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APPENDICES

APPENDICES CONTENTS

APPENDIX 1

GUIDELINES FOR IDENTIFICATION OF CHILDREN WITH MOTOR DIFFICULTIES FOR THE CLASSROOM TEACHER

(ALL NAMES HAVE BEEN CHANGED)

June 16, 1993

George Smith
Sport Coordinator
Green Valley Primary School
ARMIDALE NSW 2350

Dear George,
Further to our conversation today, I am including the guidelines for 'Clumsy Children' as we discussed. Tentatively, Petra Simpson and myself will be at your school on Wednesday 23rd June 1993, at 9:30 am.

As we discussed, if teachers could use the guidelines, assess the students they believe fit this criteria, we then will observe a normal PE lesson, using a series of stations and Petra and I will set up one station that will include all the screening 'tests' we need. We will compare those students selected by the teachers after the lesson, if that is convenient.

We look forward to seeing you next week.

Yours Sincerely,
Arthur Turnbull
Lecturer - Physical Education

GUIDELINES FOR IDENTIFICATION OF CHILDREN WITH MOTOR DIFFICULTIES FOR THE CLASSROOM TEACHER

Clumsy children are those who experience difficulty in performing both gross and fine motor skill tasks for no apparent reason. They are within the normal range of intelligence, have no obvious physical impairment and do not exhibit abnormal social/behavioural problems. Therefore, when referring children you suspect need special attention, you should not include any children who have any type of disability, learning difficulty or emotional/social problems. Clumsy children are just average or normal children who have only a difficulty with movement, may not be able to participate in physical education classes without exhibiting prominent difficulty.

Clues which may alert the teacher to these children may be combinations of the following characteristics :

Cannot hop properly
Cannot tie shoe laces
Cannot throw a ball with **any** sort of technique
Has ungainly gait or running style
Often falls over or loses balance without clear reason
Awkward head positioning when writing or drawing
Poor jumping style either - jumping upwards or forwards
Often excluded from teams, eg. consistently chosen last by peers

Teachers who observe 2 or more of these characteristics would be justified in looking more closely at the child or referring them to a specialist physical education consultant.

APPENDIX 2

SCREENING BATTERY FOR TESTING IN THE FIELD

(Extracts from various sources - identified on subsequent pages)

The screening test battery for testi ıg in the field (on the school site) consisted of the following items of assessment :

1. Standing Broad Jump (source, Bru ninks 1978)
2. Stationary Hop in 50 centimetre Sc uare (modified and adapted from Hoare 1992)
3. Dynamic Balance - (adapted from Bruininks 1978)
4. Static Balance - (source, Bruininks 1978)
5. Agility Run - (source, Barrow & McGee 1979)
6. Throw and Catch
7. Hand-Eye Dominance
8. Fine Motor Assessment

The protocols and procedures appear on subsequent pages in the order above.

1. Standing Broad Jump (source, Bruininks 1978)

SUBTEST 4 / Item 1SF

Standing Broad Jump

The subject jumps forward as far as possible, starting from a bent-knee position, as shown in Figure 17. The distance of each jump is recorded.

Trials: 3

ADMINISTERING AND RECORDING

Have the subject jump up and down a few times before starting. Then say: **Stand behind this line** (point to starting line) **with your feet spread about as far apart as your shoulders** (demonstrate). **Bend your knees, lean forward, and swing your arms at your sides a few times. When I say go, put your arms back and jump forward as far as you can, letting your arms swing forward, and and on both feet** (demonstrate). **Remember, bend your knees, swing your arms back, and jump as far as you can. When you jump, let your arms swing forward and try to land on both feet. If you lose your balance, try to fall forward. Ready, go.**

Between trials repeat instructions as necessary.

Correct the subject and readminister the trial if the subject shuffles over the starting line before jumping or if the subject jumps up instead of forward.

On the Individual Record Form, record the distance jumped on each trial by noting the number that is nearest the point where the back of the subject's heels land. If one foot lands behind the other, measure to the heel that is nearest the starting line. If the subject loses balance and falls backward, measure to the point where the subject's hands (or other part of the body nearest the starting line) touch the floor, as shown in Figure 18.

