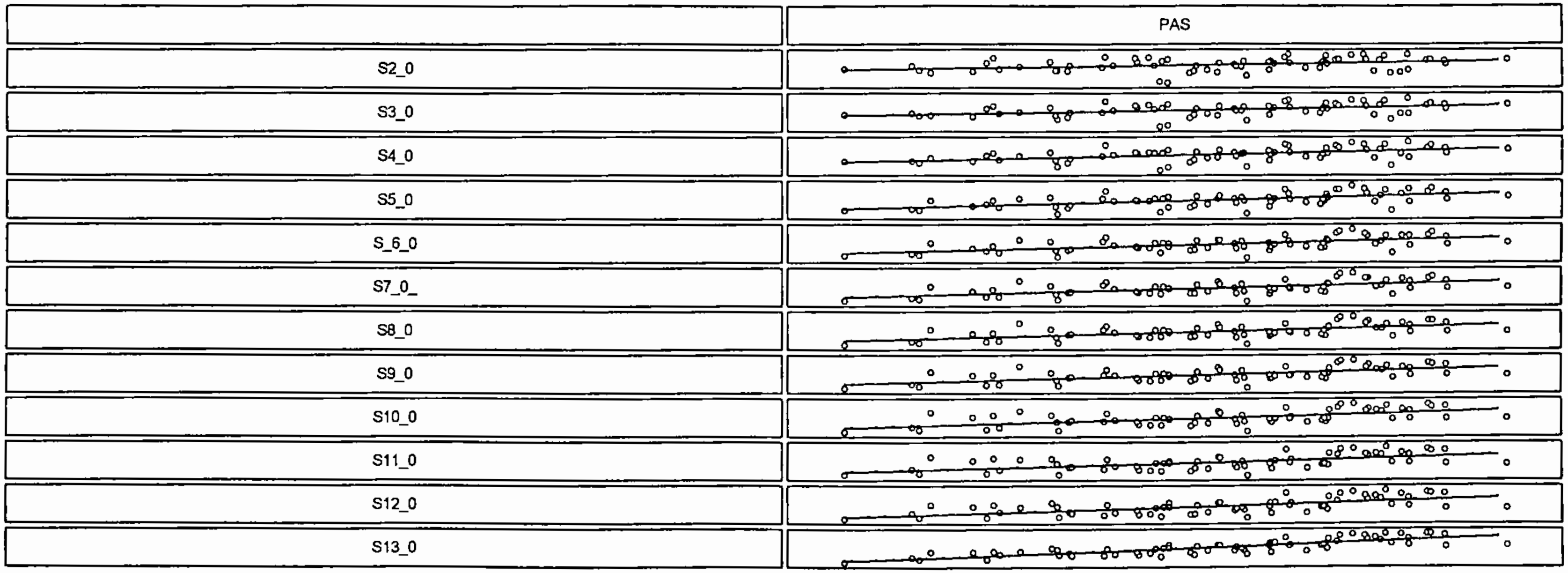

Fig. 4.4a Correlation matrix plot between adult stature and stature at different ages for Japanese girls. The statures are drawn from the estimated distance curves of the BTT model. The predicted statures considered in this study are: stature at age 2 (S2), stature at age 3 (S3), stature at age 4 (S4), stature at age 5 (S5), stature at age 6 (S6), stature at age 7 (S7), stature at age 8 (S8), stature at age 9 (S9), stature at age 10 (S10), stature at age 11 (S11), stature at age 12 (S12), stature at age 13 (S13) and predicted adult stature (PAS). In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

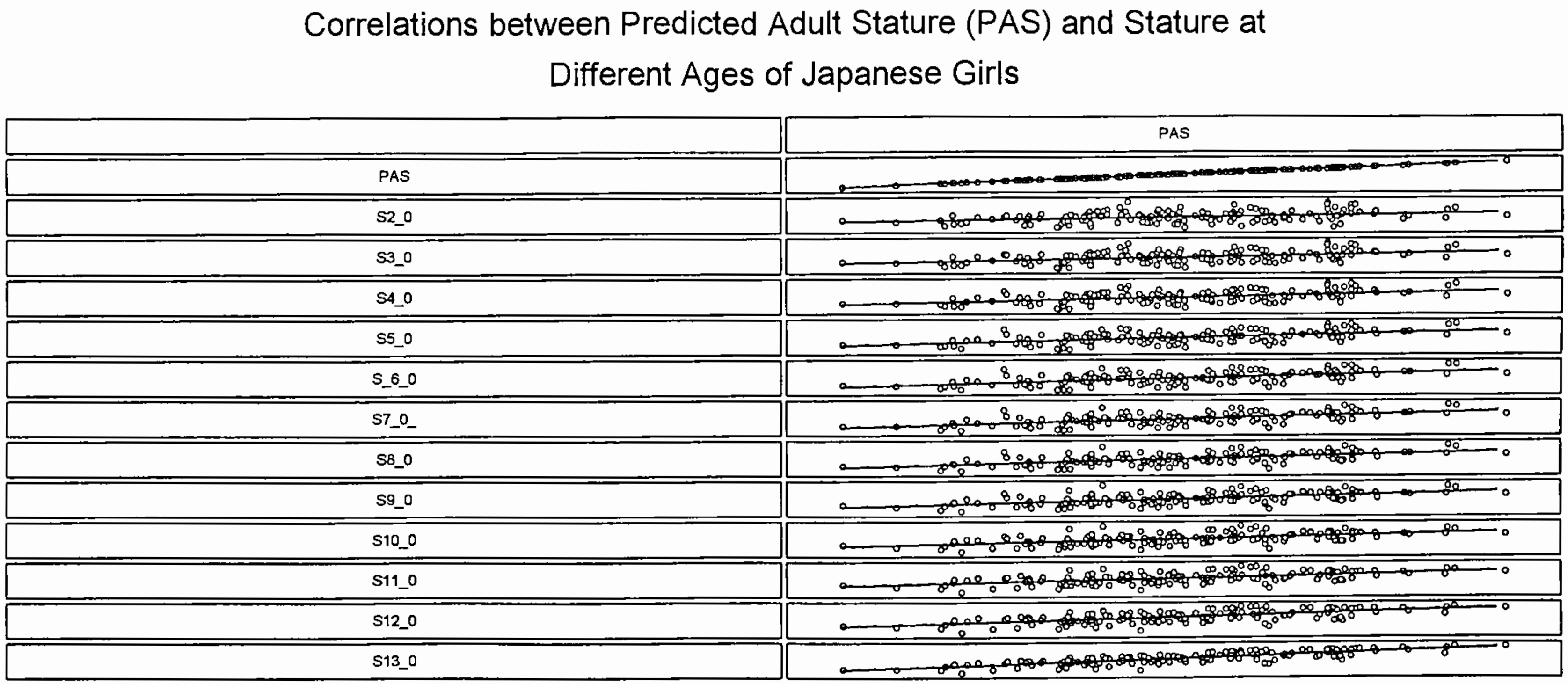

Fig. 4.4b Correlation matrix plot between adult stature and stature at different ages for Japanese girls. The statures are drawn from the estimated distance curves of the JPA-2 model. The predicted statures considered in this study are: stature at age 2 (S2), stature at age 3 (S3), stature at age 4 (S4), stature at age 5 (S5), stature at age 6 (S6), stature at age 7 (S7), stature at age 8 (S8), stature at age 9 (S9), stature at age 10 (S10), stature at age 11 (S11), stature at age 12 (S12), stature at age 13 (S13) and predicted adult stature (PAS). In every element in the matrix, the X-axis is for PAS. Only the pattern, either linear or nonlinear, is of concern. No scales are shown here.

stature. A regression equation without an intercept (intercept forced to zero, regression through the origin) is applicable in this section too. Because one cannot think of predicted adult stature (PAS) when stature at any previous age is zero. In such a situation, inclusion of an intercept term also result low value of R^2. Removing of outliers and influential data points (by the method described as above) was also considered to have better prediction equation.

4.7 Model Validation

To know how well the regression equations will predict on independent samples of the population individuals, cross-validated correlation, a model validation technique, is considered (Stevens, 1996; p. 96). The cross validity predictive power, denoted by ρ^2_{cv}, is defined as:

$$\rho^2_{cv} = 1 - \frac{(n-1)(n-2)(n+1)}{n(n-k-1)(n-k-2)}(1-R^2);$$

where n is the sample size, k is the number of predictors in the regression equation and the cross-validated R is the correlation between observed and predicted values of the dependent variable. Using the above statistic, it can be concluded that if the prediction equation is applied to many other samples from the same population, then $(\rho^2_{cv} \times 100)\%$ of the variance on the predicted variable would be explained by the regression equation (Stevens, 1996; p. 100).

CHAPTER-5

RESULTS AND DISCUSSION

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Model parameters

After changing the default value of population mean vector and covariance matrix (described as in the methodology, Chapter 1.4), the JPA-2 and BTT models were run on the individual longitudinal data of stature. Also, the defaulted values of the shape constants d_1, d_2, and d_3, and the scale c_1 for BTT model were checked and it was found that they also fit well in the Japanese population. Using the software AUXAL, the estimated population mean, standard deviation (SD), and covariance matrix of the JPA-2 and BTT model parameters, and their average root mean square errors of the model estimate for Japanese boys and girls are shown in Table 5.1a and Table 5.1b,respectively. The parameter, a, in the JPA-2 model implies the adult stature of the individual. Thus, the mean adult stature (on the basis of JPA-2 model) were 171.27cm for Japanese boys and 158.51 for Japanese girls (Table 5.1a). The parameters a_1, a_2, and a_3 in the BTT model decompose the amount of growth of stature contributed by the early, middle and adolescent growth phase respectively. Thus, this study demonstrates that, on average, 46.1%, 39.5%, and 14.4% of the total adult stature were completed during early, middle and adolescent phase of growth, respectively, for the Japanese male population. For the female population, these percentages were 42.6%, 44.6%, and 12.8%, respectively (Table 5.1b).

5.2 Growth Parameters

Growth parameters were extracted from distance, velocity and acceleration curves according to Ali (2000). These parameters from the BTT model were: age at

Table 5.1a Estimated population mean, standard deviation (SD), and covariance of the JPA-2 model parameters for Japanese boys and girls

Parameter		a	b_1	b_2	b_3	c_1	c_2	c_3	e
Boys									
Mean (N=241)		171.27	0.95	0.10	0.07	0.60	3.75	19.25	1.76
SD		6.32	0.33	0.01	0.01	0.19	0.94	2.57	0.81
Covariance Matrix	a	39.983							
	b_1	0.003	0.109						
	b_2	-0.004	0.002	0.000					
	b_3	-0.007	0.000	0.000	0.000				
	c_1	-0.064	-0.052	-0.001	0.000	0.035			
	c_2	-0.098	-0.029	-0.006	0.000	0.060	0.881		
	c_3	0.111	-0.008	0.004	-0.004	0.000	0.220	6.623	
	e	0.060	-0.094	-0.002	-0.003	-0.002	-0.202	0.011	0.651
Average root mean square error of the estimate: 0.883644									
Girls									
Mean (N=172)		158.51	0.61	0.11	0.09	0.65	3.68	15.07	1.80
SD		4.61	0.33	0.02	0.01	0.19	0.97	2.54	0.80
Covariance Matrix	a	21.243							
	b_1	0.039	0.109						
	b_2	-0.001	0.002	0.000					
	b_3	-0.007	0.000	0.000	0.000				
	c_1	-0.059	-0.054	-0.002	0.000	0.037			
	c_2	0.464	-0.011	-0.006	0.000	0.052	0.938		
	c_3	-0.047	-0.009	0.014	-0.007	-0.020	0.284	6.468	
	e	-0.144	-0.101	-0.002	-0.004	-0.002	-0.206	0.054	0.640
Average root mean square error of the estimate: 0.769022									

N.B. The sample sizes differ from those in the data section, because some individual cases did not converge due to extreme outliers.

Table 5.1b Estimated population mean, standard deviation (SD), and covariance of the BTT model parameters for Japanese boys and girls

Parameter		a_1	b_1	a_2	c_2	b_2	a_3	c_3	b_3
					Boys				
Mean (N=232)		79.37	1.45	68.01	-3.07	0.44	24.71	-18.80	1.42
SD		8.66	0.63	8.55	0.53	0.07	9.07	2.28	0.16
Covariance Matrix	a_1	75.041							
	b_1	-0.647	0.392						
	a_2	-19.700	-0.715	73.109					
	c_2	-1.817	-0.192	-0.317	0.278				
	b_2	-0.333	0.032	0.059	-0.008	0.005			
	a_3	-42.928	0.830	-35.095	2.521	0.234	82.313		
	c_3	-12.312	0.160	6.831	0.402	0.073	5.602	5.177	
	b_3	0.931	-0.002	-0.400	-0.030	-0.004	-0.518	-0.296	0.024
Average root mean square error of the estimate: 0.712442									
					Girls				
Mean (N=110)		67.77	1.55	70.96	-2.63	0.47	20.28	-15.55	1.33
SD		6.72	0.67	6.61	0.38	0.11	6.40	2.82	0.27
Covariance Matrix	a_1	45.213							
	b_1	-0.361	0.446						
	a_2	-22.742	-0.193	43.742					
	c_2	0.384	-0.252	0.117	0.146				
	b_2	0.017	-0.013	-0.178	0.004	0.012			
	a_3	-11.694	-1.083	-14.604	0.449	0.406	41.006		
	c_3	-6.152	-0.124	1.546	0.031	0.065	5.848	7.947	
	b_3	0.774	-0.021	-0.340	0.016	-0.001	-0.480	-0.680	0.073
Average root mean square error of the estimate: 0.671413									

N.B. The sample sizes differ from those in the data section, because some individual cases did not converge due to extreme outliers.

early childhood minimum (AECM), stature at early childhood minimum (SECM), velocity at early childhood minimum (VECM), age at mid childhood maximum (AMC), stature at mid childhood maximum (SMC), velocity at mid childhood maximum (VMC), age at take-off (ATO), stature at take-off (STO), velocity at take-off (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS). On the other hand, only the growth parameters age at take-off (ATO), stature at take-off (STO), velocity at take-off (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS) were found from the JPA-2 model.

The average values of growth parameters together with their sample sizes (N), standard deviations (SD), standard errors of the estimates (SE), and 95% confidence limits of the Japanese boys and girls are shown in Table 5.2a for JPA-2 model and the Table 5.2b for BTT model. These tables divulged that the mean adult stature of the Japanese boys who had the mid growth spurt was 171.69 cm and that who had no mid growth spurt was 171.53 cm. These values for Japanese girls were 158.00 cm and 158.62 cm respectively.

5.3 Correlations among growth parameters

Table 5.3a and 5.3b show the correlation matrices of the growth parameters for the Japanese population without mid growth spurt and with mid growth spurt, respectively. The values above the diagonal are for boys and those below the diagonal are for girls. The asterisks (*) indicates that the correlation coefficient is significant at 5% level. To estimate the correlation coefficient, pairwise deletion of missing data in

Table 5.2a Mean, standard deviation (SD), standard error of the estimate (SE), 95% confidence limits of the growth parameters of the Japanese boys and girls (who do not have the mid growth spurt)

Biol. Param.	Boys						Girls					
	N	Mean	SD	SE	95% Confidence Limits		N	Mean	SD	SE	95% Confidence Limits	
					Lower	Upper					Lower	Upper
ATO	268	9.48	1.11	0.07	9.34	9.61	174	7.68	1.06	0.08	7.52	7.84
STO	268	134.27	8.32	0.51	133.27	135.27	174	124.13	7.71	0.58	122.98	125.29
VTO	268	4.84	0.61	0.04	4.77	4.92	174	5.09	0.65	0.05	4.99	5.19
APHV	268	12.82	1.06	0.06	12.70	12.95	174	10.66	0.93	0.07	10.52	10.80
SPHV	268	155.34	5.99	0.37	154.61	156.06	174	142.20	4.69	0.36	141.50	142.90
PHV	268	8.62	1.47	0.09	8.45	7.80	174	7.38	1.28	0.10	7.19	7.58
AI	268	37.25	6.47	0.40	36.48	38.03	174	34.49	6.51	0.49	33.52	35.46
PAS	268	171.53	5.90	0.36	170.82	172.24	174	158.62	4.58	0.35	157.94	159.31

The abbreviation of the notations were: age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), adolescent increment (AI), and predicted adult stature (PAS).

Table 5.2b Mean, standard deviation (SD), standard error of the estimate (SE), 95% confidence limits of the growth parameters of the Japanese boys and girls (who have the mid growth spurt)

Biol. Param.	Boys						Girls					
	N	Mean	SD	SE	95% Confidence Limits		N	Mean	SD	SE	95% Confidence Limits	
					Lower	Upper					Lower	Upper
AECM	213	3.52	0.91	0.06	3.39	3.64	86	3.14	0.57	0.06	3.01	3.26
SECM	213	98.73	8.10	0.55	97.63	99.82	86	93.08	5.91	0.64	91.81	94.34
VECM	213	5.39	1.09	0.07	5.25	5.54	86	6.23	1.07	0.12	6.00	6.46
AMC	213	6.34	0.93	0.06	6.21	6.46	86	5.21	0.68	0.07	5.06	5.35
SMC	213	115.38	6.44	0.44	114.51	116.25	86	106.27	4.77	0.51	105.25	107.30
VMC	213	6.56	1.16	0.08	6.41	6.72	86	6.84	1.10	0.12	6.60	7.07
ATO	213	9.82	0.78	0.05	9.71	9.92	86	8.81	0.84	0.09	8.63	8.98
STO	213	135.51	5.41	0.37	134.78	136.24	86	128.13	5.96	0.64	126.86	129.41
VTO	213	4.93	0.77	0.05	4.83	5.03	86	5.17	0.67	0.71	5.03	5.32
APHV	213	12.81	0.85	0.06	12.69	12.92	86	11.30	0.83	0.09	11.12	11.48
SPHV	213	155.35	5.03	0.34	154.67	156.03	86	143.22	4.57	0.49	142.24	144.19
PHV	213	9.23	1.20	0.08	9.07	9.39	86	7.14	1.09	0.12	6.90	7.37
AI	213	36.19	4.53	0.31	35.58	36.80	86	29.87	5.25	0.57	28.74	30.99
PAS	213	171.69	5.68	0.39	170.92	172.45	86	158.00	4.54	0.49	157.03	158.97

The abbreviation of the notations were: age at early childhood minimum (AECM), stature at early childhood minimum (SECM), velocity at early childhood minimum (VECM), age at mid childhood maximum (AMC), stature at mid childhood maximum (SMC), velocity at mid childhood maximum (VMC), age at takeoff (ATO), stature at takeoff (STO), velocity at takeoff (VTO), age at peak height velocity(APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), adolescent increment (AI), and predicted adult stature (PAS).

correlation matrices were considered. That is, a correlation between each pair of variables is calculated from all cases that have valid data on those two variables. Thus, the sample sizes are not the same for all correlation coefficients. The critical points to determine their rejection regions of null hypothesis also differ with respect to the pair of variables. The analysis of correlation is better suited for understanding the pattern of growth of individual boys and girls within the sample. Both boys and girls without mid growth spurt and with mid growth spurt (respectively in Table 5.3a and Table 5.3b) have significant positive correlation between ATO and APHV, STO and SPHV, and SPHV and PAS. These relationships imply that during the adolescent period of growth individual children are consistent in their rate of maturation and in size which is common to other investigations (Hauspie, 1980; Billewicz and McGregor, 1982; Brown and Townsend, 1982; Bogin et al., 1990; Ali 2000). The individuals without mid growth spurt for both sexes (Table 5.3a) show that PAS was significantly positive correlated with stature at onset of adolescent and adolescent growth phases, and for only girls VTO and PHV was positively correlated ($p<.05$). The individuals with mid growth spurt for both sexes (Table 5.3b) show that PAS was significantly positively correlated with statures at early childhood minimum, mid-childhood maximum, onset of adolescent and adolescent growth phases. Also positive significant correlations were found between VEMC and VMC, VTO and PHV but in case of PHV and VMC, negative significant correlation was found (Table 5.3b). Little dissimilarity was addressed in Ali (2000), perhaps, due to the choice of the model. The individuals with and without mid growth spurt for both sexes (Table 5.3a and Table 5.3b) show significant negative correlations between ATO and PHV,

Table 5.3a Correlation coefficients among the growth parameters for the Japanese boys and girls. The values above the diagonal are for boys; those below the diagonal, for girls. Marked correlations are significant at $p<0.05$ (without mid growth spurt)

	ATO	STO	VTO	APHV	SPHV	PHV	AI	PAS
ATO		0.73*	-0.30*	0.83*	0.09	-0.60*	-0.76*	0.21*
STO	0.73*		0.14*	0.40*	0.10	-0.47*	-0.74*	0.62*
VTO	-0.23*	0.14		-0.50*	0.06	0.04	0.11	0.33*
APHV	0.68*	0.16*	-0.58*		0.07	-0.50*	-0.35*	0.19*
SPHV	0.43*	0.79*	0.20	0.22*		-0.10	-0.06	0.07
PHV	-0.70*	-0.57*	0.18*	-0.38*	-0.13		0.63*	0.04
AI	-0.72*	-0.78*	0.06	-0.08	-0.27*	0.72*		0.07
PAS	0.16*	0.51*	0.31*	0.15	0.89*	0.10	0.14	

The abbreviations of the notations are the same as that of Table 5.2a.

Table 5.3b Correlation coefficients among the growth parameters for the Japanese boys and girls. The values above the diagonal are for boys; those below the diagonal, for girls. Marked correlations are significant at p<0.05 (with mid growth spurt)

	AECM	SECM	VECM	AMC	SMC	VMC	ATO	STO	VTO	APHV	SPHV	PHV	AI	PAS
AECM		-0.00	0.02	-0.03	0.02	0.05	-0.04	0.03	0.05	-0.01	0.03	0.08	0.08	0.12
SECM	0.74*		-0.07*	0.10	0.43*	-0.34*	-0.18*	0.11	0.01	0.22*	0.32*	0.13	0.19*	0.32*
VECM	-0.18	-0.32*		-0.32*	-0.06	-0.03	0.00	0.28*	0.25*	-0.60*	-0.56*	-0.35*	-0.09	0.26*
AMC	0.13	0.17	-0.85*		0.72*	-0.39*	0.48*	0.26*	0.37*	-0.16*	-0.28*	-0.48*	-0.27*	0.05
SMC	0.05	0.58*	-0.58*	0.60*		-0.20*	0.30*	0.67*	0.49*	-0.34*	-0.26*	-0.46*	-0.27*	0.55*
VMC	-0.59*	-0.57*	0.87*	-0.74*	-0.45*		-0.12	0.23*	-0.21*	0.26*	0.43*	0.17*	-0.13	0.15*
ATO	-0.33*	-0.32*	0.13	-0.07	-0.05	0.27*		0.61*	-0.23*	0.01	-0.29*	-0.66*	-0.73*	0.02
STO	-0.41*	-0.01	0.43*	-0.38*	0.26*	0.58*	0.65*		0.14*	-0.29*	-0.26*	-0.60*	-0.61*	0.61*
VTO	0.26*	0.15	-0.06	0.24	0.09	-0.18	-0.59*	-0.35*		-0.71*	-0.54*	-0.27*	0.12	0.29*
APHV	-0.10	-0.18	-0.12	0.10	-0.06	-0.07	0.77*	0.26*	-0.66*		0.91*	0.55*	0.19*	-0.16*
SPHV	-0.24*	0.18	0.31*	-0.32*	0.35*	0.39*	0.39*	0.82*	-0.25*	0.35*		0.69*	0.34*	0.02
PHV	0.25*	0.17	-0.23	0.06	-0.07	-0.34*	-0.63*	-0.57*	0.41*	-0.21	-0.10		0.82*	0.09
AI	0.45*	0.26*	-0.32*	0.31*	0.01	-0.51*	-0.66*	-0.70*	0.49*	-0.11	-0.20	0.81*		0.25*
PAS	-0.02	0.29*	0.21	-0.15	0.36*	0.19	0.10	0.53*	0.10	0.22	0.88*	0.18	0.23	

The abbreviations of the notations are the same as that of Table 5.2b.

APHV and PHV, STO and PHV, and VTO and APHV. This is also in accord with the report of the others (Bogin et al., 1990; Ali, 2000).

5.4 Average Curve Fitting

Table 5.4a and 5.4b show the average structural curve fitted values of stature, velocity with their differences for every year from age 1-25 years of Japanese boys and girls who do not have the mid growth spurt and who have the mid growth spurt, respectively. The difference values indicate the values of boys minus values of girls.

The distributions of predicted stature that do not have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 1 to 5 and 10 to 12, and then again become shorter than boys (5.4a). The distributions of predicted stature that have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 8 and 11 to 12, and then again become shorter than boys (5.4b). Japanese boys who do not have the mid growth spurt are, on average, 13.26 cm taller than their opposite sex (Table 5.4a). Moreover, Japanese boys who have the mid growth spurt are, on average, 13.77 cm taller than their opposite sex (Table 5.4b) The distributions of predicted stature that do not have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 1 to 5 and 10 to 12, and then again become shorter than boys. The distributions of predicted stature that have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 8 and 11 to 12, and then again become shorter than boys. Japanese boys who do not have the mid growth spurt are, on average, 13.26 cm taller t than their opposite sex. Moreover, Japanese boys who have the mid growth spurt are, on average, 13.77 cm taller t than their opposite sex..

Table 5.4a. Average structural curve fitted values of height, velocity, and their differences (Boy less girl) of the Japanese boys and girls (who do not have the mid growth spurt) by age (year).

Age (Year)	Boys		Girls		Difference	
	Stature (cm)	Velocity (cm/year)	Stature (cm)	Velocity (cm/year)	Stature (cm)	Velocity (cm/year)
1.00	67.30	13.62	68.43	12.92	-1.13	0.70
2.00	80.76	10.25	81.57	9.73	-0.81	0.52
3.00	90.86	8.33	91.44	7.92	-0.58	0.41
4.00	99.11	7.17	99.48	6.82	-0.37	0.35
5.00	106.23	6.43	106.39	6.09	-0.16	0.34
6.00	112.61	5.91	112.54	5.61	0.07	0.30
7.00	118.51	5.52	118.14	5.38	0.37	0.14
8.00	124.02	5.21	123.49	5.57	0.53	-0.36
9.00	129.25	5.05	129.00	6.21	0.25	-1.16
10.00	134.34	5.29	135.21	6.75	-0.87	-1.46
11.00	139.72	6.18	142.07	6.26	-2.35	-0.08
12.00	146.03	7.19	148.46	4.66	-2.43	2.53
13.00	153.30	7.05	153.14	2.83	0.16	4.22
14.00	160.33	5.41	155.85	1.49	4.48	3.92
15.00	165.65	3.21	157.18	0.72	8.47	2.49
16.00	168.84	1.54	157.76	0.34	11.08	1.20
17.00	170.40	0.65	158.04	0.16	12.36	0.49
18.00	171.07	0.26	158.15	0.08	12.92	0.18
19.00	171.34	0.10	158.20	0.04	13.14	0.06
20.00	171.44	0.04	158.23	0.02	13.21	0.02
21.00	171.48	0.02	158.24	0.01	13.24	0.01
22.00	171.49	0.01	158.25	0.01	13.24	0.00
23.00	171.50	0.002	158.25	0.003	13.25	-0.001
24.00	171.51	0.001	158.25	0.001	13.26	0.00
25.00	171.51	0.001	158.25	0.001	13.26	0.00

Table 5.4b. Average structural curve fitted values of height, velocity, and their differences (Boy less girl) of the Japanese boys and girls (who have the mid growth spurt) by age (year).

Age (Year)	Boys		Girls		Difference	
	Stature (cm)	Velocity (cm/year)	Stature (cm)	Velocity (cm/year)	Stature (cm)	Velocity (cm/year)
1.00	70.28	14.35	66.50	13.89	3.78	0.46
2.00	85.18	7.54	81.62	7.80	3.56	-0.26
3.00	92.91	5.92	89.49	6.79	3.42	-0.87
4.00	98.77	5.91	96.08	6.79	2.69	-0.88
5.00	104.54	6.20	102.84	6.72	1.70	-0.52
6.00	110.60	6.34	109.70	6.36	0.90	-0.02
7.00	116.86	6.17	116.28	5.81	0.58	0.36
8.00	118.99	5.74	122.31	5.39	-3.32	0.35
9.00	128.73	5.30	127.84	5.53	0.89	-0.23
10.00	134.04	5.24	133.39	6.27	0.65	-1.03
11.00	139.29	6.03	139.61	6.36	-0.32	-0.33
12.00	145.36	7.44	146.22	5.16	-0.86	2.28
13.00	152.86	7.64	151.65	3.33	1.21	4.31
14.00	160.54	5.52	154.88	1.80	5.66	3.72
15.00	166.15	2.86	156.44	0.91	9.71	1.95
16.00	169.14	1.28	157.14	0.50	12.00	0.78
17.00	170.41	0.60	157.51	0.31	12.90	0.29
18.00	171.02	0.32	157.72	0.21	13.30	0.11
19.00	171.34	0.20	157.85	0.15	13.49	0.05
20.00	171.53	0.13	157.93	0.11	13.60	0.02
21.00	171.65	0.09	157.99	0.09	13.66	0.00
22.00	171.73	0.06	158.02	0.07	13.71	-0.01
23.00	171.78	0.04	158.05	0.06	13.73	-0.02
24.00	171.84	0.03	158.06	0.05	13.78	-0.02
25.00	171.84	0.02	158.07	0.04	13.77	-0.02

5.5 Comparisons with Other Studies

We drew an attention to compare our findings with those of others who have used longitudinal curve-fitting procedures. The means of the biological parameters are useful for describing central tendencies within samples and for population comparisons. Comparative results for age at takeoff, stature at takeoff, and velocity at takeoff of different ethnic groups of the world are shown in Table 5.5 for boys and in Table 5.6 for girls. Results for age at PHV, stature at PHV, and PHV are shown in Table 5.7 for boys and in Table 5.8 for girls.

The mean age at takeoff (i.e., age at the onset of the pubertal spurt in stature) of Japanese boys who do not have the mid growth spurt (Table 5.5) is approximately 1.9 years earlier than in Guatemalan boys; 1.2 years earlier than in Australian Aboriginals, urban Indian, and American; 1.7 years earlier than in Swiss, French, and Saskatchewan; and 2.7 years earlier than in African, and English boys. Again Table 5.5 shows that mean age at takeoff of Japanese boys who have the mid growth spurt is approximately 1.3 years earlier than in Guatemalan boys; 0.6 years earlier than in Australian Aboriginals, urban Indian, and American; one year earlier than in Swiss, French, and Saskatchewan; and 2.1 years earlier than in African, and English boys (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Hauspie et al., 1980a; Largo et al., 1978; Ledford and Cole, 1998 Mirwald et al., 1981; Tanner et al., 1976;).

Table 5.5 shows that the mean stature at takeoff in Japanese boys who do not have the mid growth spurt is approximately 2.5 cm, 3.4 cm, 4 cm, 10.3 cm shorter than in Australian Aboriginal, Belgian, Guatemalan, Swiss boys respectively, 9.2 cm smaller than in American boys, and Saskatchewan boys, but 3.8 cm taller than in Indian boys. The mean stature at takeoff in Japanese boys who have the mid growth spurt (Table 5.5) is approximately 1.2 cm shorter than in Guatemalan boys, 6.3 cm shorter than in American boys, and Saskatchewan boys, 7.4 cm shorter than in Swiss boys, but 3.3 cm taller than in Indian boys (Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Gasser et al., 1984; Hauspie et al., 1980a; Largo et al., 1978; Mirwald et al., 1981;). These differences in stature are not closely related to the differences in timing.

In Table 5.5 the velocity at takeoff of Japanese boys (who have the mid growth spurt or not) is approximately one cm/year larger than that of African and Indian boys (Billewicz and McGregor, 1982; Bogin et al., 1990; Hauspie et al., 1980a). It is about 0.5 cm/year larger than Swiss boys (Gasser et al., 1984; Largo et al., 1978) and Australian Aboriginal boys (Brown and Townsend, 1982; Bogin et al., 1990). The velocity at takeoff is slightly larger in Japanese boys than in Guatemalan, Saskatchewan and United States boys (Bogin et al., 1990, Byard et al., 1993; Mirwald et al., 1981).

The age at takeoff of Japanese girls who do not have the mid growth spurt (Table 5.6) is approximately 1.3 years earlier than in Australian Aboriginal girls, American girls, and French girls; 2 years earlier than in Swiss girls, and Indian girls; 2.5 years earlier than in Belgian; and 3 years earlier than in African and English girls (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Hauspie et al., 1980a; Hauspie et al., 1980b; Largo et al., 1978; Ledford and Cole, 1998; Tanner et al., 1976). The age at takeoff of Japanese girls who

Table 5.5 Average ages at takeoff (in years), stature at takeoff (in cm) and velocity at takeoff (in cm/year) of boys from this and other studies (corresponding SDs are shown in parentheses)

Authors	Ethnic Group	Method	Age at Takeoff	Stature at Takeoff	Velocity at Takeoff
Tanner et al. (1976)	English	Logistic	12.1(0.9)	146.1(6.3)	
Largo et al. (1978)	Swiss	Cubic Spline	11.0(1.2)	143.8(7.7)	4.2(0.6)
Preece and Baines (1978)	English	PB 1	10.7(0.9)	138.9(5.9)	4.5(0.6)
		PB 2	10.9(0.9)	139.7(6.2)	4.5(0.5)
		PB 3	11.2(1.1)	141.0(6.5)	4.7(0.6)
		PB 4	10.5(0.8)	137.7(5.8)	4.0(0.5)
Hauspie et al. (1980a)	India	Curve-fitting	10.5(1.5)	129.7(6.1)	3.9(0.8)
Mirwald et al. (1981)	Saskatchewan	PB 1	11.0(0.9)	142.3(7.1)	4.6(0.7)
Billewicz and McGregor (1982)	Gambian	PB 1	12.2(1.3)	135.7(6.3)	3.7(0.5)
Brown and Townsend (1982)	Australian Aboriginal	PB 1	10.6(1.4)	136.0(8.5)	4.4(0.8)
Gasser et al. (1984a)	Swiss	Kernel	10.9(1.1)	143.4(6.7)	4.3(0.5)
Bogin et al. (1990)	Guatemalan	PB 1	10.1(1.2)	137.6(6.2)	4.6(0.8)
	British		10.8	139.0	4.5
	Belgian		10.0	136.9	4.7
	Urban Indian		10.6	129.5	3.6
	Rural Indian		11.4	119.5	3.9
	Australian		10.8	136.0	4.3
	African		12.2	135.6	3.7
Guo et al. (1992)	American	PB 1	9.5(0.9)	136.4(6.9)	5.0(0.5)
		Triple Logistic	11.3(1.1)	146.0(7.5)	4.7(0.6)
		Kernel	10.9(1.3)	144.4(8.6)	4.5(0.6)
Byard et al. (1993)	American	PB 1	10.6(1.0)	142.7(7.1)	4.8(0.5)
Ledford and Cole (1998)	French	JPPS	11.2(1.1)		
		SSC	11.8(1.1)		
		PB1	10.0(0.9)		
Ali (2000)	Japanese	BTT	9.6(1.0)	134.6(6.9)	4.9(0.8)
Present Investigation	Japanese	BTT	10.0(1.0)	136.4(6.9)	4.9(1.0)
		JPA-2	9.4(1.2)	133.5(8.4)	4.9(0.6)

N.B. The order of references is arranged according to the year published.

have the mid growth spurt (Table 5.6) is approximately equal in Australian girls, American Aboriginal girls, and French girls; one year earlier than in Swiss girls, and Indian girls; 1.5 years earlier than in Belgian; and 2 years earlier than in African and English girls.

In Table 5.6 the mean stature at takeoff in Japanese girls who do not have the mid growth spurt is approximately 4 cm, 5.5 cm, 6.5 cm, 7.5 cm and 12.5 cm shorter than in African, Australian Aboriginal, Guatemalan, American and Swiss girls, but 2 cm taller than in Indian girls (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Hauspie et al., 1980a; Largo et al., 1978). These differences, like as boys, in stature are not closely related to the differences in timing. The mean stature at takeoff in Japanese girls who have the mid growth spurt (Table 5.6) is approximately equal in African girls, one cm shorter than in Australian Aboriginal girls, 2 cm shorter than in Guatemalan girls, 3 cm shorter than in American girls, 8 cm shorter than in Swiss girls, but 7 cm taller than in Indian girls.

Table 5.6 shows the velocity at takeoff in Japanese girls (who have the mid growth spurt or not) is approximately one cm/year larger than in African girls (Billewicz and McGregor, 1982; Bogin et al., 1990). It is 0.5 cm/year larger than in Indian girls (Hauspie et al., 1980a; Bogin et al., 1990). It was 0.3 cm/year smaller than in Swiss girls (Largo et al., 1978), 0.2 cm/year larger than in Guatemalan and Belgian girls (Bogin et al., 1990), while it is about the same as American and Australian Aboriginal girls (Brown and Townsend, 1982; Byard et al., 1993).

Table 5.6 Average ages at takeoff (in years), stature at takeoff (in cm) and velocity at takeoff (in cm/year) of girls from this and other studies (corresponding SDs are shown in parentheses)

Authors	Ethnic Group	Method	Age at Takeoff	Stature at Takeoff	Velocity at Takeoff
Tanner et al. (1976)	English	Logistic	10.3(1.0)	137.9(7.0)	
Largo et al. (1978)	Swiss	Cubic Spline	9.6(1.1)	135.8(7.3)	4.8(0.7)
Preece and Baines (1978)	English	PB 1	9.0(0.7)	129.9(6.3)	5.2(0.4)
		PB 2	8.9(0.6)	130.2(6.3)	5.3(0.5)
		PB 3	9.1(0.8)	130.9(6.7)	5.3(0.4)
		PB 4	8.7(0.8)	127.9(6.2)	4.6(0.4)
Hauspie et al. (1980a)	India	Curve-fitting	9.3(1.1)	121.3(6.4)	4.6(0.6)
Hauspie et al. (1980b)	Belgian	Logistic	9.9(1.1)	137.1(6.2)	4.9(1.1)
		Gompertz	9.9(1.1)	136.7(6.2)	4.5(1.3)
		PB 1	8.5(0.9)	129.9(4.2)	5.0(0.7)
		Double logistic	7.8(1.0)	125.6(4.4)	4.6(0.7)
Mirwald et al. (1981)	Saskatchewan	PB 1			
Billewicz and McGregor (1982)	Gambian	PB 1	10.2(1.4)	127.8(6.8)	4.0(0.6)
Brown and Townsend (1982)	Australian Aboriginal	PB 1	8.8(1.5)	129.1(5.2)	5.0(1.2)
Bogin et al. (1990)	Guatemalan	PB 1	9.0(1.0)	129.9(4.8)	4.9(0.7)
	British		8.9	129.8	5.2
	Belgian		8.4	129.4	5.3
	Urban Indian		9.4	121.1	4.6
	Rural Indian				
	Australian		8.9	128.5	5.1
	African		10.3	127.6	4.0
Guo et al. (1992)	American	PB 1	8.0(0.9)	125.0(6.9)	5.3(0.6)
		Triple Logistic	9.5(1.0)	133.7(6.4)	4.9(0.6)
		Kernel	9.4(1.1)	133.2(7.0)	4.8(0.8)
Byard et al. (1993)	American	PB 1	8.8(1.0)	131.0(6.9)	5.2(0.6)
Qin et al. (1996)	Japanese	PB 1	7.3(1.4)	117.4(8.5)	
		Count-Gompertz	8.5(1.7)	123.9(10.0)	
Ledford and Cole (1998)	French	JPPS	8.8(1.4)		
		SSC	9.2(1.2)		
		PB1	8.2(0.7)		
Ali (2000)	Japanese	BTT	8.0(1.1)	125.3(6.9)	5.1(0.9)
Present Investigation	Japanese	BTT	8.5(0.7)	128.0(6.9)	5.3(0.6)
		JPA-2	7.5(0.9)	123.4(7.1)	5.1(0.6)

N.B. The order of references is arranged according to the year published.

From Table 5.7, it is found that the PHV of Japanese boys who do not have the mid growth spurt is reached approximately 3.5 years earlier than African boys (Billewicz and McGregor, 1982) and 0.9 years earlier than Venezuelan, Guatemalan, Belgian and United States boys. Again it is found that the PHV of Japanese boys who have the mid growth spurt is reached (Table 5.7) approximately 3.4 years earlier than African boys and 0.8 years earlier than Venezuelan, Guatemalan, Belgian and United States boys (Bogin et al., 1990; Byard et al., 1993; Gasser et al., 1984; Mercedes et al., 1995). They also reach PHV about 1.3 years and 1.2 years earlier than English, Swiss, Indian, French and Swedish boys who do not have the mid growth spurt and who have the mid growth spurt respectively (Bogin et al., 1990; Hauspie et al., 1980a; Karlberg, 1989; Largo et al., 1978; Ledford and Cole, 1998; Marubini et al., 1972;).

The mean stature at peak velocity in Japanese boys who do not have the mid growth spurt (Table 5.7) is approximately 1 cm, 2 cm, 4.4 cm and 5.4 cm shorter than in African, Australian Aboriginal, English and Guatemalan boys respectively, and also 7.1 cm shorter than in Swiss and Saskatchewan boys. The mean stature at peak velocity in Japanese boys who have the mid growth spurt (Table 5.7) is approximately 0.8 cm, 1.8 cm, 4.2 cm and 5.2 cm shorter than in African, Australian Aboriginal, English and Guatemalan boys respectively, and also 6.9 cm shorter than in Swiss and Saskatchewan boys. The mean stature at peak velocity in Japanese boys who do not have the mid growth spurt is approximately 8.5 cm and who have the mid growth spurt is approximately 8.3 cm shorter than in United States boys (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Gasser et al., 1984; Largo et al., 1978; Mirwald et al., 1981). To the contrary, Japanese boys who do not have the mid growth spurt is 4.5 cm and who have the mid growth spurt is 4.7 cm taller than in Indian boys at peak velocity (Hauspie et al., 1980a; Bogin et al., 1990).

In Table 5.7 the peak velocity of growth in stature of Japanese boys who do not have the mid growth spurt is approximately equal and, who have the mid growth spurt is approximately 0.2 cm/year than smaller that of English, Indian, Swiss and United States boys. The peak velocity of growth in stature of Japanese boys who do not have the mid growth spurt and who have the mid growth spurt are respectively 0.8 cm/year and 0.5 cm/year smaller than Guatemalan and French boys. Respectively, the peak velocity of growth in stature of Japanese boys who do not have the mid growth spurt and who have the mid growth spurt are 1.6 cm/year and 1.2 cm/year smaller than Australian Aboriginal boys, but 1.8 cm/year and 2.2 cm/year larger than African boys (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Largo et al., 1978; Ledford and Cole, 1998; Marubini et al., 1972; Tanner et al., 1976).

The Japanese girls who do not have the mid growth spurt (Table 5.8) reach PHV approximately 0.9 year earlier than Belgian girls, 1.4 years earlier than English, Guatemalan, United States, Caracas, Australian Aboriginal, French, and Polish girls, 1.7 years earlier than Swiss, Swedish and Indian girls, and 3.3 years earlier than African girls. The Japanese girls who have the mid growth spurt (Table 5.8) reach PHV approximately 0.3 year earlier than Belgian girls, 0.8 years earlier than English, Guatemalan, United States, Caracas, Australian Aboriginal, French, and Polish girls, 1.0 years earlier than Swiss, Swedish and Indian girls, and 2.7 years earlier than

Table 5.7. Average ages at PHV (in years), stature at PHV (in cm) and velocity at PHV (in cm/year) of boys from this and other studies (corresponding SDs are shown in parentheses).

Authors	Ethnic Group	Method	Age at PHV	Stature at PHV	PHV
Marubini et al. (1972)	English	Gompertz	14.1(0.8)		9.1(1.2)
		Logistic	14.2(0.8)		8.8(1.1)
Tanner et al. (1976)	English	Logisic	13.9(0.8)		8.8(1.1)
Largo et al. (1978)	Swiss	Cubic Spline	13.9(0.8)	161.9(6.2)	9.0(1.1)
Preece and Baines (1978)	English	PB 1	14.2(0.9)	159.5(5.5)	8.2(1.2)
		PB 2	14.2(1.0)	159.7(5.6)	8.4(1.4)
		PB 3	14.4(1.0)	160.8(5.6)	8.7(1.0)
		PB 4	13.6(0.8)	155.8(5.5)	8.2(1.3)
Hauspie et al. (1980a)	Indian	Curve-fitting	14.3(1.0)	150.6(5.0)	8.7(1.3)
Hauspie et al. (1980b)	Belgian	Logistic			
		Gompertz			
		PB 1			
		Double logistic			
Mirwald et al. (1981)	Saskatchewan	PB 1	14.3(1.2)	162.5(6.5)	8.7(1.1)
Billewicz and McGregor (1982)	Gambian	PB 1	16.3(1.2)	155.8(5.4)	6.9(1.0)
Brown and Townsend (1982)	Australian Aboriginal	PB 1	14.0(0.8)	157.1(6.3)	10.3(1.2)
Cameron et al. (1982)	English	PB 1	13.9		
Tanner et al. (1982)	Japanese	PB 1	12.8	169.6	
Gasser et al. (1984a)	Swiss	Kernel	13.9(0.9)	161.7(6.7)	8.3(0.8)
Karlberg (1989)	Swedish	ICP	14.2		
Bogin et al. (1990)	Guatemalan	PB 1	13.7(1.1)	160.5(3.8)	9.5(1.8)
	British		14.2	159.6	8.2
	Belgian		13.8	159.5	7.6
	Urban Indian		14.3	150.7	8.8
	Rural Indian		15.6	142.0	7.5
	Australian		14.0	157.2	10.6
	African		16.3	156.1	6.9
Byard et al. (1993)	American	PB 1	13.9(0.9)	163.6(6.2)	8.9(1.1)
Mercedes et al. (1995)	Venezuelan	Cubic Spline	13.5		
Ledford and Cole (1998)	French	JPPS	14.0(1.0)		9.5(1.2)
		SSC	13.9(1.0)		9.7(1.3)
		PB1	13.9(1.2)		8.5(1.3)
Ali (2000)	Japanese	BTT	12.7(1.0)	154.5(5.9)	9.0(1.3)
Present Investigation	Japanese	BTT	12.9(0.8)	155.3(5.4)	9.1(1.3)
		JPA-2	12.8(1.0)	155.2(6.0)	8.7(1.3)

N.B. The order of references is arranged according to the year published.
PHV=Peak Height Velocity

African girls (Bielicki and Welon, 1973; Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Hauspie et al., 1980a,b; Karlberg, 1986; Largo et al., 1978; Ledford and Cole, 1998; Marubini et al., 1972; Mercedes et al., 1995; Tanner et al., 1976).

The mean stature at peak velocity in Japanese girls who do not have the mid growth spurt (Table 5.8) is approximately 3.4 cm shorter than in African girls, 6.6 cm shorter than in English, Guatemalan and Australian Aboriginal girls, 7.6 cm shorter than in United States girls, and 8.8 cm shorter than in Swiss girls. The mean stature at peak velocity in Japanese girls who have the mid growth spurt (Table 5.8) is approximately 1.8 cm shorter than in African girls, 5 cm shorter than in English, Guatemalan and Australian Aboriginal girls, 6 cm shorter than in United States girls, and 7.2 cm shorter than in Swiss girls (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Byard et al., 1993; Largo et al., 1978). To the contrary, Japanese girls who do not have the mid growth spurt and who have the mid growth spurt are 3.5 cm and 5.1 cm taller than in Indian girls at peak velocity, respectively (Hauspie et al., 1980a; Bogin et al., 1990).

The peak velocity of growth in stature of Japanese girls who do not have the mid growth spurt (Table 5.8) is approximately 0.8 cm/year smaller than that of English and Australian Aboriginal girls, one cm/year smaller than Italian girls, and about the same with Guatemalan and French girls, but 0.4 cm/year larger than Indian girls, and 1.5 cm/year larger than African girls. The peak velocity of growth in stature of Japanese girls who have the mid growth spurt (Table 5.8) is approximately 1.1 cm/year smaller than that of English and Australian Aboriginal girls, 1.3 cm/year

Table 5.8. Average ages at PHV (in years), stature at PHV (in cm) and velocity at PHV (in cm/year) of girls from this and other studies (corresponding SDs are shown in parentheses).

Authors	Ethnic Group	Method	Age at PHV	Stature at PHV	PHV
Marubini et al. (1971)	Italian	Gompertz	10.2	139.1	8.6
		Logistic	10.6	141.4	8.4
Marubini et al. (1972)	English	Gompertz	11.7(0.9)		8.5(0.7)
		Logistic	11.9(0.9)		8.1(0.6)
Bielicki and Welon (1973)	Polish	Graphical	11.8		
Tanner et al. (1976)	English	Logistic	11.9(0.9)		8.1(0.8)
Largo et al. (1978)	Swiss	Cubic Spline	12.2(1.0)	150.5(5.7)	7.1(1.0)
Preece and Baines (1978)	English	PB 1	11.9(0.7)	148.3(5.1)	7.5(0.8)
		PB 2	11.9(0.8)	148.4(5.1)	7.6(1.0)
		PB 3	12.0(0.9)	149.2(5.2)	7.5(0.8)
		PB 4	11.4(0.9)	145.0(5.2)	7.9(0.7)
Hauspie et al. (1980a)	Indian	Curve-fitting	12.4(1.0)	138.2(5.0)	7.2(1.2)
Hauspie et al. (1980b)	Belgian	Logistic	11.4(1.0)	147.1(5.1)	7.8(1.1)
		Gompertz	11.2(1.0)	145.3(5.2)	8.2(1.1)
		PB 1	11.6(1.0)	148.1(4.1)	7.4(1.0)
		Double logistic	10.9(1.0)	144.1(4.1)	7.7(1.1)
Hoshi and Kouchi (1981)	Japanese	Quardratic Regression	11.1(0.9)		
Billewicz and McGregor (1982)	Gambian	PB 1	13.8(1.3)	144.9(5.4)	6.0(0.9)
Brown and Townsend (1982)	Australian Aboriginal	PB 1	11.9(1.1)	147.9(4.8)	8.4(0.9)
Cameron et al. (1982)	English	PB 1	12.2		
Tanner et al. (1982)	Japanese	PB 1	10.7	156.6	
Gasser et al. (1984a)	Swiss	Kernel			
Karlberg (1989)	Swedish	ICP	12.1		
Bogin et al. (1990)	Guatemalan	PB 1	12.0(1.1)	148.1(4.2)	7.6(1.2)
	British		11.9	148.4	7.5
	Belgian		11.4	147.1	6.6
	Urban Indian		12.4	138.5	7.3
	Rural Indian				
	Australian		12.0	148.2	8.5
	African		13.8	145.1	6.1
Byard et al. (1993)	American	PB 1	11.7(1.0)	149.3(5.6)	7.5(0.9)
Mercedes et al. (1995)	Venezuelan	Cubic Spline	11.7		
Qin et al. (1996)	Japanese	PB 1	10.7(1.1)	139.1(6.1)	
		Count-Gompertz	10.8(1.3)	139.4(7.1)	
		Without curve	10.6(1.6)	138.1(9.0)	
Ledford and Cole (1998)	French	JPPS	11.9(0.9)		7.7(0.9)
		SSC	11.7(1.0)		7.8(1.0)
		PB1	11.6(0.8)		7.6(0.9)
Ali (2000)	Japanese	BTT	10.8(1.0)	142.2(4.6)	7.7(1.5)
Present Investigation	Japanese	BTT	11.1(0.7)	143.3(4.5)	7.3(1.1)
		JPA-2	10.5(0.8)	141.7(4.5)	7.3(1.2)

N.B. The order of references is arranged according to the year published.
PHV=Peak Height Velocity

smaller than Italian girls, and about the same with Guatemalan and French girls, but 0.1 cm/year larger than Indian girls, and 1.2 cm/year larger than African girls (Billewicz and McGregor, 1982; Bogin et al., 1990; Brown and Townsend, 1982; Hauspie et al., 1980a; Ledford and Cole, 1998; Marubini et al., 1971; Marubini et al., 1972; Tanner et al., 1976;).

The above tables also divulged that for the same ethnic group, Japanese, the present study differ with that of Ali (2000). *But why?* The possible reason is the involvement of those individuals who do not have the mid growth spurt in the triphasic curve fitting of Ali (2000) and therefore he found a biased estimate of the growth parameters. As in the present study growth models are applied on the data set accordingly, the present results should be more realistic and authentic.

5.6 Predicting Adult Stature based on Growth Parameters

Growth parameters were extracted from distance, velocity and acceleration curves according to Ali (2000). These parameters from the BTT model were: age at early childhood minimum (AECM), stature at early childhood minimum (SECM), velocity at early childhood minimum (VECM), age at mid childhood maximum (AMC), stature at mid childhood maximum (SMC), velocity at mid childhood maximum (VMC), age at take-off (ATO), stature at take-off (STO), velocity at take-off (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS). On the other hand, only the growth parameters age at take-off (ATO), stature at take-off (STO), velocity at take-off (VTO), age at peak height velocity (APHV), stature at peak height velocity (SPHV), peak height velocity (PHV), and predicted adult stature (PAS) were found from the JPA-2 model.

Using forward stepwise regression, like Ali and Ohtsuki (2001), only two parameter-variables can be able to explain the maximum percentage of variation by the regression equation (i.e., R^2). That is, a three-variable linear regression (with zero intercept) model is found through forward stepwise method that is enough for predicting the adult stature of the Japanese boys and girls. The model is

$$PAS=\beta_1(SPHV)+\beta_2(STO)+\varepsilon$$

where β_1 and β_2, are the partial regression coefficients, and ε is the random error term assumed to be distributed as normally with mean zero and variance unity. A summary of the stepwise regression of the dependent variable PAS for different cases (Case 1, Case 2, and Case 3) is shown in Table 5.9. Case 1, Case 2, and Case 3 refer to analysis based on whole sample of growth parameter-variables (where growth parameters are extracted from JPA-2 and BTT models, accordingly), those where the mid-growth spurt exist (where growth parameters are extracted from BTT model), and those where the mid-growth spurt does not exist (where growth parameters are extracted from JPA-2 model), respectively.

Table 5.9. exhibits that the regression coefficients are highly significant ($p<0.0000001$) with a smaller amount of standard errors of the estimate. This table also exhibits that for a three-variable regression equation, maximum R^2 is attained for all the cases.

Analyses of residual for individual cases were considered to understand the preciseness of the prediction for the adult stature. Average values of observed adult stature (extracted from the growth curve), predicted adult stature and the residuals together with those (in parenthesis) of Ali and Ohtsuki (2001) were shown in Table 5.10.

Table 5.10 shows that the residual in all the cases are very small for both boys and girls. The predictions of adult stature, on average, were approximately unbiased for all the cases of boys. For girls, very negligible amount of biased, e.g., 0.01 cm in case 1 and case 3 and 0.02 cm in case 2, were found.

In the present study, like Ali and Ohtsuki (2001), it is necessary to get STO and SPHV, that is possible after 12 years in girls and 14 years in boys, to predict adult stature, however, for clinical purpose, it would be better to predict adult stature near the onset of adolescent growth using the protocols reported by others using skeletal age (Bayley and Pinneau,1952; Khamis and Guo, 1993; Onat, 1975, 1983; Roche et al., 1975a,b; Wainer et al., 1978).

The present method need not any x-ray exposure to the subject, even though it is essential to estimate the skeletal age for clinical purposes or pediatric treatment for a short stature children. The present method is applicable not only for the purpose of sport talent detection and selection based on PAS, but also for giving advice for choosing a more suitable sport event and position from the viewpoint of PAS (Ali and Ohtsuki, 2001).

During the past 2 or 3 decades, considerable literature on the growing child in competitive sports has accumulated (Malina, 1994, 1998). Many reports indicate that physical performance is higher in those who are more biologically mature, especially among boys (Malina and Bouchard, 1991). The relationship between physical performance and biological age or skeletal age is well established, although there are not a few conflicting reports under some condition (Beunen et al., 1978a, b, 1981, 1997; Bouchard and Malina, 1977; Bouchard et al., 1976, 1978; Carron and Bailey, 1974; Ohtsuki et al., 1994).

Standard error, SE, of the estimated partial regression coefficients were very small, and also smaller with those of Ali and Ohtsuki (2001) for all the cases of both boys and girls (Table 5.9). This implies that the present predicted equations are comparatively more robust and stable.

The sample sizes in case 3 for both sexes were higher than those of Ali and Ohtsuki (2001) implying, due to convergence and over-parameterization problem, BTT model is not applicable to those individual children who do not have the mid-growth spurt (Table 5.9). Conversely, JPA-2 model fits well, rather than BTT model, to those individuals who do not have the mid-growth spurt. Adult stature (both observed and predicted) for boys in case 2 was greater than that in case 3. However, an opposite picture was found for girls. This may due to the individual's characteristics.

Predicted statures from the present proposed equations were more closer to their corresponding observed stature (Table 5.10). These residuals were, on average, sufficiently smaller than those of others (Bayley and Pinneau,1952; Roche et al., 1975a,b; Wainer et al., 1978; Khamis and Guo, 1993; Khamis and Roche, 1994; Ali and Ohtsuki, 2001). Also, standard deviations of the residuals in the present study imply that they were all very closer to their mean value compared with those of others (Bayley and Pinneau,1952; Roche et al., 1975a,b; Wainer et al., 1978; Khamis and Guo, 1993; Khamis and Roche, 1994; Ali and Ohtsuki, 2001). Standard errors of PAS

Table 5.9 Summary of the stepwise regression for the dependent variable, Predicted adult stature. Values in the parenthesis are of Ali and Ohtsuki (2001)

Case	Sample size	Variable	Step +in	Coefficient	Standard error	F-to enter/remove	R^2	Variables included
					Boys			
Case 1	481	SPHV	1	1.522934	0.009872	3001717.0	0.999840	1
	(415)			(1.534135)	(0.031135)	(1170799.0)	(0.99964)	
		STO	2	-0.482002	0.011366	1798.0	0.999966	2
				(-0.483147)	(0.035777)	(182.0)	(0.99976)	
Case 2	213	SPHV	1	1.541007	0.018204	2151716.0	0.999901	1
	(213)			(1.539818)	(0.017258)	(2202710.0)	(0.99990)	
		STO	2	-0.499682	0.020863	574.0	0.999974	2
				(-0.498201)	(0.019778)	(635.0)	(0.99998)	
Case 3	268	SPHV	1	1.531324	0.010947	1281848.0	0.999792	1
	(197)			(1.558884)	(0.050298)	(391888.3)	(0.99950)	
		STO	2	-0.49414	0.01265	1526.0	0.999969	2
				(-0.503437)	(0.058064)	(75.2)	(0.99964)	
					Girls			
Case 1	259	SPHV	1	1.461355	0.018274	1049295.0	0.999754	1
	(234)			(1.628559)	(0.038572)	(394039.4)	(0.99941)	
		STO	2	-0.397874	0.020740	368.0	0.999899	2
				(-0.580845)	(0.043748)	(176.3)	(0.99967)	
Case 2	86	SPHV	1	1.491174	0.046333	397040.5	0.999786	1
	(96)			(1.488222)	(0.046936)	(367055.8)	(0.99974)	
		STO	2	-0.433769	0.051757	70.2	0.999883	2
				(-0.431707)	(0.052431)	(66.0)	(0.99985)	
Case 3	174	SPHV	1	1.428912	0.021171	763249.7	0.999773	1
	(136)			(1.592562)	(0.057328)	(220941.4)	(0.99974)	
		STO	2	-0.359096	0.0244218	219.9	0.999901	2
				(-0.534061)	(0.065738)	(66.0)	(0.99959)	

Case 1, Case 2 and Case 3 refers to the analysis based on whole sample, individuals who have the mid-growth spurt and who without the mid-growth spurt, respectively. The growth parameters for case 2 are extracted from BTT model and that for case 3 are extracted from JPA-2 model through AUXAL. The sample sizes among three cases are not consistent due to omitting the outliers.

Table 5.10 Averages of the observed, predicted, residual, 90% confidence bounds of residuals and standard errors (SE) of prediction equations of adult stature based on growth parameter-variables for different cases. Values in the parenthesis are of Ali and Ohtsuki (2001)

Cases	Sample Size	Observed Stature (cm)	Predicted Stature (cm)	Residual (cm)		90% Confidence Bounds of Residuals		SE of Prediction (cm)
				Mean	SD	Lower (cm)	Upper (cm)	
				Boys				
Case 1	481	171.5970	171.5925	0.00458	0.997	-0.070	0.079	0.045445
	(415)	(172.40)	(172.37)	(0.026)	(2.70)	(-1.896)	(3.530)	(0.18)
Case 2	213	171.6860	171.6843	0.001765	0.886	-0.099	0.102	0.060725
	(213)	(171.72)	(171.72)	(0.002)	(0.84)	(-0.830)	(0.874)	(0.08)
Case 3	268	171.5263	171.5206	0.005693	0.956	-0.907	0.102	0.058398
	(197)	(173.10)	(173.37)	(-0.264)	(2.71)	(-2.618)	(4.342)	(0.31)
				Girls				
Case 1	259	158.4386	158.4256	0.013050	1.597	-0.151	0.177	0.099206
	(234)	(159.05)	(159.02)	(0.030)	(2.92)	(-2.651)	(4.449)	(0.26)
Case 2	86	158.0005	157.9785	0.021990	1.716	-0.285	0.330	0.185088
	(96)	(157.86)	(157.84)	(0.022)	(1.94)	(-1.855)	(2.054)	(0.27)
Case 3	174	158.6244	158.6118	0.012548	1.587	-0.186	0.212	0.120325
	(136)	(159.82)	(159.79)	(0.034)	(3.25)	(-3.304)	(4.987)	(0.38)

Categories of Cases1-3 are the same as in Table 9. The sample sizes among three cases are not consistent due to omitting the outliers.

in the present study (Table 5.10) are smaller than those of some others (Onat, 1975, 1983; Ali and Ohtsuki, 2001).

The present study exhibit that the 90% confidence bounds for residuals (Table 5.10) shows better prediction than those of some others (Roche et al., 1975a; Wainer et al., 1978; Khamis and Roche, 1994; Ali and Ohtsuki, 2001). The length of the 90% confidence intervals are 0.149cm, 0.201cm and 1.009cm for boys, and 0.328cm, 0.615cm and 0.398cm for girls for case 1, case 2 and case 3, respectively. On the other hand, Ali and Ohtsuki (2001) found that the length of the intervals were 5.426cm, 1.704cm and 6.960cm for boys, and 7.100cm, 3.909cm and 8.291cm for girls, respectively, for Case 1, Case 2 and Case 3. The predicted errors of the proposed equations are comparatively more condensed around zero. Thus, from every point of view, the proposed equations for the prediction of the adult stature in the present study are better than those of Ali and Ohtsuki (2001). These equations are

$$\textit{For Boys (whole sample)}$$
$$PAS = 1.522934(SPHV) - 0.482002(STO)$$

$$\textit{For Boys (with mid-growth spurt)}$$
$$PAS = 1.541007(SPHV) - 0.499682(STO)$$

$$\textit{For Boys (without mid-growth spurt)}$$
$$PAS = 1.531324(SPHV) - 0.503437(STO)$$

$For\ Girls\ (whole\ sample)$
$PAS = 1.461355(SPHV) - 0.397874(STO)$

$For\ Girls\ (with\ mid-growth\ spurt)$
$PAS = 1.491174(SPHV) - 0.433769(STO)$
and
$For\ Girls\ (without\ mid-growth\ spurt)$
$PAS = 1.428912(SPHV) - 0.359096(STO)$

5.7 Predicting Adult Stature based on Distance Curve

JPA-2 and BTT model ware run on the individual longitudinal data of stature to find out the distance curve for each individual. Predicted statures considered in this study for further analysis to build up some equations were: stature at age 2 (S_2), stature at age 3 (S_3), stature at age 4 (S_4), stature at age 5 (S_5), stature at age 6 (S_6), stature at age 7 (S_7), stature at age 8 (S_8), stature at age 9 (S_9), stature at age 10 (S_{10}), stature at age 11 (S_{11}), stature at age 12 (S_{12}), stature at age 13 (S_{13}), and predicted adult stature (PAS=S_{25}, stature at age 25).

Using forward stepwise regression (as in chapter 4), it was found that only two stature-variables can explain the maximum percentage of variation in the dependent variable, adult stature (a detailed result is shown in Appendix 3). The model is as follows:

$$PAS=\beta_1 S_i + \beta_2 S_j + \varepsilon$$

where β_1 and β_2 are the partial regression coefficients, and ε is the random error term assumed to be normally distributed with mean zero and variance unity; S_i, and S_j are the stature-variables defined at age i and j respectively, $i, j = 2, 3, \ldots, 13$. The set $\{i, j\}$ is different for different cases (Case 1, Case 2, and Case 3). The Case 1, Case 2, and

Case 3 refer to analysis based on whole sample individuals (using BTT model), individuals who have the mid-growth spurt (using BTT model), and individuals who do not have a mid-growth spurt (using JPA-2 model), respectively. A summary of the stepwise regression of the dependent variable (predicted adult stature, PAS) for different cases are shown in Table 5.11(a) and Table 5.11(b) for boys and girls respectively. The regression coefficients are highly significant and the standard errors of the estimates are small. These tables also exhibit that for two-variable regression equation, the maximum R^2 is attained in Case 2. Also, the average standard errors of the estimated coefficients in Case 2 are smaller than that in Case 3 for boys and Case 2 is slightly larger than that in Case 3 for girls. From the present investigation it was found that *only two statural variables* could explain the maximum percentage variation in the depended variable but Ali and Ohtsuki (2001) shown that three stature variables can explain the maximum percentage variation in the dependent variable. Again it was shown that all the values of R^2 in the present investigation are greater than their value of R^2. The possible reason is the same as in section 5.5. It should be noted that, though the present study started with a sample of 820 individuals, some were excluded. For some sample individuals, the AUXAL software (Bock et al., 1994) did not converge because of outliers or missing observations. Other individuals were excluded to discard any outliers and influential data points (as described in section 4.6). Thus, the results presented here are free from the problem of inclusion of outlier and influential data points.

Analyses of residuals for individual cases were also considered to understand the precision of the prediction for adult stature. Average values of observed adult

Table 5.11a Summary of the stepwise regression for the dependent variable PAS (Predicted adult stature) based on stature-variables of Japanese boys

Cases	Sample size	Variable	Step +in	Coefficient	Standard error	$F-$to enter/remove	R^2	Variables included
				Present investigation				
Case 1	464	S_9	1	1.046828	0.045456	548059.2	0.999156	1
		S_3	2	0.397943	0.063855	38.8	0.999221	2
				Ali and Ohtsuki investigation				
Case 1	410	S_9	1	1.270660	0.096113	377603.7	0.99892	1
		S_3	2	0.638750	0.079237	54.2	0.99905	2
		S_{12}	3	-0.377094	0.072787	26.8	0.99910	3
				Present investigation				
Case 2	215	S_{10}	1	0.881007	0.078511	293663.4	0.999272	1
		S_4	2	0.543971	0.106530	26.1	0.999351	2
				Ali and Ohtsuki investigation				
Case 2	410	S_9	1	1.281532	0.153105	225484.9	0.99906	1
		S_3	2	0.493674	0.097118	27.5	0.99917	2
		S_{12}	3	-0.296906	0.114832	6.7	0.99920	3
				Present investigation				
Case 3	249	S_9	1	1.009736	0.089888	273793.0	0.999095	1
		S_4	2	0.412471	0.117221	12.4	0.999138	2
				Ali and Ohtsuki investigation				
Case 3	191	S_5	1	-0.304324	0.345247	139935.2	0.99864	1
		S_9	2	1.080969	0.212497	10.8	0.99872	2
		S_2	3	0.730981	0.172769	17.9	0.99883	3

Categories of Cases 1, 2 and 3 are the same as in Table 5.9. The classification of Case 2 and Case 3 is considered here for each individual on the results of BTT and JPA-2 model on AUXAL. The sample sizes among three cases are not consistent due to omitting the outliers.

Table 5.11b Summary of the stepwise regression for the dependent variable PAS (Predicted adult stature) based on stature-variables of Japanese girls

Cases	Sample size	Variable	Step +in	Coefficient	Standard error	F – to enter/remove	R^2	Variables included
				Present investigation				
Case 1	259	S_{13}	1	2.87668	0.102438	345503.1	0.999254	1
		S_{12}	2	-1.89627	0.105918	320.5	0.999668	2
				Ali and Ohtsuki investigation				
Case 1	262	S_{13}	1	3.20074	0.143402	393773.6	0.99934	1
		S_{12}	2	-3.29566	0.280664	196.9	0.99962	2
		S_{11}	3	1.11848	0.155298	51.9	0.99969	3
				Present investigation				
Case 2	70	S_{13}	1	2.54599	0.122662	196119.7	0.999648	1
		S_4	2	-1.55950	0.127201	150.3	0.999890	2
				Ali and Ohtsuki investigation				
Case 2	96	S_{13}	1	3.09039	0.109926	216090.1	0.99956	1
		S_{12}	2	-3.23795	0.230637	194.4	0.99986	2
		S_{11}	3	1.16692	0.142226	67.3	0.99992	3
				Present investigation				
Case 3	157	S_{13}	1	2.63537	0.073553	359718.5	0.999567	1
		S_{12}	2	-1.65255	0.075852	474.6	0.999893	2
				Ali and Ohtsuki investigation				
Case 3	134	S_{13}	1	3.18652	0.197888	243768.8	0.99946	1
		S_{12}	2	-3.03767	0.368247	129.1	0.99972	2
		S_{11}	3	0.86965	0.192203	20.5	0.99976	3

Categories of Cases 1, 2 and 3 are the same as in Table 5.9. The classification of Case 2 and Case 3 is considered here for each individual on the results of BTT and JPA-2 model respectively on AUXAL. The sample sizes among three cases are not consistent due to omitting the outliers.

stature, predicted adult stature, residuals, and standard errors of the predictions are shown in Table 5.12. The average absolute residuals in Case 2 are smaller than those in Case 1 and Case 3 for both Japanese boys and girls. The predictions of adult stature based on growth parameters (in section 5.6), on average, were approximately unbiased for all the cases of boys. For girls, very negligible amount of biased, e.g., 0.01 cm in Case 1 and Case 3 and 0.02 cm in Case 2, were found. This may due to the measurement error of the data for girls only. On the other hand, the predictions of adult stature based on different stature variables (in the present section) are, on average, under-estimated by 0.09 cm in Case 2 and over-estimated by 0.13 cm in Case 3 for boys; and under estimated by 0.02 cm in Case 2 and by 0.01 cm in Case 3 for Japanese girls. Also, the standard errors of the prediction is smaller in Case 2 compared to Case 3 for boys and slightly larger in Case 2 compared to Case 3 for girls in the present and previous section.

Comparing with the results in section 5.6, the results of the present section show that the prediction of adult stature based on growth parameters are better than those based on statures at different ages. But the residuals and the standard errors of the prediction are also small in the present section. Therefore, the prediction equations of the present section are also useful for the Japanese population. On the other hand, the present prediction equations are easy to calculate and need stature-values at only two age points, and need not to fit any model to get growth parameters as in Ali and Ohtsuki (2001) with longitudinal data from birth to maturity.

The mean residual of the predicted adult stature of the present study (Table 5.12) are smaller compared with that of others (Bayley and Pinneau,1952; Khamis

Table 5.12 Averages of the observed, predicted, residual, 90%confidence bounds of residuals and standard error (SE) of predicted equations of adult stature based on stature-variable for different cases. Values in the parenthesis are of Ali and Ohtsuki (2001)

Cases	Sample Size	Observed Stature (cm)	Predicted Stature (cm)	Residual (cm)		90% Confidence Bound of Residuals (cm)		SE of Prediction (cm)
				Mean	SD	Lower	Upper	
Boys								
Case 1	464	171.69	171.58	0.109	4.80	-0.258	0.476	0.30
	(410)	(172.34)	(172.23)	(0.113)	(5.17)	(-6.024)	(7.497)	(0.42)
Case 2	215	171.91	171.82	0.090	4.39	-0.405	6.150	0.41
	(213)	(171.68)	(171.55)	(0.133)	(4.89)	(-4.982)	(6.150)	(0.54)
Case 3	249	171.51	171.38	0.123	5.05	-0.405	0.651	0.43
	(191)	(173.01)	(173.22)	(-0.213)	(5.94)	(-6.739)	(8.990)	(0.68)
Girls								
Case 1	259	158.44	158.39	0.046	2.89	-0.250	0.344	0.24
	(262)	(159.00)	(159.19)	(0.027)	(2.80)	(-2.652)	(3.512)	(0.29)
Case 2	70	158.10	185.08	0.016	1.67	-0.317	0.348	0.27
	(96)	(157.86)	(157.84)	(0.018)	(1.45)	(-1.717)	(1.708)	(0.25)
Case 3	157	158.25	158.24	0.016	1.64	-0.200	0.233	0.19
	(134)	(159.74)	(159.72)	(0.020)	(2.48)	(-2.421)	(3.389)	(0.36)

Categories of Cases1-3 are the same as in Table 5.9. The sample sizes among three cases are not consistent due to omitting the outliers.

and Guo, 1993; Khamis and Roche, 1994; Roche et al., 1975a,b; Wainer et al., 1978; Ali and Ohtusuki, 2001). Average prediction failure, i.e., residual>4.0 cm, was reported by Khamis and Guo (1993) as about 10% for boys and 8% for girls. In the present prediction, for boys, 8% failure occurred (for case 3), but, for girls, failures of only 6% for case 1, 2% for case 2, 4% for case 3 occurred. The previous investigation shows 12% prediction failure for Case 3 of Japanese boys and 7% for Case 1, 2% for Case 2, and 6% for Case 3 of Japanese girls (Ali and Ohtsuki, 2001). They argued that these were due to the involvement of the triphasic BTT model to the whole data set. Standard errors of the predicting adult stature (Table 5.12) are smaller than those of some others (Onat, 1975, 1983; Ali and Ohtusuki, 2001). Comparing with 90% confidence bounds for residuals, the *girls* (Table 5.12) shows better prediction than those of some others (Ali and Ohtsuki, 2001; Khamis and Roche, 1994; Roche et al., 1975a; Wainer et al., 1978).

The proposed equations to predict adult stature based on stature-variables for the Japanese are as follows:

$$\textit{For Boys (whole sample individuals)}$$
$$PAS = 1.046828S_9 + 0.397943S_3$$

$$\textit{For Boys (who have the mid – growth spurt)}$$
$$PAS = 0.881007S_{10} + 0.543971S_4$$

$$\textit{For Boys (who do not have a mid – growth spurt)}$$
$$PAS = 1.009736S_9 + 0.412471S_4$$

$$For\ Girls\ (whole\ sample\ individuals)$$
$$PAS = 2.87668S_{13} - 1.89627S_{12}$$

$$For\ Girls\ (who\ have\ the\ mid-growth\ spurt)$$
$$PAS = 2.54599S_{13} - 1.55950S_{4}$$
and
$$For\ Girls\ (who\ do\ not\ have\ a\ mid-growth\ spurt)$$
$$PAS = 2.63537S_{13} - 1.65255S_{12}$$

5.8 Model Validation

The proposed predicted equations in sections 5.6 and 5.7 to predict the adult stature of Japanese boys and girls are cross validated by the cross validity predictive power as described in section 4.7.

Estimated cross validity predictive power, ρ_{cv}^2, of the predicted equations based on growth-parameter variables (in section 5.6) and stature variables (in section 5.7) for different cases of Japanese boys and girls are shown in Table 5.13. This table indicates that for any independent sample of the Japanese population more than 99% of the variance on the predicted variable, PAS, would be explained by the proposed equations. In other words, the expected amounts of shrinkage of R^2 are very small for all cases of boys and girls, implying a highly cross validated. It should be noted that the predictor variables for both sections 5.6 and 5.7 are affected with *near multicollinearity* problem but it did not affect much the stepwise regression results as the R^2 values of all three cases of boys and girls are very high in step 1 (see Appendix-2 and 3).

Table 5.13 Estimated cross validity predictive power, ρ^2_{cv}, of the predicted equations based on growth-parameter variables and stature variables for different cases of Japanese boys and girls. Values in the parenthesis are of Ali and Ohtsuki (2001).

	Equation Based on Growth-parameter Variables				Equation Based on Stature Variables			
	n	k	R^2	ρ^2_{cv}	n	k	R^2	ρ^2_{cv}
Boys								
Case 1	481(415)	2(2)	0.99997(0.99976)	0.99997(0.99976)	464(410)	2(3)	0.99922(0.99910)	0.99921(0.99908)
Case 2	213(213)	2(2)	0.99997(0.99998)	0.99997(0.99998)	215(213)	2(3)	0.99935(0.99920)	0.99933(0.99917)
Case 3	268(197)	2(2)	0.99997(0.99964)	0.99997(0.99963)	249(191)	2(3)	0.99914(0.99883)	0.99912(0.99879)
Girls								
Case 1	259(234)	2(2)	0.99990(0.99967)	0.99990(0.99966)	259(262)	2(3)	0.99967(0.99969)	0.99966(0.99968)
Case 2	86(96)	2(2)	0.99988(0.99985)	0.99987(0.99984)	70(96)	2(3)	0.99989(0.99992)	0.99988(0.99991)
Case 3	174(136)	2(2)	0.99990(0.99959)	0.99990(0.99957)	157(134)	2(3)	0.99989(0.99976)	0.99989(0.99975)

Categories of Cases 1, 2 and 3 are the same as in Table 5.9.

CHAPTER-6

CONCLUSION

CHAPTER 6

CONCLUSION

6.1 Overall Findings

The longitudinal growth of individual's stature of the present study was characterized from early childhood to adulthood. The samples used here were 509 males and 311 females. A triphasic generalized logistic model (BTT model) and diphasic growth model (JPA-2 model) applied respectively on the above two sets of data through the software AUXAL for characterizing individual growth of stature. The default values of the population mean and covariance matrix in AUXAL for both the models were substituted by estimated population mean and covariance matrix based on Japanese population. The individuals without mid growth spurt for both sexes show that predicted adult stature (PAS) was significantly positive correlated with stature at onset of adolescent and adolescent growth phases, and for only girls VTO and PHV was positively correlated. The individuals with mid growth spurt for both sexes show that PAS was significantly positively correlated with statures at early childhood minimum, mid-childhood maximum, onset of adolescent and adolescent growth phases. Also positive significant correlations were found between VECM and VMC, VTO and PHV but in case of PHV and VMC, negative significant correlation was found. On the basis of JPA-2 model the mean adult stature were 171.27cm for Japanese boys and 158.51 for Japanese girls. On the basis of BTT model this study demonstrates that, on average, 46.1%, 39.5%, and 14.4% of the total adult stature were completed during early, middle and adolescent phase of growth, respectively, for the Japanese male population. For the female population, these percentages were

42.6%, 44.6%, and 12.8%, respectively. The distributions of predicted stature that do not have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 1 to 5 and 10 to 12, and then again become shorter than boys. The distributions of predicted stature that have the mid growth spurt, on average, shows that the Japanese girls become taller than boys from age 8 and 11 to 12, and then again become shorter than boys. Japanese boys who do not have the mid growth spurt are, on average, 13.26 cm taller than their opposite sex. Moreover, Japanese boys who have the mid growth spurt are, on average, 13.77 cm taller than their opposite sex.

After removing the problem of outliers and influential data points, several equations are proposed to predict the adult stature of the Japanese. The proposed equations are as follows:

$$\begin{aligned}&\textit{For Boys (whole sample)}\\ &PAS = 1.522934(SPHV) - 0.482002(STO)\end{aligned}$$

$$\begin{aligned}&\textit{For Boys (with mid-growth spurt)}\\ &PAS = 1.541007(SPHV) - 0.499682(STO)\end{aligned}$$

$$\begin{aligned}&\textit{For Boys (without mid-growth spurt)}\\ &PAS = 1.531324(SPHV) - 0.503437(STO)\end{aligned}$$

$$\begin{aligned}&\textit{For Girls (whole sample)}\\ &PAS = 1.461355(SPHV) - 0.397874(STO)\end{aligned}$$

$$\begin{aligned}&\textit{For Girls (with mid-growth spurt)}\\ &PAS = 1.491174(SPHV) - 0.433769(STO)\\ &\textit{and}\\ &\textit{For Girls (without mid-growth spurt)}\\ &PAS = 1.428912(SPHV) - 0.359096(STO)\end{aligned}$$

$$For\ Boys\ (whole\ sample\ individuals)$$
$$PAS = 1.046828S_9 + 0.397943S_3$$

$$For\ Boys\ (who\ have\ the\ mid-growth\ spurt)$$
$$PAS = 0.881007S_{10} + 0.543971S_4$$

$$For\ Boys\ (who\ do\ not\ have\ a\ mid-growth\ spurt)$$
$$PAS = 1.009736S_9 + 0.412471S_4$$

$$For\ Girls\ (whole\ sample\ individuals)$$
$$PAS = 2.87668S_{13} - 1.89627S_{12}$$

$$For\ Girls\ (who\ have\ the\ mid-growth\ spurt)$$
$$PAS = 2.54599S_{13} - 1.55950S_4$$
and
$$For\ Girls\ (who\ do\ not\ have\ a\ mid-growth\ spurt)$$
$$PAS = 2.63537S_{13} - 1.65255S_{12}$$

6.2 Possible Extension for Further Research

It is an open problem to find out the asymptotic distribution of the growth parameters and also the parameters of the BTT and JPA-2 models. This type of data have not been collected and preserved in our country. After collecting this type of data our country may also predict the adult stature of our children. The present predicted equations are not applicable except Japan as they are predicted only based on Japanese population.

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APPENDICES

Appendix-1

Stepwise Regression

In building a model to describe a explained (dependent) variable Y (say), we must choose the important explanatory (independent) variables to be included in the model. The list of potentially important independent variables, with their associated main effect and interaction terms, may be extremely large. Therefore, we need some objective method of screening out those that are not important. The screening procedure that is presented here is known as a stepwise regression analysis.

Stepwise regression removes and adds variables, for the purpose of identifying a useful subset of the predictors. Three commonly used procedures standard stepwise regression (adds and removes variables), forward selection (adds variables), and backwards elimination (removes variables) are as follows:

1. Stepwise: In step one, an F-statistic for each predictor already in the model is calculated. If the F-statistic for any predictor is less than the value specified in the "F to remove", removes the predictor with the lowest F-statistic and prints output from the resulting model. In step two, calculates an F-statistic for each predictor not in the current model. If any value is greater than the value specified in the *F to enter* for any predictor, enters the predictor with the highest F-statistic and find out the

output from the resulting model. These steps are repeated until no variables meet the criteria for addition or removal.

2. Forward selection: Adds predictors to the model as in Stepwise, but once added, a variable is never removed. The forward selection procedure ends when no additional variables have an F-value greater than *F to enter*
3. Backward elimination: Begins with a model containing all possible predictors and removes them one at a time without re-entering any. Ends when no variable in the model has an F-value less than *F to remove*.

F to enter: The *F to enter* value determines how significant the contribution of a variable to the regression has to be in order for it to be added to the equation. If any variables have an F-statistic greater than this value, the one with the largest F is entered into the model. If it is desirable in Forward Stepwise regression to force all (or almost all) variables into the equation (one at a time), then the F to enter value should be set to its minimum (0.0001), and the F to remove value should be set to its minimum (0.0; the F to remove must always be less than the F to enter).

F to remove: The *F to remove* value determines how "insignificant" the contribution of a variable in the regression equation has to be in order for it to be removed from the regression equation. If any variables have an F-statistic less than this value, the one with the smallest F is removed from the model. If it is desired in Backward Stepwise regression, to remove all variables from the equation (one at a time), then the *F to enter* value should be set to a very large value (e.g., 999) and the *F to remove* value should be set to a value of similar magnitude (e.g., 998; the *F to remove* value must always be less than the *F to enter* value).

Method Used to Calculate the F-statistic

The basic method of stepwise regression is to calculate an F-statistic for each variable in the model. Suppose the model contains X1,..., Xj. Then the F-statistic for Xi is

$$\frac{SSE[X1,...,X(i-1),...,Xp]-SSE[X1,...,Xp]}{MSE[X1,...,Xp]}$$

with 1 and n - j - 1 degrees of freedom. If the F-statistic for any variable is less than F to remove, the variable with the smallest F is removed from the model. The regression equation is calculated for this smaller model, the results are printed, and the procedure proceeds to a new step.

If no variable can be removed, the procedure attempts to add a variable. An F-statistic is calculated for each variable not yet in the model. Suppose the model, at this stage, contains X1,..., Xp. Then the F-statistic for a new variable, Xj + 1 is

$$\frac{SSE[X1,...,Xp]-SSE[X1,...,Xp,X(p+1)]}{MSE[X1,...,Xp]}$$

The variable with the largest F-statistic is then added, provided its F-statistic is larger than F to enter. Adding this variable is equivalent to choosing the variable with the largest partial correlation or to choosing the variable that most effectively reduces the error SS. The regression equation is then calculated, results are displayed, and the procedure goes to a new step. If no variable can enter, the stepwise procedure ends.

Tolerance: The tolerance of a variable is defined as 1 minus the squared multiple correlation of this variable with all other independent variables in the regression equation. Therefore, the smaller the tolerance of a variable, the more redundant is its contribution to the regression (i.e., it is redundant with the contribution of other independent variables). If the tolerance of any of the variables in the regression equation is equal to zero (or very close to zero) then the regression equation cannot be evaluated (the matrix is said to be ill-conditioned, and it cannot be inverted).

If the tolerance of a variable about to be entered into the regression equation is less than the default tolerance value (.01) it means that this variable is 99 percent redundant with (identical to) the variables already in the equation. Forcing very redundant variables into the regression equation is not only questionable in terms of relevance of results, but the resultant estimates (regression coefficients) will become increasingly unreliable.

Outliers and Influential Data Points

Since multiple regression is a mathematical maximization procedure, it can be very sensitive to data points within "split off" or are different from the rest of the points, that is, to outliers. Just 1 or 2 such points can affect the interpretation of the results, and it is certainly moot as to whether 1 or 2 points should be permitted to have such a profound influence. Therefore, it is important to be able to detect outliers and influential points. There is a distinction between the two because a point that is an outlier (either on y or for the predictors) will not necessarily be influential in affecting the regression equation.

Why it appear in the data

Outliers and influential data points can occur because of recording errors. Consequently, researchers should give more consideration to the data editing phase of the data analysis process (i.e., always listing the data and examined the list of possible errors). Also, outliers and influential points may occur due to different behavior of the data sets, though they are measured correctly, having a extreme heterogeneity from the population characteristics. For example, in height growth data, it is sometime found that some individuals are very short (or tall) from the normally growth individuals, and sometime they are out of pattern of the normal growth. This kind of individual, if it is influential, will seriously mislead the interpretation of the regression equation. Researchers also have to use sometime the predicted results (which have some prediction error themselves) for further analysis.

There are various statistics for identifying outliers on y and on the set of predictors, as well as for identifying influential data points. Some of them are considered in this study.

Detection of Outliers

Mahalanobis distance: One can think of the independent variables (in the equation) as defining a multidimensional space in which each observation can be plotted. Also, one can plot a point representing the means for all independent variables. This "mean point" in the multidimensional space is also called the centroid. The Mahalanobis distance is the distance of a case from the centroid in the multidimensional space, defined by the correlated independent variables (if the independent variables are uncorrelated, it is the same as the simple Euclidean distance). Thus, this measure provides an indication of whether or not an observation is an outlier with respect to the independent variable values.

Suppose a data set has p predictors and g groups. Consider the following notation:

x is a column vector of length p containing the values of the predictors for this observation (note, this column vector is stored as one row).

m_i is a column vector of length p containing the means of the predictors calculated from the data in group i.

S_i is the covariance matrix calculated from the data in group i.

$|S_i|$ the determinant of Si.

S_p is the pooled covariance matrix.

p_i is the prior probability that an observation is in group i.

The Mahalanobis distance (also called the squared distance) of observation x to the center (mean) of group i is given by the general form

$$d_i^2(x) = (x - m_i)' S_p^{-1} (x - m_i)$$

An observation x is classified into group i, if the squared distance of x to group i is the smallest. This expands to

$$d_i^2(x) = -2\left[m_i' S_p^{-1} x - 0.5 m_i' S_p^{-1} m_i\right] + x' S_p^{-1} x$$

The term in square brackets is a linear function of x, and is called the linear discriminant function for group i. For a given x, the group with the smallest squared distance has the largest linear discriminant function. So this gives us another way to classify an observation. If we consider Mahalanobis distance a reasonable way to measure the distance of an observation to a group, then you do not need to make any assumptions about the underlying distribution of your data.

Deleted residual: The deleted residual is the residual value for the respective case, had it not been included in the regression analysis, that is, if one would exclude this case from all computations. If the deleted residual differs greatly from the respective standardized residual value, then this case is possibly an outlier because its exclusion changed the regression equation.

Detection of influential data points

An influential data point is one that when deleted produces a substantial change in at least one of the regression coefficients. That is, the prediction equations with or without the influential points are quite different. Cook's distance (Cook, 1977) is very useful for identifying influential points. It measures the combined influence of the case being an outlier on y and on the set of predictors.

Cook's distance: This is another measure of the impact of the respective case on the regression equation. It indicates the difference between the computed B values and the values one would have obtained, had the respective case been excluded. All distances should be of about equal magnitude; if not, then there is reason to believe that the respective case(s) biased the estimation of the regression coefficients. Cook's distance combines leverage (also called hat element, for more details, see Hoaglin and Welsch,

1978) and standardized residual into one overall measure of how unusual an observation is. Leverage tells us if an observation has unusual predictors, and standardized residual tells us if an observation has an unusual response. Cook's distance for the ith observation is

$$\left(\frac{1}{p}\right)\left(\frac{h_i}{1-h_i}\right)(s\tan derdized\, residual_i)^2$$

There is another interpretation for Cook's distance. A (1 - α) 100% confidence ellipsoid for estimating the coefficient vector is the set of all p x 1 vectors, B, for which

$$\frac{[B-b]' X'X[B-b]}{pMSE} < F(\alpha, p, n-p)$$

where F (α, p, n - p) is from a table of the F-distribution. The formula for Cook's distance can be written as

$$\frac{[b_{(i)}-b]' X'X[b_{(i)}-b]}{pMSE} < F(\alpha, p, n-p)$$

where $b_{(i)}$ is coefficient vector calculated using the data set with the ith observation omitted. Thus Cook's distance can be viewed as the distance between the coefficients calculated with and without the ith observation. This interpretation suggests using the F-distribution to decide when to consider Cook's distance large. Cook and Weisberg (1982) have indicated that a Cook distance > 1 would generally be considered large, implying an influential point.

Critical values for an Outlier on the Predictors as Judged by Mahalanobis D^2 (Stevens, 1996, p. 115)

	Number of Predictors							
	k=2		*k*=3		*k*=4		*k*=5	
n	5%	1%	5%	1%	5%	1%	5%	1%
5	3.17	3.19						
6	4.00	4.11	4.14	4.16				
7	4.71	4.95	5.01	5.10	5.12	5.14		
8	5.32	5.70	5.77	5.97	6.01	6.09	6.11	6.12
9	5.85	6.37	6.43	6.76	6.80	6.97	7.01	7.08
10	6.32	6.97	7.01	7.47	7.50	7.79	7.82	7.98
12	7.10	8.00	7.99	8.70	8.67	9.20	9.19	9.57
14	7.74	8.84	8.78	9.71	9.61	10.37	10.29	10.90
16	8.27	9.54	9.44	10.56	10.39	11.36	11.20	12.02
18	8.73	10.15	10.00	11.28	11.06	12.20	11.96	12.98
20	9.13	10.67	10.49	11.91	11.63	12.93	12.62	13.81
25	9.94	11.73	11.48	13.18	12.78	14.40	13.94	15.47
30	10.58	12.54	12.24	14.14	13.67	15.51	14.95	16.73
35	11.10	13.20	12.85	14.92	14.37	16.40	15.75	17.73
40	11.53	13.74	13.36	15.56	14.96	17.13	16.41	18.55
45	11.90	14.20	13.80	16.10	15.46	17.74	16.97	19.24
50	12.23	14.60	14.18	16.56	15.89	18.27	17.45	19.83
100	14.22	16.95	16.45	19.26	18.43	21.30	20.26	23.17
200	15.99	18.94	18.42	21.47	20.59	23.72	22.59	25.82
500	18.12	21.22	20.75	23.95	23.06	26.37	25.21	28.62

Appendix-2

Forward stepwise regression results (using STATISTICA software) for Case 1, Case 2 and Case 3 (as described in Table 5.9) of Japanese boys and girls are available to the author. Results for some of them are shown below.

For boys

Case 1

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(480)	p-level
ATO	.994619	.994619	.994619	1.000000	1.000000	210.345	0.00
STO	.999147	.999147	.999147	1.000000	1.000000	530.239	0.00
VTO	.990955	.990955	.990955	1.000000	1.000000	161.783	0.00
APHV	.996916	.996916	.996916	1.000000	1.000000	278.327	0.00
SPHV	.999920	.999920	.999920	1.000000	1.000000	1732.546	0.00
PHV	.988498	.988498	.988498	1.000000	1.000000	143.201	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99992006 R2= .99984012 Adjusted R2= .99983978
F(1,480)=3002E3 p<0.0000 Std.Error of estimate: 2.1733

N=481	BETA	St. Err. of BETA	B	St. Err. of B	t(480)	p-level
SPHV	.999920	.000577	1.104466	.000637	1732.546	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.927088 R2=.859493 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	13867.74	1	13867.74	2936.201	0.00
Residual	2267.05	480	4.72		
Total	16134.79				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(479)	p-level
ATO	-.066750	-.510017	-.006449	.009334	.009334	-12.9769	.000000
STO	-.379023	-.888633	-.011236	.000879	.000879	-42.4070	0.000000
VTO	.031043	.338598	.004281	.019022	.019022	7.8758	.000000
APHV	-.021968	-.131715	-.001665	.005747	.005747	-2.9081	.003806
PHV	.060305	.765885	.009684	.025788	.025788	26.0697	0.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(480)	p-level
SPHV	.999920	.999920	.999920	1.000000	0.00	1732.546	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999920	.999840	.999840	3001717.	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99998319 R2= .99996637 Adjusted R2= .99996623
F(2,479)=7122E3 p<0.0000 Std.Error of estimate: .99773

N=481	BETA	St. Err. of BETA	B	St. Err. of B	t(479)	p-level
SPHV	1.378777	.008938	1.522934	.009872	154.2644	0.00
STO	-.379023	.008938	-.482002	.011366	-42.4070	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.985113 R2=.970447 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	15657.96	2	7828.978	7864.570	0.00
Residual	476.83	479	.995		
Total	16134.79				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(478)	p-level
ATO	-.007690	-.108946	-.000632	.006750	.000636	-2.39617	.016951
VTO	.021191	.500051	.002900	.018725	.000788	12.62445	.000000
APHV	-.019297	-.252232	-.001463	.005746	.000772	-5.69885	.000000
PHV	.018530	.343224	.001990	.011537	.000302	7.98931	.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(479)	p-level
SPHV	1.378777	.990085	.040874	.000879	.999121	154.2644	0.00
STO	-.379023	-.888633	-.011236	.000879	.999121	-42.4070	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999920	.999840	.999840	3001717.	0.00	1
STO	2	.999983	.999966	.000126	1798.	0.00	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS case 1 to 508

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	172.0600	171.9123	.14771	.05469	.14804	.050673	1.24069	.14809	.000028
2	170.0800	169.5091	.57091	-.35627	.57220	.051575	1.28526	.57244	.000440
3	172.6900	172.4576	.23242	.14794	.23295	.046617	1.05002	.23293	.000059
4	175.6000	175.9729	-.37285	.74908	-.37370	.048494	1.13630	-.37373	.000166
5	161.5100	161.7113	-.20135	-1.68974	-.20181	.059638	1.71853	-.20208	.000073
6	174.7700	174.6235	.14647	.51834	.14680	.046667	1.05227	.14679	.000024
7	161.5100	161.7113	-.20135	-1.68974	-.20181	.059638	1.71853	-.20208	.000073
8	170.0800	169.5340	.54604	-.35202	.54728	.051421	1.27761	.54749	.000400
9	172.6900	172.4576	.23242	.14794	.23295	.046617	1.05002	.23293	.000059
10	173.4100	170.5252	2.88480	-.18251	2.89135	.063874	1.97138	2.89667	.017273
11	174.8000	174.6212	.17877	.51794	.17918	.046577	1.04823	.17916	.000035
12	175.6000	175.9729	-.37285	.74908	-.37370	.048494	1.13630	-.37373	.000166
14	181.1470	182.5877	-1.44072	1.88027	-1.44399	.076058	2.79515	-1.44914	.006129
15	176.0500	176.0617	-.01166	.76426	-.01168	.046857	1.06088	-.01168	.000000
16	160.7400	164.0504	-3.31044	-1.28974	-3.31796	.043934	.93265	-3.31687	.010714
17	170.1200	169.1820	.93797	-.41220	.94010	.083824	3.39506	.94464	.003164
18	174.3100	174.7001	-.39011	.53143	-.39099	.046354	1.03824	-.39095	.000166
19	163.2500	163.2390	.01100	-1.42850	.01103	.047672	1.09812	.01103	.000000
21	169.5000	168.2213	1.27869	-.57649	1.28159	.046430	1.04165	1.28146	.001786
22	162.1300	162.1151	.01488	-1.62069	.01491	.043039	.89503	.01491	.000000
23	170.5400	170.6646	-.12456	-.15868	-.12484	.053432	1.37947	-.12492	.000022
24	164.3400	163.6817	.65829	-1.35280	.65979	.048473	1.13531	.65985	.000516
25	177.7500	177.4163	.33372	.99591	.33448	.050189	1.21711	.33457	.000142
26	177.2400	176.3919	.84810	.82074	.85002	.050096	1.21260	.85024	.000915
27	170.0600	169.5837	.47632	-.34352	.47740	.051224	1.26783	.47758	.000302
28	170.6400	169.3264	1.31363	-.38752	1.31661	.087825	3.72695	1.32389	.006821
29	161.6500	162.7004	-1.05040	-1.52061	-1.05278	.064408	2.00444	-1.05480	.002329
30	167.9100	168.1954	-.28545	-.58091	-.28609	.045638	1.00639	-.28604	.000086
31	166.1600	165.7911	.36894	-.99208	.36978	.046797	1.05814	.36976	.000151
32	175.0000	174.8463	.15370	.55643	.15405	.049520	1.18490	.15408	.000029
33	169.1900	169.5133	-.32330	-.35555	-.32404	.053980	1.40791	-.32425	.000155
34	172.8700	170.8234	2.04660	-.13152	2.05125	.066940	2.16511	2.05585	.009556
35	169.1500	169.5752	-.42525	-.34496	-.42621	.049901	1.20318	-.42631	.000228
37	173.1900	172.3545	.83549	.13032	.83739	.045685	1.00847	.83725	.000738
38	173.3600	173.4488	-.08878	.31744	-.08898	.047345	1.08308	-.08898	.000009
39	171.3000	171.7222	-.42216	.02218	-.42312	.046796	1.05812	-.42310	.000198
40	170.5700	170.8182	-.24820	-.13240	-.24876	.050139	1.21467	-.24883	.000079
42	166.1900	165.6675	.52246	-1.01320	.52365	.045375	.99482	.52354	.000285
43	164.2900	164.6088	-.31879	-1.19426	-.31951	.065178	2.05269	-.32015	.000220
44	175.0100	175.2440	-.23402	.62444	-.23456	.060208	1.75156	-.23488	.000101
45	166.1200	166.0629	.05711	-.94560	.05724	.046063	1.02522	.05724	.000004
46	166.6300	166.9732	-.34317	-.78993	-.34395	.056016	1.51613	-.34426	.000188
47	170.1800	169.9016	.27844	-.28916	.27907	.045021	.97936	.27901	.000080
48	164.6100	164.3548	.25517	-1.23769	.25575	.047318	1.08184	.25575	.000074
50	167.2000	165.8821	1.31790	-.97651	1.32089	.057224	1.58223	1.32225	.002889
51	177.1200	176.4991	.62090	.83907	.62231	.048243	1.12457	.62235	.000455
52	166.0400	164.9308	1.10916	-1.13919	1.11168	.043947	.93318	1.11132	.001203
53	178.7200	178.0600	.65996	1.10600	.66146	.053129	1.36388	.66183	.000624

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
54	169.3900	168.3910	.99904	-.54748	1.00131	.060777	1.78483	1.00276	.001874
55	165.4300	164.9609	.46912	-1.13405	.47018	.044361	.95085	.47005	.000219
56	168.4800	167.4621	1.01787	-.70632	1.02018	.044753	.96772	1.01992	.001051
57	171.4300	172.0353	-.60529	.07572	-.60666	.054350	1.42728	-.60709	.000549
58	171.1000	170.8583	.24170	-.12555	.24225	.049967	1.20637	.24231	.000074
59	161.8100	161.1260	.68396	-1.78983	.68551	.050527	1.23355	.68572	.000606
60	176.0000	174.9278	1.07219	.57037	1.07462	.055360	1.48085	1.07550	.001789
61	172.0400	171.1219	.91814	-.08048	.92022	.047577	1.09371	.92023	.000967
62	179.1300	178.1016	1.02843	1.11310	1.03076	.048535	1.13822	1.03087	.001263
63	179.4200	178.2642	1.15579	1.14092	1.15842	.072322	2.52732	1.16190	.003563
64	174.9200	174.3819	.53809	.47702	.53931	.046897	1.06269	.53928	.000323
65	170.0200	168.8392	1.18079	-.47082	1.18347	.069057	2.30423	1.18647	.003387
66	170.5200	170.7338	-.21384	-.14683	-.21432	.046633	1.05077	-.21430	.000050
67	178.7200	178.5185	.20149	1.18440	.20195	.048138	1.11965	.20196	.000048
68	173.9800	174.1481	-.16812	.43703	-.16850	.061545	1.83021	-.16876	.000054
69	175.1300	173.6202	1.50983	.34675	1.51325	.096607	4.50951	1.52412	.010939
70	176.4200	175.4076	1.01242	.65241	1.01472	.046477	1.04376	1.01462	.001122
71	167.8800	168.1187	-.23874	-.59403	-.23928	.046499	1.04473	-.23926	.000062
72	168.2400	168.3385	-.09853	-.55645	-.09875	.045883	1.01724	-.09873	.000010
73	165.9800	166.8118	-.83182	-.81752	-.83371	.076031	2.79315	-.83668	.002042
74	167.1700	166.3663	.80368	-.89371	.80551	.060155	1.74849	.80661	.001188
75	168.7900	168.5683	.22171	-.51716	.22221	.046561	1.04753	.22219	.000054
76	175.3400	175.2473	.09273	.62500	.09294	.047775	1.10287	.09294	.000010
77	172.0800	172.8760	-.79596	.21949	-.79777	.052253	1.31926	-.79815	.000878
78	176.1300	175.8128	.31723	.72170	.31795	.052829	1.34852	.31812	.000143
79	170.6300	170.0257	.60426	-.26792	.60564	.045463	.99870	.60552	.000382
80	177.1200	177.6234	-.50343	1.03134	-.50458	.047081	1.07103	-.50456	.000285
81	174.9300	175.4488	-.51881	.65946	-.51999	.046604	1.04945	-.51995	.000296
82	163.6500	163.5557	.09427	-1.37434	.09448	.043977	.93449	.09445	.000009
83	181.5100	180.9203	.58971	1.59512	.59105	.052346	1.32400	.59133	.000483
84	177.0300	178.2365	-1.20647	1.13617	-1.20921	.066959	2.16635	-1.21193	.003323
85	175.9500	175.3430	.60704	.64136	.60842	.050688	1.24144	.60861	.000480
86	169.3000	169.1349	.16510	-.42026	.16547	.044866	.97264	.16543	.000028
87	168.6500	168.5799	.07011	-.51517	.07027	.045461	.99860	.07026	.000005
88	178.2800	177.0101	1.26988	.92646	1.27277	.063660	1.95817	1.27507	.003324
89	167.7000	167.2839	.41606	-.73679	.41701	.049115	1.16558	.41707	.000212
91	180.9000	180.7016	.19843	1.55772	.19888	.052980	1.35624	.19899	.000056
92	178.8300	178.6229	.20712	1.20225	.20759	.057190	1.58037	.20781	.000071
93	179.0900	178.1774	.91258	1.12607	.91465	.051970	1.30504	.91507	.001141
95	192.4300	192.1721	.25793	3.51926	.25852	.052536	1.33361	.25865	.000093
97	168.6100	168.6739	-.06387	-.49910	-.06402	.045095	.98258	-.06400	.000004
98	171.1900	168.0700	3.12004	-.60237	3.12713	.057456	1.59509	3.13042	.016323
99	175.7900	175.2972	.49281	.63353	.49393	.049649	1.19106	.49404	.000304
100	172.0800	171.2357	.84431	-.06101	.84623	.050948	1.25421	.84652	.000939
101	167.0400	166.8735	.16652	-.80698	.16690	.045748	1.01123	.16687	.000029
102	172.2700	171.6494	.62065	.00973	.62206	.045686	1.00851	.62196	.000407
103	175.4900	174.5204	.96962	.50070	.97182	.082938	3.32373	.97637	.003309
104	166.0700	166.1323	-.06226	-.93373	-.06240	.046802	1.05840	-.06239	.000004
105	174.1200	174.3199	-.19995	.46642	-.20041	.055742	1.50133	-.20058	.000063
106	168.3800	168.3873	-.00728	-.54811	-.00729	.046058	1.02501	-.00729	.000000
107	170.5400	170.3096	.23042	-.21938	.23095	.046192	1.03095	.23092	.000057
108	183.2800	183.0354	.24461	1.95682	.24517	.055577	1.49244	.24537	.000094
109	174.8600	175.7436	-.88356	.70987	-.88557	.054126	1.41554	-.88617	.001161
110	170.5900	170.8608	-.27081	-.12512	-.27143	.049618	1.18956	-.27148	.000092
111	170.8700	171.6923	-.82234	.01708	-.82421	.055001	1.46171	-.82485	.001038
112	178.8900	178.8441	.04587	1.24009	.04597	.048894	1.15510	.04598	.000003
113	161.6200	161.2276	.39241	-1.77247	.39330	.051885	1.30079	.39347	.000210
114	162.8700	160.3419	2.52814	-1.92393	2.53388	.111367	5.99277	2.56003	.041012
115	173.3600	171.4792	1.88084	-.01938	1.88511	.045455	.99834	1.88476	.003703
116	163.4500	162.7587	.69133	-1.51064	.69290	.101896	5.01680	.69862	.002557
117	186.0600	186.0000	.06001	2.46379	.06015	.049805	1.19857	.06016	.000005

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
118	170.7500	170.4930	.25700	-.18802	.25759	.045246	.98919	.25753	.000069
119	166.8300	167.1292	-.29915	-.76326	-.29983	.053286	1.37196	-.30000	.000129
120	174.0600	170.5862	3.47380	-.17208	3.48169	.077313	2.88818	3.49479	.036835
123	165.2900	164.7581	.53192	-1.16873	.53313	.046330	1.03714	.53307	.000308
124	181.0200	180.1366	.88336	1.46111	.88537	.103312	5.15723	.89294	.004294
125	170.4500	171.9738	-1.52379	.06521	-1.52725	.117352	6.65419	-1.54516	.016590
126	174.5300	173.7251	.80489	.36470	.80671	.046045	1.02444	.80660	.000696
127	167.3700	167.1267	.24332	-.76368	.24387	.044286	.94766	.24380	.000059
128	180.0800	179.1524	.92757	1.29281	.92967	.068327	2.25577	.93194	.002046
129	167.3700	167.1267	.24332	-.76368	.24387	.044286	.94766	.24380	.000059
130	173.5400	172.3800	1.15996	.13468	1.16259	.057416	1.59290	1.16381	.002253
132	174.0600	170.5862	3.47380	-.17208	3.48169	.077313	2.88818	3.49479	.036835
133	174.5700	173.9471	.62288	.40266	.62429	.050629	1.23857	.62449	.000504
134	184.1500	184.4496	-.29965	2.19867	-.30033	.076862	2.85456	-.30144	.000271
135	165.8800	165.1672	.71278	-1.09876	.71440	.043835	.92846	.71416	.000494
138	167.8800	163.9631	3.91692	-1.30468	3.92581	.057465	1.59559	3.92995	.025733
140	176.8000	176.6341	.16594	.86215	.16632	.049156	1.16751	.16634	.000034
141	162.3700	162.7626	-.39264	-1.50996	-.39353	.049863	1.20134	-.39362	.000194
142	177.1100	173.5086	3.60141	.32767	3.60959	.072707	2.55425	3.62064	.034964
143	165.1300	164.6269	.50311	-1.19116	.50426	.052430	1.32826	.50451	.000353
144	167.3800	167.1251	.25487	-.76394	.25545	.044294	.94800	.25537	.000065
145	160.8900	160.9599	-.06989	-1.81825	-.07004	.065387	2.06585	-.07019	.000011
146	179.4400	178.3836	1.05643	1.16133	1.05883	.064045	1.98189	1.06080	.002329
147	167.3700	167.1267	.24332	-.76368	.24387	.044286	.94766	.24380	.000059
148	167.4700	166.0717	1.39835	-.94410	1.40152	.044036	.93700	1.40108	.001921
149	167.3700	167.1267	.24332	-.76368	.24387	.044286	.94766	.24380	.000059
150	175.2400	174.0228	1.21724	.41560	1.22000	.046412	1.04084	1.21988	.001617
153	174.2300	173.5827	.64731	.34034	.64878	.073569	2.61518	.65085	.001157
154	174.2900	173.1575	1.13246	.26764	1.13503	.084178	3.42383	1.14058	.004651
155	168.5200	169.4300	-.91002	-.36979	-.91209	.053895	1.40348	-.91268	.001221
156	170.7500	170.4930	.25700	-.18802	.25759	.045246	.98919	.25753	.000069
157	163.4600	162.8329	.62715	-1.49795	.62858	.103862	5.21234	.63402	.002188
158	186.0600	186.0000	.06001	2.46379	.06015	.049805	1.19857	.06016	.000005
159	173.3600	171.4792	1.88084	-.01938	1.88511	.045455	.99834	1.88476	.003703
160	162.8700	160.3419	2.52814	-1.92393	2.53388	.111367	5.99277	2.56003	.041012
161	161.6200	161.2276	.39241	-1.77247	.39330	.051885	1.30079	.39347	.000210
162	178.8800	178.8546	.02545	1.24187	.02551	.048900	1.15540	.02551	.000001
163	170.8700	171.6923	-.82234	.01708	-.82421	.055001	1.46171	-.82485	.001038
164	170.5900	170.8608	-.27081	-.12512	-.27143	.049618	1.18956	-.27148	.000092
165	174.8600	175.7436	-.88356	.70987	-.88557	.054126	1.41554	-.88617	.001161
166	183.2800	183.0354	.24461	1.95682	.24517	.055577	1.49244	.24537	.000094
167	170.5400	170.3096	.23042	-.21938	.23095	.046192	1.03095	.23092	.000057
168	168.3800	168.3873	-.00728	-.54811	-.00729	.046058	1.02501	-.00729	.000000
169	174.1200	174.3199	-.19995	.46642	-.20041	.055742	1.50133	-.20058	.000063
170	166.0700	166.1323	-.06226	-.93373	-.06240	.046802	1.05840	-.06239	.000004
171	175.7900	175.2972	.49281	.63353	.49393	.049649	1.19106	.49404	.000304
172	172.0800	171.2357	.84431	-.06101	.84623	.050948	1.25421	.84652	.000939
173	167.0400	166.8735	.16652	-.80698	.16690	.045748	1.01123	.16687	.000029
174	172.2700	171.6494	.62065	.00973	.62206	.045686	1.00851	.62196	.000407
175	175.4900	174.5204	.96962	.50070	.97182	.082938	3.32373	.97637	.003309
176	173.7400	174.3440	-.60397	.47053	-.60534	.047900	1.10864	-.60537	.000424
177	166.8300	167.1292	-.29915	-.76326	-.29983	.053286	1.37196	-.30000	.000129
178	172.0400	171.1219	.91814	-.08048	.92022	.047577	1.09371	.92023	.000967
180	164.6100	164.3548	.25517	-1.23769	.25575	.047318	1.08184	.25575	.000074
182	167.2000	165.8821	1.31790	-.97651	1.32089	.057224	1.58223	1.32225	.002889
183	177.1200	176.4991	.62090	.83907	.62231	.048243	1.12457	.62235	.000455
184	166.0400	164.9308	1.10916	-1.13919	1.11168	.043947	.93318	1.11132	.001203
185	178.7200	178.0529	.66710	1.10478	.66861	.053412	1.37846	.66902	.000644
186	169.3900	168.3910	.99904	-.54748	1.00131	.060777	1.78483	1.00276	.001874
187	165.4300	164.9609	.46912	-1.13405	.47018	.044361	.95085	.47005	.000219
188	168.4800	167.4621	1.01787	-.70632	1.02018	.044753	.96772	1.01992	.001051