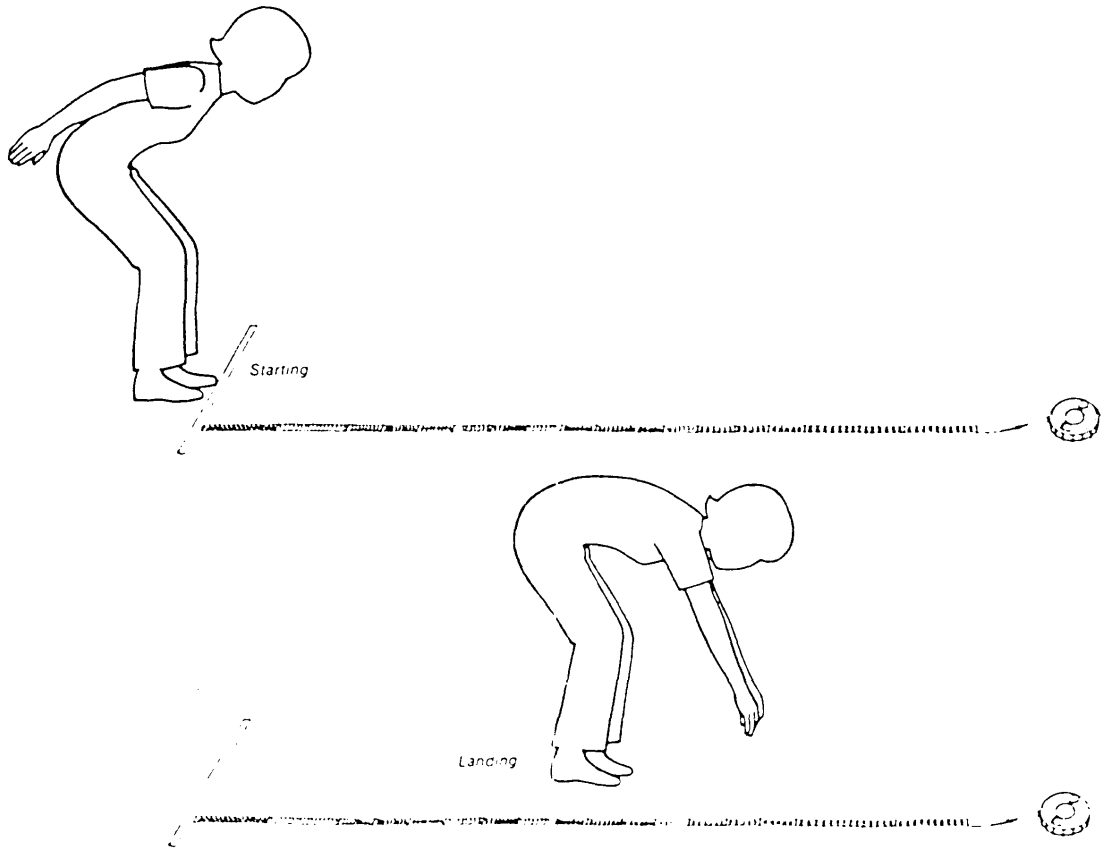


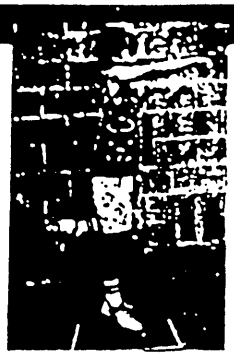
Figure 17 Layout for standing broad jump with subject in starting and landing positions (Subtest 4 Item 1)

2. Stationary Hop in 50 centimetre Square (modified and adapted from Hoare 1992)

Stationary Hop
In this task the child is required to hop continuously on one foot (within a 50 centimetre marked square) as many times as possible to a ceiling of 50 hops (Denckla, 1974). There must be vertical clearance between the child's foot and the ground on each hop. The task is conducted on both the preferred and non-preferred leg providing for a maximum possible score of 100 hops. The trial is concluded if any part of the foot protrudes on or over a line. Give the child a second trial if they score less than 10 on either foot.

STATIONARY HOP

Trunk lean excessive resulting in unstable hopping
Arms stabilise rather than assist upward drive
Limited extension in the joints of the lower limb throughout propulsion
Heavy, flat footed landings
Limited rebound between hops
Height and rhythm of hops is inconsistent



Hoare's scoring system was not adopted here, as children who were showing good controlled technique were stopped at 10 hops for each foot. Particular note of the children's technique was taken at this stage, with direct reference made to Hoare's advice for observational judgements. Assessment was made by the Research Director using expert judgement.