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
189	171.5000	172.1307	-.63071	.09204	-.63214	.053861	1.40172	-.63255	.000586
190	163.7700	163.6462	.12378	-1.35886	.12406	.047655	1.09732	.12406	.000018
191	175.7500	175.5148	.23523	.67074	.23576	.055227	1.47375	.23595	.000086
192	171.1000	170.8583	.24170	-.12555	.24225	.049967	1.20637	.24231	.000074
193	177.7700	177.0738	.69620	.93735	.69778	.065870	2.09647	.69925	.001070
194	174.5500	173.9381	.61191	.40112	.61330	.067935	2.23002	.61476	.000880
195	180.2800	179.0524	1.22765	1.27569	1.23043	.098035	4.64379	1.23961	.007451
196	172.3100	172.2118	.09819	.10591	.09841	.046416	1.04102	.09840	.000011
197	161.9000	161.6377	.26230	-1.70233	.26289	.045952	1.02027	.26286	.000074
198	170.8600	170.3126	.54738	-.21886	.54862	.059083	1.68669	.54930	.000531
199	163.6200	162.8640	.75603	-1.49263	.75774	.062974	1.91617	.75905	.001153
200	179.0100	178.1519	.85806	1.12172	.86001	.050071	1.21138	.86023	.000936
202	168.5000	168.7183	-.21834	-.49150	-.21883	.044813	.97032	-.21878	.000048
203	175.1300	173.6202	1.50983	.34675	1.51325	.096607	4.50951	1.52412	.010939
204	173.9800	174.1481	-.16812	.43703	-.16850	.061545	1.83021	-.16876	.000054
205	177.4200	176.7764	.64359	.88649	.64505	.046855	1.06079	.64501	.000461
206	185.9600	183.7301	2.22992	2.07562	2.23498	.054157	1.41717	2.23651	.007402
207	165.9800	166.8118	-.83182	-.81752	-.83371	.076031	2.79315	-.83668	.002042
208	168.2400	168.3482	-.10815	-.55480	-.10840	.045833	1.01501	-.10838	.000012
209	167.8800	168.1187	-.23874	-.59403	-.23928	.046499	1.04473	-.23926	.000062
210	176.4200	175.4076	1.01242	.65241	1.01472	.046477	1.04376	1.01462	.001122
212	170.4700	170.7362	-.26616	-.14643	-.26676	.046816	1.05900	-.26675	.000079
213	170.0200	168.8392	1.18079	-.47082	1.18347	.069057	2.30423	1.18647	.003387
214	174.9200	174.3819	.53809	.47702	.53931	.046897	1.06269	.53928	.000323
215	179.4200	178.2642	1.15579	1.14092	1.15842	.072322	2.52732	1.16190	.003563
216	172.0800	172.8760	-.79596	.21949	-.79777	.052253	1.31926	-.79815	.000878
217	177.1500	177.4429	-.29288	1.00046	-.29354	.047746	1.10150	-.29355	.000099
218	161.7800	161.8951	-.11511	-1.65832	-.11537	.043632	.91988	-.11533	.000013
219	175.9500	175.3430	.60704	.64136	.60842	.050688	1.24144	.60861	.000480
220	169.9500	169.7472	.20284	-.31556	.20330	.044985	.97782	.20325	.000042
221	175.3400	175.2473	.09273	.62500	.09294	.047775	1.10287	.09294	.000010
222	168.7900	168.5683	.22171	-.51716	.22221	.046561	1.04753	.22219	.000054
223	167.1700	166.3663	.80368	-.89371	.80551	.060155	1.74849	.80661	.001188
224	165.3100	165.3856	-.07556	-1.06142	-.07573	.044217	.94468	-.07571	.000006
225	175.8200	174.3119	1.50815	.46503	1.51157	.066645	2.14612	1.51491	.005143
226	170.1200	168.3506	1.76938	-.55438	1.77340	.045370	.99459	1.77304	.003265
227	163.6500	163.5557	.09427	-1.37434	.09448	.043977	.93449	.09445	.000009
228	172.6800	172.0580	.62202	.07961	.62344	.048145	1.12000	.62348	.000455
229	181.5100	180.9203	.58971	1.59512	.59105	.052346	1.32400	.59133	.000483
230	176.9800	178.1837	-1.20366	1.12714	-1.20639	.066724	2.15120	-1.20907	.003284
231	170.8100	170.1796	.63042	-.24161	.63185	.045574	1.00356	.63173	.000418
232	176.1300	175.8128	.31723	.72170	.31795	.052829	1.34852	.31812	.000143
234	167.6700	166.3270	1.34305	-.90044	1.34610	.045036	.98000	1.34579	.001853
235	171.2900	171.9801	-.69012	.06629	-.69169	.063970	1.97729	-.69297	.000992
236	181.9000	181.0310	.86900	1.61405	.87098	.071534	2.47251	.87349	.001970
237	175.5500	176.8852	-1.33521	.90510	-1.33824	.077388	2.89373	-1.34329	.005452
238	174.6000	175.1304	-.53036	.60501	-.53157	.052890	1.35165	-.53186	.000399
239	174.9700	177.4814	-2.51140	1.00705	-2.51710	.095110	4.37090	-2.53443	.029317
240	160.0100	160.2931	-.28308	-1.93227	-.28372	.088628	3.79539	-.28533	.000323
241	166.0700	165.5956	.47444	-1.02551	.47552	.071836	2.49344	.47691	.000592
242	172.9800	173.9223	-.94231	.39842	-.94445	.069200	2.31379	-.94686	.002166
243	169.3600	170.7526	-1.39262	-.14362	-1.39579	.089672	3.88531	-1.40396	.007997
244	171.0800	172.0343	-.95425	.07555	-.95642	.058985	1.68113	-.95760	.001610
245	171.3300	171.9269	-.59686	.05719	-.59822	.047485	1.08951	-.59822	.000407
246	171.5000	171.8817	-.38170	.04946	-.38257	.050587	1.23648	-.38268	.000189
247	179.9700	182.5260	-2.55600	1.86971	-2.56180	.124128	7.44480	-2.59618	.052398
248	175.8400	176.4890	-.64903	.83735	-.65051	.051901	1.30157	-.65079	.000576
249	165.0800	165.5197	-.43968	-1.03849	-.44068	.046516	1.04547	-.44064	.000212
250	185.4900	186.1031	-.61311	2.48143	-.61451	.052764	1.34519	-.61483	.000531
251	177.4200	177.4899	-.06989	1.00850	-.07004	.056349	1.53420	-.07011	.000008
252	170.5800	170.8983	-.31833	-.11870	-.31905	.094297	4.29644	-.32120	.000463

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
253	171.0800	172.0343	-.95425	.07555	-.95642	.058985	1.68113	-.95760	.001610
254	185.4900	186.1031	-.61311	2.48143	-.61451	.052764	1.34519	-.61483	.000531
255	163.5000	163.7794	-.27945	-1.33608	-.28008	.043475	.91326	-.27998	.000075
256	180.1800	180.1330	.04701	1.46049	.04712	.049867	1.20153	.04713	.000003
257	160.7400	160.9751	-.23506	-1.81565	-.23560	.048934	1.15701	-.23563	.000067
258	172.7100	173.2465	-.53653	.28286	-.53775	.046961	1.06557	-.53772	.000322
259	173.3300	173.9912	-.66124	.41021	-.66274	.047023	1.06842	-.66271	.000490
260	176.2500	176.6130	-.36304	.85855	-.36386	.060265	1.75486	-.36437	.000243
261	172.6100	172.8417	-.23174	.21363	-.23226	.059423	1.70618	-.23256	.000096
262	163.7800	164.4282	-.64821	-1.22514	-.64968	.044719	.96626	-.64951	.000426
263	174.0600	174.9746	-.91460	.57837	-.91667	.054438	1.43191	-.91733	.001258
264	167.0700	173.1963	-6.12633	.27427	-6.14024	.113719	6.24854	-6.20696	.251380
265	175.7300	176.7302	-1.00018	.87859	-1.00245	.051643	1.28867	-1.00287	.001353
266	166.7500	167.5219	-.77188	-.69610	-.77363	.049173	1.16832	-.77376	.000730
267	169.5200	167.9755	1.54446	-.61852	1.54797	.081001	3.17028	1.55471	.008002
268	168.3200	168.8883	-.56830	-.46243	-.56959	.047797	1.10385	-.56961	.000374
269	167.7100	167.7720	-.06198	-.65333	-.06212	.061185	1.80885	-.06222	.000007
270	171.9900	172.1372	-.14720	.09315	-.14754	.046586	1.04864	-.14752	.000024
271	179.1900	179.4393	-.24930	1.34186	-.24986	.054044	1.41129	-.25003	.000092
272	166.9900	167.5069	-.51691	-.69866	-.51808	.046298	1.03573	-.51802	.000290
273	167.0500	167.7528	-.70276	-.65662	-.70435	.050333	1.22412	-.70455	.000635
274	168.0000	168.3987	-.39867	-.54616	-.39957	.046875	1.06168	-.39955	.000177
276	184.2800	184.8254	-.54539	2.26293	-.54663	.056186	1.52538	-.54713	.000477
277	177.4400	178.3333	-.89326	1.15272	-.89529	.098889	4.72512	-.90213	.004016
278	175.6100	175.6481	-.03812	.69355	-.03820	.046717	1.05456	-.03820	.000002
279	171.1600	172.0280	-.86800	.07448	-.86997	.066574	2.14153	-.87188	.001700
280	177.4000	177.8512	-.45117	1.07028	-.45220	.063102	1.92400	-.45298	.000412
281	166.8700	168.8141	-1.94408	-.47512	-1.94849	.124784	7.52369	-1.97497	.030644
282	173.4400	173.4148	.02522	.31163	.02528	.046144	1.02883	.02528	.000001
283	159.3200	159.9998	-.67984	-1.98242	-.68138	.042689	.88053	-.68109	.000427
284	183.2600	183.3572	-.09721	2.01185	-.09743	.050531	1.23376	-.09746	.000012
285	171.4800	172.4718	-.99178	.15037	-.99403	.085650	3.54459	-.99914	.003695
286	172.6300	173.1373	-.50728	.26417	-.50843	.058099	1.63098	-.50900	.000441
287	168.9000	169.5087	-.60869	-.35634	-.61007	.053186	1.36681	-.61042	.000532
288	176.2100	175.8466	.36343	.72748	.36426	.077840	2.92767	.36566	.000409
289	172.8300	172.1114	.71857	.08875	.72020	.070366	2.39241	.72216	.001303
290	170.0900	170.7892	-.69922	-.13736	-.70081	.049558	1.18669	-.70095	.000609
291	167.3100	167.9873	-.67732	-.61650	-.67886	.045196	.98700	-.67872	.000475
292	180.6500	179.2382	1.41183	1.30747	1.41504	.148835	10.70346	1.44397	.023304
293	172.1700	171.8761	.29388	.04851	.29455	.094283	4.29517	.29653	.000394
294	176.3100	176.9876	-.67763	.92261	-.67917	.050194	1.21735	-.67935	.000587
296	168.4100	168.7847	-.37465	-.48016	-.37550	.053242	1.36967	-.37572	.000202
297	175.6400	176.1986	-.55858	.78768	-.55985	.047794	1.10373	-.55986	.000361
298	154.8400	155.6687	-.82874	-2.72307	-.83062	.073227	2.59093	-.83322	.001878
299	165.8700	166.0835	-.21349	-.94208	-.21397	.055454	1.48586	-.21415	.000071
300	165.4500	165.0264	.42360	-1.12284	.42456	.059487	1.70986	.42511	.000323
301	161.4800	162.0457	-.56572	-1.63256	-.56700	.050218	1.21852	-.56716	.000409
302	172.1400	172.9740	-.83405	.23626	-.83594	.050277	1.22139	-.83617	.000892
303	179.8400	180.8109	-.97087	1.57641	-.97308	.119382	6.88636	-.98497	.006976
304	171.0200	173.3828	-2.36279	.30616	-2.36816	.170740	14.08596	-2.43407	.087146
305	172.0100	172.6334	-.62341	.17801	-.62483	.049389	1.17864	-.62494	.000481
306	170.0500	171.0053	-.95528	-.10041	-.95745	.062831	1.90751	-.95908	.001832
307	166.6200	166.8542	-.23424	-.81027	-.23477	.047658	1.09747	-.23477	.000063
308	172.3100	173.5651	-1.25508	.33733	-1.25793	.046158	1.02946	-1.25777	.001701
309	184.3200	183.9103	.40971	2.10644	.41064	.049220	1.17057	.41071	.000206
310	179.7000	179.4239	.27612	1.33923	.27675	.047544	1.09220	.27675	.000087
311	168.3600	165.4984	2.86160	-1.04213	2.86810	.141762	9.71040	2.92056	.086490
312	172.2700	172.4735	-.20351	.15067	-.20397	.056421	1.53814	-.20416	.000067
313	173.0400	173.5738	-.53380	.33882	-.53501	.046015	1.02309	-.53494	.000306
314	173.7200	173.8286	-.10861	.38240	-.10886	.069284	2.31943	-.10914	.000029
315	161.0900	161.8101	-.72009	-1.67285	-.72173	.043796	.92682	-.72148	.000504

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
316	171.8600	172.1268	-.26683	.09138	-.26744	.050434	1.22901	-.26751	.000092
317	163.3200	162.8603	.45969	-1.49326	.46073	.065025	2.04304	.46165	.000455
318	176.9200	181.1300	-4.20996	1.63098	-4.21952	.177297	15.18866	-4.34723	.299737
319	171.8700	172.6136	-.74364	.17463	-.74533	.050959	1.25476	-.74558	.000728
320	169.6400	170.1029	-.46294	-.25472	-.46399	.046178	1.03034	-.46393	.000232
321	173.7200	174.2099	-.48993	.44761	-.49104	.046289	1.03529	-.49099	.000261
322	164.2000	164.0304	.16962	-1.29317	.17000	.060699	1.78025	.17025	.000054
323	160.8400	160.3915	.44849	-1.91544	.44950	.081113	3.17904	.45147	.000677
324	173.5700	174.2935	-.72351	.46190	-.72515	.046646	1.05135	-.72510	.000577
325	168.2200	168.3070	-.08698	-.56184	-.08717	.050484	1.23146	-.08720	.000010
326	172.6200	172.9893	-.36932	.23887	-.37016	.053340	1.37473	-.37038	.000197
327	175.6100	176.6770	-1.06697	.86949	-1.06939	.067824	2.22267	-1.07192	.002667
328	172.0100	172.6648	-.65479	.18338	-.65627	.047740	1.10121	-.65629	.000495
329	176.9000	177.5385	-.63849	1.01681	-.63994	.058820	1.67173	-.64072	.000717
330	169.1200	169.4063	-.28629	-.37385	-.28694	.056169	1.52444	-.28720	.000131
331	173.9500	174.3866	-.43665	.47782	-.43764	.046465	1.04318	-.43759	.000209
332	172.2500	170.7036	1.54645	-.15201	1.54996	.077963	2.93694	1.55595	.007425
333	165.4100	165.8652	-.45520	-.97940	-.45623	.043950	.93333	-.45609	.000203
334	169.0000	169.6646	-.66455	-.32969	-.66606	.046575	1.04814	-.66600	.000485
335	180.0100	180.2576	-.24765	1.48181	-.24821	.051148	1.26410	-.24830	.000081
336	181.1900	182.3425	-1.15251	1.83833	-1.15513	.076864	2.85471	-1.15939	.004007
337	168.3000	168.2540	.04596	-.57089	.04606	.074685	2.69512	.04622	.000006
338	171.0100	170.9258	.08418	-.11400	.08437	.046713	1.05434	.08437	.000008
339	169.9800	169.9543	.02573	-.28014	.02578	.046279	1.03489	.02578	.000001
340	177.5900	178.4925	-.90251	1.17996	-.90456	.048849	1.15301	-.90468	.000985
341	155.8900	156.0248	-.13478	-2.66218	-.13509	.083138	3.33974	-.13572	.000064
342	179.1500	179.4667	-.31674	1.34656	-.31746	.048377	1.13081	-.31749	.000119
343	174.6400	173.8204	.81964	.38099	.82150	.072500	2.53972	.82399	.001801
344	170.0600	170.5173	-.45729	-.18386	-.45833	.045423	.99692	-.45824	.000219
345	171.7000	172.7705	-1.07050	.20145	-1.07293	.054434	1.43172	-1.07369	.001724
346	167.8100	167.5404	.26959	-.69293	.27020	.063172	1.92824	.27068	.000148
347	174.6800	174.6299	.05005	.51943	.05016	.046271	1.03452	.05016	.000003
348	164.8100	165.2821	-.47214	-1.07911	-.47321	.044135	.94119	-.47306	.000220
349	157.7600	155.5186	2.24138	-2.74874	2.24647	.088364	3.77279	2.25910	.020106
350	174.6300	175.4254	-.79544	.65547	-.79725	.075562	2.75878	-.80003	.001844
351	170.9900	171.3337	-.34373	-.04424	-.34452	.046706	1.05406	-.34449	.000131
352	175.9100	176.8945	-.98450	.90669	-.98673	.049598	1.18863	-.98694	.001209
353	184.2300	184.5758	-.34576	2.22024	-.34655	.048920	1.15633	-.34660	.000145
354	172.2600	172.2711	-.01115	.11606	-.01118	.127065	7.80129	-.01134	.000001
355	173.7200	174.0296	-.30960	.41677	-.31030	.047167	1.07497	-.31029	.000108
356	169.6500	169.3209	.32910	-.38845	.32985	.107397	5.57311	.33296	.000645
357	164.4300	164.9732	-.54323	-1.13194	-.54446	.062042	1.85987	-.54534	.000578
358	170.3500	171.1847	-.83472	-.06973	-.83661	.047217	1.07725	-.83659	.000787
359	173.3900	174.1724	-.78238	.44118	-.78416	.075175	2.73065	-.78685	.001765
360	177.0400	175.9958	1.04416	.75301	1.04653	.106103	5.43968	1.05610	.006335
362	170.3100	170.7303	-.42029	-.14744	-.42124	.053719	1.39434	-.42151	.000259
363	172.7000	173.1013	-.40135	.25803	-.40226	.056379	1.53587	-.40264	.000260
364	176.2300	175.4820	.74802	.66514	.74971	.091912	4.08186	.75442	.002426
365	183.3200	184.3756	-1.05556	2.18600	-1.05795	.125668	7.63069	-1.07257	.009167
366	169.5700	169.4889	.08115	-.35973	.08133	.053108	1.36280	.08138	.000009
367	173.4800	173.0473	.43266	.24879	.43365	.052353	1.32436	.43386	.000260
368	168.5700	169.0446	-.47462	-.43570	-.47570	.058317	1.64326	-.47625	.000389
369	165.6400	166.9348	-1.29483	-.79649	-1.29777	.073086	2.58097	-1.30182	.004567
370	180.9400	178.7215	2.21851	1.21912	2.22354	.064359	2.00137	2.22778	.010372
371	157.1000	157.2316	-.13159	-2.45581	-.13189	.061524	1.82894	-.13209	.000033
372	173.7800	175.0652	-1.28525	.59387	-1.28817	.095311	4.38933	-1.29708	.007711
373	167.8200	167.5194	.30061	-.69652	.30130	.055598	1.49360	.30155	.000142
374	174.6300	175.4254	-.79544	.65547	-.79725	.075562	2.75878	-.80003	.001844
375	176.4600	177.4402	-.98024	1.00001	-.98247	.050684	1.24122	-.98278	.001252
376	161.8600	161.5412	.31883	-1.71884	.31956	.059618	1.71741	.31997	.000184
377	159.6400	159.4485	.19150	-2.07670	.19193	.045503	1.00046	.19190	.000038

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
378	163.9400	164.1663	-.22632	-1.26992	-.22683	.048926	1.15663	-.22686	.000062
379	174.9100	175.4164	-.50641	.65392	-.50756	.072084	2.51070	-.50907	.000679
380	154.4100	154.2226	.18741	-2.97037	.18783	.061368	1.81971	.18812	.000067
381	173.1000	173.3214	-.22134	.29565	-.22185	.047582	1.09394	-.22185	.000056
382	168.3200	168.4785	-.15845	-.53252	-.15881	.046333	1.03729	-.15879	.000027
383	168.6200	168.9227	-.30273	-.45654	-.30342	.049091	1.16445	-.30347	.000112
384	173.7400	174.3278	-.58778	.46776	-.58912	.060179	1.74985	-.58993	.000636
385	183.9700	181.4073	2.56267	1.67841	2.56849	.123751	7.39964	2.60271	.052343
386	169.4100	169.7038	-.29375	-.32298	-.29441	.085964	3.57062	-.29594	.000327
387	167.9600	168.3571	-.39709	-.55327	-.39800	.068904	2.29402	-.39900	.000381
388	174.1500	174.6769	-.52693	.52746	-.52813	.047005	1.06757	-.52810	.000311
389	171.2700	172.7939	-1.52390	.20546	-1.52736	.122212	7.21678	-1.54711	.018038
390	174.6400	174.1484	.49164	.43708	.49275	.121695	7.15578	.49906	.001861
391	162.3600	162.3614	-.00136	-1.57858	-.00136	.102316	5.05826	-.00137	.000000
392	169.4900	168.6216	.86842	-.50804	.87040	.051938	1.30343	.87078	.001032
393	171.7000	172.7705	-1.07050	.20145	-1.07293	.054434	1.43172	-1.07369	.001724
394	170.0600	170.5173	-.45729	-.18386	-.45833	.045423	.99692	-.45824	.000219
395	174.6400	173.8204	.81964	.38099	.82150	.072500	2.53972	.82399	.001801
396	179.1500	179.4667	-.31674	1.34656	-.31746	.048377	1.13081	-.31749	.000119
397	155.8900	156.0248	-.13478	-2.66218	-.13509	.083138	3.33974	-.13572	.000064
398	177.5900	178.4925	-.90251	1.17996	-.90456	.048849	1.15301	-.90468	.000985
399	169.9800	169.9543	.02573	-.28014	.02578	.046279	1.03489	.02578	.000001
400	171.0100	170.9258	.08418	-.11400	.08437	.046713	1.05434	.08437	.000008
401	168.3000	168.2540	.04596	-.57089	.04606	.074685	2.69512	.04622	.000006
402	181.1700	182.3925	-1.22255	1.84689	-1.22533	.065720	2.08692	-1.22788	.003286
403	174.7600	175.5638	-.80376	.67912	-.80558	.046930	1.06418	-.80554	.000721
404	180.0100	180.2447	-.23474	1.47960	-.23527	.051446	1.27887	-.23537	.000074
405	169.6500	169.6646	-.01456	-.32969	-.01459	.046575	1.04814	-.01459	.000000
406	172.0100	172.6648	-.65479	.18338	-.65627	.047740	1.10121	-.65629	.000495
407	176.9000	177.5385	-.63849	1.01681	-.63994	.058820	1.67173	-.64072	.000717
408	169.1200	169.4063	-.28629	-.37385	-.28694	.056169	1.52444	-.28720	.000131
409	173.9500	174.3866	-.43665	.47782	-.43764	.046465	1.04318	-.43759	.000209
410	172.2500	170.7036	1.54645	-.15201	1.54996	.077963	2.93694	1.55595	.007425
411	165.4100	165.8652	-.45520	-.97940	-.45623	.043950	.93333	-.45609	.000203
412	173.8900	172.4204	1.46960	.14158	1.47294	.097057	4.55160	1.48364	.010462
413	170.5800	170.8983	-.31833	-.11870	-.31905	.094297	4.29644	-.32120	.000463
414	179.0700	180.3896	-1.31964	1.50438	-1.32264	.069236	2.31619	-1.32603	.004253
415	167.8100	167.5404	.26959	-.69293	.27020	.063172	1.92824	.27068	.000148
416	174.6800	174.6299	.05005	.51943	.05016	.046271	1.03452	.05016	.000003
417	164.8100	165.2821	-.47214	-1.07911	-.47321	.044135	.94119	-.47306	.000220
418	166.8700	168.8141	-1.94408	-.47512	-1.94849	.124784	7.52369	-1.97497	.030644
419	161.1300	161.7863	-.65625	-1.67693	-.65774	.050090	1.21233	-.65791	.000548
420	165.6700	166.7248	-1.05476	-.83241	-1.05716	.051231	1.26817	-1.05755	.001481
421	165.8700	166.0835	-.21349	-.94208	-.21397	.055454	1.48586	-.21415	.000071
422	173.4400	173.4148	.02522	.31163	.02528	.046144	1.02883	.02528	.000001
423	159.3200	159.9998	-.67984	-1.98242	-.68138	.042689	.88053	-.68109	.000427
424	177.4000	177.8512	-.45117	1.07028	-.45220	.063102	1.92400	-.45298	.000412
425	171.1600	172.0280	-.86800	.07448	-.86997	.066574	2.14153	-.87188	.001700
426	175.6200	175.6377	-.01772	.69177	-.01776	.046713	1.05437	-.01775	.000000
427	171.4800	172.4718	-.99178	.15037	-.99403	.085650	3.54459	-.99914	.003695
428	172.6300	173.1373	-.50728	.26417	-.50843	.058099	1.63098	-.50900	.000441
429	168.9000	169.5087	-.60869	-.35634	-.61007	.053186	1.36681	-.61042	.000532
430	176.2100	175.8466	.36343	.72748	.36426	.077840	2.92767	.36566	.000409
431	166.2900	165.3029	.98708	-1.07556	.98932	.160572	12.45823	1.01332	.013358
432	172.8300	172.1114	.71857	.08875	.72020	.070366	2.39241	.72216	.001303
433	170.2400	170.9159	-.67586	-.11570	-.67739	.049963	1.20618	-.67756	.000578
434	180.6500	179.2382	1.41183	1.30747	1.41504	.148835	10.70346	1.44397	.023304
435	172.0700	171.7737	.29634	.03099	.29701	.084136	3.42040	.29846	.000318
436	176.3100	176.9876	-.67763	.92261	-.67917	.050194	1.21735	-.67935	.000587
438	160.6100	160.7582	-.14818	-1.85274	-.14851	.046588	1.04874	-.14850	.000024
439	175.6400	176.1986	-.55858	.78768	-.55985	.047794	1.10373	-.55986	.000361

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
440	163.9900	164.2820	-.29196	-1.25015	-.29262	.043924	.93220	-.29253	.000083
441	172.1400	172.9989	-.85890	.24051	-.86085	.050418	1.22824	-.86110	.000951
442	168.3600	165.4984	2.86160	-1.04213	2.86810	.141762	9.71040	2.92056	.086490
443	168.7900	168.4027	.38733	-.54548	.38821	.121166	7.09373	.39313	.001145
444	171.0200	173.3828	-2.36279	.30616	-2.36816	.170740	14.08596	-2.43407	.087146
445	170.1700	171.0343	-.86432	-.09545	-.86628	.046067	1.02540	-.86617	.000803
446	171.7400	172.0977	-.35770	.08640	-.35851	.049508	1.18431	-.35858	.000159
447	172.2000	173.0008	-.80083	.24084	-.80265	.046425	1.04142	-.80256	.000700
448	167.5000	172.9879	-5.48793	.23864	-5.50039	.135266	8.84083	-5.59069	.288548
449	172.9700	173.2841	-.31406	.28927	-.31477	.053498	1.38290	-.31496	.000143
450	173.7100	173.4276	.28238	.31383	.28302	.066099	2.11105	.28362	.000177
451	170.0500	169.9207	.12933	-.28589	.12963	.053780	1.39751	.12971	.000025
452	172.8200	172.8103	.00975	.20825	.00977	.054648	1.44299	.00978	.000000
453	168.3400	168.2804	.05963	-.56639	.05977	.044645	.96306	.05975	.000004
454	172.3400	173.0581	-.71806	.25063	-.71969	.057791	1.61376	-.72048	.000875
455	175.6000	175.2518	.34818	.62578	.34897	.054098	1.41411	.34920	.000180
456	179.7000	179.4239	.27612	1.33923	.27675	.047544	1.09220	.27675	.000087
457	182.9700	183.5870	-.61697	2.05115	-.61837	.050435	1.22909	-.61855	.000491
458	172.3100	173.5651	-1.25508	.33733	-1.25793	.046158	1.02946	-1.25777	.001701
459	155.2800	153.2927	1.98727	-3.12938	1.99179	.086129	3.58439	2.00219	.015005
461	169.8200	169.1223	.69769	-.42241	.69928	.080695	3.14636	.70229	.001620
462	166.6200	166.8542	-.23424	-.81027	-.23477	.047658	1.09747	-.23477	.000063
463	170.2200	171.2304	-1.01044	-.06191	-1.01273	.063488	1.94757	-1.01454	.002093
464	172.0100	172.6334	-.62341	.17801	-.62483	.049389	1.17864	-.62494	.000481
465	179.8400	180.8109	-.97087	1.57641	-.97308	.119382	6.88636	-.98497	.006976
466	167.3600	167.3239	.03609	-.72995	.03617	.072625	2.54850	.03628	.000004
467	171.8700	172.6136	-.74364	.17463	-.74533	.050959	1.25476	-.74558	.000728
468	166.8400	167.2277	-.38774	-.74640	-.38862	.045000	.97845	-.38853	.000154
469	173.0400	173.5738	-.53380	.33882	-.53501	.046015	1.02309	-.53494	.000306
470	175.5600	176.2434	-.68340	.79534	-.68495	.046753	1.05619	-.68490	.000517
471	163.3200	162.8603	.45969	-1.49326	.46073	.065025	2.04304	.46165	.000455
472	161.0900	161.8020	-.71199	-1.67424	-.71361	.043945	.93312	-.71337	.000496
473	173.3900	173.5601	-.17007	.33648	-.17046	.067825	2.22278	-.17086	.000068
474	162.6500	162.6032	.04683	-1.53723	.04694	.064536	2.01245	.04703	.000005
475	175.7300	173.5866	2.14337	.34102	2.14824	.083119	3.33819	2.15835	.016239
476	174.8400	174.9847	-.14467	.58009	-.14500	.055394	1.48265	-.14512	.000033
477	170.8000	170.3005	.49950	-.22093	.50063	.081662	3.22224	.50287	.000851
478	178.0700	178.7398	-.66983	1.22225	-.67135	.049235	1.17130	-.67147	.000551
479	177.7700	177.3022	.46776	.97641	.46882	.073659	2.62159	.47032	.000606
480	166.0900	164.5425	1.54750	-1.20560	1.55101	.083843	3.39662	1.55851	.008615
481	164.6800	165.1891	-.50912	-1.09502	-.51028	.044435	.95405	-.51014	.000259
482	167.5900	167.7841	-.19408	-.65126	-.19452	.075545	2.75759	-.19520	.000110
483	175.0900	176.4155	-1.32555	.82478	-1.32856	.054037	1.41093	-1.32945	.002604
484	178.4800	178.8768	-.39680	1.24567	-.39771	.047410	1.08605	-.39770	.000179
485	175.0000	175.2746	-.27461	.62967	-.27524	.046814	1.05894	-.27522	.000084
486	175.1500	175.3149	-.16492	.63656	-.16529	.047117	1.07268	-.16529	.000031
487	172.9600	172.8469	.11308	.21452	.11334	.046903	1.06296	.11333	.000014
488	165.7500	165.7516	-.00165	-.99882	-.00165	.066656	2.14678	-.00166	.000000
490	173.7700	173.7238	.04619	.36448	.04629	.057333	1.58829	.04634	.000004
491	177.5400	178.1808	-.64084	1.12666	-.64229	.060668	1.77840	-.64322	.000768
492	165.2100	165.7667	-.55670	-.99624	-.55797	.050429	1.22880	-.55813	.000400
493	181.3100	179.2117	2.09833	1.30294	2.10309	.087891	3.73253	2.11474	.017431
494	174.2500	175.1971	-.94714	.61643	-.94929	.062277	1.87402	-.95085	.001769
495	175.8200	176.4434	-.62343	.82955	-.62484	.047765	1.10237	-.62486	.000449
496	171.2400	171.2444	-.00444	-.05951	-.00445	.057367	1.59017	-.00446	.000000
497	175.8200	176.4434	-.62343	.82955	-.62484	.047765	1.10237	-.62486	.000449
498	177.5400	178.1808	-.64084	1.12666	-.64229	.060668	1.77840	-.64322	.000768
499	172.9600	172.8469	.11308	.21452	.11334	.046903	1.06296	.11333	.000014
500	178.0700	178.7398	-.66983	1.22225	-.67135	.049235	1.17130	-.67147	.000551
501	177.7700	177.3022	.46776	.97641	.46882	.073659	2.62159	.47032	.000606
502	166.0900	164.5425	1.54750	-1.20560	1.55101	.083843	3.39662	1.55851	.008615

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
503	164.6800	165.1891	-.50912	-1.09502	-.51028	.044435	.95405	-.51014	.000259
504	171.0500	171.8943	-.84425	.05161	-.84617	.048907	1.15573	-.84629	.000864
505	168.8500	169.5955	-.74553	-.34149	-.74722	.046897	1.06268	-.74718	.000620
506	178.4800	178.8768	-.39680	1.24567	-.39771	.047410	1.08605	-.39770	.000179
507	175.5000	176.8177	-1.31766	.89355	-1.32065	.053819	1.39954	-1.32150	.002552
508	167.5800	167.7640	-.18402	-.65469	-.18444	.075371	2.74486	-.18508	.000098
Minimum	154.4100	153.2927	-6.12633	-3.12938	-6.14024	.042689	.88053	-6.20696	.000000
Maximum	192.4300	192.1721	3.91692	3.51926	3.92581	.177297	15.18866	3.92995	.299737
Mean	171.5970	171.5925	.00458	.00000	.00459	.060505	2.00000	.00431	.004718
Median	171.8600	171.9801	-.06989	.06629	-.07004	.051885	1.30079	-.07019	.000412

Case 2

Dependent Variable: Predicted adult stature (PAS)

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(212)	p-level	
AECM		.968033	.968033	.968033	1.000000	1.000000	56.194	0.00
SECM	.997038	.997038	.997038	1.000000	1.000000	188.765	0.00	
VECM		.980888	.980888	.980888	1.000000	1.000000	73.401	0.00
AMC	.988910	.988910	.988910	1.000000	1.000000	96.950	0.00	
SMC	.998860	.998860	.998860	1.000000	1.000000	304.703	0.00	
VMC	.985239	.985239	.985239	1.000000	1.000000	83.801	0.00	
ATO	.996184	.996184	.996184	1.000000	1.000000	166.191	0.00	
STO	.999537	.999537	.999537	1.000000	1.000000	478.193	0.00	
VTO	.988732	.988732	.988732	1.000000	1.000000	96.170	0.00	
APHV	.997281	.997281	.997281	1.000000	1.000000	197.028	0.00	
SPHV	.999951	.999951	.999951	1.000000	1.000000	1466.873	0.00	
PHV	.992913	.992913	.992913	1.000000	1.000000	121.651	0.00	

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99995074 R2= .99990148 Adjusted R2= .99990102
REGRESS. F(1,212)=2152E3 p<0.0000 Std.Error of estimate: 1.7090

N=213	BETA	St. Err. of BETA	B	St. Err. of B	t(212)	p-level
SPHV	.999951	.000682	1.105115	.000753	1466.873	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.953641 R2=.909430 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	6217.506	1	6217.506	2128.736	0.00
Residual	619.199	212	2.921		
Total	6836.705				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(211)	p-level	
AECM		.008692	.221369	.002197	.063895	.063895	3.2974	.001145
SECM	.016619	.129869	.001289	.006016	.006016	1.9026	.058459	
VECM		.002612	.051272	.000509	.037959	.037959	.7458	.456646
AMC	.009932	.149774	.001487	.022401	.022401	2.2004	.028863	
SMC	.016003	.076510	.000759	.002252	.002252	1.1146	.266275	
VMC	-.006600	-.112909	-.001121	.028833	.028833	-1.6507	.100296	
ATO	-.060695	-.500835	-.004971	.006708	.006708	-8.4052	.000000	
STO	-.394504	-.855035	-.008487	.000463	.000463	-23.9506	0.000000	
VTO	.026771	.413991	.004109	.023559	.023559	6.6063	.000000	
APHV	-.033590	-.239266	-.002375	.004998	.004998	-3.5795	.000427	
PHV	.050228	.631635	.006269	.015579	.015579	11.8347	.000000	

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(212)	p-level
SPHV	.999951	.999951	.999951	1.000000	0.00	1466.873	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999951	.999901	.999901	2151716.	0.00	1

STAT. Regression Summary for Dependent Variable: PAS (db31.sta)
MULTIPLE R= .99998675 R2= .99997351 Adjusted R2= .99997326
REGRESS. F(2,211)=3982E3 p<0.0000 Std.Error of estimate: .88835

N=213	BETA	St. Err. of BETA	B	St. Err. of B	t(211)	p-level
SPHV	1.394363	.016472	1.541007	.018204	84.6528	0.00
STO	-.394504	.016472	-.499682	.020863	-23.9506	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.987747 R2=.975644 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	6670.193	2	3335.096	4226.141	0.00
Residual	166.513	211	.789		
Total	6836.705				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(210)	p-level	
AECM		.003960	.192486	.000991	.062582	.000440	2.84254	.004917
SECM	.009706	.145970	.000751	.005992	.000415	2.13821	.033655	
VECM		.002454	.092880	.000478	.037958	.000457	1.35181	.177890
AMC	.009418	.273843	.001409	.022399	.000452	4.12609	.000053	
SMC	.040057	.366138	.001885	.002213	.000419	5.70176	.000000	
VMC	.004447	.143218	.000737	.027477	.000441	2.09704	.037187	
ATO	-.023764	-.347954	-.001791	.005680	.000392	-5.37842	.000000	
VTO	.023361	.695238	.003578	.023464	.000445	14.01677	.000000	
APHV	-.029089	-.399275	-.002055	.004991	.000432	-6.31092	.000000	
PHV	-.017843	-.245617	-.001264	.005020	.000114	-3.67180	.000306	

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(211)	p-level
SPHV	1.394363	.985595	.029996	.000463	.999537	84.6528	0.00
STO	-.394504	-.855035	-.008487	.000463	.999537	-23.9506	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999951	.999901	.999901	2151716.	0.00	1
STO	2	.999987	.999974	.000072	574.	0.00	2

STAT. Predicted & Residual Values: PAS
MULTIPLE case 1 to 234
REGRESS.

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	172.0600	172.3692	-.30920	.12094	-.34807	.081910	1.81088	-.31186	.000524
2	170.0800	169.8911	.18892	-.31664	.21266	.068525	1.26741	.19005	.000136
3	172.6900	172.8703	-.18025	.20942	-.20291	.061327	1.01511	-.18112	.000099
4	175.6000	176.3883	-.78825	.83061	-.88733	.063327	1.08240	-.79228	.002021
5	161.5100	162.0507	-.54066	-1.70107	-.60862	.085184	1.95853	-.54568	.001735
6	174.7700	175.0461	-.27612	.59363	-.31083	.062099	1.04084	-.27748	.000238
7	161.5100	162.0507	-.54066	-1.70107	-.60862	.085184	1.95853	-.54568	.001735
8	170.0800	169.9165	.16351	-.31215	.18406	.068249	1.25721	.16448	.000101
9	172.6900	172.8703	-.18025	.20942	-.20291	.061327	1.01511	-.18112	.000099
10	173.4100	170.8810	2.52901	-.14184	2.84687	.091746	2.27191	2.55627	.044160
11	174.8000	175.0449	-.24487	.59340	-.27565	.062177	1.04346	-.24608	.000188
12	175.6000	176.3883	-.78825	.83061	-.88733	.063327	1.08240	-.79228	.002021
14	181.1470	182.9536	-1.80664	1.98991	-2.03371	.113166	3.45661	-1.83644	.034676
15	176.0500	176.5030	-.45299	.85087	-.50992	.066397	1.18992	-.45553	.000734
16	160.7400	164.4465	-3.70647	-1.27803	-4.17232	.058292	.91714	-3.72250	.037803
17	170.1200	169.4972	.62279	-.38618	.70106	.130705	4.61104	.63657	.005558
18	174.3100	175.1281	-.81815	.60811	-.92098	.062802	1.06453	-.82226	.002141
19	163.2500	163.6132	-.36319	-1.42517	-.40884	.062566	1.05657	-.36500	.000419
21	169.5000	168.6180	.88197	-.54143	.99283	.060616	.99171	.88610	.002316

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
22	162.1300	162.5195	-.38953	-1.61828	-.43848	.060343	.98281	-.39133	.000448
23	170.5400	171.1275	-.58748	-.09832	-.66132	.089590	2.16638	-.59352	.002270
24	164.3400	164.1175	.22252	-1.33612	.25049	.078617	1.66819	.22428	.000250
25	177.7500	177.8291	-.07907	1.08503	-.08901	.065495	1.15778	-.07950	.000022
26	177.2400	176.8015	.43849	.90358	.49360	.065400	1.15444	.44088	.000667
27	170.0600	170.0383	.02168	-.29064	.02441	.084172	1.91226	.02188	.000003
28	170.6400	169.6351	1.00485	-.36183	1.13115	.138372	5.16786	1.02984	.016303
29	161.6500	163.0329	-1.38292	-1.52763	-1.55673	.094285	2.39941	-1.39868	.013963
30	167.9100	168.6252	-.71523	-.54015	-.80512	.067601	1.23344	-.71939	.001899
31	166.1600	166.1772	-.01724	-.97241	-.01941	.061056	1.00618	-.01732	.000001
32	175.0000	175.2529	-.25287	.63013	-.28465	.064629	1.12739	-.25421	.000217
33	169.1900	169.8886	-.69864	-.31707	-.78645	.072916	1.43504	-.70338	.002112
34	172.8700	171.1739	1.69614	-.09013	1.90932	.097660	2.57425	1.71689	.022571
35	169.1500	169.9627	-.81268	-.30399	-.91483	.065620	1.16223	-.81714	.002308
37	173.1900	172.7785	.41148	.19322	.46320	.062328	1.04852	.41352	.000533
38	173.3600	173.8608	-.50078	.38432	-.56372	.061982	1.03693	-.50323	.000781
39	171.3000	172.1305	-.83054	.07880	-.93492	.061302	1.01431	-.83451	.002101
40	170.5700	171.2089	-.63890	-.08394	-.71920	.065888	1.17173	-.64243	.001439
42	166.1900	166.0602	.12985	-.99309	.14617	.059338	.95033	.13043	.000048
43	164.2900	164.9452	-.65518	-1.18997	-.73753	.095421	2.45755	-.66283	.003212
44	175.0100	175.6213	-.61134	.69519	-.68818	.083748	1.89307	-.61683	.002142
45	166.1200	166.4534	-.33337	-.92366	-.37527	.060099	.97488	-.33491	.000325
46	166.6300	167.3358	-.70583	-.76783	-.79454	.077203	1.60875	-.71120	.002420
47	170.1800	170.3206	-.14063	-.24079	-.15830	.061712	1.02791	-.14131	.000061
48	164.6100	164.7877	-.17770	-1.21777	-.20004	.075083	1.52160	-.17898	.000145
50	167.2000	166.2387	.96126	-.96155	1.08208	.079722	1.71541	.96906	.004792
51	177.1200	176.9523	.16766	.93021	.18874	.072291	1.41052	.16878	.000120
52	166.0400	165.3316	.70844	-1.12174	.79748	.058785	.93270	.71155	.001405
53	178.7200	178.5354	.18463	1.20974	.20784	.086613	2.02482	.18640	.000209
54	169.3900	168.8668	.52316	-.49749	.58892	.107437	3.11545	.53093	.002612
55	165.4300	165.3574	.07257	-1.11717	.08169	.058596	.92673	.07289	.000015
56	168.4800	167.8843	.59570	-.67099	.67058	.064228	1.11344	.59883	.001188
57	171.4300	172.4173	-.98735	.12944	-1.11145	.073197	1.44610	-.99410	.004251
58	171.1000	171.2497	-.14972	-.07673	-.16854	.065600	1.16153	-.15054	.000078
59	161.8100	161.5633	.24670	-1.78713	.27771	.084788	1.94039	.24897	.000358
60	176.0000	175.4039	.59612	.65679	.67104	.093322	2.35062	.60277	.002540
61	172.0400	171.5237	.51628	-.02835	.58117	.062063	1.03964	.51881	.000832
62	179.1300	178.5580	.57198	1.21374	.64387	.072397	1.41468	.57580	.001395
63	179.4200	178.7841	.63594	1.25366	.71587	.131086	4.63797	.65010	.005831
64	174.9200	174.8244	.09564	.55447	.10766	.068318	1.25975	.09621	.000035
65	170.0200	169.1800	.84000	-.44220	.94557	.102165	2.81719	.85126	.006072
66	170.5200	171.1392	-.61922	-.09624	-.69704	.061037	1.00554	-.62215	.001158
67	178.7200	178.9725	-.25250	1.28693	-.28424	.070503	1.34164	-.25410	.000258
68	173.9800	174.5193	-.53926	.50059	-.60704	.086534	2.02110	-.54443	.001782
69	175.1300	173.9259	1.20415	.39581	1.35549	.154430	6.43696	1.24167	.029520
70	176.4200	175.8408	.57922	.73394	.65202	.063867	1.10096	.58223	.001110
71	167.8800	168.5147	-.63474	-.55967	-.71451	.060687	.99406	-.63771	.001203
72	168.2400	168.7388	-.49878	-.52010	-.56147	.060102	.97496	-.50107	.000728
73	165.9800	167.1342	-1.15417	-.80344	-1.29924	.116094	3.63775	-1.17423	.014920
74	167.1700	166.8367	.33328	-.85597	.37517	.106389	3.05496	.33813	.001039
75	168.7900	169.0038	-.21382	-.47331	-.24070	.070782	1.35225	-.21519	.000186
76	175.3400	175.6965	-.35652	.70847	-.40133	.071306	1.37236	-.35883	.000526
77	172.0800	173.2666	-1.18657	.27940	-1.33571	.069272	1.29520	-1.19383	.005491
78	176.1300	176.2110	-.08096	.79931	-.09114	.069903	1.31889	-.08147	.000026
79	170.6300	170.4547	.17535	-.21712	.19739	.065346	1.15253	.17631	.000107
80	177.1200	178.0604	-.94044	1.12588	-1.05865	.064246	1.11404	-.94539	.002962
81	174.9300	175.8775	-.94748	.74042	-1.06657	.062855	1.06634	-.95225	.002876
82	163.6500	163.9706	-.32063	-1.36205	-.36093	.064040	1.10691	-.32231	.000342
83	181.5100	181.3978	.11224	1.71517	.12635	.083410	1.87780	.11324	.000072
84	177.0300	178.6079	-1.57793	1.22255	-1.77625	.096276	2.50179	-1.59668	.018972
85	175.9500	175.8055	.14447	.72772	.16263	.080708	1.75813	.14567	.000111

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
86	169.3000	169.5497	-.24965	-.37692	-.28103	.060867	.99997	-.25083	.000187
87	168.6500	168.9841	-.33411	-.47679	-.37610	.059907	.96867	-.33563	.000325
88	178.2800	177.3850	.89503	1.00661	1.00753	.090096	2.19089	.90434	.005330
89	167.7000	167.7279	-.02791	-.69860	-.03142	.079163	1.69146	-.02813	.000004
91	180.9000	181.1151	-.21509	1.66526	-.24212	.069601	1.30753	-.21642	.000182
92	178.8300	179.0176	-.18759	1.29489	-.21117	.077413	1.61750	-.18903	.000172
93	179.0900	178.6491	.44089	1.22983	.49630	.083347	1.87499	.44480	.001103
95	192.4300	192.6281	-.19806	3.69818	-.22295	.068742	1.27543	-.19925	.000151
97	168.6100	169.0993	-.48929	-.45645	-.55079	.064790	1.13301	-.49190	.000815
98	171.1900	168.5378	2.65216	-.55559	2.98550	.099920	2.69478	2.68614	.057837
99	175.7900	175.7048	.08519	.70993	.09590	.064797	1.13326	.08565	.000025
100	172.0800	171.6923	.38766	.00142	.43639	.082899	1.85487	.39107	.000844
101	167.0400	167.3027	-.26276	-.77367	-.29578	.068845	1.27928	-.26434	.000266
102	172.2700	172.0671	.20287	.06761	.22836	.061263	1.01301	.20384	.000125
103	175.4900	175.0514	.43858	.59456	.49371	.153365	6.34849	.45206	.003859
104	166.0700	166.5196	-.44962	-.91196	-.50613	.061056	1.00616	-.45175	.000611
105	174.1200	174.7053	-.58533	.53345	-.65890	.075416	1.53511	-.58958	.001587
106	168.3800	168.7867	-.40669	-.51164	-.45781	.060256	.97996	-.40857	.000487
107	170.5400	170.7160	-.17603	-.17097	-.19815	.060645	.99266	-.17685	.000092
108	183.2800	183.5269	-.24693	2.09114	-.27797	.091616	2.26547	-.24959	.000420
109	174.8600	176.1377	-1.27769	.78637	-1.43828	.072219	1.40772	-1.28620	.006927
110	170.5900	171.2535	-.66347	-.07607	-.74686	.065032	1.14149	-.66704	.001511
111	170.8700	172.0716	-1.20164	.06840	-1.35268	.074466	1.49668	-1.21015	.006520
112	178.8900	179.2685	-.37849	1.33920	-.42607	.063975	1.10469	-.38047	.000476
113	161.6200	161.5832	.03682	-1.78362	.04145	.070370	1.33657	.03705	.000005
114	162.8700	160.5886	2.28137	-1.95923	2.56811	.184631	9.20075	2.38437	.155595
115	173.3600	171.9009	1.45909	.03825	1.64248	.061987	1.03709	1.46623	.006632
116	163.4500	163.0268	.42319	-1.52871	.47638	.166334	7.46756	.43856	.004272
117	186.0600	186.4699	-.40993	2.61080	-.46145	.071845	1.39319	-.41263	.000706
118	170.7500	170.9179	-.16786	-.13533	-.18896	.063309	1.08179	-.16872	.000092
119	166.8300	167.4990	-.66904	-.73901	-.75313	.072013	1.39971	-.67346	.001888
120	174.0600	170.9166	3.14339	-.13555	3.53847	.117873	3.75009	3.19972	.114207
123	165.2900	165.1876	.10239	-1.14716	.11526	.071896	1.39517	.10306	.000044
124	181.0200	180.7146	.30542	1.59454	.34381	.193354	10.09075	.32061	.003085
125	170.4500	172.2417	-1.79175	.09843	-2.01695	.194075	10.16606	-1.88155	.107056
126	174.5300	174.1559	.37407	.43644	.42109	.063783	1.09807	.37601	.000462
127	167.3700	167.5403	-.17032	-.73173	-.19173	.061104	1.00777	-.17113	.000088
128	180.0800	179.6663	.41368	1.40944	.46568	.122392	4.04317	.42169	.002139
129	167.3700	167.5403	-.17032	-.73173	-.19173	.061104	1.00777	-.17113	.000088
130	173.5400	172.8564	.68362	.20696	.76955	.098928	2.64153	.69221	.003765
132	174.0600	170.9166	3.14339	-.13555	3.53847	.117873	3.75009	3.19972	.114207
133	174.5700	174.4073	.16275	.48081	.18321	.081063	1.77361	.16412	.000142
134	184.1500	184.8193	-.66927	2.31933	-.75338	.114376	3.53088	-.68055	.004864
135	165.8800	165.5789	.30112	-1.07807	.33896	.061354	1.01600	.30256	.000277
138	167.8800	164.3136	3.56642	-1.30149	4.01468	.080543	1.75093	3.59598	.067349
140	176.8000	177.0922	-.29224	.95492	-.32897	.075410	1.53486	-.29436	.000396
141	162.3700	163.1284	-.75842	-1.51076	-.85375	.066407	1.19026	-.76268	.002059
142	177.1100	173.8555	3.25449	.38339	3.66353	.108377	3.17022	3.30366	.102921
143	165.1300	165.0758	.05420	-1.16690	.06101	.088649	2.12111	.05474	.000019
144	167.3800	167.5395	-.15947	-.73187	-.17951	.061320	1.01491	-.16023	.000078
145	160.8900	161.2856	-.39561	-1.83616	-.44534	.096527	2.51485	-.40034	.001199
146	179.4400	178.7616	.67844	1.24968	.76371	.090582	2.21463	.68556	.003096
147	167.3700	167.5403	-.17032	-.73173	-.19173	.061104	1.00777	-.17113	.000088
148	167.4700	166.4795	.99054	-.91905	1.11504	.059887	.96801	.99506	.002851
149	167.3700	167.5403	-.17032	-.73173	-.19173	.061104	1.00777	-.17113	.000088
150	175.2400	174.4604	.77965	.49019	.87764	.066228	1.18385	.78401	.002165
153	174.2300	174.0948	.13518	.42565	.15217	.134254	4.86484	.13834	.000277
154	174.2900	173.6877	.60228	.35376	.67798	.155968	6.56576	.62144	.007542
155	168.5200	169.8053	-1.28532	-.33178	-1.44687	.072772	1.42936	-1.29401	.007119
156	170.7500	170.9179	-.16786	-.13533	-.18896	.063309	1.08179	-.16872	.000092
157	163.4600	163.0981	.36194	-1.51612	.40743	.170049	7.80486	.37571	.003277

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
158	186.0600	186.4699	-.40993	2.61080	-.46145	.071845	1.39319	-.41263	.000706
159	173.3600	171.9009	1.45909	.03825	1.64248	.061987	1.03709	1.46623	.006632
160	162.8700	160.5886	2.28137	-1.95923	2.56811	.184631	9.20075	2.38437	.155595
161	161.6200	161.5832	.03682	-1.78362	.04145	.070370	1.33657	.03705	.000005
162	178.8800	179.2789	-.39891	1.34103	-.44905	.063982	1.10493	-.40099	.000528
163	170.8700	172.0716	-1.20164	.06840	-1.35268	.074466	1.49668	-1.21015	.006520
164	170.5900	171.2535	-.66347	-.07607	-.74686	.065032	1.14149	-.66704	.001511
165	174.8600	176.1377	-1.27769	.78637	-1.43828	.072219	1.40772	-1.28620	.006927
166	183.2800	183.5269	-.24693	2.09114	-.27797	.091616	2.26547	-.24959	.000420
167	170.5400	170.7160	-.17603	-.17097	-.19815	.060645	.99266	-.17685	.000092
168	168.3800	168.7867	-.40669	-.51164	-.45781	.060256	.97996	-.40857	.000487
169	174.1200	174.7053	-.58533	.53345	-.65890	.075416	1.53511	-.58958	.001587
170	166.0700	166.5196	-.44962	-.91196	-.50613	.061056	1.00616	-.45175	.000611
171	175.7900	175.7048	.08519	.70993	.09590	.064797	1.13326	.08565	.000025
172	172.0800	171.6923	.38766	.00142	.43639	.082899	1.85487	.39107	.000844
173	167.0400	167.3027	-.26276	-.77367	-.29578	.068845	1.27928	-.26434	.000266
174	172.2700	172.0671	.20287	.06761	.22836	.061263	1.01301	.20384	.000125
175	175.4900	175.0514	.43858	.59456	.49371	.153365	6.34849	.45206	.003859
176	173.7400	174.7563	-1.01631	.54245	-1.14405	.062590	1.05736	-1.02138	.003281
177	166.8300	167.4990	-.66904	-.73901	-.75313	.072013	1.39971	-.67346	.001888
178	172.0400	171.5237	.51628	-.02835	.58117	.062063	1.03964	.51881	.000832
180	164.6100	164.7877	-.17770	-1.21777	-.20004	.075083	1.52160	-.17898	.000145
182	167.2000	166.2387	.96126	-.96155	1.08208	.079722	1.71541	.96906	.004792
183	177.1200	176.9523	.16766	.93021	.18874	.072291	1.41052	.16878	.000120
184	166.0400	165.3316	.70844	-1.12174	.79748	.058785	.93270	.71155	.001405
185	178.7200	178.5291	.19089	1.20864	.21488	.087383	2.06095	.19275	.000228
186	169.3900	168.8668	.52316	-.49749	.58892	.107437	3.11545	.53093	.002612
187	165.4300	165.3574	.07257	-1.11717	.08169	.058596	.92673	.07289	.000015
188	168.4800	167.8843	.59570	-.67099	.67058	.064228	1.11344	.59883	.001188
189	171.5000	172.5144	-1.01437	.14658	-1.14187	.072280	1.41010	-1.02113	.004374
190	163.7700	164.0792	-.30917	-1.34288	-.34803	.076331	1.57259	-.31147	.000454
191	175.7500	175.9916	-.24159	.76057	-.27196	.092836	2.32621	-.24426	.000413
192	171.1000	171.2497	-.14972	-.07673	-.16854	.065600	1.16153	-.15054	.000078
193	177.7700	177.5783	.19167	1.04075	.21576	.117329	3.71556	.19507	.000421
194	174.5500	174.4402	.10979	.48663	.12359	.122287	4.03621	.11191	.000150
195	180.2800	179.3702	.90976	1.35716	1.02410	.156214	6.58652	.93879	.017267
196	172.3100	172.6249	-.31493	.16610	-.35451	.061191	1.01063	-.31643	.000301
197	161.9000	162.0129	-.11287	-1.70775	-.12706	.059997	.97158	-.11339	.000037
198	170.8600	170.7887	.07129	-.15814	.08025	.103242	2.87694	.07227	.000045
199	163.6200	163.3329	.28714	-1.47466	.32323	.113128	3.45427	.29187	.000875
200	179.0100	178.6163	.39372	1.22403	.44321	.077659	1.62781	.39675	.000762
202	168.5000	169.1306	-.63065	-.45091	-.70991	.060457	.98652	-.63358	.001178
203	175.1300	173.9259	1.20415	.39581	1.35549	.154430	6.43696	1.24167	.029520
204	173.9800	174.5193	-.53926	.50059	-.60704	.086534	2.02110	-.54443	.001782
205	177.4200	177.2149	.20512	.97657	.23091	.064923	1.13766	.20623	.000144
206	185.9600	184.2184	1.74159	2.21323	1.96049	.087543	2.06852	1.75867	.019031
207	165.9800	167.1342	-1.15417	-.80344	-1.29924	.116094	3.63775	-1.17423	.014920
208	168.2400	168.7488	-.50877	-.51834	-.57272	.060064	.97375	-.51111	.000757
209	167.8800	168.5147	-.63474	-.55967	-.71451	.060687	.99406	-.63771	.001203
210	176.4200	175.8408	.57922	.73394	.65202	.063867	1.10096	.58223	.001110
212	170.4700	171.1405	-.67047	-.09602	-.75474	.061203	1.01101	-.67367	.001365
213	170.0200	169.1800	.84000	-.44220	.94557	.102165	2.81719	.85126	.006072
214	174.9200	174.8244	.09564	.55447	.10766	.068318	1.25975	.09621	.000035
215	179.4200	178.7841	.63594	1.25366	.71587	.131086	4.63797	.65010	.005831
216	172.0800	173.2666	-1.18657	.27940	-1.33571	.069272	1.29520	-1.19383	.005491
217	177.1500	177.8933	-.74330	1.09637	-.83672	.069632	1.30867	-.74790	.002177
218	161.7800	162.2835	-.50349	-1.65996	-.56678	.057524	.89314	-.50561	.000679
219	175.9500	175.8055	.14447	.72772	.16263	.080708	1.75813	.14567	.000111
220	169.9500	170.1677	-.21774	-.26779	-.24511	.062201	1.04426	-.21882	.000149
221	175.3400	175.6965	-.35652	.70847	-.40133	.071306	1.37236	-.35883	.000526
222	168.7900	169.0038	-.21382	-.47331	-.24070	.070782	1.35225	-.21519	.000186

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
223	167.1700	166.8367	.33328	-.85597	.37517	.106389	3.05496	.33813	.001039
224	165.3100	165.7856	-.47559	-1.04157	-.53536	.058802	.93325	-.47768	.000633
225	175.8200	174.8122	1.00781	.55232	1.13448	.119444	3.85073	1.02637	.012066
226	170.1200	168.7785	1.34146	-.51309	1.51007	.066374	1.18908	1.34899	.006437
227	163.6500	163.9706	-.32063	-1.36205	-.36093	.064040	1.10691	-.32231	.000342
228	172.6800	172.5055	.17450	.14501	.19643	.074319	1.49080	.17573	.000137
229	181.5100	181.3978	.11224	1.71517	.12635	.083410	1.87780	.11324	.000072
230	176.9800	178.5554	-1.57544	1.21329	-1.77345	.095829	2.47864	-1.59399	.018733
231	170.8100	170.6096	.20041	-.18976	.22560	.065758	1.16710	.20151	.000141
232	176.1300	176.2110	-.08096	.79931	-.09114	.069903	1.31889	-.08147	.000026
234	167.6700	166.7513	.91869	-.87105	1.03415	.066466	1.19238	.92386	.003027
Minimum	160.7400	160.5886	-3.70647	-1.95923	-4.17232	.057524	.89314	-3.72250	.000001
Maximum	192.4300	192.6281	3.56642	3.69818	4.01468	.194075	10.16606	3.59598	.155595
Mean	171.6860	171.6843	.00177	.00000	.00199	.081416	2.00000	.00391	.007049
Median	171.1000	171.2497	-.15947	-.07673	-.17951	.070782	1.35225	-.16023	.000832

Case 3

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(267)	p-level
ATO	.993549	.993549	.993549	1.000000	1.000000	143.159	0.00
STO	.998847	.998847	.998847	1.000000	1.000000	339.955	0.00
VTO	.992860	.992860	.992860	1.000000	1.000000	136.010	0.00
APHV	.996630	.996630	.996630	1.000000	1.000000	198.520	0.00
SPHV	.999896	.999896	.999896	1.000000	1.000000	1132.187	0.00
PHV	.985617	.985617	.985617	1.000000	1.000000	95.300	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99989587 R2= .99979175 Adjusted R2= .99979097
F(1,267)=1282E3 p<0.0000 Std.Error of estimate: 2.4814

N=268	BETA	St. Err. of BETA	B	St. Err. of B	t(267)	p-level
SPHV	.999896	.000883	1.103950	.000975	1132.187	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.907268 R2=.823136 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	7651.092	1	7651.092	1242.632	0.00
Residual	1643.963	267	6.157		
Total	9295.056				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(266)	p-level
ATO	-.074027	-.538776	-.007775	.011031	.011031	-10.4305	.000000
STO	-.387320	-.922797	-.013317	.001182	.001182	-39.0628	0.000000
VTO	.036360	.309757	.004470	.015114	.015114	5.3133	.000000
APHV	-.014578	-.080427	-.001161	.006338	.006338	-1.3160	.189309
PHV	.066683	.834881	.012048	.032644	.032644	24.7379	0.000000

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(267)	p-level
SPHV	.999896	.999896	.999896	1.000000	0.00	1132.187	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999896	.999792	.999792	1281848.	0.00	1

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99998454 R2= .99996909 Adjusted R2= .99996885
REGRESS. F(2,266)=4302E3 p<0.0000 Std.Error of estimate: .95783

N=268	BETA	St. Err. of BETA	B	St. Err. of B	t(266)	p-level
SPHV	1.386987	.009915	1.531324	.010947	139.8832	0.00
STO	-.387320	.009915	-.494138	.012650	-39.0628	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.986785 R2=.973745 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	9051.017	2	4525.508	4932.757	0.00
Residual	244.039	266	.917		
Total	9295.056				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(265)	p-level
ATO	-.002959	-.046008	-.000256	.007472	.000801	-.74975	.454070
VTO	.015796	.342530	.001904	.014537	.000959	5.93501	.000000
APHV	-.012518	-.179225	-.000996	.006337	.001006	-2.96558	.003297
PHV	.021758	.426974	.002374	.011904	.000324	7.68652	.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(266)	p-level
SPHV	1.386987	.993271	.047687	.001182	.998818	139.8832	0.00
STO	-.387320	-.922797	-.013317	.001182	.998818	-39.0628	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999896	.999792	.999792	1281848.	0.00	1
STO	2	.999985	.999969	.000177	1526.	0.00	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS
case 1 to 274

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	171.2900	171.6982	-.40819	.02965	-.42616	.072827	1.54933	-.41056	.000531
2	181.9000	180.7409	1.15910	1.53973	1.21013	.080682	1.90157	1.16739	.005270
3	175.5500	176.6129	-1.06293	.85038	-1.10972	.086235	2.17233	-1.07161	.005073
4	174.6000	174.7615	-.16150	.54121	-.16861	.069158	1.39713	-.16235	.000075
5	174.9700	177.2322	-2.26222	.95380	-2.36182	.104465	3.18787	-2.28946	.033980
6	160.0100	159.8927	.11728	-1.94178	.12244	.107757	3.39194	.11878	.000097
7	166.0700	165.3398	.73022	-1.03216	.76237	.080118	1.87505	.73537	.002062
8	172.9800	173.6443	-.66434	.35465	-.69359	.077975	1.77612	-.66877	.001615
9	169.3600	170.5105	-1.15047	-.16869	-1.20112	.098590	2.83938	-1.16279	.007807
10	171.0800	171.6575	-.57751	.02286	-.60294	.075964	1.68567	-.58117	.001158
11	171.3300	171.5780	-.24799	.00958	-.25890	.062368	1.13628	-.24904	.000143
12	171.5000	171.5230	-.02299	.00040	-.02401	.066299	1.28402	-.02311	.000001
13	179.9700	182.0405	-2.07050	1.75675	-2.16165	.148160	6.41235	-2.12125	.058676
14	175.8400	176.1208	-.28081	.76820	-.29317	.068026	1.35178	-.28223	.000219
15	165.0800	165.2165	-.13647	-1.05275	-.14248	.057354	.96091	-.13697	.000037
16	185.4900	185.7206	-.23056	2.37130	-.24071	.069303	1.40302	-.23177	.000153
17	177.4200	177.1813	.23868	.94530	.24919	.066440	1.28949	.23983	.000151
18	170.5800	170.4717	.10828	-.17516	.11304	.114673	3.84130	.10985	.000094
19	171.0800	171.6575	-.57751	.02286	-.60294	.075964	1.68567	-.58117	.001158
20	185.4900	185.7206	-.23056	2.37130	-.24071	.069303	1.40302	-.23177	.000153
21	163.5000	163.4588	.04123	-1.34627	.04304	.056496	.93238	.04137	.000003
22	180.1800	179.8002	.37979	1.38264	.39651	.061963	1.12158	.38139	.000332
23	160.7400	160.6904	.04958	-1.80857	.05176	.058475	.99884	.04976	.000005
24	172.7100	172.9219	-.21188	.23400	-.22121	.059106	1.02052	-.21269	.000094
25	173.3300	173.6431	-.31311	.35444	-.32690	.061620	1.10918	-.31441	.000223
26	176.2500	176.3141	-.06415	.80049	-.06697	.069774	1.42216	-.06449	.000012
27	172.6100	172.5500	.05997	.17191	.06261	.068686	1.37813	.06028	.000010
28	163.7800	164.1209	-.34087	-1.23571	-.35587	.056158	.92125	-.34204	.000219
29	174.0600	174.6024	-.54240	.51464	-.56628	.070957	1.47079	-.54540	.000890
30	167.0700	172.9801	-5.91006	.24372	-6.17026	.124117	4.50006	-6.01100	.330650
31	175.7300	176.3624	-.63235	.80854	-.66019	.067721	1.33968	-.63553	.001100
32	166.7500	167.1726	-.42262	-.72609	-.44123	.064459	1.21374	-.42455	.000445
33	169.5200	167.7276	1.79243	-.63341	1.87135	.089520	2.34100	1.80823	.015566
34	168.3200	168.5800	-.26004	-.49106	-.27149	.058737	1.00780	-.26102	.000140
35	167.7100	167.4949	.21509	-.67226	.22456	.069897	1.42718	.21624	.000136
36	171.9900	171.7924	.19759	.04539	.20628	.061063	1.08922	.19839	.000087

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
37	179.1900	179.1208	.06920	1.26918	.07225	.064785	1.22605	.06952	.000012
38	166.9900	167.1669	-.17685	-.72705	-.18464	.060812	1.08026	-.17757	.000069
39	167.0500	167.4546	-.40456	-.67901	-.42237	.060416	1.06626	-.40617	.000358
40	168.0000	168.0885	-.08855	-.57313	-.09245	.058076	.98524	-.08887	.000016
42	184.2800	184.4352	-.15523	2.15666	-.16206	.073419	1.57462	-.15615	.000078
43	177.4400	178.0873	-.64728	1.09659	-.67577	.108452	3.43583	-.65568	.003004
44	175.6100	175.3028	.30724	.63159	.32076	.060835	1.08108	.30848	.000209
45	171.1600	171.6385	-.47853	.01969	-.49960	.084377	2.07972	-.48227	.000984
46	177.4000	177.4579	-.05794	.99149	-.06049	.080900	1.91187	-.05835	.000013
47	166.8700	168.3527	-1.48267	-.52903	-1.54794	.148004	6.39888	-1.51893	.030022
48	173.4400	173.0833	.35672	.26096	.37242	.059042	1.01829	.35808	.000266
49	159.3200	159.6838	-.36375	-1.97668	-.37977	.055706	.90647	-.36499	.000246
50	183.2600	183.0175	.24246	1.91991	.25314	.062947	1.15745	.24351	.000140
51	171.4800	172.0539	-.57393	.08906	-.59920	.105313	3.23980	-.58095	.002224
52	172.6300	172.7605	-.13046	.20705	-.13621	.075032	1.64457	-.13127	.000058
53	168.9000	169.1471	-.24715	-.39635	-.25803	.069259	1.40122	-.24845	.000176
54	176.2100	175.5772	.63278	.67743	.66064	.086640	2.19278	.63800	.001815
55	172.8300	171.7160	1.11403	.03262	1.16307	.088551	2.29057	1.12363	.005881
56	170.0900	170.4812	-.39119	-.17358	-.40841	.060242	1.06014	-.39274	.000333
57	167.3100	167.6525	-.34248	-.64595	-.35756	.059164	1.02254	-.34380	.000246
58	180.6500	178.7283	1.92171	1.20363	2.00631	.175147	8.96109	1.98819	.072033
59	172.1700	171.6377	.53232	.01955	.55575	.103447	3.12604	.53860	.001844
60	176.3100	176.6649	-.35492	.85907	-.37054	.061623	1.10927	-.35639	.000287
62	168.4100	168.4240	-.01404	-.51711	-.01466	.069288	1.40242	-.01411	.000001
63	175.6400	175.8686	-.22858	.72608	-.23864	.060126	1.05605	-.22948	.000113
64	154.8400	155.2972	-.45720	-2.70920	-.47733	.090590	2.39727	-.46133	.001038
65	165.8700	165.8001	.06985	-.95528	.07293	.064528	1.21635	.07017	.000012
66	165.4500	164.7527	.69731	-1.13020	.72801	.068104	1.35487	.70085	.001353
67	161.4800	161.7015	-.22147	-1.63973	-.23122	.065486	1.25271	-.22251	.000126
68	172.1400	172.6623	-.52231	.19066	-.54530	.061075	1.08963	-.52444	.000609
69	179.8400	180.5859	-.74593	1.51385	-.77877	.130285	4.95843	-.75999	.005824
70	171.0200	173.2356	-2.21562	.28640	-2.31317	.186138	10.12112	-2.30258	.109123
71	172.0100	172.3200	-.31000	.13349	-.32365	.060397	1.06559	-.31124	.000210
72	170.0500	170.7237	-.67366	-.13309	-.70332	.071683	1.50102	-.67745	.001401
73	166.6200	166.5511	.06892	-.82988	.07196	.058322	.99363	.06918	.000010
74	172.3100	173.2239	-.91389	.28444	-.95413	.060100	1.05514	-.91751	.001806
75	184.3200	183.5456	.77440	2.00810	.80849	.064321	1.20853	.77791	.001487
76	179.7000	179.0753	.62466	1.26159	.65217	.061508	1.10516	.62725	.000884
77	168.3600	165.3324	3.02756	-1.03338	3.16085	.154451	6.96848	3.10838	.136919
78	172.2700	172.1770	.09297	.10962	.09706	.065989	1.27202	.09342	.000023
79	173.0400	173.2388	-.19882	.28693	-.20758	.059282	1.02659	-.19959	.000083
80	173.7200	173.5510	.16902	.33906	.17646	.078052	1.77960	.17015	.000105
81	161.0900	161.4860	-.39597	-1.67572	-.41340	.057408	.96272	-.39739	.000309
82	171.8600	171.8177	.04227	.04962	.04413	.061070	1.08948	.04244	.000004
83	163.3200	162.6004	.71962	-1.48962	.75130	.073237	1.56680	.72385	.001669
84	176.9200	180.5823	-3.66234	1.51325	-3.82358	.206680	12.47824	-3.84119	.374405
85	171.8700	172.2530	-.38300	.12230	-.39986	.066771	1.30235	-.38487	.000392
86	169.6400	169.7614	-.12144	-.29377	-.12679	.060559	1.07130	-.12193	.000032
87	173.7200	173.8760	-.15601	.39333	-.16287	.059350	1.02895	-.15661	.000051
88	164.2000	163.7610	.43904	-1.29581	.45837	.069164	1.39740	.44134	.000554
89	160.8400	160.1599	.68011	-1.89717	.71006	.089367	2.33296	.68609	.002233
90	173.5700	173.9479	-.37790	.40534	-.39454	.060957	1.08544	-.37944	.000318
91	168.2200	168.0077	.21227	-.58663	.22161	.060604	1.07289	.21312	.000099
92	172.6200	172.6852	-.06516	.19447	-.06802	.063446	1.17588	-.06544	.000010
93	175.6100	176.2778	-.66785	.79443	-.69725	.086052	2.16310	-.67328	.001994
94	172.0100	172.3456	-.33557	.13776	-.35035	.059361	1.02934	-.33687	.000238
95	176.9000	177.2347	-.33475	.95422	-.34948	.068575	1.37369	-.33647	.000316
96	169.1200	169.0389	.08113	-.41443	.08470	.072652	1.54187	.08160	.000021
97	173.9500	174.0428	-.09277	.42118	-.09686	.060585	1.07221	-.09315	.000019
98	172.2500	170.4455	1.80450	-.17954	1.88395	.086531	2.18724	1.81935	.014723
99	165.4100	165.5431	-.13313	-.99820	-.13899	.056846	.94398	-.13360	.000034
100	169.0000	169.3495	-.34947	-.36257	-.36486	.058150	.98778	-.35076	.000247

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
101	180.0100	179.8870	.12302	1.39713	.12843	.067180	1.31837	.12362	.000041
102	181.1900	181.9201	-.73009	1.73664	-.76223	.096355	2.71211	-.73755	.003000
103	168.3000	167.9966	.30341	-.58849	.31676	.083106	2.01753	.30571	.000383
104	171.0100	170.6075	.40254	-.15249	.42026	.058479	.99899	.40405	.000332
105	169.9800	169.6369	.34309	-.31457	.35820	.058070	.98507	.34436	.000238
106	177.5900	178.1604	-.57037	1.10880	-.59548	.061101	1.09058	-.57270	.000727
107	155.8900	155.8051	.08488	-2.62439	.08862	.091340	2.43714	.08566	.000036
108	179.1500	179.1289	.02113	1.27053	.02206	.061136	1.09183	.02122	.000001
109	174.6400	173.5476	1.09239	.33849	1.14049	.081207	1.92640	1.10030	.004743
110	170.0600	170.1919	-.13193	-.22188	-.13774	.058038	.98398	-.13241	.000035
111	171.7000	172.4015	-.70152	.14710	-.73241	.070850	1.46636	-.70538	.001484
112	167.8100	167.1638	.64624	-.72757	.67469	.080339	1.88545	.65082	.001624
113	174.6800	174.2913	.38867	.46269	.40578	.059799	1.04457	.39019	.000323
114	164.8100	164.9678	-.15784	-1.09427	-.16479	.056241	.92397	-.15838	.000047
115	157.7600	155.3069	2.45313	-2.70759	2.56113	.096816	2.73813	2.47845	.034204
116	174.6300	175.0167	-.38667	.58382	-.40370	.094468	2.60693	-.39047	.000808
117	170.9900	170.9888	.00121	-.08881	.00126	.061285	1.09715	.00121	.000000
118	175.9100	176.5701	-.66005	.84322	-.68911	.061224	1.09495	-.66276	.000978
119	184.2300	184.2165	.01353	2.12012	.01413	.063369	1.17303	.01359	.000000
120	172.2600	171.8006	.45937	.04676	.47959	.150733	6.63704	.47103	.002995
121	173.7200	173.6806	.03937	.36071	.04110	.061841	1.11713	.03953	.000004
122	169.6500	169.1047	.54529	-.40344	.56929	.117296	4.01908	.55359	.002505
123	164.4300	164.7039	-.27388	-1.13835	-.28594	.070503	1.45200	-.27537	.000224
124	170.3500	170.8678	-.51776	-.10902	-.54056	.058790	1.00963	-.51972	.000555
125	173.3900	173.9028	-.51280	.39781	-.53538	.083886	2.05559	-.51677	.001116
126	177.0400	175.7641	1.27591	.70863	1.33208	.116030	3.93275	1.29491	.013410
128	170.3100	170.4324	-.12245	-.18171	-.12784	.063504	1.17803	-.12299	.000036
129	172.7000	172.8033	-.10332	.21420	-.10787	.066014	1.27302	-.10381	.000028
130	176.2300	175.2328	.99719	.61991	1.04109	.101067	2.98383	1.00842	.006170
131	183.3200	184.1511	-.83112	2.10921	-.86771	.137078	5.48897	-.84849	.008036
132	169.5700	169.1927	.37729	-.38874	.39390	.062858	1.15421	.37892	.000337
133	173.4800	172.6826	.79736	.19405	.83247	.068444	1.36844	.80146	.001787
134	168.5700	168.6738	-.10379	-.47540	-.10836	.075043	1.64505	-.10443	.000036
135	165.6400	166.5441	-.90413	-.83104	-.94393	.091191	2.42916	-.91240	.004112
136	180.9400	178.3247	2.61528	1.13624	2.73042	.082349	1.98095	2.63476	.027965
137	157.1000	156.8746	.22543	-2.44579	.23536	.077864	1.77103	.22693	.000185
138	173.7800	174.8215	-1.04146	.55122	-1.08731	.104609	3.19668	-1.05403	.007222
139	167.8200	167.2330	.58702	-.71601	.61286	.064791	1.22626	.58972	.000867
140	174.6300	175.0167	-.38667	.58382	-.40370	.094468	2.60693	-.39047	.000808
141	176.4600	177.1179	-.65785	.93470	-.68681	.062023	1.12375	-.66062	.000997
142	161.8600	161.2756	.58443	-1.71086	.61016	.067964	1.34933	.58738	.000947
143	159.6400	159.1587	.48134	-2.06436	.50253	.055706	.90650	.48297	.000430
144	163.9400	163.8737	.06635	-1.27699	.06927	.058868	1.01233	.06660	.000009
145	174.9100	175.0128	-.10281	.58317	-.10734	.090655	2.40069	-.10374	.000053
146	154.4100	153.9761	.43388	-2.92981	.45299	.069150	1.39682	.43616	.000540
147	173.1000	172.9995	.10052	.24696	.10495	.059405	1.03087	.10091	.000021
148	168.3200	168.1374	.18260	-.56497	.19064	.060842	1.08134	.18334	.000074
149	168.6200	168.5719	.04810	-.49242	.05021	.064399	1.21147	.04831	.000006
150	173.7400	173.9453	-.20529	.40491	-.21433	.077432	1.75145	-.20664	.000152
151	183.9700	181.1866	2.78339	1.61416	2.90593	.134985	5.32264	2.83979	.087288
152	169.4100	169.4588	-.04884	-.34430	-.05099	.094702	2.61982	-.04933	.000013
153	167.9600	167.9702	-.01016	-.59290	-.01061	.086699	2.19578	-.01025	.000000
154	174.1500	174.3287	-.17870	.46893	-.18656	.061535	1.10611	-.17944	.000072
155	171.2700	172.5891	-1.31906	.17843	-1.37713	.133248	5.18653	-1.34509	.019083
156	174.6400	173.6811	.95892	.36078	1.00114	.144947	6.13724	.98140	.012020
157	162.3600	161.9397	.42032	-1.59995	.43882	.122899	4.41218	.42735	.001639
158	169.4900	168.2641	1.22594	-.54382	1.27991	.067774	1.34179	1.23211	.004142
159	171.7000	172.4015	-.70152	.14710	-.73241	.070850	1.46636	-.70538	.001484
160	170.0600	170.1919	-.13193	-.22188	-.13774	.058038	.98398	-.13241	.000035
161	174.6400	173.5476	1.09239	.33849	1.14049	.081207	1.92640	1.10030	.004743
162	179.1500	179.1289	.02113	1.27053	.02206	.061136	1.09183	.02122	.000001
163	155.8900	155.8051	.08488	-2.62439	.08862	.091340	2.43714	.08566	.000036

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
164	177.5900	178.1604	-.57037	1.10880	-.59548	.061101	1.09058	-.57270	.000727
165	169.9800	169.6369	.34309	-.31457	.35820	.058070	.98507	.34436	.000238
166	171.0100	170.6075	.40254	-.15249	.42026	.058479	.99899	.40405	.000332
167	168.3000	167.9966	.30341	-.58849	.31676	.083106	2.01753	.30571	.000383
168	181.1700	181.9876	-.81757	1.74791	-.85356	.084084	2.06531	-.82392	.002851
169	174.7600	175.2304	-.47037	.61950	-.49108	.059738	1.04246	-.47220	.000473
170	180.0100	179.8731	.13687	1.39482	.14290	.067556	1.33319	.13756	.000051
171	169.6500	169.3495	.30052	-.36257	.31375	.058150	.98778	.30163	.000183
172	172.0100	172.3456	-.33557	.13776	-.35035	.059361	1.02934	-.33687	.000238
173	176.9000	177.2347	-.33475	.95422	-.34948	.068575	1.37369	-.33647	.000316
174	169.1200	169.0389	.08113	-.41443	.08470	.072652	1.54187	.08160	.000021
175	173.9500	174.0428	-.09277	.42118	-.09686	.060585	1.07221	-.09315	.000019
176	172.2500	170.4455	1.80450	-.17954	1.88395	.086531	2.18724	1.81935	.014723
177	165.4100	165.5431	-.13313	-.99820	-.13899	.056846	.94398	-.13360	.000034
178	173.8900	171.9875	1.90251	.07796	1.98627	.117797	4.05345	1.93173	.030759
179	170.5800	170.4717	.10828	-.17516	.11304	.114673	3.84130	.10985	.000094
180	179.0700	179.9822	-.91216	1.41302	-.95231	.087846	2.25422	-.91989	.003879
181	167.8100	167.1638	.64624	-.72757	.67469	.080339	1.88545	.65082	.001624
182	174.6800	174.2913	.38867	.46269	.40578	.059799	1.04457	.39019	.000323
183	164.8100	164.9678	-.15784	-1.09427	-.16479	.056241	.92397	-.15838	.000047
184	166.8700	168.3527	-1.48267	-.52903	-1.54794	.148004	6.39888	-1.51893	.030022
185	161.1300	161.4427	-.31265	-1.68295	-.32642	.065326	1.24660	-.31411	.000250
186	165.6700	166.4312	-.76122	-.84990	-.79473	.061004	1.08712	-.76432	.001291
187	165.8700	165.8001	.06985	-.95528	.07293	.064528	1.21635	.07017	.000012
188	173.4400	173.0833	.35672	.26096	.37242	.059042	1.01829	.35808	.000266
189	159.3200	159.6838	-.36375	-1.97668	-.37977	.055706	.90647	-.36499	.000246
190	177.4000	177.4579	-.05794	.99149	-.06049	.080900	1.91187	-.05835	.000013
191	171.1600	171.6385	-.47853	.01969	-.49960	.084377	2.07972	-.48227	.000984
192	175.6200	175.2924	.32761	.62986	.34203	.060828	1.08085	.32893	.000238
193	171.4800	172.0539	-.57393	.08906	-.59920	.105313	3.23980	-.58095	.002224
194	172.6300	172.7605	-.13046	.20705	-.13621	.075032	1.64457	-.13127	.000058
195	168.9000	169.1471	-.24715	-.39635	-.25803	.069259	1.40122	-.24845	.000176
196	176.2100	175.5772	.63278	.67743	.66064	.086640	2.19278	.63800	.001815
197	166.2900	164.8046	1.48537	-1.12153	1.55076	.187258	10.24324	1.54440	.049683
198	172.8300	171.7160	1.11403	.03262	1.16307	.088551	2.29057	1.12363	.005881
199	170.2400	170.6086	-.36862	-.15230	-.38485	.060555	1.07118	-.37010	.000298
200	180.6500	178.7283	1.92171	1.20363	2.00631	.175147	8.96109	1.98819	.072033
201	172.0700	171.5219	.54814	.00021	.57227	.092885	2.52026	.55335	.001569
202	176.3100	176.6649	-.35492	.85907	-.37054	.061623	1.10927	-.35639	.000287
204	160.6100	160.4681	.14194	-1.84570	.14819	.056662	.93786	.14244	.000039
205	175.6400	175.8686	-.22858	.72608	-.23864	.060126	1.05605	-.22948	.000113
206	163.9900	163.9566	.03343	-1.26315	.03490	.057376	.96164	.03355	.000002
207	172.1400	172.6875	-.54750	.19486	-.57160	.061181	1.09341	-.54974	.000672
208	168.3600	165.3324	3.02756	-1.03338	3.16085	.154451	6.96848	3.10838	.136919
209	168.7900	168.2056	.58441	-.55359	.61014	.132085	5.09638	.59574	.003678
210	171.0200	173.2356	-2.21562	.28640	-2.31317	.186138	10.12112	-2.30258	.109123
211	170.1700	170.7121	-.54210	-.13502	-.56597	.058253	.99129	-.54411	.000597
212	171.7400	171.7861	-.04607	.04433	-.04809	.060399	1.06564	-.04625	.000005
213	172.2000	172.6568	-.45682	.18974	-.47693	.060728	1.07728	-.45866	.000461
214	167.5000	172.7988	-5.29877	.21344	-5.53205	.147381	6.34517	-5.42726	.380069
215	172.9700	172.9795	-.00954	.24363	-.00996	.063609	1.18192	-.00958	.000000
216	173.7100	173.1459	.56412	.27141	.58895	.074952	1.64105	.56759	.001075
217	170.0500	169.6249	.42508	-.31657	.44379	.063467	1.17667	.42695	.000436
218	172.8200	172.5094	.31064	.16512	.32431	.064507	1.21556	.31205	.000241
219	168.3400	167.9514	.38858	-.59603	.40569	.057968	.98158	.39001	.000304
220	172.3400	172.6819	-.34195	.19393	-.35700	.074682	1.62923	-.34404	.000392
221	175.6000	174.9438	.65617	.57165	.68506	.064325	1.20869	.65915	.001068
222	179.7000	179.0753	.62466	1.26159	.65217	.061508	1.10516	.62725	.000884
223	182.9700	183.2462	-.27621	1.95810	-.28838	.062942	1.15727	-.27741	.000181
224	172.3100	173.2239	-.91389	.28444	-.95413	.060100	1.05514	-.91751	.001806
225	155.2800	153.0827	2.19725	-3.07900	2.29399	.094408	2.60362	2.21881	.026066
227	169.8200	168.8715	.94855	-.44239	.99031	.089250	2.32690	.95686	.004332

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
228	166.6200	166.5511	.06892	-.82988	.07196	.058322	.99363	.06918	.000010
229	170.2200	170.9494	-.72940	-.09539	-.76151	.072317	1.52771	-.73358	.001672
230	172.0100	172.3200	-.31000	.13349	-.32365	.060397	1.06559	-.31124	.000210
231	179.8400	180.5859	-.74593	1.51385	-.77877	.130285	4.95843	-.75999	.005824
232	167.3600	167.0655	.29446	-.74397	.30743	.080993	1.91624	.29658	.000343
233	171.8700	172.2530	-.38300	.12230	-.39986	.066771	1.30235	-.38487	.000392
234	166.8400	166.9124	-.07242	-.76954	-.07561	.056946	.94729	-.07268	.000010
235	173.0400	173.2388	-.19882	.28693	-.20758	.059282	1.02659	-.19959	.000083
236	175.5600	175.8990	-.33896	.73115	-.35388	.060697	1.07620	-.34033	.000253
237	163.3200	162.6004	.71962	-1.48962	.75130	.073237	1.56680	.72385	.001669
238	161.0900	161.4771	-.38705	-1.67721	-.40409	.057635	.97035	-.38846	.000298
239	173.3900	173.2808	.10922	.29393	.11403	.076620	1.71491	.10993	.000042
240	162.6500	162.3430	.30695	-1.53259	.32046	.072745	1.54586	.30873	.000300
241	175.7300	173.3296	2.40044	.30208	2.50612	.091907	2.46748	2.42274	.029453
242	174.8400	174.6801	.15987	.52762	.16690	.065368	1.24821	.16061	.000065
243	170.8000	170.0485	.75153	-.24584	.78461	.090287	2.38128	.75826	.002784
244	178.0700	178.3777	-.30766	1.14508	-.32121	.064659	1.22127	-.30907	.000237
245	177.7700	176.8931	.87691	.89717	.91551	.092507	2.49979	.88516	.003983
246	166.0900	164.1410	1.94902	-1.23235	2.03483	.102803	3.08722	1.97173	.024407
247	164.6800	164.8599	-.17992	-1.11230	-.18784	.058166	.98831	-.18058	.000066
248	167.5900	167.5289	.06111	-.66659	.06380	.083953	2.05885	.06158	.000016
249	175.0900	176.0422	-.95219	.75507	-.99412	.070556	1.45419	-.95739	.002711
250	178.4800	178.5286	-.04857	1.17028	-.05071	.061415	1.10180	-.04877	.000005
251	175.0000	174.9414	.05858	.57125	.06116	.059640	1.03905	.05881	.000007
252	175.1500	174.9839	.16606	.57835	.17337	.059686	1.04064	.16671	.000059
253	172.9600	172.5233	.43671	.16744	.45593	.058990	1.01650	.43837	.000397
254	165.7500	165.4878	.26218	-1.00744	.27372	.075001	1.64321	.26379	.000233
256	173.7700	173.4262	.34384	.31821	.35898	.066906	1.30764	.34553	.000317
257	177.5400	177.7914	-.25142	1.04718	-.26249	.078202	1.78646	-.25311	.000233
258	165.2100	165.4167	-.20670	-1.01931	-.21580	.065892	1.26828	-.20768	.000111
259	181.3100	178.7790	2.53099	1.21211	2.64242	.108218	3.42104	2.56372	.045725
260	174.2500	174.8096	-.55959	.54924	-.58422	.079823	1.86128	-.56350	.001202
261	175.8200	176.0900	-.26994	.76305	-.28183	.062611	1.14514	-.27110	.000171
262	171.2400	170.9527	.28734	-.09484	.29999	.066702	1.29968	.28874	.000220
263	175.8200	176.0900	-.26994	.76305	-.28183	.062611	1.14514	-.27110	.000171
264	177.5400	177.7914	-.25142	1.04718	-.26249	.078202	1.78646	-.25311	.000233
265	172.9600	172.5233	.43671	.16744	.45593	.058990	1.01650	.43837	.000397
266	178.0700	178.3777	-.30766	1.14508	-.32121	.064659	1.22127	-.30907	.000237
267	177.7700	176.8931	.87691	.89717	.91551	.092507	2.49979	.88516	.003983
268	166.0900	164.1410	1.94902	-1.23235	2.03483	.102803	3.08722	1.97173	.024407
269	164.6800	164.8599	-.17992	-1.11230	-.18784	.058166	.98831	-.18058	.000066
270	171.0500	171.5404	-.49036	.00330	-.51194	.064230	1.20512	-.49257	.000595
271	168.8500	169.2512	-.40115	-.37898	-.41881	.061599	1.10841	-.40282	.000366
272	178.4800	178.5286	-.04857	1.17028	-.05071	.061415	1.10180	-.04877	.000005
273	175.5000	176.4442	-.94424	.82221	-.98582	.070317	1.44435	-.94936	.002647
274	167.5800	167.5086	.07137	-.66997	.07451	.083775	2.05016	.07192	.000022
Minimum	154.4100	153.0827	-5.91006	-3.07900	-6.17026	.055706	.90647	-6.01100	.000000
Maximum	185.4900	185.7206	3.02756	2.37130	3.16085	.206680	12.47824	3.10838	.380069
Mean	171.5263	171.5206	.00569	.00000	.00594	.078183	2.00000	.00526	.009546
Median	172.0100	172.2530	-.06104	.12230	-.06373	.067869	1.34556	-.06142	.000317

For girls

Case 1

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(258)	p-level
ATO	.990506	.990506	.990506	1.000000	1.000000	115.733	0.00
STO	.998691	.998691	.998691	1.000000	1.000000	313.628	0.00
VTO	.992457	.992457	.992457	1.000000	1.000000	130.031	0.00
APHV	.996255	.996255	.996255	1.000000	1.000000	185.064	0.00
SPHV	.999877	.999877	.999877	1.000000	1.000000	1024.351	0.00
PHV	.986107	.986107	.986107	1.000000	1.000000	95.353	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99987708 R2= .99975418 Adjusted R2= .99975323
F(1,258)=1049E3 p<0.0000 Std.Error of estimate: 2.4899

N=259	BETA	St. Err. of BETA	B	St. Err. of B	t(258)	p-level
SPHV	.999877	.000976	1.111031	.001085	1024.351	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.838008 R2=.702257 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	3772.685	1	3772.685	608.5193	0.00
Residual	1599.543	258	6.200		
Total	5372.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(257)	p-level
ATO	-.077809	-.630938	-.009892	.016163	.016163	-13.0372	.000000
STO	-.315505	-.767350	-.012031	.001454	.001454	-19.1843	0.000000
VTO	.056981	.469272	.007358	.016673	.016673	8.5193	.000000
APHV	-.042361	-.220652	-.003460	.006670	.006670	-3.6267	.000346
PHV	.052300	.582548	.009134	.030498	.030498	11.4899	.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(258)	p-level
SPHV	.999877	.999877	.999877	1.000000	0.00	1024.351	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 挂out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999877	.999754	.999754	1049295.	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS

R= .99994946 R2= .99989893 Adjusted R2= .99989814

F(2,257)=1271E3 p<0.0000 Std.Error of estimate: 1.5997

N=259	BETA	St. Err. of BETA	B	St. Err. of B	t(257)	p-level
SPHV	1.315153	.016446	1.461355	.018274	79.9680	0.00
STO	-.315505	.016446	-.397874	.020740	-19.1843	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean

R=.936790 R2=.877576 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	4714.536	2	2357.268	921.1285	0.00
Residual	657.691	257	2.559		
Total	5372.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(256)	p-level
ATO	-.020480	-.180506	-.001815	.007852	.000706	-2.93633	.003623
VTO	.039445	.495720	.004984	.015964	.001154	9.13261	.000000
APHV	-.027964	-.226031	-.002272	.006603	.001281	-3.71257	.000252
PHV	-.004568	-.049193	-.000495	.011721	.000404	-.78805	.431397

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(257)	p-level
SPHV	1.315153	.980492	.050150	.001454	.998546	79.9680	0.00
STO	-.315505	-.767350	-.012031	.001454	.998546	-19.1843	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999877	.999754	.999754	1049295.	0.00	1
STO	2	.999949	.999899	.000145	368.	0.00	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS case 1 to 297

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	155.1000	156.0818	-.98177	-.49495	-.61371	.177504	3.18880	-.99400	.002377
2	163.6700	162.5235	1.14647	.86537	.71667	.101942	1.05176	1.15114	.001051
3	157.3000	158.7870	-1.48703	.07632	-.92956	.099584	1.00368	-1.49282	.001687
4	156.5100	158.3625	-1.85254	-.01332	-1.15804	.128732	1.67719	-1.86461	.004399
5	153.7900	154.8730	-1.08298	-.75022	-.67698	.142676	2.06022	-1.09166	.001852
6	164.1900	164.0612	.12877	1.19010	.08049	.158676	2.54822	.13005	.000033
7	158.1000	157.0773	1.02272	-.28473	.63931	.202804	4.16258	1.03943	.003393
8	155.4400	158.2437	-2.80365	-.03842	-1.75259	.120534	1.47039	-2.81966	.008819
9	149.7700	149.9419	-.17188	-1.79154	-.10744	.123871	1.55291	-.17291	.000035
10	159.6300	158.6868	.94319	.05516	.58960	.124020	1.55667	.94889	.001057
11	156.6600	157.9077	-1.24768	-.10937	-.77994	.109997	1.22454	-1.25361	.001452
13	159.6700	161.4140	-1.74402	.63107	-1.09020	.109439	1.21216	-1.75222	.002807
14	158.5500	159.0568	-.50676	.13329	-.31678	.103861	1.09173	-.50890	.000213
15	147.2800	146.7422	.53778	-2.46722	.33617	.093747	.88947	.53963	.000195
16	159.6700	161.4140	-1.74402	.63107	-1.09020	.109439	1.21216	-1.75222	.002807
17	158.5500	159.0568	-.50676	.13329	-.31678	.103861	1.09173	-.50890	.000213
18	147.2800	146.7422	.53778	-2.46722	.33617	.093747	.88947	.53963	.000195
19	161.1900	163.3407	-2.15070	1.03794	-1.34442	.105619	1.12901	-2.16011	.003974
20	158.6500	159.2149	-.56488	.16667	-.35311	.119483	1.44486	-.56805	.000352
21	157.4400	157.9644	-.52435	-.09740	-.32778	.103015	1.07401	-.52654	.000225
22	163.4300	164.4767	-1.04674	1.27784	-.65432	.104260	1.10015	-1.05120	.000917
24	151.4100	151.4958	-.08582	-1.46339	-.05364	.119322	1.44096	-.08630	.000008
25	157.4400	157.9644	-.52435	-.09740	-.32778	.103015	1.07401	-.52654	.000225
26	157.8000	159.4608	-1.66081	.21861	-1.03819	.103888	1.09230	-1.66785	.002292
27	154.1400	153.3195	.82045	-1.07826	.51287	.127378	1.64211	.82568	.000845
31	162.4500	164.9487	-2.49875	1.37752	-1.56199	.152174	2.34364	-2.52157	.011241
32	166.5100	167.4499	-.93987	1.90569	-.58752	.107591	1.17156	-.94414	.000788
33	162.9800	163.5171	-.53714	1.07520	-.33577	.111706	1.26289	-.53977	.000278
34	158.1600	155.7116	2.44844	-.57313	1.53054	.164229	2.72967	2.47452	.012609
35	155.2900	152.9581	2.33194	-1.15460	1.45772	.229395	5.32574	2.38090	.022774
36	149.4400	149.2805	.15945	-1.93119	.09968	.093647	.88757	.16000	.000017
38	152.3700	155.5997	-3.22969	-.59676	-2.01891	.297941	8.98405	-3.34575	.075865
40	161.2300	161.0185	.21146	.54756	.13218	.140884	2.00878	.21311	.000069
41	158.8700	157.0852	1.78476	-.28305	1.11567	.111827	1.26562	1.79352	.003071
42	161.5800	164.6543	-3.07425	1.31533	-1.92174	.213781	4.62541	-3.13015	.034187
43	159.6200	160.4720	-.85197	.43214	-.53258	.102502	1.06335	-.85549	.000587
44	162.6800	158.6972	3.98280	.05735	2.48969	.124552	1.57005	4.00709	.019018
46	162.0300	165.0995	-3.06946	1.40934	-1.91875	.161116	2.62719	-3.10091	.019057
48	154.5900	155.1036	-.51363	-.70151	-.32107	.097323	.95861	-.51553	.000192
49	155.7900	155.5234	.26662	-.61287	.16666	.110569	1.23731	.26790	.000067
50	160.2300	157.8681	2.36192	-.11773	1.47646	.122686	1.52334	2.37590	.006487
51	164.7400	165.4621	-.72208	1.48592	-.45138	.106650	1.15114	-.72530	.000457
52	154.8800	155.0931	-.21310	-.70373	-.13321	.182508	3.37113	-.21591	.000119
54	156.4400	156.5281	-.08810	-.40070	-.05507	.109432	1.21200	-.08852	.000007
55	156.1300	156.6438	-.51381	-.37627	-.32119	.100091	1.01392	-.51583	.000204
56	160.2000	160.4955	-.29555	.43712	-.18475	.112706	1.28560	-.29702	.000086

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
60	151.6000	151.7397	-.13971	-1.41188	-.08733	.095289	.91897	-.14021	.000014
61	160.7000	162.1427	-1.44272	.78496	-.90186	.103184	1.07754	-1.44875	.001706
62	152.2100	153.7023	-1.49228	-.99744	-.93284	.108986	1.20214	-1.49924	.002038
63	161.6700	163.4901	-1.82007	1.06948	-1.13774	.165800	2.78215	-1.83983	.007104
64	160.1800	160.9214	-.74144	.52705	-.46348	.154125	2.40413	-.74839	.001016
65	153.5000	155.0050	-1.50502	-.72234	-.94080	.097623	.96452	-1.51065	.001660
66	157.4200	155.4784	1.94162	-.62238	1.21372	.153623	2.38850	1.95969	.006920
67	156.2800	157.1353	-.85529	-.27248	-.53465	.143396	2.08106	-.86221	.001167
68	164.3000	166.0586	-1.75859	1.61189	-1.09931	.114902	1.33619	-1.76771	.003150
69	164.6900	162.9332	1.75681	.95189	1.09819	.143551	2.08556	1.77107	.004935
70	153.2900	155.1440	-1.85402	-.69298	-1.15896	.120268	1.46390	-1.86456	.003839
71	160.0800	161.6463	-1.56627	.68012	-.97909	.101403	1.04066	-1.57259	.001941
72	172.3800	172.9144	-.53439	3.05965	-.33405	.110340	1.23219	-.53695	.000268
74	153.8600	153.3065	.55345	-1.08101	.34597	.234567	5.56858	.56561	.001344
75	158.5900	159.5138	-.92384	.22981	-.57750	.132421	1.77470	-.93022	.001158
76	157.6600	160.9731	-3.31311	.53797	-2.07105	.175790	3.12750	-3.35361	.026534
77	163.1500	160.6997	2.45033	.48022	1.53172	.104716	1.10979	2.46088	.005070
78	157.5000	159.1096	-1.60957	.14444	-1.00616	.129377	1.69405	-1.62017	.003355
80	162.3900	164.5529	-2.16292	1.29393	-1.35206	.106206	1.14158	-2.17249	.004064
81	161.2900	162.9712	-1.68117	.95990	-1.05091	.105290	1.12199	-1.68848	.002413
83	159.7800	160.1497	-.36974	.36409	-.23113	.114922	1.33664	-.37165	.000139
85	163.6400	162.5886	1.05141	.87912	.65724	.106474	1.14735	1.05609	.000965
87	151.7700	151.9447	-.17474	-1.36858	-.10923	.107267	1.16451	-.17553	.000027
88	149.2400	148.9957	.24429	-1.99134	.15271	.093686	.88831	.24513	.000040
89	154.8000	157.4701	-2.67014	-.20177	-1.66913	.121338	1.49007	-2.68559	.008107
92	162.8400	158.6503	4.18967	.04746	2.61900	.102781	1.06915	4.20703	.014275
94	161.3300	160.5541	.77592	.44948	.48504	.125103	1.58396	.78070	.000728
95	161.1200	161.3457	-.22566	.61664	-.14106	.101216	1.03684	-.22657	.000040
96	156.6700	156.1934	.47656	-.47137	.29790	.112527	1.28152	.47893	.000222
97	159.0700	159.9918	-.92177	.33074	-.57621	.144606	2.11633	-.92936	.001379
100	158.9600	158.7816	.17838	.07518	.11150	.137340	1.90901	.17970	.000047
101	151.0000	149.3749	1.62508	-1.91126	1.01585	.133507	1.80393	1.63647	.003644
103	154.0700	152.7685	1.30150	-1.19463	.81358	.136486	1.88533	1.31104	.002445
104	161.2500	162.0841	-.83412	.77258	-.52142	.102719	1.06785	-.83758	.000565
105	155.7400	154.7262	1.01379	-.78121	.63373	.114413	1.32483	1.01901	.001038
106	153.4400	153.7031	-.26306	-.99728	-.16444	.099315	.99826	-.26408	.000053
108	161.1900	163.3407	-2.15070	1.03794	-1.34442	.105619	1.12901	-2.16011	.003974
109	158.6500	159.2149	-.56488	.16667	-.35311	.119483	1.44486	-.56805	.000352
110	158.8000	159.9089	-1.10889	.31323	-.69317	.159547	2.57624	-1.12003	.002438
111	157.6300	158.8865	-1.25652	.09733	-.78546	.187752	3.56763	-1.27407	.004369
112	158.3200	158.3780	-.05801	-.01005	-.03627	.129693	1.70234	-.05840	.000004
113	157.4100	158.6802	-1.27023	.05377	-.79403	.100073	1.01355	-1.27522	.001243
114	158.3200	158.3780	-.05801	-.01005	-.03627	.129693	1.70234	-.05840	.000004
115	157.6300	158.8915	-1.26151	.09839	-.78858	.194399	3.82471	-1.28041	.004730
116	158.3200	158.3780	-.05801	-.01005	-.03627	.129693	1.70234	-.05840	.000004
117	154.7100	156.1183	-1.40825	-.48725	-.88031	.104978	1.11534	-1.41434	.001683
118	156.3000	157.5730	-1.27303	-.18004	-.79578	.101054	1.03352	-1.27813	.001274
119	149.8400	150.3713	-.53130	-1.70086	-.33212	.094909	.91164	-.53317	.000195
120	155.0100	155.4840	-.47403	-.62118	-.29632	.116943	1.38408	-.47658	.000237
121	152.8100	153.2082	-.39818	-1.10178	-.24890	.096125	.93515	-.39962	.000113
122	167.9100	169.5862	-1.67615	2.35682	-1.04777	.115185	1.34277	-1.68488	.002876
123	163.7500	164.7563	-1.00635	1.33689	-.62908	.141928	2.03866	-1.01433	.001582
124	161.8000	158.9868	2.81320	.11851	1.75856	.229955	5.35175	2.87256	.033313
125	160.8900	161.1993	-.30930	.58573	-.19334	.121669	1.49820	-.31110	.000109
126	167.5700	167.8792	-.30919	1.99635	-.19328	.168422	2.87084	-.31265	.000212
127	163.4700	163.6279	-.15787	1.09858	-.09868	.102688	1.06721	-.15852	.000020
128	157.1000	157.6659	-.56593	-.16042	-.35377	.099692	1.00584	-.56814	.000245
129	150.1100	150.7481	-.63811	-1.62128	-.39889	.098122	.97442	-.64052	.000302
130	156.9900	156.5870	.40302	-.38827	.25193	.118273	1.41575	.40523	.000175
131	148.1100	149.4574	-1.34744	-1.89384	-.84230	.093842	.89127	-1.35210	.001229
132	156.7100	156.8769	-.16692	-.32704	-.10434	.103082	1.07541	-.16761	.000023