3. Dynamic Balance - (adapted from Bruininks 1978)

SUBTEST 2 / Item 6

Walking Forward Heel-to-Toe on Walking Line

The subject walks forward on the walking line heel-to-toe, with hands on hips, as shown in Figure 8. The subject must make six consecutive steps correctly to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial

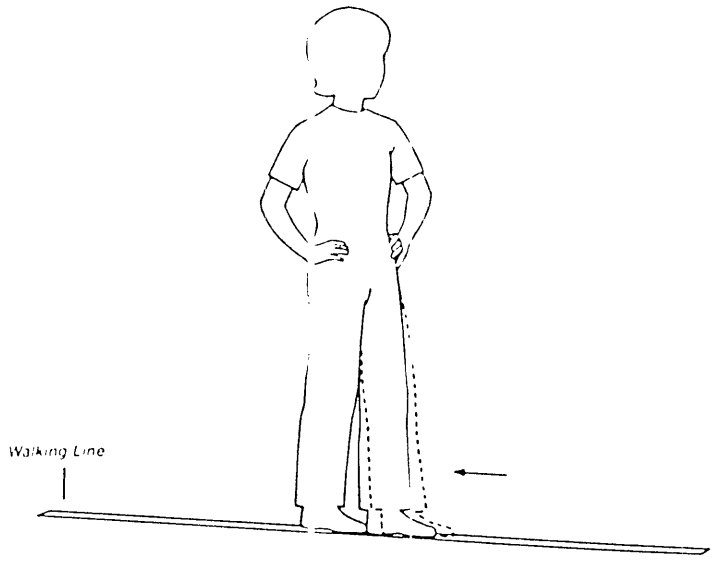


Figure 8 Walking forward heel-to-toe on walking line or balance beam (Subtest 2: Items 6 7).

ADMINISTERING AND RECORDING

Have the subject stand at one end of the walking line. Say: **Place your feet on the line. Place your hands on your hips. When you walk, hit the toe of your back foot with the heel of your front foot** (demonstrate). **Walk to the end of the line. Remember, keep your feet on the line and your hands on your hips as you walk. Ready, begin.**

Stand at one side of the line and count the subject's steps, keeping track of both correct and incorrect steps for six steps. A step is incorrect if the subject:

a. does not touch the heel of the front foot to the toe of the back foot
b. moves the back foot forward to touch the heel of the front foot.

Remind the subject as needed to walk heel-to-toe and to keep hands on hips. After six steps have been taken, tell the subject to stop. If the subject places one or both feet completely off the line before taking six steps, stop the trial and record the number of steps taken on the line.

On the Individual Record Form, record the number of correct and incorrect steps. Use "1" for correct steps and "0" for incorrect steps. For example, 1-1-0-1-1-0 equals a score of 4.

4. Static Balance - (source, Bruininks 1978)

SUBTEST 2 / Item 1

Standing on Preferred Leg on Floor

The subject stands on preferred leg on the walking line, looking at the target, with hands on hips, and with other leg bent so that it is parallel to the floor, as shown in Figure 7. The subject must maintain the position for 10 seconds to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Say: **Place your (right/left*) leg on this line** (point to walking line) **and raise your other leg like this** (demonstrate). **Place your hands on your hips and look at the target** (point to target). **Stand like this until I tell you to stop.**

If necessary, help subject achieve the correct position. Begin timing as soon as position is achieved and remind subject as needed to keep hands on hips and to look at target. Slight swaying is acceptable. Allow only one warning to keep the raised leg parallel to the floor (or above a 45° angle).

After 10 seconds, tell the subject to stop. Stop the trial and record the time before 10 seconds if the subject:

a. drops the raised leg so that it touches the floor
b. drops the raised leg below a 45° angle after one warning, as shown in Figure 7
c. hooks the raised leg behind the supporting leg, as shown in Figure 7
d. shifts the supporting foot out of place.

On the Individual Record Form, record to the nearest second the time that the subject maintains the correct position.

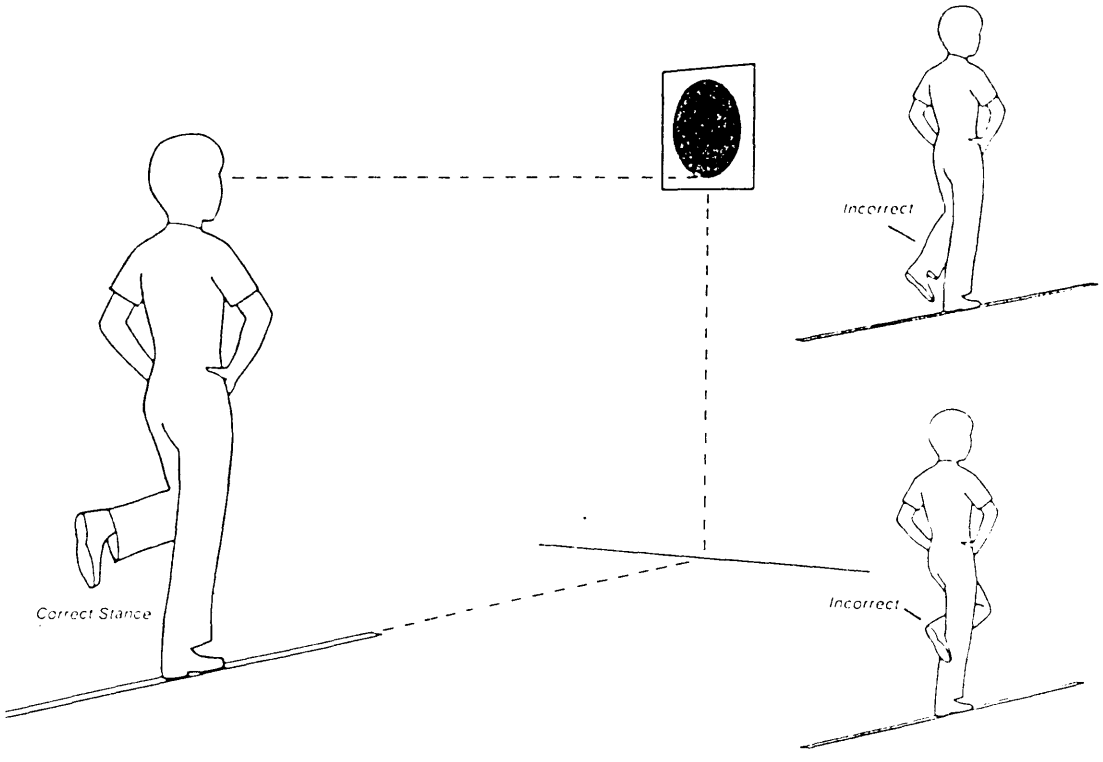


Figure 7 Standing on preferred leg on walking line or balance beam (Subtest 2 Items 1,2,3)

5. Agility Run - (source, Barrow & McGee 1979)

Item Number IV—Shuttle Run (Fig. 8-1 D)

Purpose. To measure speed and agility.

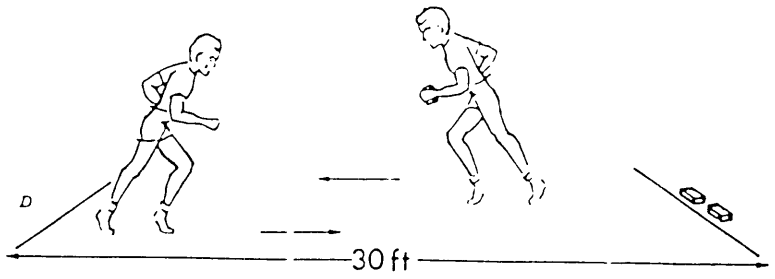
Facilities and Equipment. Two lines parallel to each other are placed on the floor 30 feet apart. Since the student must overrun both of these lines, it is necessary to have several feet more of floor space at either end. Two blocks of wood, 2 by 2 by 4 inches and a stopwatch are needed.

Procedures. The student stands at one of the lines with the 2 blocks at the other line. On the signal to start, the student runs to the blocks, takes one, and returns to the starting line, and *places* the block behind that line. He/she then returns to the second block, which is carried across the starting line on the way back. Two students can run at the same time if 2 timers are available, or if 1 test administrator has a split-second timer, and of course, if there are 2 sets of blocks. Two trials are permitted. If the students start first at one line and then at the other, it is not necessary to return the blocks after each race. Sneakers should be worn or the students may run barefooted.

Instructions. On the signal to "Go," run as fast as you can to the next line and pick up a block. You should return the block over the second line where you place it on the floor. Do not throw it. Return for the second block, and this time you may run across the starting line as fast as you can without placing the blocks on the floor.

Scoring. The score is the elapsed time recorded in seconds and tenths of seconds for the better of 2 trials.

Testing Personnel. One trained tester can administer this test and time and record the score. If he has a split-second timer, he may have 2 students running at the same time. If 2 regular stopwatches are available, 2 timers can be used.