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
133	159.2500	159.2899	-.03995	.18253	-.02497	.108466	1.19070	-.04013	.000001
134	160.2900	160.3522	-.06218	.40684	-.03887	.101718	1.04714	-.06243	.000003
135	159.1300	159.0856	.04439	.13938	.02775	.101734	1.04748	.04457	.000002
136	163.4500	162.9466	.50339	.95472	.31467	.152366	2.34956	.50800	.000457
137	163.6600	164.6020	-.94199	1.30429	-.58884	.124805	1.57642	-.94775	.001068
138	159.7600	160.3906	-.63058	.41495	-.39418	.112273	1.27573	-.63371	.000386
139	152.7200	151.8318	.88815	-1.39243	.55519	.169386	2.90380	.89822	.001767
140	156.0400	157.5504	-1.51039	-.18482	-.94416	.100809	1.02850	-1.51641	.001784
141	163.6100	165.2711	-1.66110	1.44559	-1.03837	.107212	1.16333	-1.66860	.002443
142	160.2200	156.6484	3.57164	-.37531	2.23266	.158918	2.55598	3.60724	.025089
143	158.9100	156.3351	2.57494	-.44146	1.60962	.100136	1.01482	2.58506	.005116
144	156.0400	157.5504	-1.51039	-.18482	-.94416	.100809	1.02850	-1.51641	.001784
145	152.7800	151.8198	.96016	-1.39496	.60020	.170302	2.93529	.97117	.002088
146	160.2200	156.6484	3.57164	-.37531	2.23266	.158918	2.55598	3.60724	.025089
147	158.9100	156.3351	2.57494	-.44146	1.60962	.100136	1.01482	2.58506	.005116
148	160.8200	160.8564	-.03638	.51332	-.02274	.121213	1.48700	-.03659	.000002
149	154.7900	154.4356	.35442	-.84259	.22155	.140952	2.01073	.35719	.000194
150	156.7000	156.2046	.49541	-.46902	.30968	.153657	2.38954	.50002	.000451
151	163.8500	164.8412	-.99123	1.35481	-.61962	.167995	2.85629	-1.00228	.002165
152	160.3000	161.6641	-1.36412	.68389	-.85272	.111544	1.25922	-1.37078	.001785
153	162.7600	163.4274	-.66737	1.05624	-.41718	.106729	1.15286	-.67036	.000391
154	154.2100	153.8994	.31058	-.95581	.19414	.115313	1.34576	.31220	.000099
155	158.2700	158.7511	-.48106	.06873	-.30072	.099573	1.00344	-.48293	.000177
157	154.9900	155.3703	-.38034	-.64519	-.23775	.123253	1.53747	-.38261	.000170
158	164.2300	161.8923	2.33772	.73207	1.46133	.181254	3.32497	2.36812	.014066
159	158.2700	158.7511	-.48106	.06873	-.30072	.099573	1.00344	-.48293	.000177
160	153.2600	154.6452	-1.38522	-.79832	-.86592	.102074	1.05448	-1.39089	.001539
161	162.9800	164.7694	-1.78941	1.33964	-1.11858	.103813	1.09073	-1.79698	.002657
162	161.3900	162.0974	-.70735	.77538	-.44217	.112627	1.28380	-.71088	.000489
163	160.0400	159.5551	.48489	.23852	.30311	.162888	2.68529	.48997	.000486
164	155.6000	155.1291	.47087	-.69613	.29435	.132618	1.77999	.47413	.000302
165	162.6200	164.3567	-1.73674	1.25250	-1.08565	.109731	1.21863	-1.74495	.002799
166	149.6700	147.8206	1.84937	-2.23949	1.15605	.136885	1.89637	1.86301	.004965
167	163.4100	164.1326	-.72258	1.20516	-.45169	.111921	1.26775	-.72613	.000504
168	163.9800	162.3316	1.64836	.82485	1.03041	.230583	5.38105	1.68333	.011502
169	161.8300	162.0887	-.25865	.77354	-.16169	.101713	1.04704	-.25970	.000053
170	154.0300	150.7150	3.31496	-1.62827	2.07221	.228594	5.28862	3.38406	.045688
171	169.7200	169.3066	.41338	2.29779	.25840	.159928	2.58858	.41755	.000340
172	165.0500	166.0019	-.95192	1.59992	-.59505	.109233	1.20759	-.95638	.000833
173	153.8800	153.0712	.80879	-1.13070	.50558	.159724	2.58196	.81694	.001300
174	161.8500	163.3603	-1.51028	1.04208	-.94409	.111590	1.26026	-1.51767	.002190
175	146.2200	145.8380	.38200	-2.65817	.23879	.091597	.84912	.38326	.000094
176	162.1000	159.1199	2.98010	.14662	1.86289	.110957	1.24601	2.99451	.008429
177	152.7700	153.2753	-.50533	-1.08760	-.31588	.107679	1.17348	-.50763	.000228
178	160.8600	155.6106	5.24939	-.59445	3.28144	.141566	2.02829	5.29082	.042831
179	157.0900	156.2043	.88567	-.46908	.55364	.135395	1.85530	.89206	.001114
180	162.0300	160.9701	1.05989	.53733	.66255	.194847	3.84236	1.07585	.003355
181	157.7400	156.0375	1.70253	-.50431	1.06427	.108864	1.19945	1.71045	.002647
182	154.2500	154.6579	-.40788	-.79564	-.25497	.168169	2.86223	-.41244	.000367
183	161.3000	159.9248	1.37521	.31659	.85966	.211848	4.54215	1.39976	.006714
184	159.2800	159.1598	.12024	.15504	.07516	.111129	1.24986	.12082	.000014
185	154.3000	155.6238	-1.32384	-.59166	-.82754	.100197	1.01606	-1.32905	.001354
186	161.1400	161.7247	-.58472	.69669	-.36551	.182600	3.37452	-.59244	.000893
187	154.8600	153.8486	1.01143	-.96655	.63225	.149707	2.26827	1.02036	.001782
189	152.8800	153.2975	-.41748	-1.08292	-.26097	.131447	1.74870	-.42032	.000233
190	155.3800	153.6510	1.72896	-1.00826	1.08079	.135882	1.86868	1.74152	.004275
191	159.1300	159.3188	-.18883	.18863	-.11804	.115973	1.36121	-.18983	.000037
192	154.4700	155.5076	-1.03763	-.61620	-.64863	.103862	1.09176	-1.04202	.000894
193	151.9400	153.6687	-1.72871	-1.00453	-1.08063	.248150	6.23218	-1.77134	.014751
194	163.5400	163.4598	.08020	1.06309	.05013	.174732	3.08998	.08117	.000015
195	154.9900	155.2707	-.28065	-.66624	-.17544	.123214	1.53648	-.28233	.000092

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
196	157.5100	156.5057	1.00429	-.40543	.62779	.141296	2.02056	1.01218	.001562
197	156.0800	157.1338	-1.05380	-.27279	-.65874	.098834	.98861	-1.05784	.000835
198	160.0100	159.8768	.13321	.30645	.08327	.139664	1.97414	.13423	.000027
199	158.0700	156.1585	1.91151	-.47875	1.19490	.145916	2.15483	1.92755	.006040
200	152.0100	153.4709	-1.46094	-1.04630	-.91324	.108010	1.18070	-1.46763	.001918
201	156.8300	157.1334	-.30342	-.27287	-.18967	.098554	.98301	-.30458	.000069
202	153.8100	153.3931	.41687	-1.06273	.26059	.132525	1.77749	.41975	.000236
203	153.9900	154.3258	-.33583	-.86576	-.20993	.119262	1.43951	-.33771	.000124
204	170.5800	170.3843	.19568	2.52537	.12232	.139758	1.97682	.19718	.000058
205	154.0800	155.9414	-1.86143	-.52459	-1.16360	.139309	1.96413	-1.87566	.005213
207	154.2100	155.8985	-1.68845	-.53367	-1.05546	.101362	1.03983	-1.69525	.002254
208	159.9900	160.3839	-.39388	.41354	-.24621	.129745	1.70370	-.39648	.000202
210	151.5000	152.5759	-1.07593	-1.23530	-.67257	.098431	.98056	-1.08002	.000863
211	157.9600	157.5912	.36877	-.17620	.23052	.149287	2.25555	.37201	.000235
212	160.0300	158.9784	1.05159	.11674	.65736	.184491	3.44476	1.06576	.002952
213	159.9600	161.0012	-1.04118	.54390	-.65085	.132431	1.77496	-1.04837	.001472
214	156.8400	157.3036	-.46362	-.23693	-.28981	.135469	1.85733	-.46697	.000306
215	156.3300	155.8294	.50061	-.54825	.31294	.117178	1.38965	.50331	.000266
216	163.3900	164.3877	-.99767	1.25903	-.62365	.113224	1.29744	-1.00269	.000984
217	159.9500	159.7577	.19234	.28130	.12023	.102988	1.07345	.19314	.000030
218	166.0600	166.8749	-.81491	1.78427	-.50941	.112162	1.27321	-.81894	.000644
219	163.4500	164.3066	-.85657	1.24191	-.53545	.128477	1.67055	-.86213	.000937
220	160.7200	160.7554	-.03543	.49200	-.02215	.139687	1.97480	-.03570	.000002
221	158.1700	156.7284	1.44156	-.35840	.90113	.151272	2.31595	1.45457	.003696
222	155.9500	149.8683	6.08165	-1.80707	3.80169	.302163	9.24048	6.30666	.277252
223	163.9100	164.8524	-.94240	1.35717	-.58910	.118686	1.42564	-.94761	.000966
224	165.1000	165.7540	-.65404	1.54758	-.40884	.151287	2.31641	-.65994	.000761
226	155.4700	156.2690	-.79900	-.45542	-.49946	.106779	1.15393	-.80257	.000561
227	161.1500	159.6115	1.53845	.25044	.96170	.202533	4.15148	1.56351	.007656
229	158.1300	158.9841	-.85406	.11793	-.53388	.102433	1.06192	-.85758	.000589
231	150.4000	150.8207	-.42070	-1.60596	-.26298	.117334	1.39335	-.42298	.000188
232	152.4900	151.5323	.95770	-1.45568	.59867	.095100	.91531	.96110	.000638
233	162.4900	162.3421	.14790	.82706	.09246	.103313	1.08023	.14852	.000018
234	157.3300	157.4389	-.10886	-.20838	-.06805	.164638	2.74327	-.11002	.000025
235	163.7100	163.2221	.48790	1.01290	.30499	.104143	1.09767	.48998	.000199
237	160.6300	161.1869	-.55692	.58312	-.34813	.127363	1.64172	-.56047	.000389
238	164.2300	165.3423	-1.11232	1.46063	-.69532	.116131	1.36493	-1.11821	.001287
239	164.3800	165.6800	-1.29997	1.53193	-.81262	.111144	1.25021	-1.30628	.001609
240	155.5900	154.5921	.99792	-.80954	.62381	.114225	1.32048	1.00304	.001002
241	159.5400	156.4804	3.05962	-.41078	1.91259	.247451	6.19710	3.13462	.045935
242	158.9400	159.9015	-.96152	.31168	-.60105	.110983	1.24659	-.96617	.000878
243	152.3500	153.1253	-.77528	-1.11929	-.48464	.105950	1.13609	-.77870	.000520
245	163.3900	161.8933	1.49672	.73228	.93561	.105372	1.12373	1.50324	.001916
246	163.8400	165.1152	-1.27522	1.41267	-.79715	.103664	1.08760	-1.28060	.001345
247	164.2300	163.7991	.43086	1.13475	.26934	.144251	2.10596	.43439	.000300
248	153.1900	152.4077	.78230	-1.27082	.48902	.190089	3.65698	.79351	.001737
250	155.2600	155.0386	.22141	-.71525	.13840	.115759	1.35620	.22257	.000051
251	171.8700	167.1671	4.70290	1.84597	2.93982	.199444	4.02582	4.77715	.069306
253	166.2700	167.5994	-1.32941	1.93727	-.83102	.105374	1.12378	-1.33520	.001511
254	157.6900	157.5344	.15562	-.18820	.09728	.144078	2.10089	.15690	.000039
255	156.0900	156.5494	-.45937	-.39621	-.28715	.099113	.99420	-.46114	.000159
256	158.2900	158.6400	-.35001	.04528	-.21879	.101264	1.03781	-.35141	.000097
257	157.8800	153.2222	4.65778	-1.09882	2.91162	.196024	3.88894	4.72878	.065601
258	158.6800	158.6507	.02930	.04754	.01831	.127092	1.63473	.02948	.000001
260	154.8400	154.4831	.35687	-.83255	.22308	.155258	2.43961	.36027	.000239
261	154.9700	155.4534	-.48341	-.62765	-.30219	.114536	1.32769	-.48590	.000236
262	157.6300	156.4476	1.18245	-.41771	.73916	.102592	1.06522	1.18733	.001133
263	161.1900	161.1550	.03499	.57638	.02187	.127393	1.64248	.03521	.000002
264	150.9800	150.8844	.09564	-1.59251	.05979	.119359	1.44186	.09618	.000010
265	163.3700	163.3776	-.00761	1.04574	-.00476	.126441	1.61804	-.00766	.000000
266	157.1600	156.7865	.37355	-.34614	.23351	.098354	.97902	.37497	.000104

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
267	157.7300	155.3573	2.37274	-.64795	1.48322	.217702	4.79663	2.41751	.021147
268	161.0300	162.5511	-1.52112	.87120	-.95086	.105007	1.11596	-1.52770	.001965
269	152.6500	152.8624	-.21243	-1.17480	-.13279	.117607	1.39983	-.21359	.000048
270	159.2100	160.2849	-1.07494	.39264	-.67195	.100559	1.02342	-1.07920	.000899
271	154.1300	155.0244	-.89438	-.71825	-.55908	.099708	1.00616	-.89787	.000612
272	157.3500	153.2916	4.05840	-1.08416	2.53694	.104391	1.10291	4.07575	.013821
273	154.9900	155.8693	-.87933	-.53982	-.54968	.115060	1.33986	-.88391	.000790
274	159.9200	159.5441	.37593	.23619	.23500	.109766	1.21940	.37771	.000131
275	157.3900	157.9220	-.53197	-.10636	-.33254	.102117	1.05537	-.53414	.000227
276	155.1200	157.8919	-2.77188	-.11271	-1.73273	.110269	1.23060	-2.78511	.007201
277	156.4100	155.6104	.79964	-.59450	.49986	.131787	1.75775	.80510	.000859
278	164.5300	165.0427	-.51266	1.39735	-.32047	.116620	1.37643	-.51540	.000276
279	156.7000	156.2046	.49541	-.46902	.30968	.153657	2.38954	.50002	.000451
280	154.7900	154.4356	.35442	-.84259	.22155	.140952	2.01073	.35719	.000194
281	160.8200	160.8564	-.03638	.51332	-.02274	.121213	1.48700	-.03659	.000002
282	163.8500	164.7565	-.90645	1.33691	-.56663	.162705	2.67923	-.91592	.001696
283	167.6400	165.7577	1.88232	1.54834	1.17666	.273561	7.57389	1.93903	.021482
284	158.3100	158.1907	.11926	-.04960	.07455	.108273	1.18645	.11981	.000013
285	156.2400	158.2369	-1.99692	-.03984	-1.24829	.119426	1.44348	-2.00811	.004391
286	161.5100	159.6679	1.84206	.26235	1.15149	.131038	1.73783	1.85450	.004509
287	150.6100	149.2036	1.40645	-1.94745	.87918	.184556	3.44721	1.42542	.005284
288	163.9300	162.4753	1.45468	.85519	.90933	.233261	5.50674	1.48628	.009177
289	159.0900	156.0638	3.02621	-.49875	1.89171	.140186	1.98893	3.04963	.013954
290	165.1200	162.8229	2.29712	.92859	1.43595	.304339	9.37404	2.38338	.040169
291	165.0600	165.0846	-.02460	1.40621	-.01538	.291490	8.59921	-.02544	.000004
293	158.0500	151.8008	6.24918	-1.39898	3.90641	.185021	3.46460	6.33390	.104852
294	160.6600	163.3198	-2.65976	1.03352	-1.66264	.121021	1.48228	-2.67507	.008002
295	163.1000	157.4590	5.64101	-.20412	3.52624	.381207	14.70732	5.98062	.396832
296	150.1600	149.5968	.56317	-1.86440	.35204	.112038	1.27041	.56595	.000307
297	163.9300	162.4753	1.45468	.85519	.90933	.233261	5.50674	1.48628	.009177
Minimum	146.2200	145.8380	-3.31311	-2.65817	-2.07105	.091597	.84912	-3.35361	.000000
Maximum	172.3800	172.9144	6.24918	3.05965	3.90641	.381207	14.70732	6.33390	.396832
Mean	158.4386	158.4256	.01305	.00000	.00816	.133730	2.00000	.01720	.007197
Median	158.3200	158.3780	-.25865	-.01005	-.16169	.118273	1.41575	-.25970	.000917

Case 3

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(173)	p-level
ATO	.991158	.991158	.991158	1.000000	1.000000	98.2490	0.00
STO	.998632	.998632	.998632	1.000000	1.000000	251.2085	0.00
VTO	.992583	.992583	.992583	1.000000	1.000000	107.3873	0.00
APHV	.996395	.996395	.996395	1.000000	1.000000	154.4762	0.00
SPHV	.999887	.999887	.999887	1.000000	1.000000	873.6416	0.00
PHV	.984801	.984801	.984801	1.000000	1.000000	74.5765	0.00

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99988669 R2= .99977339 Adjusted R2= .99977208
REGRESS. F(1,173)=7632E2 p<0.0000 Std.Error of estimate: 2.3958

N=174	BETA	St. Err. of BETA	B	St. Err. of B	t(173)	p-level
SPHV	.999887	.001145	1.115254	.001277	873.6416	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.852005 R2=.725913 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	2629.813	1	2629.813	458.1858	0.00
Residual	992.954	173	5.740		
Total	3622.767				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(172)	p-level
ATO	-.074896	-.612081	-.009214	.015135	.015135	-10.1510	.000000
STO	-.281438	-.749041	-.011276	.001605	.001605	-14.8275	.000000
VTO	.045437	.381791	.005747	.016000	.016000	5.4175	.000000
APHV	-.024606	-.133259	-.002006	.006647	.006647	-1.7634	.079608
PHV	.047092	.568351	.008556	.033007	.033007	9.0593	.000000

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(173)	p-level
SPHV	.999887	.999887	.999887	1.000000	0.00	873.6416	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 証out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999887	.999773	.999773	763249.7	0.00	1

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99995026 R2= .99990053 Adjusted R2= .99989938
REGRESS. F(2,172)=8645E2 p<0.0000 Std.Error of estimate: 1.5918

N=174	BETA	St. Err. of BETA	B	St. Err. of B	t(172)	p-level
SPHV	1.281098	.018981	1.428912	.021171	67.4946	0.000000
STO	-.281438	.018981	-.359096	.024218	-14.8275	.000000

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.937919 R2=.879693 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	3186.922	2	1593.461	628.8364	0.00
Residual	435.845	172	2.534		
Total	3622.767				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(171)	p-level
ATO	-.017093	-.144095	-.001437	.007068	.000750	-1.90415	.058569
VTO	.031264	.390811	.003898	.015543	.001294	5.55206	.000000
APHV	-.023082	-.188670	-.001882	.006646	.001306	-2.51230	.012921
PHV	-.002207	-.025503	-.000254	.013280	.000468	-.33360	.739091

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(172)	p-level
SPHV	1.281098	.981640	.051327	.001605	.998395	67.4946	0.000000
STO	-.281438	-.749041	-.011276	.001605	.998395	-14.8275	.000000

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
SPHV	1	.999887	.999773	.999773	763249.7	0.000000	1
STO	2	.999950	.999901	.000127	219.9	.000000	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS case 1 to 187

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	157.6300	158.8253	-1.19533	.04509	-.75091	.202072	2.80386	-1.21490	.004693
2	158.3200	158.4599	-.13988	-.03208	-.08787	.141111	1.36731	-.14099	.000031
3	157.4100	158.9009	-1.49091	.06105	-.93659	.121431	1.01253	-1.49963	.002582
4	158.3200	158.4599	-.13988	-.03208	-.08787	.141111	1.36731	-.14099	.000031
5	157.6300	158.8155	-1.18552	.04302	-.74474	.209448	3.01229	-1.20640	.004972
6	158.3200	158.4599	-.13988	-.03208	-.08787	.141111	1.36731	-.14099	.000031
7	154.7100	156.4270	-1.71695	-.46138	-1.07859	.137122	1.29110	-1.72978	.004381
8	156.3000	157.8521	-1.55212	-.16043	-.97504	.129589	1.15314	-1.56248	.003192
9	149.8400	150.5791	-.73909	-1.69628	-.46430	.114995	.90803	-.74297	.000568
10	155.0100	155.8425	-.83246	-.58481	-.52295	.154643	1.64211	-.84039	.001315
11	152.8100	153.4353	-.62535	-1.09312	-.39285	.118425	.96301	-.62883	.000432
12	167.9100	169.9274	-2.01736	2.38951	-1.26731	.150787	1.56125	-2.03563	.007336
13	163.7500	164.8215	-1.07147	1.31130	-.67310	.153567	1.61936	-1.08154	.002148
14	161.8000	158.8344	2.96556	.04701	1.86297	.249471	4.27351	3.04023	.044793
15	160.8900	161.3152	-.42525	.57089	-.26714	.134285	1.23823	-.42830	.000258
16	167.5700	168.3835	-.81346	2.06349	-.51102	.220540	3.33980	-.82938	.002605
17	163.4700	163.8690	-.39897	1.11016	-.25063	.126321	1.09572	-.40150	.000200
18	157.1000	157.8810	-.78099	-.15433	-.49062	.120424	.99580	-.78549	.000697
19	150.1100	150.9269	-.81689	-1.62283	-.51317	.115038	.90872	-.82118	.000695
20	156.9900	156.6993	.29068	-.40386	.18261	.130516	1.16970	.29265	.000114
21	148.1100	149.6927	-1.58272	-1.88346	-.99426	.117268	.94429	-1.59135	.002712
22	156.7100	157.1733	-.46327	-.30378	-.29103	.133738	1.22815	-.46657	.000303
23	159.2500	159.6118	-.36179	.21116	-.22727	.142063	1.38583	-.36469	.000209
24	160.2900	160.6244	-.33438	.42499	-.21006	.129298	1.14796	-.33660	.000147

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
25	159.1300	159.3647	-.23468	.15898	-.14743	.130208	1.16419	-.23626	.000074
26	163.4500	162.9791	.47086	.92225	.29579	.164000	1.84686	.47591	.000474
27	163.6600	164.7185	-1.05846	1.28955	-.66492	.137606	1.30023	-1.06643	.001677
28	159.7600	160.5392	-.77916	.40700	-.48947	.126699	1.10228	-.78413	.000769
29	152.7200	151.7961	.92389	-1.43928	.58039	.182065	2.27614	.93613	.002262
30	156.0400	157.8273	-1.78729	-.16567	-1.12278	.129075	1.14401	-1.79912	.004199
31	163.6100	165.4697	-1.85973	1.44819	-1.16828	.126024	1.09057	-1.87146	.004331
32	160.2200	157.1232	3.09683	-.31436	1.94543	.207939	2.96905	3.15059	.033421
33	158.9100	156.5336	2.37645	-.43887	1.49289	.119044	.97310	2.38981	.006302
34	156.0400	157.8273	-1.78729	-.16567	-1.12278	.129075	1.14401	-1.79912	.004199
35	152.7800	151.7820	.99802	-1.44227	.62695	.183068	2.30128	1.01139	.002669
36	160.2200	157.1232	3.09683	-.31436	1.94543	.207939	2.96905	3.15059	.033421
37	158.9100	156.5336	2.37645	-.43887	1.49289	.119044	.97310	2.38981	.006302
38	160.8200	160.9728	-.15276	.49856	-.09596	.133832	1.22989	-.15384	.000033
39	154.7900	154.8643	-.07430	-.79137	-.04667	.185633	2.36623	-.07532	.000015
40	156.7000	156.2167	.48329	-.50578	.30360	.165140	1.87262	.48855	.000507
41	163.8500	164.8398	-.98979	1.31517	-.62179	.180468	2.23639	-1.00268	.002550
42	160.3000	161.9976	-1.69763	.71499	-1.06645	.146433	1.47239	-1.71212	.004895
43	162.7600	163.6187	-.85873	1.05731	-.53946	.124823	1.06987	-.86405	.000906
44	154.2100	154.0130	.19696	-.97113	.12373	.127487	1.11603	.19823	.000050
45	158.2700	158.9890	-.71904	.07966	-.45170	.122993	1.03874	-.72336	.000616
47	154.9900	155.4627	-.47267	-.66501	-.29693	.134730	1.24645	-.47608	.000320
48	164.2300	161.8527	2.37730	.68438	1.49342	.194834	2.60661	2.41346	.017218
49	158.2700	158.9890	-.71904	.07966	-.45170	.122993	1.03874	-.72336	.000616
50	153.2600	154.9402	-1.68021	-.77534	-1.05551	.132635	1.20799	-1.69195	.003922
51	162.9800	165.0004	-2.02045	1.34909	-1.26925	.126212	1.09382	-2.03323	.005128
52	161.3900	162.2512	-.86116	.76852	-.54098	.127467	1.11569	-.86672	.000950
53	160.0400	159.5530	.48695	.19876	.30590	.174981	2.10245	.49291	.000579
54	155.6000	155.1933	.40672	-.72190	.25550	.143596	1.41589	.41006	.000270
55	162.6200	164.6775	-2.05748	1.28089	-1.29251	.143072	1.40557	-2.07424	.006858
56	149.6700	147.8536	1.81641	-2.27183	1.14107	.147399	1.49189	1.83211	.005679
57	163.4100	164.2981	-.88809	1.20078	-.55790	.127696	1.11969	-.89384	.001014
58	163.9800	162.9707	1.00925	.92048	.63401	.294378	5.95053	1.04498	.007369
59	161.8300	162.3280	-.49799	.78475	-.31283	.125185	1.07609	-.50108	.000306
60	154.0300	150.5484	3.48161	-1.70276	2.18715	.248561	4.24241	3.56862	.061268
61	169.7200	169.3363	.38368	2.26470	.24103	.172072	2.03313	.38822	.000347
62	165.0500	166.1909	-1.14091	1.60049	-.71672	.127089	1.10908	-1.14823	.001658
63	153.8800	153.0610	.81903	-1.17218	.51452	.171571	2.02132	.82866	.001574
64	161.8500	163.5241	-1.67407	1.03733	-1.05165	.127215	1.11128	-1.68483	.003577
65	146.2200	146.0686	.15141	-2.64877	.09512	.114579	.90148	.15220	.000024
66	162.1000	159.2691	2.83087	.13881	1.77835	.125399	1.07977	2.84855	.009936
67	152.7700	153.4157	-.64566	-1.09728	-.40560	.121352	1.01120	-.64943	.000484
68	160.8600	156.0414	4.81862	-.54280	3.02706	.186474	2.38771	4.88566	.064632
69	157.0900	156.2638	.82623	-.49584	.51904	.146419	1.47212	.83328	.001159
70	162.0300	161.5307	.49925	.61639	.31363	.251715	4.35074	.51206	.001294
71	157.7400	156.1836	1.55643	-.51278	.97775	.123009	1.03901	1.56578	.002889
72	154.2500	154.6316	-.38158	-.84051	-.23971	.180690	2.24189	-.38656	.000380
73	161.3000	159.8130	1.48701	.25365	.93414	.228930	3.59873	1.51842	.009409
74	159.2800	159.3084	-.02841	.14710	-.01785	.125530	1.08203	-.02859	.000001
75	154.3000	155.8168	-1.51685	-.59022	-.95288	.118530	.96473	-1.52530	.002545
76	161.1400	161.6817	-.54167	.64826	-.34028	.196312	2.64630	-.55004	.000908
77	154.8600	154.2993	.56070	-.91068	.35223	.196423	2.64929	.56937	.000974
79	152.8800	153.3598	-.47977	-1.10908	-.30139	.142288	1.39021	-.48363	.000369
80	155.3800	154.0660	1.31396	-.95994	.82543	.179238	2.20601	1.33084	.004431
81	159.1300	159.4487	-.31868	.17672	-.20019	.129192	1.14609	-.32079	.000134
82	154.4700	155.6757	-1.20567	-.62003	-.75740	.119758	.98482	-1.21254	.001642
83	151.9400	154.3361	-2.39606	-.90292	-1.50520	.313954	6.76826	-2.49303	.047703
84	163.5400	163.4390	.10098	1.01936	.06344	.187711	2.41950	.10241	.000029
85	154.9900	155.3628	-.37280	-.68610	-.23419	.134680	1.24552	-.37549	.000199
86	157.5100	156.5501	.95993	-.43538	.60303	.152353	1.59385	.96880	.001696
87	156.0800	157.3864	-1.30641	-.25877	-.82069	.124112	1.05772	-1.31440	.002072

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
88	160.0100	159.9347	.07533	.27934	.04732	.150938	1.56439	.07602	.000010
89	158.0700	156.6008	1.46925	-.42468	.92299	.191919	2.52920	1.49093	.006375
90	152.0100	153.7968	-1.78679	-1.01680	-1.12246	.142178	1.38806	-1.80116	.005107
91	156.8300	157.3696	-.53958	-.26232	-.33897	.121809	1.01884	-.54276	.000340
92	153.8100	153.4527	.35730	-1.08946	.22446	.143356	1.41117	.36022	.000208
93	153.9900	154.4276	-.43758	-.88359	-.27489	.130977	1.17798	-.44056	.000259
94	170.5800	170.8138	-.23383	2.57671	-.14689	.184841	2.34607	-.23702	.000149
95	154.0800	156.3664	-2.28636	-.47417	-1.43629	.183670	2.31645	-2.31721	.014105
97	154.2100	156.1857	-1.97568	-.51233	-1.24112	.130949	1.17747	-1.98914	.005283
98	159.9900	160.4715	-.48151	.39271	-.30248	.141403	1.37298	-.48534	.000367
100	151.5000	152.7635	-1.26353	-1.23499	-.79375	.116235	.92773	-1.27031	.001698
101	157.9600	157.6178	.34221	-.20991	.21498	.160606	1.77120	.34573	.000240
102	160.0300	158.9248	1.10524	.06608	.69431	.198466	2.70470	1.12269	.003866
103	159.9600	161.4081	-1.44810	.59050	-.90970	.175138	2.10623	-1.46585	.005132
104	156.8400	157.3659	-.52591	-.26310	-.33038	.146582	1.47539	-.53041	.000471
105	156.3300	155.9430	.38702	-.56358	.24313	.129440	1.15049	.38960	.000198
106	163.3900	164.5481	-1.15811	1.25357	-.72753	.128607	1.13573	-1.16572	.001750
107	159.9500	159.9547	-.00471	.28358	-.00296	.121695	1.01693	-.00474	.000000
108	166.0600	167.0514	-.99141	1.78220	-.62280	.128885	1.14065	-.99795	.001288
109	163.4500	164.7015	-1.25151	1.28596	-.78620	.170003	1.98453	-1.26595	.003607
110	160.7200	160.8156	-.09564	.46538	-.06008	.151029	1.56627	-.09651	.000017
111	158.1700	156.7478	1.42220	-.39363	.89342	.162648	1.81654	1.43720	.004255
112	155.9500	150.6410	5.30899	-1.68320	3.33511	.376926	9.75570	5.62433	.349959
113	163.9100	164.9917	-1.08174	1.34726	-.67955	.132651	1.20828	-1.08931	.001626
114	165.1000	165.7967	-.69672	1.51724	-.43768	.163025	1.82496	-.70410	.001026
116	155.4700	156.4255	-.95552	-.46168	-.60026	.121713	1.01724	-.96114	.001066
117	161.1500	159.5193	1.63071	.19163	1.02441	.218492	3.27805	1.66202	.010268
119	158.1300	159.1806	-1.05063	.12012	-.66001	.121099	1.00699	-1.05674	.001275
121	150.4000	150.9176	-.51761	-1.62480	-.32516	.128697	1.13732	-.52101	.000350
122	152.4900	151.7688	.72118	-1.44504	.45304	.118602	.96590	.72520	.000576
123	162.4900	162.6216	-.13162	.84676	-.08269	.131723	1.19144	-.13253	.000024
124	157.3300	157.4275	-.09746	-.25010	-.06122	.176850	2.14761	-.09868	.000024
125	163.7100	163.5061	.20393	1.03352	.12811	.133066	1.21586	.20537	.000058
127	160.6300	161.2843	-.65427	.56434	-.41101	.139314	1.33271	-.65932	.000657
128	164.2300	165.6924	-1.46239	1.49521	-.91867	.152832	1.60388	-1.47599	.003962
129	164.3800	165.8564	-1.47635	1.52984	-.92744	.127847	1.12234	-1.48593	.002810
130	155.5900	154.7119	.87813	-.82356	.55164	.126725	1.10272	.88373	.000977
131	159.5400	156.2863	3.25366	-.49108	2.04395	.269620	4.99172	3.34976	.063518
132	158.9400	160.0538	-1.11377	.30450	-.69967	.125660	1.08428	-1.12075	.001544
133	152.3500	153.2726	-.92255	-1.12750	-.57954	.120114	.99068	-.92783	.000967
135	163.3900	162.1924	1.19763	.75611	.75235	.136194	1.27368	1.20646	.002102
136	163.8400	165.3566	-1.51656	1.42429	-.95270	.127275	1.11232	-1.52631	.002939
137	164.2300	163.8553	.37473	1.10726	.23540	.155799	1.66676	.37835	.000271
138	153.1900	152.3268	.86317	-1.32721	.54225	.204938	2.88398	.87772	.002520
140	155.2600	155.1544	.10555	-.73010	.06630	.128089	1.12659	.10623	.000014
141	171.8700	167.0984	4.77155	1.79213	2.99749	.214715	3.16570	4.85997	.084792
143	166.2700	167.8395	-1.56949	1.94862	-.98595	.128757	1.13837	-1.57982	.003222
144	157.6900	157.5742	.11583	-.21912	.07276	.155239	1.65481	.11694	.000026
145	156.0900	156.7611	-.67107	-.39083	-.42156	.119488	.98039	-.67487	.000506
146	158.2900	158.8448	-.55481	.04920	-.34853	.120821	1.00238	-.55802	.000354
147	157.8800	153.1302	4.74985	-1.15757	2.98386	.211536	3.07265	4.83523	.081464
148	158.6800	158.7412	-.06119	.02732	-.03844	.138712	1.32122	-.06166	.000006
150	154.8400	154.4870	.35295	-.87103	.22172	.166807	1.91062	.35687	.000276
151	154.9700	155.5750	-.60504	-.64128	-.38009	.127165	1.11040	-.60893	.000467
152	157.6300	156.7418	.88824	-.39490	.55800	.133004	1.21471	.89449	.001102
153	161.1900	161.2522	-.06218	.55757	-.03906	.139337	1.33314	-.06266	.000006
154	150.9800	150.9751	.00493	-1.61266	.00310	.130534	1.17002	.00496	.000000
155	163.3700	163.4847	-.11473	1.02902	-.07207	.138823	1.32333	-.11561	.000020
156	157.1600	157.0201	.13986	-.33612	.08786	.121320	1.01067	.14068	.000023
157	157.7300	155.2232	2.50681	-.71558	1.57478	.235832	3.81902	2.56306	.028450
158	161.0300	162.8455	-1.81548	.89403	-1.14048	.135232	1.25575	-1.82867	.004762

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
159	152.6500	152.9649	-.31493	-1.19246	-.19784	.129273	1.14752	-.31702	.000131
160	159.2100	160.5230	-1.31299	.40359	-.82482	.123937	1.05474	-1.32100	.002087
161	154.1300	155.2175	-1.08752	-.71678	-.68318	.118063	.95714	-1.09354	.001298
162	157.3500	153.4469	3.90314	-1.09069	2.45195	.119178	.97530	3.92514	.017040
163	154.9900	156.2210	-1.23099	-.50487	-.77331	.152037	1.58724	-1.24232	.002778
164	159.9200	159.7003	.21965	.22987	.13798	.124739	1.06844	.22101	.000059
165	157.3900	158.1143	-.72426	-.10507	-.45498	.120349	.99456	-.72842	.000598
166	155.1200	158.2235	-3.10350	-.08200	-1.94962	.145013	1.44396	-3.12947	.016037
167	156.4100	155.6782	.73180	-.61949	.45971	.142829	1.40080	.73774	.000865
168	164.5300	165.1910	-.66098	1.38933	-.41523	.131153	1.18114	-.66550	.000593
169	156.7000	156.2167	.48329	-.50578	.30360	.165140	1.87262	.48855	.000507
170	154.7900	154.8643	-.07430	-.79137	-.04667	.185633	2.36623	-.07532	.000015
171	160.8200	160.9728	-.15276	.49856	-.09596	.133832	1.22989	-.15384	.000033
172	163.8500	164.7677	-.91766	1.29994	-.57648	.174852	2.09935	-.92887	.002054
173	167.6400	166.4896	1.15038	1.66356	.72267	.345593	8.20115	1.20728	.013555
174	158.3100	158.5130	-.20302	-.02086	-.12754	.141946	1.38354	-.20465	.000066
175	156.2400	158.6031	-2.36310	-.00184	-1.48450	.157942	1.71294	-2.38659	.011064
176	161.5100	160.0706	1.43938	.30806	.90422	.173305	2.06238	1.45664	.004962
177	150.6100	149.7319	.87805	-1.87517	.55159	.238036	3.89072	.89813	.003559
178	163.9300	163.1202	.80977	.95204	.50870	.297567	6.08014	.83909	.004855
179	159.0900	156.4911	2.59892	-.44784	1.63264	.184776	2.34443	2.63442	.018451
180	165.1200	163.6143	1.50571	1.05638	.94589	.381385	9.98787	1.59740	.028901
181	165.0600	165.8524	-.79245	1.52901	-.49782	.366604	9.22871	-.83683	.007329
183	158.0500	152.3324	5.71765	-1.32604	3.59183	.238898	3.91895	5.84940	.152058
184	160.6600	163.6899	-3.02989	1.07234	-1.90338	.159942	1.75659	-3.06079	.018662
185	163.1000	158.3970	4.70296	-.04535	2.95440	.470777	15.21863	5.15372	.458389
186	150.1600	149.7074	.45256	-1.88035	.28430	.123880	1.05377	.45532	.000248
187	163.9300	163.1202	.80977	.95204	.50870	.297567	6.08014	.83909	.004855
Minimum	146.2200	146.0686	-3.10350	-2.64877	-1.94962	.114579	.90148	-3.12947	.000000
Maximum	171.8700	170.8138	5.71765	2.57671	3.59183	.470777	15.21863	5.84940	.458389
Mean	158.6244	158.6118	.01255	.00000	.00788	.161112	2.00000	.02063	.011181
Median	158.3000	158.4285	-.27480	-.03872	-.17263	.140224	1.35023	-.27702	.001291

Appendix-3

Forward stepwise regression results (using STATISTICA software) Case 1, Case 2 and Case 3 (as described in Table 5.11a and 5.11b) of Japanese boys and girls are shown below.

For boys

Case 1

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(463)	p-level
S2_0	.998377	.998377	.998377	1.000000	1.000000	377.1696	0.00
S3_0	.999163	.999163	.999163	1.000000	1.000000	525.7123	0.00
S4_0	.999407	.999407	.999407	1.000000	1.000000	624.6330	0.00
S5_0	.999458	.999458	.999458	1.000000	1.000000	653.5630	0.00
S6_0	.999485	.999485	.999485	1.000000	1.000000	670.2456	0.00
S7_0	.999518	.999518	.999518	1.000000	1.000000	692.4628	0.00
S8_0	.999552	.999552	.999552	1.000000	1.000000	718.8209	0.00
S9_0	.999578	.999578	.999578	1.000000	1.000000	740.3102	0.00
S10_0	.999576	.999576	.999576	1.000000	1.000000	739.0163	0.00
S11_0	.999504	.999504	.999504	1.000000	1.000000	683.1790	0.00
S12_0	.999297	.999297	.999297	1.000000	1.000000	573.4028	0.00
S13_0	.999121	.999121	.999121	1.000000	1.000000	512.7140	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99957787 R2= .99915591 Adjusted R2= .99915409
F(1,463)=5481E2 p<0.0000 Std.Error of estimate: 4.9963

N=464	BETA	St. Err. of BETA	B	St. Err. of B	t(463)	p-level
S9_0	.999578	.001350	1.329904	.001796	740.3102	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.485188 R2=.235407 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	3558.52	1	3558.521	142.5510	.000000
Residual	11557.93	463	24.963		
Total	15116.45				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(462)	p-level
S2_0	.116650	.224702	.006528	.003132	.003132	4.95653	.000001
S3_0	.212919	.278470	.008090	.001444	.001444	6.23200	.000000
S4_0	.276004	.262303	.007621	.000762	.000762	5.84255	.000000
S5_0	.245716	.183321	.005326	.000470	.000470	4.00825	.000071
S6_0	.158517	.089966	.002614	.000272	.000272	1.94162	.052791
S7_0	.002496	.000946	.000027	.000121	.000121	.02034	.983782
S8_0	-.375780	-.069937	-.002032	.000029	.000029	-1.50694	.132510
S10_0	.441586	.076603	.002226	.000025	.000025	1.65138	.099341
S11_0	-.121398	-.045451	-.001320	.000118	.000118	-.97795	.328613
S12_0	-.245019	-.163868	-.004761	.000378	.000378	-3.57047	.000394
S13_0	-.160148	-.145102	-.004216	.000693	.000693	-3.15221	.001726

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(463)	p-level
S9_0	.999578	.999578	.999578	1.000000	0.00	740.3102	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S9_0	1	.999578	.999156	.999156	548059.2	0.00	1

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99961061 R2= .99922137 Adjusted R2= .99921800
REGRESS. F(2,462)=2964E2 p<0.0000 Std.Error of estimate: 4.8039

N=464	BETA	St. Err. of BETA	B	St. Err. of B	t(462)	p-level
S9_0	.786813	.034165	1.046828	.045456	23.02949	0.000000
S3_0	.212919	.034165	.397943	.063855	6.23200	.000000

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.542861 R2=.294698 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	4454.79	2	2227.394	96.51926	.000000
Residual	10661.67	462	23.077		
Total	15116.45				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(461)	p-level
S2_0	-.139487	-.100969	-.002817	.000408	.000188	-2.17903	.029835
S4_0	.059043	.024761	.000691	.000137	.000137	.53180	.595124
S5_0	-.021784	-.012265	-.000342	.000247	.000247	-.26335	.792397
S6_0	-.097663	-.050727	-.001415	.000210	.000210	-1.09056	.276038
S7_0	-.248816	-.093370	-.002605	.000110	.000110	-2.01353	.044639
S8_0	-.681863	-.129764	-.003621	.000028	.000028	-2.80991	.005166
S10_0	.536050	.096659	.002697	.000025	.000025	2.08511	.037609
S11_0	-.103492	-.040331	-.001125	.000118	.000108	-.86665	.386584
S12_0	-.248622	-.173119	-.004831	.000378	.000301	-3.77401	.000182
S13_0	-.180666	-.170081	-.004746	.000690	.000496	-3.70578	.000236

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(462)	p-level
S9_0	.786813	.731055	.029897	.001444	.998556	23.02949	0.000000
S3_0	.212919	.278470	.008090	.001444	.998556	6.23200	.000000

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S9_0	1	.999578	.999156	.999156	548059.2	0.000000	1
S3_0	2	.999611	.999221	.000065	38.8	.000000	2

STAT. Predicted & Residual Values: PAS
MULTIPLE case 1 to 509
REGRESS.

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	172.0600	169.7235	2.3365	-.27032	.48638	.273216	1.50089	2.3441	.000385
2	170.0800	166.6137	3.4663	-.72271	.72157	.276520	1.53740	3.4778	.000868
3	172.6900	169.3582	3.3318	-.32347	.69358	.268274	1.44708	3.3423	.000755
4	175.6000	176.0833	-.4833	.65485	-.10061	.392244	3.09348	-.4866	.000034
5	161.5100	157.6848	3.8252	-2.02161	.79628	.378167	2.87542	3.8491	.001989
6	174.7700	171.1737	3.5963	-.05935	.74862	.232947	1.09106	3.6048	.000662
7	161.5100	157.6848	3.8252	-2.02161	.79628	.378167	2.87542	3.8491	.001989
8	170.0800	166.7116	3.3684	-.70847	.70118	.276538	1.53760	3.3796	.000820
9	172.6900	169.3582	3.3318	-.32347	.69358	.268274	1.44708	3.3423	.000755
10	173.4100	168.6772	4.7328	-.42253	.98521	.320734	2.06835	4.7540	.002183
11	174.8000	169.8870	4.9130	-.24653	1.02271	.226973	1.03581	4.9240	.001173
12	175.6000	176.0833	-.4833	.65485	-.10061	.392244	3.09348	-.4866	.000034
14	181.1470	182.9700	-1.8230	1.65667	-.37949	.359916	2.60457	-1.8333	.000409
15	176.0500	171.3660	4.6841	-.03139	.97506	.251549	1.27227	4.6969	.001311
16	160.7400	163.1470	-2.4070	-1.22701	-.50106	.428953	3.69959	-2.4264	.001017
17	170.1200	169.8360	.2840	-.25395	.05912	.235008	1.11045	.2847	.000004
18	174.3100	173.3448	.9651	.25648	.20091	.253424	1.29131	.9678	.000056
19	163.2500	168.9724	-5.7224	-.37958	-1.19120	.302596	1.84103	-5.7452	.002838

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
20	178.5400	181.5355	-2.9955	1.44798	-.62355	.239893	1.15710	-3.0030	.000487
21	169.5000	174.0243	-4.5243	.35532	-.94180	.257495	1.33313	-4.5373	.001282
22	162.1300	160.8465	1.2835	-1.56167	.26718	.294237	1.74072	1.2883	.000135
23	170.5400	169.5680	.9720	-.29294	.20234	.634733	8.10059	.9893	.000370
24	164.3400	164.2613	.0787	-1.06492	.01639	.325736	2.13338	.0791	.000001
25	177.7500	175.4344	2.3156	.56045	.48203	.227841	1.04375	2.3208	.000263
27	170.0600	166.0991	3.9609	-.79757	.82453	.316038	2.00823	3.9782	.001484
28	170.6400	169.7569	.8831	-.26547	.18384	.237001	1.12937	.8853	.000041
29	161.6500	161.1923	.4577	-1.51137	.09527	.458789	4.23215	.4619	.000042
30	167.9100	170.1041	-2.1941	-.21496	-.45673	.316590	2.01525	-2.2037	.000457
31	166.1600	161.9708	4.1892	-1.39812	.87205	.295474	1.75539	4.2051	.001449
32	175.0000	171.9915	3.0085	.05961	.62627	.234809	1.10857	3.0157	.000471
33	169.1900	168.4623	.7277	-.45379	.15149	.254711	1.30446	.7298	.000032
34	172.8700	182.0190	-9.1490	1.51832	-1.90450	.261851	1.37861	-9.1762	.005421
35	169.1500	175.3881	-6.2381	.55371	-1.29855	.247067	1.22734	-6.2546	.002242
37	173.1900	173.8975	-.7075	.33688	-.14728	.257112	1.32916	-.7095	.000031
38	173.3600	178.6797	-5.3197	1.03255	-1.10737	.247076	1.22742	-5.3338	.001631
39	171.3000	167.4928	3.8072	-.59483	.79253	.227412	1.03983	3.8158	.000707
40	170.5700	176.5958	-6.0258	.72940	-1.25436	.229518	1.05917	-6.0396	.001804
41	167.7100	165.7880	1.9220	-.84282	.40009	.237669	1.13574	1.9267	.000197
42	166.1900	167.3736	-1.1836	-.61216	-.24639	.367861	2.72083	-1.1906	.000180
43	164.2900	168.7951	-4.5051	-.40537	-.93781	.299547	1.80412	-4.5227	.001723
44	175.0100	180.3656	-5.3556	1.27780	-1.11485	.234653	1.10710	-5.3684	.001490
45	166.1200	168.5136	-2.3936	-.44632	-.49827	.407945	3.34610	-2.4110	.000908
46	166.6300	166.0968	.5332	-.79790	.11098	.216249	.94025	.5342	.000013
47	170.1800	168.8456	1.3344	-.39803	.27777	.322107	2.08610	1.3404	.000175
48	164.6100	160.4818	4.1282	-1.61472	.85935	.208461	.87374	4.1360	.000698
49	170.1500	175.5361	-5.3861	.57525	-1.12120	.368200	2.72586	-5.4179	.003736
50	167.2000	167.9581	-.7581	-.52714	-.15780	.227089	1.03687	-.7598	.000028
52	166.0400	162.1819	3.8581	-1.36742	.80313	.236502	1.12462	3.8675	.000785
53	178.7200	173.0043	5.7157	.20695	1.18980	.290285	1.69427	5.7366	.002604
54	169.3900	162.2089	7.1811	-1.36348	1.49485	.244484	1.20181	7.1997	.002909
55	165.4300	169.9372	-4.5072	-.23923	-.93825	.257558	1.33379	-4.5202	.001273
56	168.4800	170.7047	-2.2247	-.12759	-.46310	.266994	1.43331	-2.2316	.000333
57	171.4300	178.9987	-7.5687	1.07896	-1.57555	.232473	1.08662	-7.5865	.002920
58	171.1000	174.1886	-3.0886	.37923	-.64295	.226456	1.03110	-3.0955	.000461
59	161.8100	160.0382	1.7718	-1.67925	.36882	.390887	3.07211	1.7836	.000456
60	176.0000	169.9021	6.0979	-.24434	1.26937	.408019	3.34731	6.1422	.005897
61	172.0400	178.4435	-6.4035	.99819	-1.33298	.321601	2.07955	-6.4323	.004018
62	179.1300	184.8379	-5.7079	1.92839	-1.18819	.240513	1.16309	-5.7222	.001778
63	179.4200	170.8736	8.5464	-.10302	1.77907	.249094	1.24756	8.5695	.004278
64	174.9200	179.0557	-4.1357	1.08725	-.86091	.234024	1.10117	-4.1455	.000884
65	170.0200	172.1655	-2.1455	.08493	-.44663	.483647	4.70319	-2.1675	.001032
66	170.5200	165.3316	5.1884	-.90921	1.08004	.258835	1.34704	5.2035	.001703
67	178.7200	176.7574	1.9626	.75291	.40855	.764718	11.75811	2.0136	.002226
68	173.9800	176.5689	-2.5889	.72548	-.53891	.244050	1.19755	-2.5956	.000377
70	176.4200	177.0320	-.6120	.79285	-.12739	.403086	3.26686	-.6163	.000058
71	167.8800	173.5864	-5.7064	.29162	-1.18787	.226370	1.03032	-5.7191	.001574
72	168.2400	174.4471	-6.2071	.41683	-1.29210	.228659	1.05126	-6.2212	.001900
73	165.9800	167.7230	-1.7430	-.56134	-.36283	.253181	1.28884	-1.7478	.000184
74	167.1700	160.1875	6.9825	-1.65753	1.45351	.238917	1.14770	6.9998	.002626
75	168.7900	169.1191	-.3291	-.35824	-.06851	.375305	2.83207	-.3311	.000015
76	175.3400	175.6269	-.2869	.58846	-.05973	.351487	2.48401	-.2885	.000010
77	172.0800	176.0931	-4.0131	.65627	-.83539	.265034	1.41233	-4.0253	.001069
78	176.1300	185.8006	-9.6706	2.06844	-2.01309	.466643	4.37829	-9.7627	.019486
79	170.6300	161.7876	8.8424	-1.42476	1.84067	.244692	1.20385	8.8654	.004418
80	177.1200	175.3399	1.7801	.54671	.37055	.299608	1.80485	1.7870	.000269
81	174.9300	177.2876	-2.3576	.83004	-.49078	.231014	1.07303	-2.3631	.000280
82	163.6500	166.3377	-2.6877	-.76286	-.55949	.227731	1.04275	-2.6938	.000353
83	181.5100	178.7944	2.7156	1.04923	.56530	.233837	1.09941	2.7221	.000380
84	177.0300	180.3727	-3.3427	1.27884	-.69584	.234256	1.10336	-3.3507	.000578

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
85	175.9500	172.1758	3.7742	.08642	.78565	.480957	4.65102	3.8124	.003157
86	169.3000	167.0372	2.2628	-.66110	.47104	.313521	1.97637	2.2725	.000477
87	168.6500	169.1124	-.4624	-.35921	-.09627	.221244	.98418	-.4634	.000010
88	178.2800	169.1622	9.1178	-.35198	1.89801	.242816	1.18546	9.1412	.004626
89	167.7000	165.1559	2.5441	-.93478	.52960	.306641	1.89058	2.5545	.000576
92	178.8300	179.9231	-1.0931	1.21343	-.22754	.239652	1.15478	-1.0958	.000065
93	179.0900	177.9418	1.1482	.92521	.23901	.247844	1.23507	1.1512	.000076
94	169.7800	163.8296	5.9504	-1.12772	1.23868	.218313	.95829	5.9628	.001591
95	192.4300	189.5736	2.8564	2.61731	.59459	.263465	1.39566	2.8650	.000535
96	178.9300	181.1307	-2.2007	1.38911	-.45812	.345597	2.40145	-2.2122	.000549
97	168.6100	167.6392	.9708	-.57353	.20210	.225063	1.01846	.9730	.000045
99	175.7900	177.3423	-1.5523	.83800	-.32314	.257149	1.32955	-1.5568	.000150
100	172.0800	175.8780	-3.7980	.62498	-.79061	.233231	1.09372	-3.8070	.000740
101	167.0400	166.6339	.4061	-.71977	.08454	.247172	1.22838	.4072	.000010
102	172.2700	177.0364	-4.7664	.79350	-.99220	.268092	1.44512	-4.7813	.001543
103	175.4900	171.5754	3.9146	-.00093	.81489	.272111	1.48876	3.9272	.001072
104	166.0700	166.8832	-.8132	-.68351	-.16927	.269410	1.45935	-.8157	.000045
105	174.1200	178.7237	-4.6037	1.03896	-.95834	.548821	6.05615	-4.6646	.006153
106	168.3800	169.1257	-.7457	-.35728	-.15523	.266355	1.42645	-.7480	.000037
107	170.5400	173.5656	-3.0256	.28859	-.62983	.236951	1.12889	-3.0330	.000485
108	183.2800	176.7599	6.5201	.75328	1.35725	.456883	4.19706	6.5796	.008484
109	174.8600	175.4129	-.5529	.55733	-.11510	.408386	3.35333	-.5569	.000049
110	170.5900	173.7848	-3.1948	.32048	-.66505	.226190	1.02868	-3.2019	.000492
111	170.8700	171.6626	-.7926	.01176	-.16500	.241378	1.17146	-.7946	.000035
112	178.8900	168.3876	10.5024	-.46466	2.18624	.368191	2.72572	10.5645	.014205
113	161.6200	162.2533	-.6333	-1.35702	-.13184	.387842	3.02444	-.6375	.000057
114	162.8700	172.1435	-9.2735	.08172	-1.93042	.226914	1.03528	-9.2942	.004176
115	173.3600	173.8478	-.4878	.32965	-.10155	.272799	1.49631	-.4894	.000017
117	186.0600	186.6596	-.5996	2.19339	-.12481	.330322	2.19387	-.6024	.000037
118	170.7500	166.0485	4.7015	-.80494	.97870	.224428	1.01272	4.7118	.001050
119	166.8300	156.7218	10.1082	-2.16170	2.10418	.249562	1.25226	10.1356	.006007
120	174.0600	173.9388	.1212	.34289	.02522	.226285	1.02955	.1214	.000001
121	175.6700	180.2966	-4.6266	1.26776	-.96309	.236594	1.12550	-4.6378	.001130
123	165.2900	160.4027	4.8873	-1.62623	1.01736	.431051	3.73587	4.9269	.004235
124	181.0200	170.3229	10.6971	-.18313	2.22677	.310061	1.93299	10.7419	.010415
125	170.4500	169.8376	.6124	-.25373	.12749	.286772	1.65352	.6146	.000029
126	174.5300	177.6244	-3.0944	.87904	-.64415	.431714	3.74738	-3.1196	.001703
127	167.3700	171.4499	-4.0799	-.01918	-.84930	.331141	2.20476	-4.0994	.001730
128	180.0800	177.6165	2.4635	.87789	.51281	.277886	1.55263	2.4718	.000443
129	167.3700	171.4499	-4.0799	-.01918	-.84930	.331141	2.20476	-4.0994	.001730
130	173.5400	171.6973	1.8427	.01681	.38358	.293113	1.72745	1.8496	.000276
132	174.0600	173.9388	.1212	.34289	.02522	.226285	1.02955	.1214	.000001
133	174.5700	174.3200	.2500	.39834	.05204	.312075	1.95818	.2510	.000006
134	184.1500	192.5134	-8.3634	3.04495	-1.74096	.500038	5.02737	-8.4550	.016782
135	165.8800	169.3483	-3.4682	-.32491	-.72197	.320796	2.06915	-3.4838	.001173
137	175.6700	180.2966	-4.6266	1.26776	-.96309	.236594	1.12550	-4.6378	.001130
138	167.8800	177.6438	-9.7638	.88186	-2.03249	.306936	1.89421	-9.8038	.008501
140	176.8000	173.0630	3.7370	.21549	.77790	.427753	3.67893	3.7668	.002437
141	162.3700	161.0430	1.3270	-1.53309	.27624	.252545	1.28237	1.3307	.000106
142	177.1100	174.7070	2.4030	.45463	.50023	.227262	1.03846	2.4084	.000281
143	165.1300	163.1459	1.9841	-1.22718	.41302	.235889	1.11880	1.9889	.000207
144	167.3800	171.2620	-3.8820	-.04651	-.80810	.324042	2.11124	-3.8997	.001499
146	179.4400	182.4679	-3.0279	1.58363	-.63031	.446413	4.00691	-3.0543	.001745
147	167.3700	171.4499	-4.0799	-.01918	-.84930	.331141	2.20476	-4.0994	.001730
148	167.4700	165.6824	1.7876	-.85819	.37212	.323037	2.09816	1.7957	.000316
149	167.3700	171.4499	-4.0799	-.01918	-.84930	.331141	2.20476	-4.0994	.001730
151	187.8400	187.7856	.0544	2.35721	.01131	.421496	3.57208	.0548	.000001
152	176.9000	170.8590	6.0410	-.10513	1.25752	.226624	1.03263	6.0544	.001768
153	174.2300	170.4389	3.7911	-.16625	.78917	.303702	1.85451	3.8063	.001255
154	174.2900	163.4765	10.8135	-1.17908	2.25099	.264532	1.40699	10.8464	.007729
155	168.5200	166.8675	1.6525	-.68578	.34399	.337292	2.28742	1.6607	.000295

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
156	170.7500	166.0485	4.7015	-.80494	.97870	.224428	1.01272	4.7118	.001050
158	186.0600	186.6596	-.5996	2.19339	-.12481	.330322	2.19387	-.6024	.000037
159	173.3600	173.8478	-.4878	.32965	-.10155	.272799	1.49631	-.4894	.000017
160	162.8700	172.1435	-9.2735	.08172	-1.93042	.226914	1.03528	-9.2942	.004176
161	161.6200	162.2533	-.6333	-1.35702	-.13184	.387842	3.02444	-.6375	.000057
162	178.8800	168.4948	10.3853	-.44907	2.16185	.365432	2.68502	10.4457	.013680
163	170.8700	171.6626	-.7926	.01176	-.16500	.241378	1.17146	-.7946	.000035
164	170.5900	173.7848	-3.1948	.32048	-.66505	.226190	1.02868	-3.2019	.000492
165	174.8600	175.4129	-.5529	.55733	-.11510	.408386	3.35333	-.5569	.000049
166	183.2800	176.7599	6.5201	.75328	1.35725	.456883	4.19706	6.5796	.008484
167	170.5400	173.5656	-3.0256	.28859	-.62983	.236951	1.12889	-3.0330	.000485
168	168.3800	169.1257	-.7457	-.35728	-.15523	.266355	1.42645	-.7480	.000037
169	174.1200	178.7237	-4.6037	1.03896	-.95834	.548821	6.05615	-4.6646	.006153
170	166.0700	166.8832	-.8132	-.68351	-.16927	.269410	1.45935	-.8157	.000045
171	175.7900	177.3423	-1.5523	.83800	-.32314	.257149	1.32955	-1.5568	.000150
172	172.0800	175.8780	-3.7980	.62498	-.79061	.233231	1.09372	-3.8070	.000740
173	167.0400	166.6339	.4061	-.71977	.08454	.247172	1.22838	.4072	.000010
174	172.2700	177.0364	-4.7664	.79350	-.99220	.268092	1.44512	-4.7813	.001543
175	175.4900	171.5754	3.9146	-.00093	.81489	.272111	1.48876	3.9272	.001072
176	173.7400	169.6143	4.1257	-.28620	.85882	.270838	1.47487	4.1388	.001180
177	166.8300	156.7218	10.1082	-2.16170	2.10418	.249562	1.25226	10.1356	.006007
178	172.0400	178.4435	-6.4035	.99819	-1.33298	.321601	2.07955	-6.4323	.004018
179	179.1400	177.7852	1.3548	.90242	.28203	.246025	1.21701	1.3584	.000105
180	164.6100	160.4818	4.1282	-1.61472	.85935	.208461	.87374	4.1360	.000698
181	170.1500	175.5361	-5.3861	.57525	-1.12120	.368200	2.72586	-5.4179	.003736
182	167.2000	167.9581	-.7581	-.52714	-.15780	.227089	1.03687	-.7598	.000028
183	177.1200	174.5934	2.5266	.43811	.52595	.278416	1.55856	2.5351	.000468
184	166.0400	162.1819	3.8581	-1.36742	.80313	.236502	1.12462	3.8675	.000785
185	178.7200	172.9852	5.7348	.20416	1.19380	.290073	1.69181	5.7558	.002617
186	169.3900	162.2089	7.1811	-1.36348	1.49485	.244484	1.20181	7.1997	.002909
187	165.4300	169.9372	-4.5072	-.23923	-.93825	.257558	1.33379	-4.5202	.001273
188	168.4800	170.7047	-2.2247	-.12759	-.46310	.266994	1.43331	-2.2316	.000333
189	171.5000	178.9928	-7.4928	1.07810	-1.55974	.232467	1.08657	-7.5104	.002862
190	163.7700	160.0356	3.7344	-1.67963	.77737	.215984	.93794	3.7420	.000613
191	175.7500	174.7067	1.0433	.45459	.21719	.486434	4.75754	1.0541	.000247
192	171.1000	174.1886	-3.0886	.37923	-.64295	.226456	1.03110	-3.0955	.000461
193	177.7700	167.4621	10.3079	-.59929	2.14575	.229077	1.05511	10.3314	.005259
194	174.5500	169.4217	5.1283	-.31423	1.06754	.271776	1.48510	5.1448	.001836
195	180.2800	188.3494	-8.0694	2.43922	-1.67977	.440029	3.89311	-8.1377	.012038
196	172.3100	168.3795	3.9305	-.46583	.81819	.223529	1.00462	3.9390	.000728
197	161.9000	161.4052	.4948	-1.48040	.10300	.233692	1.09805	.4960	.000013
198	170.8600	165.4630	5.3970	-.89010	1.12346	.233670	1.09784	5.4098	.001500
199	163.6200	163.6924	-.0724	-1.14768	-.01507	.348289	2.43901	-.0728	.000001
200	179.0100	174.9575	4.0525	.49107	.84360	.431839	3.74954	4.0856	.002922
202	168.5000	167.8266	.6734	-.54626	.14017	.285382	1.63752	.6758	.000035
204	173.9800	176.5689	-2.5889	.72548	-.53891	.244050	1.19755	-2.5956	.000377
205	177.4200	176.0281	1.3919	.64682	.28974	.237053	1.12986	1.3953	.000103
206	185.9600	183.6652	2.2948	1.75780	.47770	.240725	1.16514	2.3006	.000288
207	165.9800	167.7230	-1.7430	-.56134	-.36283	.253181	1.28884	-1.7478	.000184
208	168.2400	174.3641	-6.1241	.40475	-1.27483	.228681	1.05147	-6.1380	.001850
209	167.8800	173.5864	-5.7064	.29162	-1.18787	.226370	1.03032	-5.7191	.001574
210	176.4200	177.0320	-.6120	.79285	-.12739	.403086	3.26686	-.6163	.000058
212	170.4700	165.9417	4.5283	-.82046	.94263	.268316	1.44753	4.5425	.001395
213	170.0200	172.1655	-2.1455	.08493	-.44663	.483647	4.70319	-2.1675	.001032
214	174.9200	179.0557	-4.1357	1.08725	-.86091	.234024	1.10117	-4.1455	.000884
215	179.4200	170.8736	8.5464	-.10302	1.77907	.249094	1.24756	8.5695	.004278
216	172.0800	176.0931	-4.0131	.65627	-.83539	.265034	1.41233	-4.0253	.001069
217	177.1500	174.5951	2.5549	.43836	.53183	.328125	2.16477	2.5668	.000666
218	161.7800	166.9678	-5.1878	-.67120	-1.07992	.520542	5.44811	-5.2494	.007010
219	175.9500	172.1758	3.7742	.08642	.78565	.480957	4.65102	3.8124	.003157
220	169.9500	167.0383	2.9117	-.66094	.60610	.313194	1.97225	2.9241	.000787

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
221	175.3400	175.6269	-.2869	.58846	-.05973	.351487	2.48401	-.2885	.000010
222	168.7900	169.1191	-.3291	-.35824	-.06851	.375305	2.83207	-.3311	.000015
223	167.1700	160.1875	6.9825	-1.65753	1.45351	.238917	1.14770	6.9998	.002626
224	165.3100	165.8479	-.5379	-.83411	-.11198	.363567	2.65769	-.5410	.000036
225	175.8200	180.5461	-4.7261	1.30406	-.98381	.238958	1.14809	-4.7378	.001203
226	170.1200	168.5832	1.5368	-.43621	.31991	.228776	1.05234	1.5403	.000117
227	163.6500	166.3377	-2.6877	-.76286	-.55949	.227731	1.04275	-2.6938	.000353
228	172.6800	174.4125	-1.7325	.41179	-.36064	.272047	1.48806	-1.7381	.000210
229	181.5100	178.7944	2.7156	1.04923	.56530	.233837	1.09941	2.7221	.000380
230	176.9800	180.8354	-3.8554	1.34614	-.80256	.234926	1.10968	-3.8647	.000774
231	170.8100	161.7801	9.0299	-1.42586	1.87972	.244935	1.20625	9.0535	.004617
232	176.1300	185.8006	-9.6706	2.06844	-2.01309	.466643	4.37829	-9.7627	.019486
233	179.7300	175.5034	4.2266	.57049	.87982	.236825	1.12769	4.2369	.000945
234	167.6700	164.5876	3.0824	-1.01745	.64165	.476044	4.55647	3.1130	.002062
235	171.2900	163.3572	7.9328	-1.19644	1.65133	.224445	1.01287	7.9501	.002989
236	181.9000	184.4533	-2.5533	1.87244	-.53151	.252394	1.28083	-2.5604	.000392
237	175.5500	170.1793	5.3707	-.20401	1.11799	.295883	1.76025	5.3911	.002389
238	174.6000	170.7282	3.8718	-.12416	.80597	.246707	1.22377	3.8820	.000861
239	174.9700	172.8011	2.1689	.17738	.45149	.391371	3.07973	2.1834	.000686
241	166.0700	168.6362	-2.5662	-.42850	-.53419	.285867	1.64309	-2.5753	.000509
242	172.9800	170.6174	2.3626	-.14028	.49180	.269352	1.45873	2.3700	.000383
243	169.3600	164.8456	4.5144	-.97992	.93974	.296002	1.76167	4.5316	.001689
244	171.0800	170.3147	.7654	-.18433	.15932	.245127	1.20814	.7673	.000033
245	171.3300	173.8712	-2.5412	.33304	-.52898	.238180	1.14063	-2.5474	.000346
246	171.5000	176.3859	-4.8859	.69887	-1.01708	.344734	2.38948	-4.9112	.002691
248	175.8400	179.6942	-3.8542	1.18014	-.80232	.238534	1.14403	-3.8638	.000797
249	165.0800	171.3425	-6.2625	-.03481	-1.30363	.224900	1.01698	-6.2762	.001871
250	185.4900	181.5757	3.9143	1.45384	.81482	.357015	2.56276	3.9360	.001854
251	177.4200	177.5074	-.0874	.86202	-.01820	.239951	1.15765	-.0876	.000000
252	170.5800	169.9857	.5943	-.23218	.12371	.262487	1.38532	.5961	.000023
253	171.0800	170.3147	.7654	-.18433	.15932	.245127	1.20814	.7673	.000033
254	185.4900	181.5757	3.9143	1.45384	.81482	.357015	2.56276	3.9360	.001854
255	163.5000	169.5019	-6.0019	-.30256	-1.24939	.349518	2.45625	-6.0339	.004176
256	180.1800	182.0105	-1.8305	1.51708	-.38104	.362073	2.63588	-1.8409	.000417
257	160.7400	155.8533	4.8867	-2.28804	1.01724	.220792	.98017	4.8970	.001098
258	172.7100	169.2749	3.4351	-.33558	.71506	.221913	.99015	3.4424	.000548
259	173.3300	167.6969	5.6331	-.56513	1.17261	.251597	1.27276	5.6486	.001896
260	176.2500	179.3430	-3.0930	1.12905	-.64387	.238469	1.14340	-3.1007	.000513
262	163.7800	169.6562	-5.8762	-.28011	-1.22322	.293119	1.72752	-5.8982	.002806
263	174.0600	179.8044	-5.7444	1.19616	-1.19578	.278354	1.55786	-5.7637	.002417
266	166.7500	175.4428	-8.6928	.56167	-1.80954	.227957	1.04482	-8.7124	.003703
267	169.5200	170.2678	-.7478	-.19114	-.15566	.385854	2.99351	-.7526	.000079
268	168.3200	170.6003	-2.2803	-.14278	-.47467	.259906	1.35821	-2.2870	.000332
269	167.7100	166.0683	1.6417	-.80205	.34174	.225171	1.01944	1.6453	.000129
270	171.9900	170.7746	1.2154	-.11742	.25301	.253188	1.28890	1.2188	.000089
271	179.1900	184.9293	-5.7393	1.94169	-1.19472	.254222	1.29945	-5.7554	.002010
272	166.9900	173.0700	-6.0800	.21650	-1.26564	.298353	1.78977	-6.1035	.003113
273	167.0500	165.3779	1.6721	-.90248	.34807	.231684	1.07926	1.6760	.000142
274	168.0000	174.5720	-6.5720	.43500	-1.36806	.227253	1.03838	-6.5867	.002104
275	175.3400	167.6987	7.6413	-.56487	1.59065	.219691	.97042	7.6573	.002657
276	184.2800	186.3013	-2.0213	2.14128	-.42076	.256494	1.32279	-2.0271	.000254
277	177.4400	172.3139	5.1261	.10651	1.06707	.225911	1.02615	5.1374	.001265
278	175.6100	172.7130	2.8970	.16457	.60306	.399798	3.21378	2.9172	.001277
279	171.1600	176.9634	-5.8034	.78287	-1.20806	.324880	2.12217	-5.8300	.003368
280	177.4000	177.3166	.0834	.83425	.01737	.439922	3.89122	.0841	.000001
282	173.4400	164.8938	8.5462	-.97290	1.77901	.669803	9.02047	8.7156	.031996
283	159.3200	162.8278	-3.5078	-1.27345	-.73020	.211597	.90023	-3.5146	.000519
285	171.4800	179.5267	-8.0467	1.15576	-1.67504	.259485	1.35381	-8.0702	.004117
286	172.6300	176.8295	-4.1995	.76340	-.87419	.232260	1.08463	-4.2093	.000897
287	168.9000	170.6695	-1.7695	-.13270	-.36835	.286990	1.65603	-1.7759	.000244
289	172.8300	172.5093	.3207	.13493	.06677	.461005	4.27314	.3237	.000021

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
290	170.0900	169.6420	.4480	-.28217	.09325	.270970	1.47631	.4494	.000014
291	167.3100	177.8023	-10.4923	.90491	-2.18413	.237425	1.13341	-10.5180	.005855
293	172.1700	167.0341	5.1359	-.66156	1.06912	.217008	.94686	5.1464	.001171
294	176.3100	177.3393	-1.0293	.83756	-.21426	.251433	1.27110	-1.0321	.000063
295	169.3500	168.3851	.9649	-.46501	.20085	.226861	1.03479	.9670	.000045
296	168.4100	169.6098	-1.1998	-.28686	-.24976	.355416	2.53985	-1.2064	.000173
297	175.6400	175.4788	.1612	.56691	.03356	.231411	1.07672	.1616	.000001
299	165.8700	169.2530	-3.3830	-.33877	-.70422	.225054	1.01838	-3.3904	.000547
300	165.4500	169.9356	-4.4856	-.23947	-.93375	.369205	2.74076	-4.5123	.002606
301	161.4800	171.4815	-10.0015	-.01458	-2.08196	.278903	1.56401	-10.0353	.007355
302	172.1400	164.6546	7.4854	-1.00770	1.55820	.214418	.92440	7.5004	.002428
303	179.8400	173.6587	6.1813	.30214	1.28672	.242952	1.18680	6.1971	.002128
304	171.0200	169.3355	1.6845	-.32676	.35065	.392034	3.09018	1.6958	.000415
305	172.0100	170.6302	1.3798	-.13842	.28723	.298170	1.78757	1.3851	.000160
306	170.0500	169.4801	.5699	-.30573	.11863	.222055	.99142	.5711	.000015
307	166.6200	159.1707	7.4492	-1.80545	1.55068	.246941	1.22609	7.4690	.003194
308	172.3100	167.9537	4.3563	-.52778	.90683	.381345	2.92396	4.3839	.002624
309	184.3200	183.1625	1.1575	1.68466	.24096	.507936	5.18745	1.1706	.000332
310	179.7000	185.7396	-6.0396	2.05956	-1.25723	.269232	1.45743	-6.0586	.002498
311	168.3600	169.4227	-1.0627	-.31408	-.22121	.293371	1.73049	-1.0666	.000092
312	172.2700	179.4988	-7.2288	1.15171	-1.50479	.266858	1.43185	-7.2512	.003515
313	173.0400	171.7181	1.3219	.01983	.27518	.225905	1.02610	1.3248	.000084
314	173.7200	167.1257	6.5943	-.64823	1.37271	.282980	1.61008	6.6173	.003292
315	161.0900	172.1637	-11.0737	.08466	-2.30517	.242325	1.18067	-11.1020	.006795
316	171.8600	172.9410	-1.0810	.19773	-.22502	.241933	1.17687	-1.0837	.000065
317	163.3200	154.7169	8.6031	-2.45335	1.79086	.265717	1.41963	8.6295	.004936
319	171.8700	168.8427	3.0273	-.39846	.63018	.231915	1.08142	3.0344	.000465
320	169.6400	170.2035	-.5635	-.20049	-.11731	.372958	2.79676	-.5669	.000042
321	173.7200	175.6629	-1.9429	.59369	-.40444	.251391	1.27068	-1.9482	.000225
322	164.2000	160.5216	3.6784	-1.60894	.76572	.278975	1.56482	3.6909	.000995
323	160.8400	166.4798	-5.6398	-.74219	-1.17401	.395987	3.15281	-5.6784	.004747
324	173.5700	174.1345	-.5645	.37135	-.11750	.245199	1.20885	-.5659	.000018
325	168.2200	175.5887	-7.3687	.58290	-1.53390	.304479	1.86401	-7.3984	.004764
326	172.6200	165.6408	6.9792	-.86423	1.45282	.215123	.93048	6.9932	.002125
327	175.6100	171.6802	3.9298	.01432	.81806	.503872	5.10476	3.9736	.003764
328	172.0100	173.5030	-1.4930	.27948	-.31079	.295414	1.75468	-1.4986	.000184
329	176.9000	166.7729	10.1271	-.69955	2.10811	.245948	1.21625	10.1537	.005855
330	169.1200	176.0451	-6.9251	.64929	-1.44156	.271077	1.47747	-6.9472	.003330
331	173.9500	177.3100	-3.3600	.83331	-.69945	.301553	1.82836	-3.3733	.000972
332	172.2500	172.3950	-.1450	.11831	-.03019	.378468	2.88000	-.1459	.000003
333	165.4100	157.2902	8.1198	-2.07902	1.69027	.378649	2.88276	8.1706	.008986
334	169.0000	169.2452	-.2452	-.33989	-.05105	.296021	1.76190	-.2462	.000005
335	180.0100	175.3113	4.6987	.54254	.97811	.268083	1.44502	4.7134	.001499
336	181.1900	184.0148	-2.8248	1.80866	-.58803	.362640	2.64416	-2.8410	.000997
337	168.3000	166.6428	1.6572	-.71847	.34497	.228203	1.04708	1.6609	.000135
339	169.9800	167.6114	2.3686	-.57758	.49306	.309903	1.93102	2.3785	.000510
340	177.5900	170.4810	7.1090	-.16012	1.47984	.251198	1.26873	7.1285	.003010
341	155.8900	151.4712	4.4188	-2.92552	.91985	.225318	1.02077	4.4286	.000935
342	179.1500	182.2334	-3.0834	1.54951	-.64185	.256595	1.32382	-3.0922	.000591
343	174.6400	173.9429	.6971	.34348	.14511	.230306	1.06646	.6987	.000024
344	170.0600	175.8109	-5.7509	.61522	-1.19714	.228603	1.05075	-5.7640	.001630
345	171.7000	172.7358	-1.0358	.16789	-.21562	.250815	1.26486	-1.0387	.000064
346	167.8100	177.9472	-10.1372	.92599	-2.11021	.309726	1.92882	-10.1795	.009333
347	174.6800	174.2047	.4753	.38157	.09893	.507777	5.18419	.4806	.000056
348	164.8100	168.6704	-3.8604	-.42352	-.80359	.244639	1.20333	-3.8704	.000842
349	157.7600	155.6319	2.1281	-2.32024	.44299	.355649	2.54319	2.1398	.000544
350	174.6300	175.7883	-1.1582	.61193	-.24111	.520052	5.43787	-1.1720	.000349
351	170.9900	173.8010	-2.8110	.32284	-.58516	.229473	1.05876	-2.8174	.000392
352	175.9100	184.3599	-8.4499	1.85886	-1.75897	.347838	2.43270	-8.4944	.008196
353	184.2300	179.5147	4.7153	1.15402	.98155	.370060	2.75347	4.7434	.002893
354	172.2600	176.3738	-4.1138	.69711	-.85636	.476187	4.55922	-4.1547	.003675

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
355	173.7200	175.0418	-1.3218	.50334	-.27515	.281353	1.59161	-1.3263	.000131
356	169.6500	159.4718	10.1782	-1.76165	2.11875	.209055	.87873	10.1975	.004267
357	164.4300	161.1270	3.3030	-1.52087	.68758	.258498	1.34353	3.3126	.000688
359	173.3900	167.2518	6.1382	-.62988	1.27775	.231342	1.07608	6.1524	.001902
360	177.0400	176.1972	.8428	.67142	.17544	.232318	1.08518	.8447	.000036
362	170.3100	163.0906	7.2194	-1.23522	1.50283	.221664	.98792	7.2348	.002415
363	172.7000	177.4007	-4.7007	.84650	-.97853	.242520	1.18258	-4.7128	.001226
364	176.2300	176.3607	-.1307	.69520	-.02720	.244198	1.19900	-.1310	.000001
365	183.3200	173.4813	9.8387	.27633	2.04808	.267059	1.43400	9.8692	.006522
367	173.4800	166.5202	6.9598	-.73632	1.44880	.222298	.99359	6.9748	.002257
368	168.5700	172.6292	-4.0592	.15238	-.84499	.368223	2.72619	-4.0832	.002122
369	165.6400	169.2971	-3.6571	-.33235	-.76128	.219987	.97304	-3.6648	.000610
370	180.9400	187.7144	-6.7744	2.34684	-1.41019	.412025	3.41337	-6.8246	.007423
371	157.1000	160.9192	-3.8192	-1.55109	-.79502	.257181	1.32988	-3.8302	.000911
372	173.7800	166.8588	6.9212	-.68705	1.44075	.391799	3.08646	6.9675	.006997
373	167.8200	158.6205	9.1995	-1.88550	1.91503	.442809	3.94246	9.2784	.015848
374	174.6300	175.7883	-1.1582	.61193	-.24111	.520052	5.43787	-1.1720	.000349
375	176.4600	184.3707	-7.9107	1.86043	-1.64673	.347095	2.42232	-7.9522	.007153
376	161.8600	154.3616	7.4984	-2.50505	1.56092	.267929	1.44336	7.5218	.003813
377	159.6400	161.4993	-1.8593	-1.46671	-.38704	.215207	.93121	-1.8631	.000151
378	163.9400	156.8488	7.0912	-2.14322	1.47614	.310452	1.93787	7.1209	.004588
379	174.9100	180.7397	-5.8297	1.33222	-1.21354	.282152	1.60067	-5.8499	.002558
380	154.4100	151.6972	2.7128	-2.89263	.56470	.359266	2.59518	2.7280	.000902
381	173.1000	172.5321	.5679	.13825	.11821	.418411	3.51998	.5722	.000054
382	168.3200	176.9908	-8.6708	.78686	-1.80496	.232466	1.08656	-8.6911	.003832
383	168.6200	169.6688	-1.0488	-.27828	-.21833	.284012	1.62184	-1.0525	.000084
384	173.7400	179.8877	-6.1477	1.20829	-1.27975	.293851	1.73616	-6.1708	.003087
386	169.4100	166.1496	3.2604	-.79022	.67870	.219851	.97183	3.2672	.000484
388	174.1500	179.0819	-4.9319	1.09106	-1.02665	.362528	2.64252	-4.9601	.003036
389	171.2700	173.4074	-2.1374	.26558	-.44493	.259733	1.35640	-2.1437	.000291
390	174.6400	181.7100	-7.0700	1.47337	-1.47172	.237135	1.13065	-7.0872	.002652
392	169.4900	169.8245	-.3345	-.25563	-.06963	.220555	.97807	-.3352	.000005
393	171.7000	172.7358	-1.0358	.16789	-.21562	.250815	1.26486	-1.0387	.000064
394	170.0600	175.8109	-5.7509	.61522	-1.19714	.228603	1.05075	-5.7640	.001630
395	174.6400	173.9429	.6971	.34348	.14511	.230306	1.06646	.6987	.000024
396	179.1500	182.2334	-3.0834	1.54951	-.64185	.256595	1.32382	-3.0922	.000591
397	155.8900	151.4712	4.4188	-2.92552	.91985	.225318	1.02077	4.4286	.000935
398	177.5900	170.4810	7.1090	-.16012	1.47984	.251198	1.26873	7.1285	.003010
399	169.9800	167.6114	2.3686	-.57758	.49306	.309903	1.93102	2.3785	.000510
401	168.3000	166.6428	1.6572	-.71847	.34497	.228203	1.04708	1.6609	.000135
402	181.1700	183.8736	-2.7036	1.78812	-.56280	.332816	2.22712	-2.7167	.000768
403	174.7600	169.8308	4.9292	-.25471	1.02608	.253426	1.29133	4.9429	.001473
404	180.0100	175.2602	4.7498	.53511	.98874	.269090	1.45589	4.7647	.001543
405	169.6500	169.2452	.4048	-.33989	.08426	.296021	1.76190	.4063	.000014
406	172.0100	173.5030	-1.4930	.27948	-.31079	.295414	1.75468	-1.4986	.000184
407	176.9000	166.7729	10.1271	-.69955	2.10811	.245948	1.21625	10.1537	.005855
408	169.1200	176.0451	-6.9251	.64929	-1.44156	.271077	1.47747	-6.9472	.003330
409	173.9500	177.3100	-3.3600	.83331	-.69945	.301553	1.82836	-3.3733	.000972
410	172.2500	172.3950	-.1450	.11831	-.03019	.378468	2.88000	-.1459	.000003
411	165.4100	157.2902	8.1198	-2.07902	1.69027	.378649	2.88276	8.1706	.008986
412	173.8900	173.1133	.7767	.22280	.16167	.464521	4.33857	.7840	.000125
413	170.5800	169.9857	.5943	-.23218	.12371	.262487	1.38532	.5961	.000023
414	179.0700	187.5644	-8.4944	2.32502	-1.76824	.245922	1.21599	-8.5167	.004119
415	167.8100	177.9472	-10.1372	.92599	-2.11021	.309726	1.92882	-10.1795	.009333
416	174.6800	174.2047	.4753	.38157	.09893	.507777	5.18419	.4806	.000056
417	164.8100	168.6704	-3.8604	-.42352	-.80359	.244639	1.20333	-3.8704	.000842
419	161.1300	171.4413	-10.3113	-.02043	-2.14645	.276847	1.54104	-10.3456	.007702
420	165.6700	171.8297	-6.1597	.03606	-1.28223	.287589	1.66295	-6.1818	.002967
421	165.8700	169.2530	-3.3830	-.33877	-.70422	.225054	1.01838	-3.3904	.000547
422	173.4400	164.8938	8.5462	-.97290	1.77901	.669803	9.02047	8.7156	.031996
423	159.3200	162.8278	-3.5078	-1.27345	-.73020	.211597	.90023	-3.5146	.000519

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
424	177.4000	177.3166	.0834	.83425	.01737	.439922	3.89122	.0841	.000001
425	171.1600	176.9634	-5.8034	.78287	-1.20806	.324880	2.12217	-5.8300	.003368
426	175.6200	172.5215	3.0985	.13670	.64501	.407114	3.33248	3.1209	.001516
427	171.4800	179.5267	-8.0467	1.15576	-1.67504	.259485	1.35381	-8.0702	.004117
428	172.6300	176.8295	-4.1995	.76340	-.87419	.232260	1.08463	-4.2093	.000897
429	168.9000	170.6695	-1.7695	-.13270	-.36835	.286990	1.65603	-1.7759	.000244
431	166.2900	172.6451	-6.3551	.15469	-1.32292	.835577	14.03809	-6.5534	.028152
432	172.8300	172.5093	.3207	.13493	.06677	.461005	4.27314	.3237	.000021
433	170.2400	169.6448	.5952	-.28177	.12391	.270856	1.47507	.5971	.000025
435	172.0700	175.0477	-2.9777	.50420	-.61985	.288146	1.66940	-2.9884	.000696
436	176.3100	177.3393	-1.0293	.83756	-.21426	.251433	1.27110	-1.0321	.000063
437	169.3500	168.3851	.9649	-.46501	.20085	.226861	1.03479	.9670	.000045
438	160.6100	156.3830	4.2270	-2.21098	.87991	.346243	2.41045	4.2490	.002032
439	175.6400	175.4788	.1612	.56691	.03356	.231411	1.07672	.1616	.000001
440	163.9900	164.3858	-.3958	-1.04681	-.08239	.378207	2.87604	-.3982	.000021
441	172.1400	164.6720	7.4680	-1.00517	1.55459	.214136	.92196	7.4829	.002411
442	168.3600	169.4227	-1.0627	-.31408	-.22121	.293371	1.73049	-1.0666	.000092
443	168.7900	165.4546	3.3354	-.89132	.69431	.315693	2.00385	3.3499	.001050
444	171.0200	169.3355	1.6845	-.32676	.35065	.392034	3.09018	1.6958	.000415
445	170.1700	166.3991	3.7709	-.75392	.78496	.297623	1.78101	3.7854	.001192
446	171.7400	169.3945	2.3455	-.31818	.48826	.269930	1.46499	2.3529	.000379
447	172.2000	174.9661	-2.7661	.49233	-.57582	.253855	1.29570	-2.7739	.000466
448	167.5000	164.8595	2.6405	-.97790	.54966	.221851	.98959	2.6461	.000324
449	172.9700	174.3622	-1.3922	.40448	-.28981	.232417	1.08610	-1.3955	.000099
450	173.7100	174.9928	-1.2828	.49621	-.26703	.286619	1.65175	-1.2874	.000128
451	170.0500	165.4832	4.5668	-.88717	.95065	.313852	1.98054	4.5864	.001945
452	172.8200	168.0179	4.8021	-.51844	.99964	.280239	1.57903	4.8185	.001712
454	172.3400	178.1825	-5.8425	.96022	-1.21620	.323511	2.10433	-5.8691	.003385
455	175.6000	176.9778	-1.3778	.78498	-.28681	.243439	1.19155	-1.3814	.000106
456	179.7000	185.7396	-6.0396	2.05956	-1.25723	.269232	1.45743	-6.0586	.002498
457	182.9700	180.3121	2.6579	1.27001	.55329	.234306	1.10383	2.6643	.000366
458	172.3100	167.9537	4.3563	-.52778	.90683	.381345	2.92396	4.3839	.002624
459	155.2800	151.0652	4.2148	-2.98457	.87737	.347428	2.42697	4.2369	.002034
460	177.5600	167.8501	9.7099	-.54284	2.02126	.362113	2.63647	9.7653	.011740
462	166.6200	159.1707	7.4492	-1.80545	1.55068	.246941	1.22609	7.4690	.003194
463	170.2200	172.4738	-2.2538	.12977	-.46916	.227880	1.04411	-2.2589	.000249
464	172.0100	170.6302	1.3798	-.13842	.28723	.298170	1.78757	1.3851	.000160
465	179.8400	173.6587	6.1813	.30214	1.28672	.242952	1.18680	6.1971	.002128
466	167.3600	156.7925	10.5675	-2.15142	2.19979	.229122	1.05552	10.5916	.005529
467	171.8700	168.8427	3.0273	-.39846	.63018	.231915	1.08142	3.0344	.000465
468	166.8400	166.5261	.3139	-.73545	.06533	.276651	1.53886	.3149	.000007
469	173.0400	171.7181	1.3219	.01983	.27518	.225905	1.02610	1.3248	.000084
470	175.5600	176.7283	-1.1683	.74868	-.24321	.231839	1.08071	-1.1711	.000069
471	163.3200	154.7169	8.6031	-2.45335	1.79086	.265717	1.41963	8.6295	.004936
472	161.0900	172.1798	-11.0898	.08700	-2.30852	.242583	1.18319	-11.1182	.006830
473	173.3900	167.1060	6.2840	-.65109	1.30811	.284029	1.62204	6.3061	.003012
474	162.6500	163.1180	-.4680	-1.23123	-.09742	.231281	1.07551	-.4691	.000011
475	175.7300	168.6696	7.0603	-.42363	1.46972	.437959	3.85658	7.1195	.009128
476	174.8400	179.2659	-4.4259	1.11783	-.92132	.356847	2.56034	-4.4505	.002368
477	170.8000	168.7215	2.0785	-.41608	.43266	.419253	3.53417	2.0944	.000724
478	178.0700	169.5457	8.5243	-.29619	1.77447	.297330	1.77751	8.5571	.006078
479	177.7700	174.1583	3.6117	.37482	.75183	.273926	1.50869	3.6235	.000925
480	166.0900	162.5310	3.5590	-1.31663	.74086	.719975	10.42245	3.6408	.006451
481	164.6800	168.7859	-4.1060	-.40671	-.85472	.219844	.97177	-4.1146	.000768
482	167.5900	168.9095	-1.3195	-.38873	-.27468	.439847	3.88990	-1.3307	.000322
483	175.0900	176.4264	-1.3364	.70476	-.27819	.263131	1.39213	-1.3404	.000117
484	178.4800	180.3043	-1.8243	1.26888	-.37976	.236227	1.12201	-1.8287	.000175
486	175.1500	182.9389	-7.7889	1.65215	-1.62139	.269900	1.46467	-7.8136	.004176
487	172.9600	170.8497	2.1103	-.10649	.43929	.491249	4.85220	2.1326	.001030
488	165.7500	169.2351	-3.4851	-.34136	-.72548	.271047	1.47715	-3.4963	.000843
489	172.9800	176.9203	-3.9404	.77662	-.82025	.337335	2.28800	-3.9599	.001675

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
490	173.7700	179.4408	-5.6708	1.14327	-1.18047	.267904	1.44309	-5.6885	.002181
491	177.5400	170.7495	6.7905	-.12107	1.41356	.410753	3.39231	6.8406	.007412
492	165.2100	174.3294	-9.1194	.39970	-1.89834	.235958	1.11945	-9.1414	.004368
493	181.3100	180.8980	.4120	1.35525	.08576	.551216	6.10911	.4175	.000050
494	174.2500	175.7288	-1.4788	.60328	-.30784	.268775	1.45249	-1.4834	.000149
495	175.8200	165.6293	10.1907	-.86591	2.12135	.243339	1.19058	10.2169	.005803
496	171.2400	177.0912	-5.8512	.80147	-1.21802	.242609	1.18345	-5.8662	.001902
497	175.8200	165.6293	10.1907	-.86591	2.12135	.243339	1.19058	10.2169	.005803
498	177.5400	170.7495	6.7905	-.12107	1.41356	.410753	3.39231	6.8406	.007412
499	172.9600	170.8497	2.1103	-.10649	.43929	.491249	4.85220	2.1326	.001030
500	178.0700	169.5457	8.5243	-.29619	1.77447	.297330	1.77751	8.5571	.006078
501	177.7700	174.1583	3.6117	.37482	.75183	.273926	1.50869	3.6235	.000925
502	166.0900	162.5310	3.5590	-1.31663	.74086	.719975	10.42245	3.6408	.006451
503	164.6800	168.7859	-4.1060	-.40671	-.85472	.219844	.97177	-4.1146	.000768
504	171.0500	180.0563	-9.0063	1.23281	-1.87480	.331576	2.21056	-9.0494	.008453
506	178.4800	180.3043	-1.8243	1.26888	-.37976	.236227	1.12201	-1.8287	.000175
507	175.5000	176.4156	-.9156	.70319	-.19060	.262276	1.38309	-.9184	.000054
508	167.5800	169.1979	-1.6179	-.34678	-.33679	.449465	4.06187	-1.6322	.000505
509	167.5800	169.1979	-1.6179	-.34678	-.33679	.449465	4.06187	-1.6322	.000505
Minimum	154.4100	151.0652	-11.0898	-2.98457	-2.30852	.208461	.87374	-11.1182	.000000
Maximum	192.4300	192.5134	10.8135	3.04495	2.25099	.835577	14.03809	10.8464	.031996
Mean	171.6911	171.5817	.1094	-.00000	.02277	.301528	2.00000	.1102	.002094
Median	171.9300	171.4499	-.0799	-.01918	-.01663	.268092	1.44512	-.0802	.000852

Case 2
Dependent Variable: Predicted adult stature (PAS)

STAT. Variables not in the Equation; DV: PAS (dbmp2.sta)
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(214)	p-level
S2_0	.998948	.998948	.998948	1.000000	1.000000	318.6208	0.00
S3_0	.999345	.999345	.999345	1.000000	1.000000	403.9531	0.00
S4_0	.999484	.999484	.999484	1.000000	1.000000	455.0674	0.00
S5_0	.999541	.999541	.999541	1.000000	1.000000	482.7743	0.00
S6_0	.999556	.999556	.999556	1.000000	1.000000	490.5244	0.00
S7_0	.999563	.999563	.999563	1.000000	1.000000	494.4056	0.00
S8_0	.999589	.999589	.999589	1.000000	1.000000	510.1509	0.00
S9_0	.999624	.999624	.999624	1.000000	1.000000	533.5361	0.00
S10_0	.999636	.999636	.999636	1.000000	1.000000	541.9072	0.00
S11_0	.999584	.999584	.999584	1.000000	1.000000	507.1922	0.00
S12_0	.999416	.999416	.999416	1.000000	1.000000	427.9424	0.00
S13_0	.999258	.999258	.999258	1.000000	1.000000	379.5428	0.00

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99963584 R2= .99927181 Adjusted R2= .99926840
REGRESS. F(1,214)=2937E2 p<0.0000 Std.Error of estimate: 4.6522

N=215	BETA	St. Err. of BETA	B	St. Err. of B	t(214)	p-level
S10_0	.999636	.001845	1.281743	.002365	541.9072	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.578072 R2=.334168 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	2324.547	1	2324.547	107.4023	.000000
Residual	4631.680	214	21.643		
Total	6956.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(213)	p-level
S2_0	.126203	.200653	.005415	.001841	.001841	2.98923	.003126
S3_0	.245968	.308481	.008324	.001145	.001145	4.73296	.000004
S4_0	.312662	.330246	.008912	.000812	.000812	5.10628	.000001
S5_0	.331055	.290410	.007837	.000560	.000560	4.42929	.000015
S6_0	.287777	.207423	.005597	.000378	.000378	3.09454	.002236
S7_0	.197755	.114144	.003080	.000243	.000243	1.67684	.095040
S8_0	.118220	.048474	.001308	.000122	.000122	.70829	.479542
S9_0	.141427	.029701	.000801	.000032	.000032	.43367	.664969
S11_0	-.824318	-.190551	-.005142	.000039	.000039	-2.83290	.005056
S12_0	-.534505	-.288606	-.007788	.000212	.000212	-4.39926	.000017
S13_0	-.280734	-.228865	-.006176	.000484	.000484	-3.43125	.000722

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(214)	p-level
S10_0	.999636	.999636	.999636	1.000000	0.00	541.9072	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S10_0	1	.999636	.999272	.999272	293663.4	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99967556 R2= .99935122 Adjusted R2= .99934513
F(2,213)=1640E2 p<0.0000 Std.Error of estimate: 4.4015

N=215	BETA	St. Err. of BETA	B	St. Err. of B	t(213)	p-level
S10_0	.687101	.061231	.881007	.078511	11.22146	.000000
S4_0	.312662	.061231	.543971	.106530	5.10628	.000001

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.637797 R2=.406785 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	2829.690	2	1414.845	73.03024	.000000
Residual	4126.537	213	19.373		
Total	6956.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(212)	p-level
S2_0	-.022267	-.027943	-.000712	.001022	.000451	-.40701	.684411
S3_0	.013487	.006727	.000171	.000161	.000114	.09795	.922067
S5_0	-.208333	-.065059	-.001657	.000063	.000063	-.94928	.343558
S6_0	-.174941	-.083846	-.002136	.000149	.000149	-1.22514	.221883
S7_0	-.182608	-.092253	-.002350	.000166	.000166	-1.34897	.178786
S8_0	-.214037	-.086188	-.002195	.000105	.000105	-1.25960	.209197
S9_0	-.261329	-.056357	-.001435	.000030	.000030	-.82187	.412074
S11_0	-.604589	-.146026	-.003719	.000038	.000034	-2.14921	.032751
S12_0	-.441625	-.248792	-.006337	.000206	.000143	-3.74006	.000237
S13_0	-.236488	-.202846	-.005167	.000477	.000269	-3.01618	.002873

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(213)	p-level
S10_0	.687101	.609537	.019584	.000812	.999188	11.22146	.000000
S4_0	.312662	.330246	.008912	.000812	.999188	5.10628	.000001

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S10_0	1	.999636	.999272	.999272	293663.4	0.000000	1
S4_0	2	.999676	.999351	.000079	26.1	.000001	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS
case 1 to 234

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	172.0600	169.4652	2.5948	-.35357	.58953	.375341	1.563455	2.6138	.001282
2	170.0800	166.5103	3.5697	-.79810	.81100	.575576	3.676525	3.6318	.005821
3	172.6900	169.8295	2.8605	-.29876	.64988	.351807	1.373539	2.8788	.001366
4	175.6000	175.8966	-.2966	.61398	-.06739	.382201	1.621124	-.2989	.000017
5	161.5100	157.9751	3.5349	-2.08216	.80311	.281242	.877795	3.5494	.001327
6	174.7700	171.0472	3.7228	-.11557	.84581	.400419	1.779353	3.7539	.003010
7	161.5100	157.9751	3.5349	-2.08216	.80311	.281242	.877795	3.5494	.001327

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
8	170.0800	166.5821	3.4979	-.78730	.79470	.576075	3.682903	3.5588	.005599
9	172.6900	169.8295	2.8605	-.29876	.64988	.351807	1.373539	2.8788	.001366
10	173.4100	169.8605	3.5495	-.29410	.80643	.400521	1.780258	3.5792	.002738
11	174.8000	169.8430	4.9570	-.29674	1.12621	.401117	1.785560	4.9986	.005355
12	175.6000	175.8966	-.2966	.61398	-.06739	.382201	1.621124	-.2989	.000017
14	181.1470	182.1583	-1.0113	1.55600	-.22976	.643507	4.595559	-1.0334	.000589
15	176.0500	171.3136	4.7364	-.07548	1.07607	.310021	1.066635	4.7600	.002901
16	160.7400	162.8113	-2.0713	-1.35459	-.47059	.422319	1.979308	-2.0906	.001038
17	170.1200	170.4387	-.3187	-.20712	-.07240	.318580	1.126341	-.3203	.000014
18	174.3100	172.5208	1.7892	.10612	.40650	.302592	1.016123	1.7977	.000394
19	163.2500	168.5702	-5.3202	-.48821	-1.20872	.419880	1.956512	-5.3690	.006770
20	178.5400	182.0016	-3.4616	1.53243	-.78646	.317789	1.120751	-3.4798	.001629
21	169.5000	174.4316	-4.9316	.39358	-1.12043	.336831	1.259090	-4.9606	.003719
22	162.1300	161.1061	1.0239	-1.61113	.23263	.441361	2.161822	1.0343	.000278
23	170.5400	169.1036	1.4364	-.40796	.32633	.832781	7.696520	1.4897	.002050
24	164.3400	164.8369	-.4969	-1.04986	-.11289	.439340	2.142075	-.5019	.000065
25	177.7500	175.3666	2.3834	.53424	.54150	.420969	1.966679	2.4054	.001366
27	170.0600	166.4561	3.6039	-.80627	.81879	.390924	1.695966	3.6326	.002686
28	170.6400	170.4684	.1716	-.20265	.03899	.314268	1.096053	.1725	.000004
29	161.6500	161.0588	.5912	-1.61824	.13431	.388180	1.672241	.5958	.000071
30	167.9100	169.0628	-1.1528	-.41410	-.26192	.431014	2.061649	-1.1640	.000335
31	166.1600	162.5392	3.6208	-1.39552	.82261	.375396	1.563907	3.6473	.002497
32	175.0000	171.9940	3.0060	.02687	.68294	.433405	2.084588	3.0354	.002306
33	169.1900	168.6771	.5129	-.47213	.11653	.318879	1.128453	.5156	.000036
34	172.8700	182.8557	-9.9857	1.66092	-2.26869	.401431	1.788358	-10.0694	.021767
35	169.1500	174.8870	-5.7370	.46209	-1.30341	.310061	1.066909	-5.7656	.004257
37	173.1900	174.2935	-1.1035	.37280	-.25070	.304465	1.028745	-1.1088	.000152
38	173.3600	178.1285	-4.7685	.94975	-1.08337	.351700	1.372707	-4.7991	.003795
39	171.3000	167.3139	3.9861	-.67720	.90561	.324174	1.166240	4.0078	.002249
40	170.5700	175.8096	-5.2396	.60090	-1.19041	.337006	1.260401	-5.2705	.004203
41	167.7100	165.8828	1.8272	-.89251	.41514	.341825	1.296704	1.8383	.000526
42	166.1900	167.6171	-1.4271	-.63160	-.32422	.379463	1.597980	-1.4377	.000397
43	164.2900	167.8457	-3.5557	-.59721	-.80784	.463232	2.381381	-3.5955	.003696
44	175.0100	179.4397	-4.4297	1.14700	-1.00639	.342395	1.301028	-4.4566	.003102
45	166.1200	167.3118	-1.1918	-.67753	-.27076	.651023	4.703541	-1.2184	.000838
46	166.6300	166.0307	.5993	-.87026	.13616	.326559	1.183464	.6026	.000052
47	170.1800	168.2844	1.8956	-.53121	.43068	.543604	3.279424	1.9250	.001459
48	164.6100	160.1232	4.4868	-1.75899	1.01938	.279962	.869821	4.5050	.002119
49	170.1500	177.4434	-7.2934	.84669	-1.65702	.347796	1.342398	-7.3393	.008680
50	167.2000	168.1499	-.9499	-.55145	-.21581	.630297	4.408822	-.9698	.000498
52	166.0400	163.0500	2.9900	-1.31868	.67931	.330308	1.210796	3.0069	.001314
53	178.7200	173.4066	5.3134	.23938	1.20718	.316585	1.112277	5.3410	.003809
54	169.3900	162.5895	6.8005	-1.38795	1.54502	.283855	.894181	6.8289	.005006
55	165.4300	170.0100	-4.5800	-.27160	-1.04056	.299405	.994832	-4.6013	.002528
56	168.4800	171.2185	-2.7385	-.08980	-.62217	.301839	1.011074	-2.7514	.000919
57	171.4300	177.6366	-6.2066	.87575	-1.41010	.321793	1.149173	-6.2399	.005371
58	171.1000	174.1078	-3.0078	.34487	-.68335	.335849	1.251755	-3.0254	.001375
59	161.8100	160.6259	1.1841	-1.68336	.26902	.491782	2.683971	1.1991	.000463
60	176.0000	169.5636	6.4364	-.33877	1.46232	.555834	3.428645	6.5408	.017608
61	172.0400	179.0875	-7.0475	1.09402	-1.60115	.459190	2.340010	-7.1250	.014260
62	179.1300	185.7456	-6.6156	2.09568	-1.50302	.331137	1.216877	-6.6532	.006466
63	179.4200	170.2578	9.1622	-.23432	2.08159	.298749	.990482	9.2046	.010073
64	174.9200	179.4708	-4.5508	1.15169	-1.03391	.318294	1.124316	-4.5747	.002825
65	170.0200	172.8859	-2.8659	.16104	-.65111	.654762	4.757720	-2.9307	.004905
66	170.5200	165.3391	5.1810	-.97431	1.17708	.294089	.959820	5.2042	.003120
67	178.7200	176.8841	1.8359	.76255	.41710	.855637	8.124786	1.9080	.003550
68	173.9800	176.9008	-2.9208	.76505	-.66358	.341204	1.291995	-2.9384	.001339
70	176.4200	176.6064	-.1864	.72077	-.04236	.680071	5.132639	-.1910	.000022
71	167.8800	173.4463	-5.5663	.24536	-1.26463	.303191	1.020155	-5.5929	.003831
72	168.2400	173.4751	-5.2351	.24969	-1.18938	.392501	1.709676	-5.2771	.005715
73	165.9800	167.4107	-1.4307	-.66266	-.32504	.471445	2.466574	-1.4473	.000620

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
74	167.1700	160.2836	6.8864	-1.73486	1.56454	.376863	1.576153	6.9372	.009105
75	168.7900	169.0570	-.2670	-.41498	-.06065	.359642	1.435404	-.2688	.000012
76	175.3400	175.6940	-.3540	.58350	-.08042	.460328	2.351615	-.3579	.000036
77	172.0800	175.0171	-2.9371	.48167	-.66729	.314354	1.096658	-2.9522	.001147
78	176.1300	186.2228	-10.0928	2.16747	-2.29303	.722243	5.788933	-10.3721	.074758
79	170.6300	162.4149	8.2151	-1.41423	1.86643	.283549	.892256	8.2494	.007289
80	177.1200	174.3001	2.8199	.37381	.64065	.309401	1.062371	2.8339	.001024
81	174.9300	176.0388	-1.1088	.63538	-.25192	.309211	1.061063	-1.1143	.000158
82	163.6500	165.7805	-2.1305	-.90790	-.48404	.295305	.967774	-2.1402	.000532
83	181.5100	178.6627	2.8473	1.03012	.64688	.402368	1.796716	2.8713	.001778
84	177.0300	179.4765	-2.4465	1.15255	-.55583	.332967	1.230368	-2.4606	.000894
85	175.9500	172.6542	3.2958	.12619	.74879	.493369	2.701325	3.3377	.003613
86	169.3000	167.2907	2.0093	-.68070	.45650	.359751	1.436275	2.0228	.000705
87	168.6500	168.8045	-.1545	-.45296	-.03510	.325254	1.174023	-.1554	.000003
88	178.2800	170.2441	8.0359	-.23639	1.82571	.334594	1.242419	8.0826	.009743
89	167.7000	163.7424	3.9576	-1.21451	.89914	.420648	1.963681	3.9940	.003760
92	178.8300	180.2159	-1.3859	1.26379	-.31487	.316085	1.108765	-1.3931	.000258
93	179.0900	178.4646	.6254	1.00032	.14208	.311671	1.078016	.6285	.000051
94	169.7800	165.4803	4.2997	-.95306	.97686	.349498	1.355569	4.3270	.003047
95	192.4300	189.0370	3.3930	2.59085	.77086	.447056	2.217970	3.4283	.003129
96	178.9300	182.9765	-4.0465	1.67910	-.91935	.583602	3.779776	-4.1189	.007698
97	168.6100	166.8180	1.7920	-.75182	.40714	.291281	.941580	1.7999	.000366
99	175.7900	177.8717	-2.0818	.91113	-.47296	.354757	1.396673	-2.0954	.000736
100	172.0800	176.6739	-4.5939	.73092	-1.04370	.308835	1.058484	-4.6166	.002708
101	167.0400	165.6237	1.4163	-.93150	.32178	.311607	1.077572	1.4235	.000262
102	172.2700	176.6064	-4.3364	.72076	-.98520	.521155	3.014163	-4.3980	.006999
103	175.4900	172.2985	3.1915	.07268	.72508	.363566	1.466897	3.2134	.001818
104	166.0700	166.5436	-.4736	-.79309	-.10761	.290964	.939533	-.4757	.000026
105	174.1200	177.3862	-3.2663	.83809	-.74207	.804155	7.176486	-3.3790	.009836
106	168.3800	168.2931	.0869	-.52991	.01975	.399650	1.772522	.0877	.000002
107	170.5400	173.8272	-3.2872	.30266	-.74684	.318495	1.125742	-3.3045	.001476
108	183.2800	177.0207	6.2593	.78310	1.42207	.553535	3.400336	6.3598	.016510
109	174.8600	174.8257	.0343	.45287	.00780	.396779	1.747145	.0346	.000000
110	170.5900	173.6030	-3.0130	.26893	-.68454	.304746	1.030645	-3.0275	.001134
111	170.8700	170.8117	.0583	-.15100	.01324	.356106	1.407313	.0587	.000001
112	178.8900	169.0968	9.7932	-.40898	2.22495	.601598	4.016474	9.9796	.048017
113	161.6200	162.7564	-1.1364	-1.36285	-.25819	.497629	2.748176	-1.1511	.000437
114	162.8700	172.0563	-9.1863	.03623	-2.08706	.502642	2.803816	-9.3076	.029158
115	173.3600	174.6538	-1.2938	.42702	-.29395	.327861	1.192922	-1.3011	.000242
117	186.0600	186.5576	-.4976	2.21783	-.11304	.404311	1.814110	-.5018	.000055
118	170.7500	166.4545	4.2955	-.80650	.97590	.293109	.953431	4.3146	.002131
119	166.8300	157.2797	9.5503	-2.18677	2.16977	.274642	.837077	9.5876	.009237
120	174.0600	174.6818	-.6218	.43123	-.14127	.500749	2.782741	-.6300	.000133
121	175.6700	180.2222	-4.5522	1.26473	-1.03423	.652681	4.727535	-4.6545	.012295
123	165.2900	160.8207	4.4693	-1.65406	1.01539	.439377	2.142434	4.5143	.005241
124	181.0200	171.2499	9.7701	-.08508	2.21972	.367362	1.497690	9.8387	.017403
125	170.4500	170.4474	.0026	-.20580	.00059	.496758	2.738553	.0026	.000000
126	174.5300	176.8758	-2.3458	.76129	-.53295	.710393	5.600545	-2.4085	.003900
127	167.3700	171.8884	-4.5184	.01099	-1.02656	.484750	2.607763	-4.5739	.006549
128	180.0800	178.3618	1.7182	.98485	.39036	.349431	1.355047	1.7291	.000486
129	167.3700	171.8884	-4.5184	.01099	-1.02656	.484750	2.607763	-4.5739	.006549
130	173.5400	171.5447	1.9953	-.04073	.45332	.495901	2.729117	2.0210	.001338
132	174.0600	174.6818	-.6218	.43123	-.14127	.500749	2.782741	-.6300	.000133
133	174.5700	174.8428	-.2728	.45544	-.06197	.405159	1.821724	-.2751	.000017
134	184.1500	191.4868	-7.3368	2.95939	-1.66687	.661782	4.860291	-7.5065	.032874
135	165.8800	169.9073	-4.0273	-.28705	-.91499	.416031	1.920804	-4.0636	.003807
137	175.6700	180.2222	-4.5522	1.26473	-1.03423	.652681	4.727535	-4.6545	.012295
138	167.8800	178.7111	-10.8311	1.03740	-2.46076	.399050	1.767203	-10.9208	.025300
140	176.8000	173.0572	3.7428	.18682	.85034	.468873	2.439732	3.7858	.004197
141	162.3700	160.8396	1.5304	-1.65121	.34770	.387861	1.669493	1.5424	.000477
142	177.1100	175.9763	1.1337	.62597	.25757	.307536	1.049604	1.1393	.000164

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
143	165.1300	163.2642	1.8658	-1.28646	.42391	.285975	.907587	1.8738	.000383
144	167.3800	171.7147	-4.3347	-.01515	-.98481	.478364	2.539503	-4.3865	.005865
146	179.4400	182.9311	-3.4911	1.67226	-.79316	.442517	2.173165	-3.5268	.003245
147	167.3700	171.8884	-4.5184	.01099	-1.02656	.484750	2.607763	-4.5739	.006549
148	167.4700	166.4500	1.0200	-.80718	.23174	.363647	1.467551	1.0270	.000186
149	167.3700	171.8884	-4.5184	.01099	-1.02656	.484750	2.607763	-4.5739	.006549
151	187.8400	187.5039	.3361	2.36021	.07635	.380968	1.610680	.3386	.000022
152	176.9000	172.2757	4.6243	.06926	1.05060	.486185	2.623226	4.6814	.006901
153	174.2300	170.7072	3.5228	-.16672	.80037	.405097	1.821167	3.5529	.002760
154	174.2900	164.5487	9.7413	-1.09322	2.21317	.384256	1.638601	9.8161	.018953
155	168.5200	166.6114	1.9086	-.78290	.43363	.334352	1.240627	1.9197	.000549
156	170.7500	166.4545	4.2955	-.80650	.97590	.293109	.953431	4.3146	.002131
158	186.0600	186.5576	-.4976	2.21783	-.11304	.404311	1.814110	-.5018	.000055
159	173.3600	174.6538	-1.2938	.42702	-.29395	.327861	1.192922	-1.3011	.000242
160	162.8700	172.0563	-9.1863	.03623	-2.08706	.502642	2.803816	-9.3076	.029158
161	161.6200	162.7564	-1.1364	-1.36285	-.25819	.497629	2.748176	-1.1511	.000437
162	178.8800	169.1932	9.6868	-.39448	2.20078	.598362	3.973384	9.8692	.046456
163	170.8700	170.8117	.0583	-.15100	.01324	.356106	1.407313	.0587	.000001
164	170.5900	173.6030	-3.0130	.26893	-.68454	.304746	1.030645	-3.0275	.001134
165	174.8600	174.8257	.0343	.45287	.00780	.396779	1.747145	.0346	.000000
166	183.2800	177.0207	6.2593	.78310	1.42207	.553535	3.400336	6.3598	.016510
167	170.5400	173.8272	-3.2872	.30266	-.74684	.318495	1.125742	-3.3045	.001476
168	168.3800	168.2931	.0869	-.52991	.01975	.399650	1.772522	.0877	.000002
169	174.1200	177.3862	-3.2663	.83809	-.74207	.804155	7.176486	-3.3790	.009836
170	166.0700	166.5436	-.4736	-.79309	-.10761	.290964	.939533	-.4757	.000026
171	175.7900	177.8717	-2.0818	.91113	-.47296	.354757	1.396673	-2.0954	.000736
172	172.0800	176.6739	-4.5939	.73092	-1.04370	.308835	1.058484	-4.6166	.002708
173	167.0400	165.6237	1.4163	-.93150	.32178	.311607	1.077572	1.4235	.000262
174	172.2700	176.6064	-4.3364	.72076	-.98520	.521155	3.014163	-4.3980	.006999
175	175.4900	172.2985	3.1915	.07268	.72508	.363566	1.466897	3.2134	.001818
176	173.7400	169.5043	4.2357	-.34768	.96232	.333967	1.237766	4.2602	.002697
177	166.8300	157.2797	9.5503	-2.18677	2.16977	.274642	.837077	9.5876	.009237
178	172.0400	179.0875	-7.0475	1.09402	-1.60115	.459190	2.340010	-7.1250	.014260
179	179.1400	178.2689	.8711	.97088	.19790	.311227	1.074950	.8754	.000099
180	164.6100	160.1232	4.4868	-1.75899	1.01938	.279962	.869821	4.5050	.002119
181	170.1500	177.4434	-7.2934	.84669	-1.65702	.347796	1.342398	-7.3393	.008680
182	167.2000	168.1499	-.9499	-.55145	-.21581	.630297	4.408822	-.9698	.000498
183	177.1200	174.8532	2.2668	.45701	.51500	.307652	1.050390	2.2779	.000654
184	166.0400	163.0500	2.9900	-1.31868	.67931	.330308	1.210796	3.0069	.001314
185	178.7200	173.3853	5.3347	.23618	1.21201	.317248	1.116941	5.3625	.003856
186	169.3900	162.5895	6.8005	-1.38795	1.54502	.283855	.894181	6.8289	.005006
187	165.4300	170.0100	-4.5800	-.27160	-1.04056	.299405	.994832	-4.6013	.002528
188	168.4800	171.2185	-2.7385	-.08980	-.62217	.301839	1.011074	-2.7514	.000919
189	171.5000	177.6158	-6.1158	.87263	-1.38948	.321637	1.148060	-6.1487	.005210
190	163.7700	159.8870	3.8830	-1.79453	.88220	.304024	1.025765	3.9016	.001874
191	175.7500	174.8112	.9388	.45070	.21328	.528270	3.097028	.9525	.000337
192	171.1000	174.1078	-3.0078	.34487	-.68335	.335849	1.251755	-3.0254	.001375
193	177.7700	167.1046	10.6654	-.70870	2.42311	.295266	.967516	10.7136	.013331
194	174.5500	168.9868	5.5632	-.42554	1.26393	.382354	1.622424	5.6055	.006120
195	180.2800	188.6266	-8.3466	2.52911	-1.89631	.385512	1.649329	-8.4112	.014007
196	172.3100	168.3640	3.9460	-.51923	.89650	.353301	1.385232	3.9716	.002623
197	161.9000	161.8281	.0719	-1.50250	.01633	.325537	1.176072	.0723	.000001
198	170.8600	164.4766	6.3834	-1.10405	1.45027	.304150	1.026615	6.4140	.005070
199	163.6200	164.5675	-.9475	-1.09038	-.21527	.560314	3.484143	-.9631	.000388
200	179.0100	175.2929	3.7171	.52315	.84451	.436059	2.110195	3.7540	.003570
202	168.5000	167.9310	.5690	-.58438	.12927	.429850	2.050528	.5745	.000081
204	173.9800	176.9008	-2.9208	.76505	-.66358	.341204	1.291995	-2.9384	.001339
205	177.4200	176.3356	1.0844	.68002	.24637	.314696	1.099043	1.0900	.000157
206	185.9600	184.8774	1.0826	1.96506	.24597	.323527	1.161593	1.0885	.000165
207	165.9800	167.4107	-1.4307	-.66266	-.32504	.471445	2.466574	-1.4473	.000620
208	168.2400	173.4044	-5.1644	.23905	-1.17332	.393231	1.716041	-5.2059	.005583

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
209	167.8800	173.4463	-5.5663	.24536	-1.26463	.303191	1.020155	-5.5929	.003831
210	176.4200	176.6064	-.1864	.72077	-.04236	.680071	5.132639	-.1910	.000022
212	170.4700	165.8399	4.6301	-.89897	1.05194	.296460	.975362	4.6512	.002533
213	170.0200	172.8859	-2.8659	.16104	-.65111	.654762	4.757720	-2.9307	.004905
214	174.9200	179.4708	-4.5508	1.15169	-1.03391	.318294	1.124316	-4.5747	.002825
215	179.4200	170.2578	9.1622	-.23432	2.08159	.298749	.990482	9.2046	.010073
216	172.0800	175.0171	-2.9371	.48167	-.66729	.314354	1.096658	-2.9522	.001147
217	177.1500	173.6531	3.4969	.27647	.79448	.303886	1.024832	3.5137	.001519
218	161.7800	166.8168	-5.0368	-.75199	-1.14434	.581944	3.758334	-5.1264	.011856
219	175.9500	172.6542	3.2958	.12619	.74879	.493369	2.701325	3.3377	.003613
220	169.9500	167.2971	2.6528	-.67973	.60271	.358885	1.429367	2.6706	.001224
221	175.3400	175.6940	-.3540	.58350	-.08042	.460328	2.351615	-.3579	.000036
222	168.7900	169.0570	-.2670	-.41498	-.06065	.359642	1.435404	-.2688	.000012
223	167.1700	160.2836	6.8864	-1.73486	1.56454	.376863	1.576153	6.9372	.009105
224	165.3100	165.2579	.0521	-.98652	.01183	.333695	1.235752	.0524	.000000
225	175.8200	181.9763	-6.1563	1.52862	-1.39867	.317706	1.120167	-6.1885	.005150
226	170.1200	169.5839	.5361	-.33571	.12180	.338441	1.271152	.5393	.000044
227	163.6500	165.7805	-2.1305	-.90790	-.48404	.295305	.967774	-2.1402	.000532
228	172.6800	174.9926	-2.3126	.47798	-.52540	.380444	1.606251	-2.3300	.001047
229	181.5100	178.6627	2.8473	1.03012	.64688	.402368	1.796716	2.8713	.001778
230	176.9800	179.8145	-2.8345	1.20340	-.64398	.331644	1.220609	-2.8507	.001191
231	170.8100	162.4180	8.3920	-1.41376	1.90661	.283562	.892336	8.4270	.007607
232	176.1300	186.2228	-10.0928	2.16747	-2.29303	.722243	5.788933	-10.3721	.074758
233	179.7300	176.5018	3.2282	.70503	.73343	.310669	1.071092	3.2444	.001353
234	167.6700	166.4014	1.2686	-.81449	.28822	.783321	6.809442	1.3101	.001403
Minimum	160.7400	157.2797	-10.8311	-2.18677	-2.46076	.274642	.837077	-10.9208	.000000
Maximum	192.4300	191.4868	10.6654	2.95939	2.42311	.855637	8.124786	10.7136	.074758
Mean	171.9051	171.8154	.0897	-.00000	.02037	.406419	2.000000	.0856	.004824
Median	171.1000	171.8884	.0343	.01099	.00780	.363566	1.466897	.0346	.001778

Case 3

Dependent Variable: Predicted adult stature (PAS)

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(248)	p-level
S2_0	.998464	.998464	.998464	1.000000	1.000000	283.7557	0.00
S3_0	.999096	.999096	.999096	1.000000	1.000000	370.0734	0.00
S4_0	.999349	.999349	.999349	1.000000	1.000000	436.1452	0.00
S5_0	.999465	.999465	.999465	1.000000	1.000000	481.3439	0.00
S6_0	.999520	.999520	.999520	1.000000	1.000000	507.8753	0.00
S7_0	.999541	.999541	.999541	1.000000	1.000000	519.3222	0.00
S8_0	.999547	.999547	.999547	1.000000	1.000000	523.1830	0.00
S9_0	.999547	.999547	.999547	1.000000	1.000000	523.2523	0.00
S10_0	.999530	.999530	.999530	1.000000	1.000000	513.5733	0.00
S11_0	.999442	.999442	.999442	1.000000	1.000000	471.4093	0.00
S12_0	.999205	.999205	.999205	1.000000	1.000000	394.7020	0.00
S13_0	.999008	.999008	.999008	1.000000	1.000000	353.3568	0.00

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99954741 R2= .99909503 Adjusted R2= .99909138
REGRESS. F(1,248)=2738E2 p<0.0000 Std.Error of estimate: 5.1727

N=249	BETA	St. Err. of BETA	B	St. Err. of B	t(248)	p-level
S9_0	.999547	.001910	1.325908	.002534	523.2523	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.430126 R2=.185008 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	1506.315	1	1506.315	56.29746	.000000
Residual	6635.579	248	26.756		
Total	8141.894				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(247)	p-level
S2_0	.097440	.168050	.005055	.002692	.002692	2.67921	.007876
S3_0	.169661	.208543	.006274	.001367	.001367	3.35119	.000931
S4_0	.238439	.218483	.006573	.000760	.000760	3.51874	.000516
S5_0	.300766	.203137	.006111	.000413	.000413	3.26052	.001269
S6_0	.362723	.171714	.005166	.000203	.000203	2.73939	.006604
S7_0	.413617	.122782	.003694	.000080	.000080	1.94438	.052984
S8_0	.493087	.069382	.002087	.000018	.000018	1.09306	.275434
S10_0	-.442353	-.062843	-.001891	.000018	.000018	-.98962	.323329
S11_0	-.443325	-.155445	-.004676	.000111	.000111	-2.47307	.014069
S12_0	-.321314	-.218109	-.006561	.000417	.000417	-3.51242	.000528
S13_0	-.189805	-.176391	-.005306	.000782	.000782	-2.81636	.005249

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(248)	p-level
S9_0	.999547	.999547	.999547	1.000000	0.00	523.2523	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S9_0	1	.999547	.999095	.999095	273793.0	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99956902 R2= .99913822 Adjusted R2= .99913125
F(2,247)=1432E2 p<0.0000 Std.Error of estimate: 5.0579

N=249	BETA	St. Err. of BETA	B	St. Err. of B	t(247)	p-level
S9_0	.761199	.067763	1.009736	.089888	11.23330	.000000
S4_0	.238439	.067763	.412471	.117221	3.51874	.000516

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.473193 R2=.223912 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	1823.064	2	911.5319	35.63134	.000000
Residual	6318.830	247	25.5823		
Total	8141.894				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolemce	Minimum Tolemce	t(246)	p-level
S2_0	-.12770	-.087709	-.002575	.000407	.000115	-1.38098	.168537
S3_0	-.19337	-.041181	-.001209	.000039	.000022	-.64645	.518588
S5_0	-.82842	-.086815	-.002549	.000009	.000009	-1.36681	.172933
S6_0	-.93023	-.131353	-.003856	.000017	.000017	-2.07820	.038728
S7_0	-1.36126	-.177835	-.005221	.000015	.000015	-2.83442	.004972
S8_0	-2.43196	-.199204	-.005848	.000006	.000006	-3.18829	.001617
S10_0	.46255	.057919	.001700	.000014	.000011	.90995	.363738
S11_0	-.30731	-.106948	-.003140	.000104	.000078	-1.68709	.092854
S12_0	-.30760	-.213761	-.006275	.000416	.000258	-3.43203	.000703
S13_0	-.20663	-.196333	-.005764	.000778	.000411	-3.14049	.001893

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolemce	R-square	t(247)	p-level
S9_0	.761199	.581493	.020982	.000760	.999240	11.23330	.000000
S4_0	.238439	.218483	.006573	.000760	.999240	3.51874	.000516

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S9_0	1	.999547	.999095	.999095	273793.0	0.000000	1
S4_0	2	.999569	.999138	.000043	12.4	.000516	2

STAT. MULTIPLE REGRESS.

Predicted & Residual Values: PAS
case 1 to 275

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	171.2900	163.3879	7.9021	-1.13406	1.56232	.305971	.91121	7.9311	.004499
2	181.9000	184.3586	-2.4586	1.84037	-.48608	.344614	1.15592	-2.4700	.000554
3	175.5500	170.6950	4.8550	-.09765	.95989	.323580	1.01911	4.8750	.001901
4	174.6000	170.1933	4.4067	-.16880	.87125	.368381	1.32085	4.4302	.002035
5	174.9700	172.2244	2.7456	.11929	.54283	.638066	3.96270	2.7900	.002421
7	166.0700	168.3181	-2.2481	-.43478	-.44447	.492604	2.36187	-2.2696	.000955
8	172.9800	170.0891	2.8909	-.18358	.57156	.415142	1.67747	2.9105	.001115
9	169.3600	164.2696	5.0904	-1.00901	1.00643	.457381	2.03618	5.1324	.004210
10	171.0800	170.4662	.6138	-.13009	.12135	.318562	.98775	.6162	.000029
11	171.3300	173.6242	-2.2942	.31783	-.45358	.388220	1.46695	-2.3078	.000613
12	171.5000	176.4991	-4.9991	.72560	-.98837	.426852	1.77343	-5.0349	.003529
14	175.8400	179.4309	-3.5909	1.14144	-.70996	.374558	1.36552	-3.6107	.001397
15	165.0800	171.0214	-5.9414	-.05135	-1.17468	.339220	1.12001	-5.9682	.003131
16	185.4900	181.5973	3.8927	1.44872	.76963	.460267	2.06195	3.9252	.002494
17	177.4200	177.5462	-.1262	.87412	-.02496	.334981	1.09219	-.1268	.000001
18	170.5800	169.9719	.6081	-.20021	.12024	.335615	1.09633	.6108	.000032
19	171.0800	170.4662	.6138	-.13009	.12135	.318562	.98775	.6162	.000029
20	185.4900	181.5973	3.8927	1.44872	.76963	.460267	2.06195	3.9252	.002494
21	163.5000	169.5441	-6.0441	-.26089	-1.19498	.451411	1.98337	-6.0926	.005779
22	180.1800	182.4360	-2.2560	1.56768	-.44604	.398700	1.54722	-2.2701	.000626
23	160.7400	155.9216	4.8184	-2.19306	.95264	.291377	.82636	4.8344	.001516
24	172.7100	169.2521	3.4579	-.30230	.68366	.327689	1.04516	3.4725	.000989
25	173.3300	167.6634	5.6666	-.52764	1.12035	.325345	1.03026	5.6901	.002618
26	176.2500	179.3937	-3.1437	1.13616	-.62154	.344266	1.15358	-3.1583	.000903
28	163.7800	169.2249	-5.4449	-.30616	-1.07651	.482745	2.26828	-5.4950	.005376
29	174.0600	179.9955	-5.9355	1.22152	-1.17351	.341401	1.13446	-5.9627	.003166
32	166.7500	175.4823	-8.7323	.58138	-1.72646	.371458	1.34301	-8.7796	.008126
33	169.5200	169.9241	-.4041	-.20699	-.07989	.685172	4.56939	-.4116	.000061
34	168.3200	170.5042	-2.1842	-.12470	-.43184	.480305	2.24540	-2.2041	.000856
35	167.7100	165.8836	1.8264	-.78007	.36109	.371446	1.34292	1.8363	.000355
36	171.9900	170.9725	1.0175	-.05828	.20117	.319736	.99504	1.0216	.000082
37	179.1900	184.8875	-5.6975	1.91540	-1.12646	.345496	1.16184	-5.7242	.002988
38	166.9900	173.2757	-6.2856	.26839	-1.24274	.352403	1.20876	-6.3163	.003785
39	167.0500	165.3940	1.6560	-.84953	.32741	.430904	1.80726	1.6681	.000395
40	168.0000	174.0546	-6.0546	.37887	-1.19705	.326694	1.03882	-6.0799	.003014
41	175.3400	166.9447	8.3953	-.62957	1.65983	.312550	.95082	8.4274	.005301
42	184.2800	185.9921	-1.7121	2.07207	-.33850	.356186	1.23484	-1.7206	.000287
43	177.4400	171.9876	5.4524	.08570	1.07799	.321392	1.00538	5.4745	.002365
44	175.6100	173.0453	2.5647	.23573	.50706	.470174	2.15167	2.5870	.001130
45	171.1600	177.1561	-5.9960	.81878	-1.18548	.385968	1.44998	-6.0312	.004140
46	177.4000	177.5305	-.1305	.87189	-.02580	.557860	3.02908	-.1321	.000004
48	173.4400	165.5258	7.9142	-.83082	1.56471	.856914	7.14716	8.1480	.037245
49	159.3200	162.9496	-3.6296	-1.19623	-.71761	.357750	1.24572	-3.6479	.001301
51	171.4800	179.8497	-8.3697	1.20084	-1.65478	.339103	1.11924	-8.4075	.006210
52	172.6300	176.4122	-3.7822	.71328	-.74779	.330822	1.06524	-3.7985	.001206
53	168.9000	170.7906	-1.8906	-.08408	-.37379	.348768	1.18395	-1.8996	.000335
55	172.8300	172.4709	.3591	.15426	.07099	.658194	4.21665	.3652	.000044
56	170.0900	169.3474	.7426	-.28879	.14683	.465046	2.10499	.7490	.000093
57	167.3100	177.7899	-10.4799	.90868	-2.07198	.413966	1.66797	-10.5505	.014574
59	172.1700	166.8715	5.2985	-.63996	1.04757	.329939	1.05956	5.3212	.002355
60	176.3100	177.1514	-.8414	.81813	-.16636	.431839	1.81511	-.8476	.000102
61	169.3500	167.9893	1.3607	-.48141	.26903	.322567	1.01274	1.3663	.000148
62	168.4100	169.9219	-1.5119	-.20730	-.29892	.409064	1.62871	-1.5218	.000296
63	175.6400	175.8465	-.2065	.63304	-.04083	.376884	1.38253	-.2077	.000005
65	165.8700	169.1261	-3.2561	-.32017	-.64376	.316974	.97793	-3.2689	.000820
66	165.4500	169.5361	-4.0862	-.26201	-.80788	.639335	3.97848	-4.1525	.005385
67	161.4800	171.6115	-10.1315	.03236	-2.00311	.339669	1.12298	-10.1774	.009130

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
68	172.1400	164.7220	7.4180	-.94484	1.46662	.335327	1.09445	7.4508	.004769
69	179.8400	173.5981	6.2419	.31413	1.23409	.436261	1.85247	6.2887	.005750
70	171.0200	168.6489	2.3711	-.38786	.46880	.611139	3.63530	2.4063	.001652
71	172.0100	170.8466	1.1634	-.07613	.23001	.350205	1.19372	1.1690	.000128
72	170.0500	168.9849	1.0651	-.34020	.21058	.319219	.99183	1.0694	.000089
73	166.6200	159.3385	7.2815	-1.70842	1.43963	.302591	.89119	7.3076	.003736
74	172.3100	167.2581	5.0519	-.58512	.99882	.588941	3.37601	5.1213	.006950
75	184.3200	183.3857	.9343	1.70239	.18472	.666291	4.32103	.9508	.000307
76	179.7000	185.4365	-5.7365	1.99327	-1.13417	.372785	1.35262	-5.7679	.003532
77	168.3600	168.6808	-.3208	-.38334	-.06342	.420002	1.71697	-.3230	.000014
78	172.2700	179.3379	-7.0679	1.12825	-1.39740	.356177	1.23478	-7.1031	.004890
79	173.0400	171.7690	1.2710	.05470	.25128	.335786	1.09745	1.2766	.000140
80	173.7200	167.1797	6.5403	-.59624	1.29309	.351659	1.20366	6.5721	.004081
81	161.0900	172.0708	-10.9808	.09750	-2.17102	.324440	1.02454	-11.0262	.009777
82	171.8600	172.9215	-1.0615	.21816	-.20987	.323508	1.01866	-1.0659	.000091
83	163.3200	155.1272	8.1928	-2.30574	1.61980	.295490	.84986	8.2208	.004508
85	171.8700	168.7470	3.1230	-.37394	.61745	.315703	.97010	3.1352	.000748
86	169.6400	170.4845	-.8445	-.12749	-.16697	.440435	1.88809	-.8510	.000107
87	173.7200	175.6738	-1.9538	.60855	-.38630	.329854	1.05902	-1.9622	.000320
88	164.2000	160.2828	3.9172	-1.57449	.77448	.497781	2.41177	3.9555	.002962
89	160.8400	165.9550	-5.1150	-.76996	-1.01129	.657606	4.20912	-5.2029	.008944
90	173.5700	174.3038	-.7338	.41422	-.14507	.327156	1.04176	-.7368	.000044
91	168.2200	175.1953	-6.9753	.54067	-1.37909	.513442	2.56591	-7.0479	.010004
92	172.6200	165.3537	7.2663	-.85524	1.43663	.314566	.96312	7.2945	.004023
93	175.6100	172.1445	3.4655	.10795	.68517	.609927	3.62089	3.5167	.003515
94	172.0100	173.2971	-1.2871	.27143	-.25447	.536780	2.80448	-1.3017	.000373
95	176.9000	166.8153	10.0847	-.64792	1.99384	.315743	.97035	10.1241	.007807
96	169.1200	175.9171	-6.7971	.64306	-1.34387	.358111	1.24823	-6.8314	.004572
97	173.9500	177.4945	-3.5445	.86678	-.70078	.359559	1.25835	-3.5625	.001254
98	172.2500	172.2590	-.0090	.12420	-.00179	.536430	2.80082	-.0092	.000000
99	165.4100	157.7085	7.7015	-1.93962	1.52266	.426810	1.77308	7.7567	.008374
100	169.0000	169.3134	-.3134	-.29360	-.06197	.366568	1.30788	-.3151	.000010
101	180.0100	175.0716	4.9384	.52313	.97637	.367386	1.31373	4.9645	.002542
102	181.1900	184.2571	-3.0671	1.82598	-.60640	.428130	1.78407	-3.0892	.001336
103	168.3000	166.3615	1.9386	-.71230	.38327	.364977	1.29656	1.9487	.000386
105	169.9800	167.7454	2.2346	-.51600	.44180	.375744	1.37418	2.2470	.000545
106	177.5900	169.9305	7.6595	-.20608	1.51437	.375145	1.36980	7.7019	.006378
107	155.8900	151.2706	4.6194	-2.85276	.91330	.389066	1.47335	4.6469	.002497
108	179.1500	182.2601	-3.1101	1.54273	-.61490	.340753	1.13016	-3.1243	.000866
109	174.6400	174.1250	.5150	.38887	.10181	.347601	1.17604	.5174	.000025
110	170.0600	175.8094	-5.7494	.62778	-1.13672	.370197	1.33391	-5.7804	.003498
111	171.7000	172.6974	-.9974	.18637	-.19719	.328314	1.04915	-1.0016	.000083
112	167.8100	177.8516	-10.0416	.91743	-1.98533	.408881	1.62725	-10.1076	.013049
113	174.6800	174.8611	-.1811	.49327	-.03580	.569380	3.15547	-.1834	.000008
114	164.8100	168.7437	-3.9337	-.37441	-.77774	.316428	.97456	-3.9492	.001193
115	157.7600	155.3112	2.4488	-2.27966	.48416	.630255	3.86627	2.4875	.001878
116	174.6300	176.1302	-1.5002	.67328	-.29661	.663947	4.29068	-1.5265	.000785
117	170.9900	173.4811	-2.4911	.29754	-.49252	.324499	1.02491	-2.5014	.000503
118	175.9100	183.8458	-7.9358	1.76765	-1.56900	.572582	3.19106	-8.0388	.016186
119	184.2300	179.5334	4.6966	1.15598	.92856	.483157	2.27215	4.7398	.004007
120	172.2600	176.6210	-4.3610	.74289	-.86221	.611826	3.64347	-4.4258	.005602
121	173.7200	175.3282	-1.6082	.55953	-.31797	.333208	1.08067	-1.6153	.000221
122	169.6500	159.2940	10.3560	-1.71474	2.04749	.327658	1.04496	10.3996	.008871
123	164.4300	161.1575	3.2725	-1.45042	.64700	.324424	1.02444	3.2860	.000868
125	173.3900	166.9113	6.4787	-.63432	1.28092	.364023	1.28979	6.5125	.004294
126	177.0400	175.8682	1.1718	.63611	.23168	.353021	1.21300	1.1776	.000132
128	170.3100	162.8522	7.4578	-1.21005	1.47449	.357702	1.24538	7.4953	.005492
129	172.7000	177.1397	-4.4397	.81646	-.87777	.393173	1.50462	-4.4667	.002356
130	176.2300	176.0255	.2045	.65843	.04043	.388136	1.46631	.2057	.000005
131	183.3200	173.3852	9.9348	.28393	1.96421	.495691	2.39156	10.0311	.018889
133	173.4800	166.3782	7.1018	-.70993	1.40410	.311143	.94228	7.1288	.003759

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
134	168.5700	172.6705	-4.1005	.18256	-.81071	.480113	2.24360	-4.1378	.003015
135	165.6400	169.3184	-3.6784	-.29289	-.72726	.356600	1.23772	-3.6968	.001328
136	180.9400	187.3048	-6.3648	2.25826	-1.25839	.644683	4.04531	-6.4699	.013292
137	157.1000	160.9662	-3.8661	-1.47756	-.76438	.321272	1.00463	-3.8818	.001188
138	173.7800	166.3035	7.4765	-.72053	1.47819	.642299	4.01545	7.5991	.018201
139	167.8200	158.8386	8.9814	-1.77933	1.77572	.576021	3.22951	9.0994	.020989
140	174.6300	176.1302	-1.5002	.67328	-.29661	.663947	4.29068	-1.5265	.000785
141	176.4600	183.8557	-7.3956	1.76904	-1.46220	.570909	3.17244	-7.4911	.013974
142	161.8600	154.5075	7.3525	-2.39365	1.45367	.320698	1.00104	7.3822	.004282
143	159.6400	161.3038	-1.6638	-1.42967	-.32895	.345319	1.16064	-1.6716	.000255
144	163.9400	157.0861	6.8539	-2.02791	1.35510	.361688	1.27329	6.8892	.004743
145	174.9100	180.4025	-5.4925	1.27925	-1.08592	.400794	1.56352	-5.5272	.003749
146	154.4100	151.1321	3.2779	-2.87241	.64808	.574593	3.21351	3.3208	.002782
147	173.1000	172.4312	.6688	.14862	.13223	.598334	3.48455	.6783	.000126
148	168.3200	176.7437	-8.4237	.76030	-1.66546	.360044	1.26174	-8.4666	.007099
149	168.6200	169.7691	-1.1491	-.22897	-.22718	.347545	1.17566	-1.1545	.000123
150	173.7400	179.8652	-6.1252	1.20305	-1.21103	.375019	1.36888	-6.1591	.004076
152	169.4100	165.7858	3.6242	-.79395	.71654	.330082	1.06048	3.6397	.001103
154	174.1500	179.2450	-5.0950	1.11507	-1.00733	.443451	1.91404	-5.1344	.003961
155	171.2700	172.8121	-1.5421	.20264	-.30489	.384390	1.43815	-1.5510	.000272
156	174.6400	181.5005	-6.8605	1.43499	-1.35640	.343711	1.14986	-6.8923	.004288
158	169.4900	169.4010	.0890	-.28117	.01759	.317711	.98248	.0893	.000001
159	171.7000	172.6974	-.9974	.18637	-.19719	.328314	1.04915	-1.0016	.000083
160	170.0600	175.8094	-5.7494	.62778	-1.13672	.370197	1.33391	-5.7804	.003498
161	174.6400	174.1250	.5150	.38887	.10181	.347601	1.17604	.5174	.000025
162	179.1500	182.2601	-3.1101	1.54273	-.61490	.340753	1.13016	-3.1243	.000866
163	155.8900	151.2706	4.6194	-2.85276	.91330	.389066	1.47335	4.6469	.002497
164	177.5900	169.9305	7.6595	-.20608	1.51437	.375145	1.36980	7.7019	.006378
165	169.9800	167.7454	2.2346	-.51600	.44180	.375744	1.37418	2.2470	.000545
167	168.3000	166.3615	1.9386	-.71230	.38327	.364977	1.29656	1.9487	.000386
168	181.1700	184.2074	-3.0374	1.81893	-.60053	.378038	1.39101	-3.0545	.001019
169	174.7600	169.8517	4.9083	-.21725	.97042	.324668	1.02598	4.9286	.001956
170	180.0100	175.0123	4.9977	.51471	.98811	.370033	1.33273	5.0246	.002641
171	169.6500	169.3134	.3365	-.29360	.06654	.366568	1.30788	.3383	.000012
172	172.0100	173.2971	-1.2871	.27143	-.25447	.536780	2.80448	-1.3017	.000373
173	176.9000	166.8153	10.0847	-.64792	1.99384	.315743	.97035	10.1241	.007807
174	169.1200	175.9171	-6.7971	.64306	-1.34387	.358111	1.24823	-6.8314	.004572
175	173.9500	177.4945	-3.5445	.86678	-.70078	.359559	1.25835	-3.5625	.001254
176	172.2500	172.2590	-.0090	.12420	-.00179	.536430	2.80082	-.0092	.000000
177	165.4100	157.7085	7.7015	-1.93962	1.52266	.426810	1.77308	7.7567	.008374
178	173.8900	173.1779	.7121	.25453	.14078	.638535	3.96852	.7236	.000163
179	170.5800	169.9719	.6081	-.20021	.12024	.335615	1.09633	.6108	.000032
180	179.0700	187.5342	-8.4642	2.29079	-1.67346	.362614	1.27982	-8.5079	.007272
181	167.8100	177.8516	-10.0416	.91743	-1.98533	.408881	1.62725	-10.1076	.013049
182	174.6800	174.8611	-.1811	.49327	-.03580	.569380	3.15547	-.1834	.000008
183	164.8100	168.7437	-3.9337	-.37441	-.77774	.316428	.97456	-3.9492	.001193
185	161.1300	171.5828	-10.4528	.02829	-2.06663	.336706	1.10347	-10.4993	.009548
186	165.6700	171.3174	-5.6474	-.00936	-1.11656	.454481	2.01044	-5.6934	.005115
187	165.8700	169.1261	-3.2561	-.32017	-.64376	.316974	.97793	-3.2689	.000820
188	173.4400	165.5258	7.9142	-.83082	1.56471	.856914	7.14716	8.1480	.037245
189	159.3200	162.9496	-3.6296	-1.19623	-.71761	.357750	1.24572	-3.6479	.001301
190	177.4000	177.5305	-.1305	.87189	-.02580	.557860	3.02908	-.1321	.000004
191	171.1600	177.1561	-5.9960	.81878	-1.18548	.385968	1.44998	-6.0312	.004140
192	175.6200	172.8665	2.7535	.21035	.54440	.479027	2.23347	2.7785	.001353
193	171.4800	179.8497	-8.3697	1.20084	-1.65478	.339103	1.11924	-8.4075	.006210
194	172.6300	176.4122	-3.7822	.71328	-.74779	.330822	1.06524	-3.7985	.001206
195	168.9000	170.7906	-1.8906	-.08408	-.37379	.348768	1.18395	-1.8996	.000335
197	166.2900	173.1444	-6.8544	.24978	-1.35519	1.176239	13.46637	-7.2463	.055503
198	172.8300	172.4709	.3591	.15426	.07099	.658194	4.21665	.3652	.000044
199	170.2400	169.3492	.8909	-.28853	.17613	.464593	2.10090	.8984	.000133
201	172.0700	174.6325	-2.5625	.46085	-.50664	.475071	2.19673	-2.5853	.001152

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
202	176.3100	177.1514	-.8414	.81813	-.16636	.431839	1.81511	-.8476	.000102
203	169.3500	167.9893	1.3607	-.48141	.26903	.322567	1.01274	1.3663	.000148
204	160.6100	156.6286	3.9814	-2.09279	.78716	.412599	1.65698	4.0081	.002089
205	175.6400	175.8465	-.2065	.63304	-.04083	.376884	1.38253	-.2077	.000005
206	163.9900	164.5540	-.5640	-.96867	-.11151	.474971	2.19580	-.5690	.000056
207	172.1400	164.7337	7.4063	-.94317	1.46429	.338231	1.11349	7.4395	.004837
208	168.3600	168.6808	-.3208	-.38334	-.06342	.420002	1.71697	-.3230	.000014
209	168.7900	164.9872	3.8028	-.90723	.75186	.519317	2.62497	3.8433	.003044
210	171.0200	168.6489	2.3711	-.38786	.46880	.611139	3.63530	2.4063	.001652
211	170.1700	165.9318	4.2382	-.77325	.83794	.484045	2.28051	4.2774	.003275
212	171.7400	169.2579	2.4821	-.30147	.49073	.358723	1.25250	2.4946	.000612
213	172.2000	175.2878	-3.0878	.55379	-.61049	.549971	2.94401	-3.1247	.002256
214	167.5000	164.7690	2.7310	-.93817	.53995	.377686	1.38842	2.7463	.000822
215	172.9700	174.0220	-1.0520	.37426	-.20800	.356364	1.23608	-1.0573	.000108
216	173.7100	174.8175	-1.1075	.48709	-.21897	.523556	2.66800	-1.1195	.000262
217	170.0500	165.6011	4.4489	-.82016	.87960	.384369	1.43799	4.4748	.002260
218	172.8200	168.2837	4.5363	-.43966	.89688	.327201	1.04205	4.5554	.001697
220	172.3400	178.2150	-5.8750	.96897	-1.16154	.408549	1.62460	-5.9135	.004459
221	175.6000	176.7099	-1.1099	.75550	-.21944	.395561	1.52295	-1.1167	.000149
222	179.7000	185.4365	-5.7365	1.99327	-1.13417	.372785	1.35262	-5.7679	.003532
223	182.9700	180.2329	2.7371	1.25519	.54116	.367287	1.31301	2.7516	.000780
224	172.3100	167.2581	5.0519	-.58512	.99882	.588941	3.37601	5.1213	.006950
225	155.2800	150.7567	4.5233	-2.92565	.89431	.616693	3.70167	4.5916	.006126
226	177.5600	167.6057	9.9543	-.53582	1.96807	.664022	4.29166	10.1289	.034560
228	166.6200	159.3385	7.2815	-1.70842	1.43963	.302591	.89119	7.3076	.003736
229	170.2200	171.8276	-1.6076	.06300	-.31784	.323421	1.01811	-1.6142	.000208
230	172.0100	170.8466	1.1634	-.07613	.23001	.350205	1.19372	1.1690	.000128
231	179.8400	173.5981	6.2419	.31413	1.23409	.436261	1.85247	6.2887	.005750
232	167.3600	157.1074	10.2526	-2.02488	2.02705	.296154	.85368	10.2879	.007092
233	171.8700	168.7470	3.1230	-.37394	.61745	.315703	.97010	3.1352	.000748
234	166.8400	166.2585	.5815	-.72690	.11496	.484563	2.28539	.5869	.000062
235	173.0400	171.7690	1.2710	.05470	.25128	.335786	1.09745	1.2766	.000140
236	175.5600	176.5044	-.9444	.72635	-.18671	.360771	1.26684	-.9492	.000090
237	163.3200	155.1272	8.1928	-2.30574	1.61980	.295490	.84986	8.2208	.004508
238	161.0900	172.0831	-10.9931	.09924	-2.17345	.324759	1.02655	-11.0386	.009818
239	173.3900	167.1743	6.2157	-.59701	1.22891	.351147	1.20016	6.2458	.003675
240	162.6500	162.9329	-.2829	-1.19860	-.05593	.394985	1.51852	-.2846	.000010
241	175.7300	168.3362	7.3938	-.43221	1.46184	.785716	6.00884	7.5767	.027076
242	174.8400	179.0707	-4.2307	1.09035	-.83645	.666389	4.32231	-4.3054	.006289
243	170.8000	168.9252	1.8748	-.34867	.37067	.531893	2.75364	1.8958	.000777
244	178.0700	169.6597	8.4103	-.24449	1.66281	.361901	1.27479	8.4536	.007151
245	177.7700	174.0681	3.7020	.38079	.73192	.357634	1.24491	3.7206	.001353
246	166.0900	162.8422	3.2478	-1.21146	.64212	1.032977	10.38583	3.3891	.009364
247	164.6800	168.7097	-4.0297	-.37924	-.79671	.328973	1.05337	-4.0468	.001354
248	167.5900	168.3323	-.7423	-.43276	-.14676	.726131	5.13204	-.7579	.000231
249	175.0900	176.3511	-1.2611	.70461	-.24933	.487208	2.31041	-1.2729	.000294
250	178.4800	180.2351	-1.7551	1.25551	-.34701	.386940	1.45729	-1.7655	.000357
252	175.1500	182.6669	-7.5170	1.60044	-1.48618	.371263	1.34160	-7.5577	.006015
253	172.9600	170.9333	2.0267	-.06383	.40069	.682490	4.53370	2.0642	.001516
254	165.7500	168.8038	-3.0538	-.36589	-.60376	.437463	1.86269	-3.0768	.001384
255	172.9800	176.9436	-3.9636	.78865	-.78365	.431524	1.81247	-3.9927	.002268
256	173.7700	179.3582	-5.5882	1.13113	-1.10485	.350467	1.19551	-5.6152	.002959
257	177.5400	171.1759	6.3641	-.02943	1.25825	.468574	2.13705	6.4192	.006912
258	165.2100	174.2474	-9.0374	.40622	-1.78678	.325747	1.03281	-9.0750	.006676
259	181.3100	180.8857	.4243	1.34779	.08389	.802951	6.27534	.4353	.000093
260	174.2500	175.9067	-1.6567	.64158	-.32755	.332334	1.07500	-1.6639	.000234
261	175.8200	165.1470	10.6730	-.88456	2.11016	.371229	1.34135	10.7308	.012124
262	171.2400	176.8843	-5.6443	.78023	-1.11593	.333300	1.08126	-5.6689	.002727
263	175.8200	165.1470	10.6730	-.88456	2.11016	.371229	1.34135	10.7308	.012124
264	177.5400	171.1759	6.3641	-.02943	1.25825	.468574	2.13705	6.4192	.006912
265	172.9600	170.9333	2.0267	-.06383	.40069	.682490	4.53370	2.0642	.001516

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
266	178.0700	169.6597	8.4103	-.24449	1.66281	.361901	1.27479	8.4536	.007151
267	177.7700	174.0681	3.7020	.38079	.73192	.357634	1.24491	3.7206	.001353
268	166.0900	162.8422	3.2478	-1.21146	.64212	1.032977	10.38583	3.3891	.009364
269	164.6800	168.7097	-4.0297	-.37924	-.79671	.328973	1.05337	-4.0468	.001354
270	171.0500	179.7391	-8.6891	1.18515	-1.71792	.585720	3.33917	-8.8072	.020330
272	178.4800	180.2351	-1.7551	1.25551	-.34701	.386940	1.45729	-1.7655	.000357
273	175.5000	176.3375	-.8375	.70268	-.16558	.484349	2.28337	-.8452	.000128
274	167.5800	168.6039	-1.0238	-.39424	-.20243	.739553	5.32351	-1.0462	.000457
275	167.5800	168.6039	-1.0238	-.39424	-.20243	.739553	5.32351	-1.0462	.000457
Minimum	154.4100	150.7567	-10.9931	-2.92565	-2.17345	.291377	.82636	-11.0386	.000000
Maximum	185.4900	187.5342	10.6730	2.29079	2.11016	1.176239	13.46637	10.7308	.055503
Mean	171.5064	171.3834	.1230	.00000	.02432	.431586	2.00000	.1255	.003801
Median	172.0100	171.1759	-.1305	-.02943	-.02580	.372785	1.35262	-.1321	.001516

For girls

Case1

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(258)	p-level
S2_0	.998742	.998742	.998742	1.000000	1.000000	319.9279	0.00
S3_0	.999086	.999086	.999086	1.000000	1.000000	375.4439	0.00
S4_0	.999174	.999174	.999174	1.000000	1.000000	394.9925	0.00
S5_0	.999243	.999243	.999243	1.000000	1.000000	412.5416	0.00
S_6_0	.999313	.999313	.999313	1.000000	1.000000	433.1468	0.00
S7_0_	.999370	.999370	.999370	1.000000	1.000000	452.2641	0.00
S8_0	.999396	.999396	.999396	1.000000	1.000000	461.7476	0.00
S9_0	.999374	.999374	.999374	1.000000	1.000000	453.7468	0.00
S10_0	.999272	.999272	.999272	1.000000	1.000000	420.6964	0.00
S11_0	.999187	.999187	.999187	1.000000	1.000000	398.0651	0.00
S12_0	.999324	.999324	.999324	1.000000	1.000000	436.7129	0.00
S13_0	.999627	.999627	.999627	1.000000	1.000000	587.7951	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99962684 R2= .99925382 Adjusted R2= .99925093
F(1,258)=3455E2 p<0.0000 Std.Error of estimate: 4.3381

N=259	BETA	St. Err. of BETA	B	St. Err. of B	t(258)	p-level
S13_0	.999627	.001701	1.042829	.001774	587.7951	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.310169 R2=.096205 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	516.835	1	516.8351	27.46296	.000000
Residual	4855.392	258	18.8194		
Total	5372.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(257)	p-level
S2_0	.12935	.231319	.006319	.002386	.002386	3.8117	.000173
S3_0	.14070	.199819	.005458	.001505	.001505	3.2693	.001225
S4_0	.10565	.131034	.003579	.001148	.001148	2.1189	.035057
S5_0	.07677	.084659	.002313	.000907	.000907	1.3621	.174366
S_6_0	.07355	.073040	.001995	.000736	.000736	1.1741	.241459
S7_0_	.09828	.091003	.002486	.000640	.000640	1.4650	.144151
S8_0	.10514	.093173	.002545	.000586	.000586	1.5002	.134791
S9_0	.01861	.015617	.000427	.000525	.000525	.2504	.802482
S10_0	-.27095	-.212840	-.005814	.000460	.000460	-3.4921	.000564
S11_0	-.74321	-.511854	-.013982	.000354	.000354	-9.5517	.000000
S12_0	-1.75799	-.744982	-.020350	.000134	.000134	-17.9032	0.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(258)	p-level
S13_0	.999627	.999627	.999627	1.000000	0.00	587.7951	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999627	.999254	.999254	345503.1	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99983396 R2= .99966795 Adjusted R2= .99966536
F(2,257)=3869E2 p<0.0000 Std.Error of estimate: 2.8995

N=259	BETA	St. Err. of BETA	B	St. Err. of B	t(257)	p-level
S13_0	2.75750	.098194	2.87668	.102438	28.0821	0.00
S12_0	-1.75799	.098194	-1.89627	.105918	-17.9032	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.773181 R2=.597810 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	3211.569	2	1605.784	191.0004	0.00
Residual	2160.659	257	8.407		
Total	5372.227				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(256)	p-level
S2_0	.148667	.398138	.007255	.002381	.000129	6.94432	.000000
S3_0	.203291	.429963	.007835	.001485	.000130	7.61969	.000000
S4_0	.237960	.433155	.007893	.001100	.000128	7.68925	.000000
S5_0	.278435	.443337	.008079	.000842	.000124	7.91360	.000000
S_6_0	.328562	.466505	.008501	.000669	.000122	8.43859	.000000
S7_0_	.374797	.496037	.009039	.000582	.000122	9.14037	.000000
S8_0	.424706	.533317	.009718	.000524	.000120	10.08738	.000000
S9_0	.526214	.590694	.010764	.000418	.000107	11.71292	.000000
S10_0	.792826	.661617	.012056	.000231	.000067	14.11748	.000000
S11_0	1.924305	.733244	.013361	.000048	.000018	17.25369	.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(257)	p-level
S13_0	2.75750	.868452	.031920	.000134	.999866	28.0821	0.00
S12_0	-1.75799	-.744982	-.020350	.000134	.999866	-17.9032	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 詳out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999627	.999254	.999254	345503.1	0.00	1
S12_0	2	.999834	.999668	.000414	320.5	0.00	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS
case 1 to 297

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	155.1000	154.4232	.67680	-.75903	.23342	.181575	1.015686	.67947	.000108
2	163.6700	163.1039	.56612	.90122	.19524	.261520	2.106954	.57076	.000158
3	157.3000	159.8897	-2.58969	.28648	-.89314	.347349	3.716872	-2.62740	.005892
4	156.5100	159.2203	-2.71033	.15846	-.93475	.196081	1.184448	-2.72278	.002016
5	153.7900	155.7545	-1.96455	-.50440	-.67754	.194034	1.159847	-1.97339	.001037
6	164.1900	165.4938	-1.30383	1.35831	-.44967	.214349	1.415428	-1.31100	.000559
7	158.1000	158.4194	-.31938	.00527	-.11015	.195443	1.176758	-.32084	.000028

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
8	155.4400	152.2975	3.14247	-1.16558	1.08379	.226938	1.586581	3.16184	.003642
9	149.7700	148.5502	1.21985	-1.88230	.42071	.409956	5.177504	1.24473	.001842
10	159.6300	162.0683	-2.43832	.70316	-.84094	.194920	1.170464	-2.44939	.001612
11	156.6600	158.7682	-2.10818	.07198	-.72708	.191199	1.126204	-2.11739	.001159
13	159.6700	158.7339	.93610	.06542	.32284	.289457	2.581162	.94552	.000530
14	158.5500	154.5764	3.97356	-.72972	1.37042	.254407	1.993912	4.00438	.007342
15	147.2800	147.5944	-.31438	-2.06510	-.10842	.171361	.904632	-.31548	.000021
16	159.6700	158.7339	.93610	.06542	.32284	.289457	2.581162	.94552	.000530
17	158.5500	154.5764	3.97356	-.72972	1.37042	.254407	1.993912	4.00438	.007342
18	147.2800	147.5944	-.31438	-2.06510	-.10842	.171361	.904632	-.31548	.000021
19	161.1900	165.2601	-4.07013	1.31361	-1.40372	.333389	3.424116	-4.12466	.013376
20	158.6500	162.6042	-3.95418	.80564	-1.36373	.291264	2.613485	-3.99448	.009575
21	157.4400	152.5760	4.86395	-1.11231	1.67750	.338839	3.536990	4.93130	.019750
22	163.4300	166.6877	-3.25768	1.58664	-1.12352	.189538	1.106727	-3.27166	.002720
24	151.4100	151.7560	-.34599	-1.26916	-.11933	.191972	1.135327	-.34752	.000031
25	157.4400	152.5760	4.86395	-1.11231	1.67750	.338839	3.536990	4.93130	.019750
26	157.8000	160.9841	-3.18408	.49579	-1.09814	.322820	3.210464	-3.22405	.007663
27	154.1400	145.3027	8.83734	-2.50341	3.04786	.176920	.964269	8.87037	.017422
31	162.4500	165.0231	-2.57306	1.26827	-.88741	.197566	1.202460	-2.58506	.001845
32	166.5100	164.4270	2.08298	1.15427	.71839	.346447	3.697596	2.11315	.003791
33	162.9800	163.0287	-.04866	.88683	-.01678	.304864	2.863240	-.04920	.000002
34	158.1600	157.9397	.22029	-.08647	.07597	.209530	1.352505	.22145	.000015
35	155.2900	146.8414	8.44861	-2.20911	2.91379	.168488	.874545	8.47723	.014431
36	149.4400	151.1018	-1.66177	-1.39428	-.57312	.180229	1.000684	-1.66822	.000639
38	152.3700	152.4335	-.06352	-1.13957	-.02191	.241560	1.797620	-.06397	.000002
40	161.2300	163.4068	-2.17677	.95915	-.75073	.261080	2.099879	-2.19457	.002322
41	158.8700	158.1651	.70491	-.04337	.24311	.208434	1.338395	.70857	.000154
42	161.5800	161.9147	-.33472	.67378	-.11544	.184075	1.043847	-.33607	.000027
43	159.6200	162.0389	-2.41895	.69754	-.83426	.241469	1.796257	-2.43584	.002447
44	162.6800	163.5401	-.86012	.98465	-.29664	.196496	1.189476	-.86409	.000204
46	162.0300	163.6168	-1.58678	.99931	-.54725	.259264	2.070774	-1.59957	.001217
48	154.5900	146.1320	8.45802	-2.34479	2.91704	.237794	1.741994	8.51530	.029004
49	155.7900	155.2886	.50140	-.59352	.17293	.216876	1.449004	.50422	.000085
50	160.2300	158.8821	1.34792	.09376	.46488	.189904	1.111007	1.35372	.000468
51	164.7400	162.5664	2.17357	.79843	.74963	.289342	2.579113	2.19543	.002854
52	154.8800	154.3821	.49791	-.76689	.17172	.242680	1.814328	.50142	.000105
54	156.4400	154.6832	1.75679	-.70930	.60589	.233048	1.673156	1.76821	.001201
55	156.1300	158.0863	-1.95628	-.05844	-.67469	.280918	2.431108	-1.97482	.002177
56	160.2000	161.0659	-.86591	.51144	-.29864	.206456	1.313113	-.87032	.000228
60	151.6000	150.1896	1.41040	-1.56874	.48643	.358074	3.949952	1.43224	.001861
61	160.7000	160.3284	.37158	.37039	.12815	.312786	3.013994	.37596	.000098
62	152.2100	146.4837	5.72629	-2.27752	1.97491	.191200	1.126222	5.75130	.008554
63	161.6700	163.2630	-1.59300	.93165	-.54940	.238952	1.759004	-1.60390	.001039
64	160.1800	155.3864	4.79358	-.57481	1.65323	.204871	1.293022	4.81763	.006891
65	153.5000	159.0447	-5.54472	.12487	-1.91229	.374415	4.318703	-5.63875	.031531
66	157.4200	154.8134	2.60660	-.68440	.89897	.197437	1.200894	2.61874	.001891
67	156.2800	157.6893	-1.40927	-.13437	-.48604	.181327	1.012908	-1.41480	.000466
68	164.3000	167.3406	-3.04059	1.71152	-1.04865	.190479	1.117741	-3.05377	.002393
69	164.6900	164.7902	-.10016	1.22373	-.03454	.208744	1.342376	-.10068	.000003
70	153.2900	153.6043	-.31435	-.91565	-.10841	.296515	2.708561	-.31767	.000063
71	160.0800	160.3352	-.25523	.37169	-.08803	.316993	3.095601	-.25832	.000047
72	172.3800	169.2303	3.14970	2.07294	1.08628	.360443	4.002399	3.19914	.009406
74	153.8600	152.8378	1.02217	-1.06225	.35253	.173923	.931886	1.02586	.000225
75	158.5900	157.9590	.63095	-.08277	.21761	.211410	1.376887	.63432	.000127
76	157.6600	152.1092	5.55083	-1.20161	1.91439	.173212	.924279	5.57071	.006586
77	163.1500	164.2174	-1.06741	1.11419	-.36813	.269611	2.239356	-1.07672	.000596
78	157.5000	159.6973	-2.19727	.24967	-.75780	.187587	1.084060	-2.20650	.001212
80	162.3900	166.2388	-3.84885	1.50080	-1.32741	.189695	1.108562	-3.86539	.003803
81	161.2900	161.0543	.23572	.50921	.08130	.273391	2.302590	.23783	.000030
83	159.7800	162.3229	-2.54286	.75184	-.87699	.190663	1.119896	-2.55390	.001677
85	163.6400	162.9494	.69057	.87167	.23817	.191527	1.130076	.69359	.000125

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
87	151.7700	153.6500	-1.88000	-.90691	-.64838	.174773	.941016	-1.88686	.000769
88	149.2400	149.7186	-.47856	-1.65883	-.16505	.200964	1.244177	-.48087	.000066
89	154.8000	155.3223	-.52231	-.58707	-.18014	.226782	1.584392	-.52552	.000100
92	162.8400	161.0249	1.81511	.50359	.62600	.206942	1.319297	1.82440	.001008
94	161.3300	162.3285	-.99849	.75292	-.34436	.211001	1.371567	-1.00381	.000317
95	161.1200	163.6307	-2.51074	1.00198	-.86592	.291692	2.621171	-2.53641	.003872
96	156.6700	158.3907	-1.72067	-.00022	-.59343	.183967	1.042622	-1.72763	.000715
97	159.0700	151.5473	7.52274	-1.30908	2.59447	.178166	.977904	7.55125	.012804
100	158.9600	160.4860	-1.52596	.40052	-.52628	.439342	5.946368	-1.56181	.003331
101	151.0000	150.6887	.31129	-1.47328	.10736	.298747	2.749509	.31463	.000063
103	154.0700	150.9791	3.09088	-1.41774	1.06600	.216627	1.445673	3.10823	.003207
104	161.2500	157.6730	3.57697	-.13748	1.23364	.297237	2.721769	3.61495	.008167
105	155.7400	156.0673	-.32727	-.44459	-.11287	.182009	1.020547	-.32857	.000025
106	153.4400	155.1992	-1.75919	-.61062	-.60672	.196140	1.185168	-1.76727	.000850
108	161.1900	165.2601	-4.07013	1.31361	-1.40372	.333389	3.424116	-4.12466	.013376
109	158.6500	162.6042	-3.95418	.80564	-1.36373	.291264	2.613485	-3.99448	.009575
110	158.8000	158.7770	.02303	.07366	.00794	.186841	1.075452	.02312	.000000
111	157.6300	152.4886	5.14142	-1.12904	1.77319	.259017	2.066831	5.18278	.012748
112	158.3200	160.5308	-2.21082	.40910	-.76248	.318674	3.128535	-2.23785	.003598
113	157.4100	160.2219	-2.81192	.35002	-.96979	.183367	1.035830	-2.82321	.001896
114	158.3200	160.5308	-2.21082	.40910	-.76248	.318674	3.128535	-2.23785	.003598
115	157.6300	152.5424	5.08755	-1.11874	1.75462	.260257	2.086657	5.12888	.012604
116	158.3200	160.5308	-2.21082	.40910	-.76248	.318674	3.128535	-2.23785	.003598
117	154.7100	155.3680	-.65800	-.57833	-.22694	.207324	1.324181	-.66139	.000133
118	156.3000	158.2380	-1.93802	-.02942	-.66839	.194355	1.163698	-1.94677	.001013
119	149.8400	151.9468	-2.10678	-1.23267	-.72660	.176040	.954704	-2.11458	.000980
120	155.0100	156.8039	-1.79395	-.30370	-.61870	.185625	1.061500	-1.80133	.000791
121	152.8100	154.3379	-1.52789	-.77535	-.52695	.197312	1.199368	-1.53500	.000649
122	167.9100	169.9573	-2.04727	2.21198	-.70607	.195397	1.176199	-2.05661	.001142
123	163.7500	164.7897	-1.03969	1.22364	-.35857	.316064	3.077482	-1.05219	.000782
124	161.8000	163.4780	-1.67802	.97277	-.57872	.209376	1.350513	-1.68682	.000882
125	160.8900	163.8143	-2.92432	1.03709	-1.00855	.201944	1.256339	-2.93857	.002491
126	167.5700	164.4835	3.08650	1.16508	1.06449	.200127	1.233835	3.10128	.002725
127	163.4700	164.9488	-1.47876	1.25406	-.51000	.245862	1.862220	-1.48947	.000949
128	157.1000	159.2496	-2.14961	.16406	-.74137	.196814	1.193330	-2.15956	.001278
129	150.1100	151.2659	-1.15585	-1.36290	-.39864	.214470	1.417039	-1.16221	.000440
130	156.9900	158.8251	-1.83510	.08287	-.63290	.198394	1.212560	-1.84373	.000946
131	148.1100	150.4301	-2.32011	-1.52274	-.80017	.174878	.942146	-2.32858	.001173
132	156.7100	155.9318	.77820	-.47050	.26839	.405210	5.058327	.79370	.000732
133	159.2500	161.3467	-2.09671	.56514	-.72312	.183605	1.038527	-2.10515	.001057
134	160.2900	158.7337	1.55632	.06538	.53675	.473267	6.900146	1.59892	.004051
135	159.1300	158.5333	.59668	.02706	.20579	.392700	4.750831	.60783	.000403
136	163.4500	164.7141	-1.26405	1.20917	-.43595	.210363	1.363284	-1.27074	.000505
137	163.6600	166.2068	-2.54684	1.49468	-.87837	.198102	1.208991	-2.55879	.001818
138	159.7600	159.5980	.16199	.23069	.05587	.370931	4.238698	.16468	.000026
139	152.7200	153.3223	-.60233	-.96958	-.20773	.286398	2.526893	-.60826	.000215
140	156.0400	156.3273	-.28734	-.39485	-.09910	.319494	3.144645	-.29087	.000061
141	163.6100	166.3335	-2.72348	1.51890	-.93929	.408960	5.152379	-2.77876	.009135
142	160.2200	158.7892	1.43080	.07600	.49346	.180611	1.004926	1.43637	.000476
143	158.9100	159.2018	-.29184	.15492	-.10065	.184896	1.053180	-.29303	.000021
144	156.0400	156.3273	-.28734	-.39485	-.09910	.319494	3.144645	-.29087	.000061
145	152.7800	153.4022	-.62216	-.95431	-.21457	.283205	2.470858	-.62815	.000224
146	160.2200	158.7892	1.43080	.07600	.49346	.180611	1.004926	1.43637	.000476
147	158.9100	159.2018	-.29184	.15492	-.10065	.184896	1.053180	-.29303	.000021
148	160.8200	159.5529	1.26711	.22206	.43700	.450515	6.252678	1.29845	.002421
149	154.7900	155.4172	-.62723	-.56892	-.21632	.193368	1.151904	-.63003	.000105
150	156.7000	153.1866	3.51340	-.99554	1.21172	.324578	3.245522	3.55798	.009434
151	163.8500	164.8381	-.98807	1.23289	-.34077	.288662	2.567006	-.99796	.000587
152	160.3000	162.7747	-2.47472	.83826	-.85349	.196068	1.184292	-2.48608	.001681
153	162.7600	164.1135	-1.35355	1.09432	-.46682	.259340	2.071977	-1.36446	.000886
154	154.2100	152.1541	2.05588	-1.19301	.70904	.496343	7.589445	2.11794	.007817

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
155	158.2700	153.2820	4.98802	-.97730	1.72029	.226472	1.580069	5.01864	.009138
157	154.9900	154.5146	.47545	-.74156	.16397	.389851	4.682129	.48420	.000252
158	164.2300	163.2325	.99754	.92580	.34404	.216668	1.446223	1.00314	.000334
159	158.2700	153.2820	4.98802	-.97730	1.72029	.226472	1.580069	5.01864	.009138
160	153.2600	153.9475	-.68750	-.85002	-.23711	.282730	2.462582	-.69410	.000272
161	162.9800	163.9455	-.96552	1.06218	-.33299	.290967	2.608162	-.97534	.000570
162	161.3900	164.2962	-2.90619	1.12925	-1.00230	.186902	1.076154	-2.91831	.002105
163	160.0400	160.0581	-.01814	.31869	-.00626	.334961	3.456488	-.01839	.000000
164	155.6000	156.6782	-1.07817	-.32775	-.37184	.245500	1.856733	-1.08596	.000503
165	162.6200	154.9651	7.65494	-.65540	2.64007	.206804	1.317548	7.69408	.017910
166	149.6700	150.1767	-.50673	-1.57120	-.17476	.183519	1.037547	-.50877	.000062
167	163.4100	158.8395	4.57051	.08562	1.57630	.279059	2.399047	4.61324	.011724
168	163.9800	164.3235	-.34348	1.13447	-.11846	.254304	1.992290	-.34614	.000055
169	161.8300	162.8385	-1.00850	.85046	-.34782	.203224	1.272319	-1.01348	.000300
170	154.0300	154.2829	-.25293	-.78586	-.08723	.183477	1.037079	-.25395	.000015
171	169.7200	172.5471	-2.82715	2.70731	-.97504	.224643	1.554650	-2.84422	.002888
172	165.0500	167.3242	-2.27420	1.70838	-.78434	.199842	1.230328	-2.28506	.001475
173	153.8800	156.2987	-2.41872	-.40032	-.83418	.182434	1.025316	-2.42833	.001388
174	161.8500	165.0106	-3.16057	1.26588	-1.09003	.224412	1.551451	-3.17961	.003602
175	146.2200	146.7684	-.54840	-2.22307	-.18913	.224916	1.558424	-.55172	.000109
176	162.1000	161.7150	.38506	.63557	.13280	.205526	1.301304	.38700	.000045
177	152.7700	154.5557	-1.78569	-.73369	-.61586	.218987	1.477345	-1.79593	.001094
178	160.8600	158.2546	2.60538	-.02624	.89855	.180581	1.004596	2.61552	.001578
179	157.0900	158.4736	-1.38359	.01564	-.47718	.222500	1.525129	-1.39179	.000678
180	162.0300	161.2957	.73428	.55539	.25324	.183488	1.037195	.73724	.000129
181	157.7400	157.9191	-.17909	-.09041	-.06177	.268999	2.229198	-.18065	.000017
182	154.2500	157.7783	-3.52831	-.11734	-1.21686	.225570	1.567503	-3.54979	.004536
183	161.3000	161.1040	.19600	.51872	.06760	.454164	6.354360	.20093	.000059
184	159.2800	158.5301	.74989	.02645	.25863	.410612	5.194109	.76524	.000698
185	154.3000	156.8452	-2.54521	-.29580	-.87780	.178417	.980662	-2.55489	.001470
186	161.1400	157.2393	3.90073	-.22043	1.34530	.255732	2.014735	3.93131	.007150
187	154.8600	154.3791	.48094	-.76747	.16587	.190188	1.114331	.48302	.000060
189	152.8800	156.5346	-3.65462	-.35521	-1.26042	.243452	1.825879	-3.68056	.005680
190	155.3800	153.1058	2.27422	-1.01100	.78434	.515474	8.185785	2.34844	.010367
191	159.1300	160.2345	-1.10454	.35243	-.38094	.239054	1.760510	-1.11210	.000500
192	154.4700	157.9813	-3.51134	-.07851	-1.21101	.191841	1.133784	-3.52678	.003238
193	151.9400	151.8387	.10129	-1.25333	.03493	.274103	2.314593	.10220	.000006
194	163.5400	166.5793	-3.03928	1.56591	-1.04820	.202202	1.259560	-3.05413	.002698
195	154.9900	157.1848	-2.19475	-.23086	-.75693	.242261	1.808067	-2.21018	.002028
196	157.5100	158.3530	-.84297	-.00743	-.29073	.191735	1.132533	-.84667	.000186
197	156.0800	144.5063	11.57372	-2.65572	3.99159	.166541	.854451	11.61202	.026456
198	160.0100	161.4933	-1.48332	.59318	-.51157	.222235	1.521501	-1.49209	.000778
199	158.0700	159.0020	-.93202	.11671	-.32144	.211248	1.374778	-.93700	.000277
200	152.0100	152.2836	-.27361	-1.16825	-.09436	.314088	3.039126	-.27685	.000053
201	156.8300	158.0825	-1.25253	-.05916	-.43198	.217879	1.462437	-1.25965	.000533
202	153.8100	153.0395	.77046	-1.02367	.26572	.260567	2.091635	.77673	.000290
203	153.9900	156.4783	-2.48828	-.36598	-.85817	.177910	.975097	-2.49768	.001397
204	170.5800	164.4149	6.16515	1.15195	2.12626	.196189	1.185759	6.19350	.010444
205	154.0800	151.7434	2.33659	-1.27156	.80585	.182650	1.027750	2.34590	.001299
207	154.2100	156.8416	-2.63159	-.29649	-.90759	.178321	.979607	-2.64158	.001570
208	159.9900	163.1193	-3.12932	.90417	-1.07925	.204934	1.293825	-3.14503	.002939
210	151.5000	152.0788	-.57880	-1.20742	-.19962	.236487	1.722900	-.58267	.000134
211	157.9600	160.5140	-2.55400	.40588	-.88083	.183318	1.035279	-2.56425	.001563
212	160.0300	162.0618	-2.03175	.70190	-.70072	.185765	1.063103	-2.04013	.001016
213	159.9600	159.5856	.37444	.22831	.12914	.387906	4.635523	.38126	.000155
214	156.8400	158.0130	-1.17305	-.07245	-.40457	.267813	2.209584	-1.18314	.000710
215	156.3300	156.4597	-.12970	-.36953	-.04473	.331487	3.385170	-.13142	.000013
216	163.3900	166.1670	-2.77698	1.48706	-.95774	.218379	1.469154	-2.79282	.002631
217	159.9500	161.5972	-1.64722	.61305	-.56810	.185127	1.055807	-1.65396	.000663
218	166.0600	168.8132	-2.75317	1.99316	-.94953	.191961	1.135198	-2.76529	.001993
219	163.4500	165.4128	-1.96283	1.34282	-.67695	.189618	1.107654	-1.97126	.000988

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
220	160.7200	164.3530	-3.63303	1.14013	-1.25297	.199595	1.227286	-3.65032	.003755
221	158.1700	158.7421	-.57207	.06698	-.19730	.217722	1.460337	-.57531	.000111
222	155.9500	154.7697	1.18031	-.69277	.40707	.186460	1.071068	1.18521	.000345
223	163.9100	159.6900	4.21999	.24829	1.45541	.239191	1.762523	4.24890	.007306
224	165.1000	168.0255	-2.92554	1.84252	-1.00897	.244771	1.845722	-2.94654	.003680
226	155.4700	156.3481	-.87811	-.39088	-.30285	.269507	2.237630	-.88577	.000403
227	161.1500	163.8490	-2.69902	1.04373	-.93085	.191867	1.134091	-2.71089	.001914
229	158.1300	159.7044	-1.57442	.25104	-.54299	.194201	1.161851	-1.58151	.000667
231	150.4000	150.2569	.14313	-1.55588	.04936	.299094	2.755893	.14467	.000013
232	152.4900	151.8901	.59991	-1.24351	.20690	.363556	4.071823	.60950	.000347
233	162.4900	163.4385	-.94849	.96521	-.32712	.282472	2.458094	-.95757	.000518
234	157.3300	161.7160	-4.38599	.63577	-1.51266	.328853	3.331572	-4.44314	.015102
235	163.7100	165.2262	-1.51622	1.30713	-.52292	.196898	1.194340	-1.52324	.000636
237	160.6300	159.7030	.92700	.25077	.31971	.430950	5.721364	.94794	.001181
238	164.2300	165.3938	-1.16376	1.33917	-.40136	.199939	1.231518	-1.16932	.000387
239	164.3800	166.5609	-2.18092	1.56240	-.75217	.197928	1.206873	-2.19113	.001331
240	155.5900	153.0598	2.53023	-1.01980	.87264	.192893	1.146253	2.54148	.001700
241	159.5400	160.2216	-.68161	.34996	-.23508	.213766	1.407749	-.68534	.000152
242	158.9400	159.9272	-.98718	.29365	-.34046	.300256	2.777339	-.99788	.000635
243	152.3500	153.7998	-1.44981	-.87826	-.50002	.247396	1.885523	-1.46045	.000923
245	163.3900	163.1429	.24707	.90868	.08521	.239143	1.761823	.24876	.000025
246	163.8400	159.1490	4.69096	.14482	1.61784	.264751	2.159347	4.73040	.011095
247	164.2300	165.8089	-1.57889	1.41857	-.54453	.202992	1.269420	-1.58666	.000734
248	153.1900	154.1137	-.92369	-.81823	-.31857	.196976	1.195285	-.92797	.000236
250	155.2600	156.2626	-1.00261	-.40723	-.34578	.181270	1.012280	-1.00654	.000235
251	171.8700	166.2358	5.63417	1.50022	1.94314	.200795	1.242091	5.66132	.009141
253	166.2700	168.5770	-2.30698	1.94799	-.79564	.228588	1.609728	-2.32140	.001992
254	157.6900	158.8835	-1.19354	.09404	-.41163	.248566	1.903397	-1.20238	.000632
255	156.0900	157.5819	-1.49190	-.15491	-.51453	.179720	.995034	-1.49765	.000512
256	158.2900	160.2346	-1.94460	.35244	-.67066	.196076	1.184394	-1.95353	.001038
257	157.8800	156.9464	.93358	-.27645	.32198	.335351	3.464553	.94624	.000712
258	158.6800	160.1588	-1.47881	.33795	-.51002	.222955	1.531378	-1.48760	.000778
260	154.8400	154.7204	.11964	-.70220	.04126	.354276	3.866616	.12146	.000013
261	154.9700	158.2944	-3.32439	-.01864	-1.14653	.185556	1.060707	-3.33806	.002714
262	157.6300	149.6852	7.94481	-1.66521	2.74004	.179148	.988711	7.97525	.014440
263	161.1900	160.4942	.69580	.40209	.23997	.407704	5.120781	.70984	.000592
264	150.9800	150.9576	.02235	-1.42185	.00771	.339110	3.542637	.02266	.000000
265	163.3700	164.5601	-1.19008	1.17972	-.41044	.237661	1.740060	-1.19813	.000574
266	157.1600	157.6677	-.50774	-.13849	-.17511	.181620	1.016190	-.50974	.000061
267	157.7300	158.8613	-1.13132	.08979	-.39017	.234069	1.687853	-1.13874	.000503
268	161.0300	162.6525	-1.62245	.81488	-.55956	.233074	1.673538	-1.63300	.001025
269	152.6500	154.8400	-2.18997	-.67932	-.75529	.188808	1.098212	-2.19930	.001220
270	159.2100	160.7217	-1.51169	.44560	-.52136	.252168	1.958966	-1.52321	.001044
271	154.1300	155.0027	-.87271	-.64819	-.30098	.267080	2.197504	-.88018	.000391
272	157.3500	154.2757	3.07434	-.78725	1.06029	.175610	.950048	3.08566	.002077
273	154.9900	154.8049	.18515	-.68604	.06386	.356349	3.911990	.18799	.000032
274	159.9200	161.2016	-1.28159	.53739	-.44200	.219000	1.477530	-1.28894	.000564
275	157.3900	157.0390	.35097	-.25873	.12104	.367318	4.156521	.35669	.000121
276	155.1200	151.6339	3.48611	-1.29251	1.20231	.203339	1.273764	3.50334	.003590
277	156.4100	157.4517	-1.04169	-.17981	-.35926	.241539	1.797297	-1.04897	.000454
278	164.5300	166.4843	-1.95433	1.54775	-.67402	.214828	1.421762	-1.96512	.001261
279	156.7000	153.1170	3.58301	-1.00886	1.23572	.324746	3.248881	3.62852	.009822
280	154.7900	155.4172	-.62723	-.56892	-.21632	.193368	1.151904	-.63003	.000105
281	160.8200	159.5529	1.26711	.22206	.43700	.450515	6.252678	1.29845	.002421
282	163.8500	164.8312	-.98120	1.23158	-.33840	.288676	2.567248	-.99102	.000579
283	167.6400	167.1686	.47139	1.67863	.16257	.207564	1.327244	.47382	.000068
284	158.3100	152.5541	5.75586	-1.11650	1.98511	.186096	1.066887	5.77967	.008184
285	156.2400	157.4477	-1.20767	-.18058	-.41651	.246712	1.875118	-1.21648	.000637
286	161.5100	158.7224	2.78757	.06323	.96139	.205077	1.295631	2.80158	.002335
287	150.6100	151.0870	-.47699	-1.39711	-.16451	.253676	1.982469	-.48067	.000105
288	163.9300	158.8715	5.05853	.09173	1.74461	.183961	1.042559	5.07898	.006175

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
289	159.0900	159.6051	-.51508	.23204	-.17764	.182461	1.025619	-.51712	.000063
290	165.1200	159.9023	5.21765	.28890	1.79949	.192529	1.141928	5.24076	.007202
291	165.0600	155.8051	9.25490	-.49473	3.19187	.214179	1.413196	9.30567	.028101
293	158.0500	158.9160	-.86601	.10025	-.29867	.199141	1.221712	-.87012	.000212
294	160.6600	146.5349	14.12512	-2.26774	4.87153	.183841	1.041193	14.18213	.048087
295	163.1000	160.4774	2.62260	.39888	.90450	.187712	1.085503	2.63364	.001729
296	150.1600	150.3414	-.18137	-1.53972	-.06255	.306981	2.903155	-.18342	.000022
297	163.9300	158.8715	5.05853	.09173	1.74461	.183961	1.042559	5.07898	.006175
Minimum	146.2200	144.5063	-5.54472	-2.65572	-1.91229	.166541	.854451	-5.63875	.000000
Maximum	172.3800	172.5471	14.12512	2.70731	4.87153	.515474	8.185785	14.18213	.048087
Mean	158.4386	158.3918	.04682	.00000	.01615	.244763	2.000000	.04748	.003096
Median	158.3200	158.7421	-.57880	.06698	-.19962	.216876	1.449004	-.58267	.000923

Case 2

Dependent Variable: Predicted adult stature (PAS)

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(69)	p-level
S2_0	.998576	.998576	.998576	1.000000	1.000000	155.5014	0.00
S3_0	.999050	.999050	.999050	1.000000	1.000000	190.4152	0.00
S4_0	.999346	.999346	.999346	1.000000	1.000000	229.4832	0.00
S5_0	.999471	.999471	.999471	1.000000	1.000000	255.3391	0.00
S_6_0	.999481	.999481	.999481	1.000000	1.000000	257.6621	0.00
S7_0_	.999473	.999473	.999473	1.000000	1.000000	255.8049	0.00
S8_0	.999498	.999498	.999498	1.000000	1.000000	261.9936	0.00
S9_0	.999534	.999534	.999534	1.000000	1.000000	271.9800	0.00
S10_0	.999533	.999533	.999533	1.000000	1.000000	271.8475	0.00
S11_0	.999500	.999500	.999500	1.000000	1.000000	262.6698	0.00
S12_0	.999598	.999598	.999598	1.000000	1.000000	292.9063	0.00
S13_0	.999824	.999824	.999824	1.000000	1.000000	442.8540	0.00

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99982413 R2= .99964830 Adjusted R2= .99964320
REGRESS. F(1,69)=1961E2 p<0.0000 Std.Error of estimate: 2.9875

N=70	BETA	St. Err. of BETA	B	St. Err. of B	t(69)	p-level
S13_0	.999824	.002258	1.042230	.002353	442.8540	0.00

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.751893 R2=.565343 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	800.998	1	800.9976	89.74589	.000000
Residual	615.837	69	8.9252		
Total	1416.834				

STAT. Variables not in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(68)	p-level
S2_0	.02052	.055796	.001046	.002601	.002601	.4608	.646396
S3_0	.03065	.066367	.001245	.001649	.001649	.5485	.585156
S4_0	.01152	.019221	.000360	.000980	.000980	.1585	.874510
S5_0	-.05596	-.075171	-.001410	.000635	.000635	-.6216	.536259
S_6_0	-.12520	-.156455	-.002934	.000549	.000549	-1.3063	.195869
S7_0_	-.14746	-.183065	-.003433	.000542	.000542	-1.5355	.129292
S8_0	-.15371	-.183140	-.003435	.000499	.000499	-1.5362	.129131
S9_0	-.19615	-.213551	-.004005	.000417	.000417	-1.8026	.075887
S10_0	-.37722	-.366139	-.006866	.000331	.000331	-3.2446	.001826
S11_0	-.73364	-.633789	-.011886	.000262	.000262	-6.7567	.000000
S12_0	-1.44266	-.829769	-.015561	.000116	.000116	-12.2601	.000000

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(69)	p-level
S13_0	.999824	.999824	.999824	1.000000	0.00	442.8540	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 詿out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999824	.999648	.999648	196119.7	0.00	1

STAT. Regression Summary for Dependent Variable: PAS
MULTIPLE R= .99994522 R2= .99989045 Adjusted R2= .99988723
REGRESS. F(2,68)=3103E2 p<0.0000 Std.Error of estimate: 1.6796

N=70	BETA	St. Err. of BETA	B	St. Err. of B	t(68)	p-level
S13_0	2.44240	.117672	2.54599	.122662	20.7561	.000000
S12_0	-1.44266	.117672	-1.55950	.127201	-12.2601	.000000

STAT. Analysis of Variance, Adjusted For Mean
MULTIPLE R=.929845 R2=.864611 (Ajusted for mean)
REGRESS.

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	1225.011	2	612.5055	217.1287	.000000
Residual	191.823	68	2.8209		
Total	1416.834				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(67)	p-level
S2_0	.039513	.192174	.002011	.002591	.000114	1.602887	.113664
S3_0	.067266	.259843	.002720	.001635	.000113	2.202561	.031070
S4_0	.100045	.294719	.003085	.000951	.000113	2.524512	.013961
S5_0	.126905	.293253	.003069	.000585	.000107	2.510768	.014466
S_6_0	.121557	.255041	.002669	.000482	.000102	2.159001	.034435
S7_0_	.114864	.237468	.002485	.000468	.000101	2.000997	.049446
S8_0	.139100	.273436	.002862	.000423	.000099	2.326847	.023005
S9_0	.206471	.355781	.003724	.000325	.000091	3.116078	.002698
S10_0	.359895	.463469	.004851	.000182	.000064	4.281238	.000061
S11_0	.946842	.580202	.006073	.000041	.000018	5.830959	.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(68)	p-level
S13_0	2.44240	.929342	.026345	.000116	.999884	20.7561	.000000
S12_0	-1.44266	-.829769	-.015561	.000116	.999884	-12.2601	.000000

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999824	.999648	.999648	196119.7	0.000000	I
S12_0	2	.999945	.999890	.000242	150.3	.000000	2

STAT. MULTIPLE REGRESS. Predicted & Residual Values: PAS case 1 to 110

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
1	155.1000	153.5288	1.57120	-.95331	.93548	.194922	.942819	1.59265	.006055
2	163.6700	161.7402	1.92976	.76663	1.14897	.265181	1.744977	1.97910	.017306
3	157.3000	158.1965	-.89655	.02438	-.53380	.363998	3.287790	-.94073	.007367
4	156.5100	158.2128	-1.70282	.02779	-1.01385	.204303	1.035745	-1.72839	.007835
5	153.7900	154.7516	-.96165	-.69718	-.57256	.201185	1.004379	-.97565	.002421
6	164.1900	165.0066	-.81664	1.45081	-.48622	.275856	1.888301	-.83928	.003368
7	158.1000	157.8837	.21629	-.04114	.12878	.247247	1.516940	.22108	.000188
9	149.7700	148.9832	.78683	-1.90543	.46848	.535289	7.110199	.87579	.013809
10	159.6300	161.0834	-1.45337	.62905	-.86533	.205688	1.049841	-1.47550	.005787
11	156.6600	158.1911	-1.53111	.02324	-.91161	.238895	1.416180	-1.56273	.008757
13	159.6700	157.2619	2.40811	-.17139	1.43377	.296983	2.188615	2.48583	.034245
15	147.2800	146.9842	.29584	-2.32414	.17614	.207814	1.071657	.30044	.000245
16	159.6700	157.2619	2.40811	-.17139	1.43377	.296983	2.188615	2.48583	.034245
18	147.2800	146.9842	.29584	-2.32414	.17614	.207814	1.071657	.30044	.000245
19	161.1900	163.6045	-2.41454	1.15712	-1.43760	.346164	2.973515	-2.52165	.047876
20	158.6500	161.1172	-2.46716	.63612	-1.46893	.298256	2.207415	-2.54750	.036274
22	163.4300	165.8886	-2.45863	1.63554	-1.46385	.219084	1.191040	-2.50119	.018867
24	151.4100	150.7575	.65247	-1.53377	.38847	.197958	.972410	.66166	.001078

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
26	157.8000	159.3786	-1.57860	.27197	-.93989	.334944	2.783869	-1.64398	.019051
31	162.4500	164.0289	-1.57893	1.24602	-.94009	.209104	1.085005	-1.60379	.007067
32	166.5100	162.7251	3.78488	.97292	2.25349	.361669	3.245840	3.96892	.129464
33	162.9800	162.9845	-.00450	1.02725	-.00268	.403909	4.048295	-.00478	.000000
34	158.1600	157.5056	.65437	-.12033	.38961	.271288	1.826283	.67190	.002088
36	149.4400	150.1982	-.75824	-1.65092	-.45145	.191248	.907608	-.76820	.001356
38	152.3700	152.2127	.15729	-1.22898	.09365	.319374	2.531069	.16319	.000171
40	161.2300	162.0446	-.81465	.83039	-.48504	.264676	1.738340	-.83540	.003072
41	158.8700	157.0698	1.80019	-.21162	1.07182	.212714	1.122787	1.82953	.009516
42	161.5800	161.1264	.45355	.63807	.27004	.211541	1.110440	.46086	.000597
43	159.6200	160.7680	-1.14801	.56299	-.68352	.244153	1.479203	-1.17279	.005152
44	162.6800	162.9415	-.26146	1.01824	-.15567	.245175	1.491624	-.26715	.000270
46	162.0300	163.3797	-1.34970	1.11003	-.80360	.342780	2.915655	-1.40836	.014643
49	155.7900	154.1437	1.64627	-.82451	.98018	.219696	1.197709	1.67493	.008508
50	160.2300	158.2907	1.93927	.04411	1.15463	.236163	1.383981	1.97838	.013716
51	164.7400	161.0872	3.65280	.62985	2.17485	.296088	2.175432	3.76996	.078289
52	154.8800	154.1497	.73032	-.82327	.43483	.320730	2.552603	.75796	.003713
54	156.4400	153.4579	2.98210	-.96816	1.77552	.235674	1.378251	3.04200	.032294
55	156.1300	156.6496	-.51962	-.29963	-.30938	.287418	2.049902	-.53530	.001487
56	160.2000	159.9876	.21240	.39953	.12646	.212053	1.115820	.21584	.000132
60	151.6000	150.4327	1.16728	-1.60181	.69499	.470795	5.500079	1.26682	.022350
61	160.7000	158.7624	1.93756	.14291	1.15361	.323449	2.596066	2.01219	.026615
63	161.6700	162.9345	-1.26450	1.01678	-.75287	.314146	2.448877	-1.31034	.010647
65	153.5000	157.2571	-3.75711	-.17239	-2.23696	.396298	3.897164	-3.97862	.156204
66	157.4200	153.7838	3.63625	-.89991	2.16499	.203083	1.023412	3.69020	.035288
67	156.2800	156.8382	-.55815	-.26014	-.33232	.200089	.993465	-.56619	.000806
68	164.3000	166.5561	-2.25606	1.77534	-1.34324	.221963	1.222549	-2.29616	.016321
69	164.6900	164.2735	.41650	1.29724	.24798	.266806	1.766435	.42729	.000817
70	153.2900	153.5985	-.30855	-.93871	-.18371	.392648	3.825717	-.32639	.001032
71	160.0800	160.3577	-.27765	.47704	-.16531	.419551	4.367929	-.29613	.000970
74	153.8600	152.0709	1.78909	-1.25868	1.06521	.197565	.968555	1.81420	.008072
75	158.5900	156.8457	1.74425	-.25855	1.03851	.215175	1.148922	1.77335	.009149
77	163.1500	162.8171	.33290	.99219	.19821	.273843	1.860843	.34199	.000551
78	157.5000	158.7746	-1.27463	.14546	-.75890	.201565	1.008178	-1.29325	.004270
80	162.3900	165.3799	-2.98985	1.52898	-1.78014	.213002	1.125829	-3.03873	.026323
81	161.2900	159.6430	1.64696	.32736	.98059	.278462	1.924148	1.69351	.013973
83	159.7800	161.3852	-1.60516	.69226	-.95570	.204879	1.041596	-1.62941	.007002
85	163.6400	162.3074	1.33264	.88542	.79345	.235169	1.372356	1.35929	.006421
87	151.7700	152.8850	-1.11499	-1.08816	-.66386	.199133	.983989	-1.13089	.003186
88	149.2400	149.3209	-.08090	-1.83469	-.04817	.260857	1.688540	-.08290	.000029
89	154.8000	154.1268	.67323	-.82806	.40084	.229311	1.304830	.68602	.001555
92	162.8400	160.5403	2.29974	.51529	1.36925	.265726	1.752156	2.35879	.024685
94	161.3300	161.8554	-.52544	.79076	-.31284	.271815	1.833379	-.53957	.001352
95	161.1200	162.1400	-1.02000	.85037	-.60730	.298541	2.211636	-1.05328	.006213
96	156.6700	157.5038	-.83385	-.12071	-.49647	.200073	.993302	-.84585	.001799
100	158.9600	158.4692	.49077	.08150	.29220	.473403	5.561187	.53312	.004002
101	151.0000	150.7129	.28711	-1.54313	.17094	.395377	3.879078	.30395	.000907
105	155.7400	155.1827	.55727	-.60688	.33179	.197008	.963101	.56504	.000779
106	153.4400	154.7094	-1.26939	-.70603	-.75579	.250497	1.557076	-1.29827	.006645
108	161.1900	163.6045	-2.41454	1.15712	-1.43760	.346164	2.973515	-2.52165	.047876
109	158.6500	161.1172	-2.46716	.63612	-1.46893	.298256	2.207415	-2.54750	.036274
110	158.8000	157.8556	.94441	-.04703	.56230	.200431	.996865	.95806	.002317
Minimum	147.2800	146.9842	-3.75711	-2.32414	-2.23696	.191248	.907608	-3.97862	.000000
Maximum	166.5100	166.5561	3.78488	1.77534	2.25349	.535289	7.110199	3.96892	.156204
Mean	158.0959	158.0801	.01571	.00000	.00935	.273416	2.000000	.01618	.015157
Median	158.7250	158.2518	.07639	.03595	.04548	.255677	1.622808	.07921	.006317

Case 3

Dependent Variable: Predicted adult stature (PAS)

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(156)	p-level
S2_0	.998814	.998814	.998814	1.000000	1.000000	256.2488	0.00
S3_0	.999182	.999182	.999182	1.000000	1.000000	308.5137	0.00
S4_0	.999335	.999335	.999335	1.000000	1.000000	342.4008	0.00
S5_0	.999407	.999407	.999407	1.000000	1.000000	362.4949	0.00
S_6_0	.999440	.999440	.999440	1.000000	1.000000	372.9473	0.00
S7_0_	.999457	.999457	.999457	1.000000	1.000000	378.7287	0.00
S8_0	.999445	.999445	.999445	1.000000	1.000000	374.8368	0.00
S9_0	.999392	.999392	.999392	1.000000	1.000000	358.0517	0.00
S10_0	.999286	.999286	.999286	1.000000	1.000000	330.3106	0.00
S11_0	.999277	.999277	.999277	1.000000	1.000000	328.1963	0.00
S12_0	.999505	.999505	.999505	1.000000	1.000000	396.6560	0.00
S13_0	.999783	.999783	.999783	1.000000	1.000000	599.7654	0.00

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99978323 R2= .99956652 Adjusted R2= .99956374
F(1,156)=3597E2 p<0.0000 Std.Error of estimate: 3.3067

N=157	BETA	St. Err. of BETA	B	St. Err. of B	t(156)	p-level
S13_0	.999783	.001667	1.033028	.001722	599.7654	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.665646 R2=.443085 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	1357.115	1	1357.115	124.1147	.000000
Residual	1705.760	156	10.934		
Total	3062.875				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(155)	p-level
S2_0	.02790	.060699	.001264	.002052	.002052	.7571	.450143
S3_0	.03980	.069115	.001439	.001307	.001307	.8625	.389722
S4_0	.03206	.047646	.000992	.000957	.000957	.5939	.553469
S5_0	.00944	.012558	.000261	.000767	.000767	.1564	.875951
S_6_0	-.01757	-.021741	-.000453	.000664	.000664	-.2707	.786952
S7_0_	-.04136	-.048797	-.001016	.000603	.000603	-.6082	.543920
S8_0	-.09351	-.107168	-.002231	.000569	.000569	-1.3420	.181572
S9_0	-.22085	-.247082	-.005144	.000543	.000543	-3.1746	.001810
S10_0	-.44205	-.487867	-.010158	.000528	.000528	-6.9581	.000000
S11_0	-.73780	-.716914	-.014926	.000409	.000409	-12.8026	.000000
S12_0	-1.55088	-.868234	-.018077	.000136	.000136	-21.7864	0.000000

STAT. MULTIPLE REGRESS. Variables currently in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(156)	p-level
S13_0	.999783	.999783	.999783	1.000000	0.00	599.7654	0.00

STAT. MULTIPLE REGRESS. Summary of Stepwise Regression; DV: PAS

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999783	.999567	.999567	359718.5	0.00	1

STAT. MULTIPLE REGRESS. Regression Summary for Dependent Variable: PAS
R= .99994664 R2= .99989329 Adjusted R2= .99989191
F(2,155)=7262E2 p<0.0000 Std.Error of estimate: 1.6459

N=157	BETA	St. Err. of BETA	B	St. Err. of B	t(155)	p-level
S13_0	2.55055	.071186	2.63537	.073553	35.8297	0.00
S12_0	-1.55088	.071186	-1.65255	.075852	-21.7864	0.00

STAT. MULTIPLE REGRESS. Analysis of Variance, Adjusted For Mean
R=.928926 R2=.862904 (Ajusted for mean)

Effect	Sums of Squares	df	Mean Squares	F	p-level
Regress.	2642.968	2	1321.484	487.7989	0.00
Residual	419.907	155	2.709		
Total	3062.875				

STAT. MULTIPLE REGRESS. Variables not in the Equation; DV: PAS

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	Minimum Tolernce	t(154)	p-level
S2_0	.085382	.370724	.003830	.002012	.000133	4.95354	.000002
S3_0	.109543	.379887	.003924	.001283	.000131	5.09634	.000001
S4_0	.133380	.393847	.004068	.000930	.000130	5.31727	.000000
S5_0	.157805	.413111	.004267	.000731	.000130	5.62938	.000000
S_6_0	.180421	.433999	.004483	.000617	.000126	5.97814	.000000
S7_0_	.203041	.459589	.004748	.000547	.000123	6.42174	.000000
S8_0	.232475	.495647	.005120	.000485	.000116	7.08191	.000000
S9_0	.301344	.565791	.005845	.000376	.000094	8.51530	.000000
S10_0	.496266	.670327	.006925	.000195	.000050	11.20997	.000000
S11_0	1.358551	.779281	.008050	.000035	.000012	15.43165	.000000

STAT. Variables currently in the Equation; DV: PAS
MULTIPLE
REGRESS.

Variable	Beta in	Partial Cor.	Semipart Cor.	Tolernce	R-square	t(155)	p-level
S13_0	2.55055	.944600	.029729	.000136	.999864	35.8297	0.00
S12_0	-1.55088	-.868234	-.018077	.000136	.999864	-21.7864	0.00

STAT. Summary of Stepwise Regression; DV: PAS
MULTIPLE
REGRESS.

variable	Step 註out	Multiple R	Multiple R-square	R-square change	F - to entr/rem	p-level	Variabls included
S13_0	1	.999783	.999567	.999567	359718.5	0.00	1
S12_0	2	.999947	.999893	.000327	474.6	0.00	2

STAT. Predicted & Residual Values: PAS
MULTIPLE case 2 to 186
REGRESS.

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
2	158.3200	159.0831	-.76308	.17993	-.46362	.253219	3.715958	-.78158	.002668
3	157.4100	159.3052	-1.89522	.22719	-1.15146	.139586	1.129181	-1.90895	.004837
4	158.3200	159.0831	-.76308	.17993	-.46362	.253219	3.715958	-.78158	.002668
6	158.3200	159.0831	-.76308	.17993	-.46362	.253219	3.715958	-.78158	.002668
7	154.7100	154.2849	.42514	-.84089	.25830	.166395	1.604563	.42953	.000348
8	156.3000	157.5407	-1.24072	-.14820	-.75381	.132732	1.021005	-1.24884	.001872
9	149.8400	151.1962	-1.35625	-1.49799	-.82400	.125526	.913159	-1.36418	.001998
10	155.0100	156.0664	-1.05637	-.46187	-.64181	.129730	.975349	-1.06297	.001296
11	152.8100	153.6986	-.88857	-.96562	-.53986	.132417	1.016162	-.89435	.000955
12	167.9100	169.0983	-1.18831	2.31068	-.72197	.140735	1.147846	-1.19706	.001934
13	163.7500	163.3336	.41644	1.08422	.25301	.251719	3.672055	.42642	.000785
14	161.8000	162.3776	-.57758	.88084	-.35091	.167286	1.621797	-.58360	.000649
15	160.8900	162.7524	-1.86244	.96059	-1.13155	.160183	1.487005	-1.88025	.006180
16	167.5700	163.4330	4.13704	1.10537	2.51350	.158181	1.450062	4.17561	.029722
17	163.4700	164.4034	-.93335	1.31182	-.56707	.159506	1.474461	-.94220	.001539
18	157.1000	158.2145	-1.11452	-.00485	-.67714	.156210	1.414149	-1.12465	.002103
19	150.1100	150.7268	-.61678	-1.59787	-.37473	.140137	1.138107	-.62128	.000516
20	156.9900	158.1437	-1.15366	-.01993	-.70092	.134401	1.046843	-1.16140	.001660
21	148.1100	149.5325	-1.42253	-1.85195	-.86427	.135334	1.061425	-1.43221	.002559
22	156.7100	155.8881	.82193	-.49980	.49937	.264516	4.054932	.84372	.003393
23	159.2500	160.4527	-1.20265	.47131	-.73068	.137857	1.101376	-1.21115	.001899
24	160.2900	158.8359	1.45407	.12735	.88344	.311591	5.626637	1.50812	.015044
25	159.1300	158.4413	.68866	.04341	.41840	.255617	3.786664	.70568	.002217
26	163.4500	164.0307	-.58070	1.23254	-.35281	.141229	1.155911	-.58501	.000465
27	163.6600	165.4353	-1.77528	1.53137	-1.07859	.137755	1.099743	-1.78781	.004132
28	159.7600	159.4443	.31569	.25678	.19180	.240576	3.354158	.32258	.000410
29	152.7200	152.9905	-.27049	-1.11626	-.16434	.184198	1.966291	-.27392	.000173
30	156.0400	156.0635	-.02350	-.46248	-.01428	.205976	2.458731	-.02387	.000002
31	163.6100	164.6308	-1.02077	1.36020	-.62018	.320052	5.936362	-1.06088	.007854
32	160.2200	157.9393	2.28075	-.06341	1.38569	.133512	1.033043	2.29585	.006401

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
33	158.9100	158.4205	.48952	.03897	.29741	.131481	1.001852	.49266	.000286
34	156.0400	156.0635	-.02350	-.46248	-.01428	.205976	2.458731	-.02387	.000002
35	152.7800	153.0608	-.28084	-1.10130	-.17063	.182117	1.922112	-.28432	.000183
36	160.2200	157.9393	2.28075	-.06341	1.38569	.133512	1.033043	2.29585	.006401
37	158.9100	158.4205	.48952	.03897	.29741	.131481	1.001852	.49266	.000286
38	160.8200	159.5953	1.22469	.28891	.74407	.295604	5.064075	1.26550	.009534
39	154.7900	154.7463	.04372	-.74272	.02656	.131231	.998053	.04400	.000002
40	156.7000	151.7508	4.94917	-1.38000	3.00692	.256747	3.820237	5.07260	.115558
41	163.8500	163.4588	.39120	1.11087	.23768	.231157	3.096662	.39908	.000580
42	160.3000	162.0335	-1.73346	.80763	-1.05318	.135389	1.062293	-1.74527	.003804
43	162.7600	163.6192	-.85924	1.14500	-.52204	.167367	1.623367	-.86821	.001439
44	154.2100	152.3532	1.85680	-1.25185	1.12812	.328614	6.258230	1.93388	.027514
47	154.9900	154.4425	.54752	-.80735	.33265	.254038	3.740038	.56088	.001383
48	164.2300	162.0993	2.13065	.82165	1.29450	.173816	1.750895	2.15468	.009556
50	153.2600	153.6008	-.34081	-.98642	-.20706	.181802	1.915475	-.34501	.000268
51	162.9800	162.5626	.41743	.92019	.25362	.232831	3.141670	.42596	.000670
52	161.3900	163.4186	-2.02858	1.10231	-1.23248	.138034	1.104206	-2.04295	.005418
53	160.0400	159.8087	.23129	.33431	.14052	.216147	2.707558	.23535	.000176
54	155.6000	156.1996	-.59961	-.43353	-.36430	.158529	1.456450	-.60522	.000627
56	149.6700	149.2127	.45729	-1.91999	.27783	.145236	1.222443	.46088	.000305
58	163.9800	163.8113	.16869	1.18586	.10249	.164372	1.565801	.17039	.000053
59	161.8300	161.7693	.06073	.75142	.03690	.161644	1.514257	.06132	.000007
60	154.0300	153.3263	.70372	-1.04483	.42755	.143831	1.198899	.70914	.000709
61	169.7200	171.3687	-1.64867	2.79369	-1.00166	.179864	1.874860	-1.66859	.006136
62	165.0500	166.5504	-1.50041	1.76861	-.91159	.138767	1.115960	-1.51115	.002996
63	153.8800	155.3587	-1.47870	-.61243	-.89840	.141583	1.161718	-1.48972	.003031
64	161.8500	163.8428	-1.99284	1.19258	-1.21077	.180345	1.884900	-2.01706	.009015
65	146.2200	146.3037	-.08369	-2.53888	-.05085	.145501	1.226898	-.08435	.000010
66	162.1000	161.0391	1.06088	.59608	.64455	.138237	1.107462	1.06842	.001486
67	152.7700	154.0043	-1.23434	-.90057	-.74994	.143104	1.186820	-1.24375	.002158
68	160.8600	157.3609	3.49910	-.18646	2.12591	.136711	1.083141	3.52341	.015807
69	157.0900	157.3251	-.23506	-.19409	-.14281	.179059	1.858113	-.23788	.000124
70	162.0300	160.4053	1.62474	.46123	.98713	.137542	1.096344	1.63617	.003450
71	157.7400	157.5030	.23705	-.15624	.14402	.173043	1.735347	.23969	.000117
72	154.2500	156.6199	-2.36987	-.34412	-1.43984	.181607	1.911374	-2.39908	.012933
73	161.3000	159.3129	1.98709	.22883	1.20728	.351994	7.180408	2.08233	.036601
74	159.2800	158.4823	.79767	.05212	.48463	.267990	4.162120	.81939	.003285
75	154.3000	155.9798	-1.67982	-.48029	-1.02059	.133707	1.036061	-1.69098	.003483
76	161.1400	155.9821	5.15785	-.47979	3.13371	.205499	2.447359	5.23953	.078983
77	154.8600	153.7021	1.15793	-.96488	.70351	.129687	.974700	1.16516	.001556
79	152.8800	155.3182	-2.43822	-.62104	-1.48136	.195909	2.224277	-2.47326	.015995
80	155.3800	153.3437	2.03629	-1.04112	1.23717	.341940	6.776078	2.12814	.036077
81	159.1300	159.0230	.10696	.16716	.06499	.192500	2.147539	.10845	.000030
82	154.4700	156.9747	-2.50467	-.26863	-1.52174	.151543	1.330909	-2.52608	.009984
83	151.9400	151.4834	.45663	-1.43691	.27743	.176236	1.799985	.46193	.000452
84	163.5400	165.8307	-2.29073	1.61549	-1.39175	.138981	1.119405	-2.30718	.007005
85	154.9900	155.9705	-.98045	-.48228	-.59568	.194992	2.203489	-.99441	.002561
86	157.5100	157.3475	.16252	-.18932	.09874	.151321	1.327023	.16391	.000042
88	160.0100	160.8922	-.88222	.56483	-.53600	.146049	1.236169	-.88922	.001149
89	158.0700	158.3794	-.30940	.03023	-.18798	.140029	1.136364	-.31166	.000130
90	152.0100	152.0342	-.02417	-1.31972	-.01468	.202560	2.377867	-.02454	.000002
91	156.8300	156.9524	-.12241	-.27337	-.07437	.175217	1.779234	-.12381	.000032
92	153.8100	151.7808	2.02924	-1.37364	1.23288	.208962	2.530547	2.06248	.012654
93	153.9900	155.6336	-1.64359	-.55395	-.99858	.132023	1.010125	-1.65423	.003249
95	154.0800	150.7870	3.29305	-1.58507	2.00072	.143865	1.199462	3.31840	.015527
97	154.2100	155.9849	-1.77487	-.47921	-1.07834	.133035	1.025679	-1.78654	.003848
98	159.9900	162.0411	-2.05109	.80925	-1.24616	.163218	1.543887	-2.07146	.007788
100	151.5000	150.8971	.60286	-1.56163	.36627	.190305	2.098844	.61103	.000921
101	157.9600	159.6807	-1.72073	.30709	-1.04545	.133637	1.034982	-1.73215	.003651
102	160.0300	161.1292	-1.09921	.61525	-.66784	.141746	1.164399	-1.10743	.001679
103	159.9600	159.4746	.48544	.26322	.29494	.252218	3.686641	.49712	.001071

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance
104	156.8400	157.5927	-.75266	-.13716	-.45728	.172300	1.720476	-.76099	.001171
105	156.3300	156.2265	.10350	-.42780	.06288	.214017	2.654445	.10528	.000035
106	163.3900	165.0230	-1.63298	1.44365	-.99213	.175026	1.775344	-1.65166	.005693
107	159.9500	160.7698	-.81984	.53879	-.49810	.134114	1.042387	-.82532	.000835
108	166.0600	167.8873	-1.82730	2.05303	-1.11020	.143472	1.192929	-1.84129	.004755
109	163.4500	164.5680	-1.11803	1.34686	-.67927	.137215	1.091136	-1.12585	.001626
110	160.7200	163.3057	-2.58566	1.07829	-1.57095	.157672	1.440740	-2.60961	.011534
111	158.1700	158.1483	.02165	-.01893	.01316	.143187	1.188196	.02182	.000001
112	155.9500	154.0651	1.88490	-.88764	1.14519	.128740	.960511	1.89651	.004061
113	163.9100	158.4794	5.43060	.05150	3.29942	.192604	2.149858	5.50600	.076618
114	165.1000	166.7756	-1.67557	1.81651	-1.01801	.197108	2.251582	-1.69995	.007649
116	155.4700	155.9455	-.47548	-.48759	-.28888	.173331	1.741127	-.48081	.000473
117	161.1500	163.0605	-1.91048	1.02612	-1.16073	.135323	1.061266	-1.92348	.004616
119	158.1300	158.6851	-.55510	.09526	-.33726	.153471	1.364998	-.55997	.000503
121	150.4000	148.8996	1.50041	-1.98661	.91159	.237617	3.272140	1.53235	.009032
122	152.4900	151.7703	.71967	-1.37585	.43724	.236178	3.232636	.73480	.002052
123	162.4900	163.0198	-.52979	1.01747	-.32188	.181662	1.912517	-.53632	.000647
124	157.3300	160.2366	-2.90663	.42535	-1.76595	.260877	3.944121	-2.98153	.041217
125	163.7100	164.4590	-.74895	1.32365	-.45503	.136935	1.086691	-.75417	.000727
127	160.6300	159.6971	.93289	.31057	.56679	.281970	4.607702	.96110	.005003
128	164.2300	164.6453	-.41527	1.36329	-.25230	.137758	1.099802	-.41820	.000226
129	164.3800	165.7833	-1.40327	1.60540	-.85257	.137932	1.102578	-1.41320	.002589
130	155.5900	152.0450	3.54504	-1.31743	2.15383	.153716	1.369353	3.57624	.020588
131	159.5400	159.5980	-.05801	.28948	-.03525	.141536	1.160942	-.05845	.000005
132	158.9400	158.5318	.40816	.06266	.24798	.239456	3.323008	.41698	.000679
133	152.3500	152.5787	-.22867	-1.20388	-.13893	.198881	2.292269	-.23206	.000145
135	163.3900	162.5896	.80040	.92595	.48629	.155469	1.400772	.80761	.001074
137	164.2300	165.0743	-.84435	1.45457	-.51299	.138866	1.117563	-.85040	.000950
138	153.1900	153.4751	-.28506	-1.01317	-.17319	.132203	1.012891	-.28692	.000098
140	155.2600	155.3344	-.07443	-.61759	-.04522	.140048	1.136659	-.07498	.000008
143	166.2700	167.3867	-1.11674	1.94654	-.67849	.183669	1.955007	-1.13083	.002939
144	157.6900	158.3970	-.70699	.03397	-.42954	.160527	1.493399	-.71377	.000894
145	156.0900	156.7576	-.66756	-.31482	-.40558	.131471	1.001705	-.67184	.000532
146	158.2900	159.2044	-.91441	.20575	-.55556	.155232	1.396505	-.92262	.001397
147	157.8800	156.7199	1.16011	-.32284	.70484	.216592	2.718712	1.18055	.004454
148	158.6800	159.5726	-.89256	.28407	-.54229	.146175	1.238292	-.89966	.001178
150	154.8400	154.5579	.28210	-.78280	.17140	.229591	3.054843	.28770	.000297
151	154.9700	157.3349	-2.36493	-.19198	-1.43684	.144395	1.208324	-2.38327	.008068
153	161.1900	160.4262	.76382	.46568	.46407	.265780	4.093759	.78427	.002960
154	150.9800	150.7824	.19756	-1.58603	.12003	.219544	2.793327	.20113	.000133
155	163.3700	163.9894	-.61938	1.22375	-.37631	.154831	1.389286	-.62491	.000638
156	157.1600	156.8759	.28410	-.28964	.17261	.130447	.986165	.28590	.000095
157	157.7300	157.6703	.05972	-.12064	.03629	.188495	2.059111	.06052	.000009
158	161.0300	162.0818	-1.05179	.81791	-.63902	.152026	1.339404	-1.06084	.001772
159	152.6500	154.1495	-1.49947	-.86969	-.91102	.129442	.971025	-1.50880	.002599
160	159.2100	159.4657	-.25568	.26133	-.15534	.202877	2.385310	-.25962	.000189
161	154.1300	154.6032	-.47324	-.77315	-.28752	.171771	1.709927	-.47845	.000460
162	157.3500	153.4571	3.89290	-1.01699	2.36517	.129298	.968860	3.91707	.017476
163	154.9900	154.6471	.34294	-.76383	.20836	.230999	3.092427	.34983	.000445
164	159.9200	160.0618	-.14175	.38815	-.08612	.175985	1.794867	-.14339	.000043
165	157.3900	156.8937	.49631	-.28586	.30154	.238315	3.291417	.50694	.000994
166	155.1200	150.5726	4.54741	-1.63067	2.76283	.163258	1.544644	4.59259	.038300
167	156.4100	156.2390	.17096	-.42514	.10387	.194429	2.190779	.17338	.000077
168	164.5300	165.8041	-1.27411	1.60983	-.77410	.143694	1.196623	-1.28389	.002319
169	156.7000	151.6810	5.01895	-1.39485	3.04932	.256862	3.823666	5.14424	.118952
170	154.7900	154.7463	.04372	-.74272	.02656	.131231	.998053	.04400	.000002
171	160.8200	159.5953	1.22469	.28891	.74407	.295604	5.064075	1.26550	.009534
172	163.8500	163.4519	.39809	1.10940	.24186	.231167	3.096925	.40610	.000600
173	167.6400	166.4446	1.19539	1.74610	.72627	.140999	1.152159	1.20423	.001964
175	156.2400	156.9668	-.72678	-.27031	-.44156	.159312	1.470866	-.73365	.000931
176	161.5100	157.6456	3.86444	-.12590	2.34788	.164047	1.559608	3.90321	.027932

Case No.	Observed Value	Predictd Value	Residual	Standard Pred. v.	Standard Residual	Std.Err. Pred.Val	Mahalns. Distance	Deleted Residual	Cook's Distance	
177	150.6100	150.6779	-.06787	-1.60828	-.04124	.163246	1.544411	-.06855	.000009	
179	159.0900	158.7805	.30949	.11556	.18804	.132722	1.020863	.31152	.000116	
183	158.0500	158.2375	-.18753	.00004	-.11394	.134718	1.051797	-.18880	.000044	
185	163.1000	159.7032	3.39685	.31186	2.06379	.132528	1.017875	3.41902	.013988	
186	150.1600	150.0869	.07310	-1.73401	.04442	.197902	2.269764	.07418	.000015	
Minimum		146.2200	146.3037	-2.90663	-2.53888	-1.76595	.125526	.913159	-2.98153	.000001
Maximum		169.7200	171.3687	5.43060	2.79369	3.29942	.351994	7.180408	5.50600	.118952
Mean	158.2535	158.2373	.01617	.00000	.00983	.178739	2.000000	.02007	.006788	
Median	158.1300	158.2375	-.14175	.00004	-.08612	.160527	1.493399	-.14339	.001556	