6. Throw and Catch

The children were asked to throw and catch a soft medium-sized ball from a close distance to the research director, who ascertained capability at that level. If satisfactory, a tennis ball was then used over ever increasing distances, using both underarm and overarm techniques, until an assessment of throwing and catching skill was made. Children were stopped at a point where they were considered satisfactory or above for an overarm throw at a distance commensurate with their physique. Children not achieving an appropriate level of technique at points leading up to the overarm distance throw were noted. The assessments were made arbitrarily by the Research Director, using expert observational judgement.

7. Hand-Eye Dominance

A mock telescope/kaleidoscope is placed exactly in the middle of the table in front of the child. Their hands should be on their thighs, symmetrically placed, before asking them to pick up the telescope. They are asked to lift the telescope/kaleidoscope to one eye and look at a distant object or mark or the pattern on the kaleidoscope. Note which hand they lift the telescope/kaleidoscope with and which eye is used - repeat twice. Check handedness by asking them to show you which hand they write with.

Recording - if they use both Left hand and Left eye or Right hand and Right eye, the answer is NO to cross dominance. If they have Left hand and Right eye or Right hand and Left eye they are YES and this should be indicated on the recording sheet.

8. Fine Motor Assessment

Children were asked to copy a circle and or a triangle, then they were asked to write their name. The program director used expert judgement to subjectively assess their fine motor ability, in particular looking at:

- Grip on the pencil
- Sitting posture while writing/drawing
- Accuracy of shape and size in copying
- General neatness and control in letters, considering the child's age

Any unusual or very poor attempts regarding any one of the above four items was noted, as well as consistent below average/normal attempts across all four.

APPENDIX 3

INITIAL LETTER TO SCHOOLS

(all names have been changed)

June 1, 1993

Mr Ivan Jones
Principal
Green Valley Primary School
ARMIDALE NSW 2350

Dear Mr. Jones,
As Research Team Leader in Hea th and Physical Education I wish to request your permission to either refer or screen students in the age range of 6-8 years, first and second class.

We are conducting a study of **normal** children who appear to lack motor co-ordination (sometimes labelled clumsy). The children who fit our study criteria would be assessed by non-invasive testing methods, for an ongoing research project. After initial identification of children the program would be conducted outside school hours, with parental approval and participation. Any extensive testing would take place at the Newling campus of UNE.

If your permission is granted to access these children, then either your Physical Education Specialist or class teachers in grades 1 or 2 can refer children to us, using a set of guidelines we will provide. We will then come into the school and screen them on-site by viewing a Physical Education Lesson.

As a follow-up to this study we anticipate running a remedial program to benefit those students identified as most in need. This would of course be of enormous benefit to these individuals in their learning and development of physical skills and has considerable spin-off in the development of self-esteem.

Your support of this worthwhile project would be greatly appreciated. If you have any further questions please don't hesitate to telephone me on 734 368, or Petra Simpson (Associate Lecturer) on 734 233.

Yours Sincerely
Arthur Turnbull
Lecturer - Physical Education

APPENDIX 4

LETTER TO PARENTS FOR PERMISSION TO SCREEN THEIR CHILDREN

(all names have been changed)

June 20, 1993

To the Parents/Caregivers of _____ _____Class _____

Following an initial screening of your child at Green Valley Primary School today, we are writing to you to request your permission for further testing of your child.

We are conducting a study at the University of New England on children with motor development needs, and your child may be eligible for our program. We require that testing of fine and gross motor skills be implemented to determine your child's eligibility. If your child is accepted for this program, he or she will gain important one to one attention in their development of physical skills which will be invaluable in all aspects of your child's education.

The testing to be carried out is non invasive, and if you have any concerns about this testing criteria we would be happy to discuss them with you.

We anticipate carrying out testing at the school on **Tuesday June 29th, 1993** and we would appreciate your prompt reply to the permission request below no later than **Monday June 28th**. We appreciate your cooperation.

Sincerely,

Arthur Turnbull
Lecturer
Physical Education Area
Phone 73 4368

Petra Simpson
Associate Lecturer

I hereby give my permission for my son/daughter _____
to be tested at Green Valley Primary School on Tuesday 29th June, 1993.

Signed_____ _____ Date:_____

APPENDIX 5

LETTER TO PARENTS INVITING CHILD TO JOIN THE REMEDIAL PROGRAM

(all names have been changed)

June 28, 1993

To the Parents of

Armidale NSW 2350

Following further testing at Green Valley Primary School, your child has been identified as being eligible for our special UNE project. We are writing to request your commitment for your child in this program.

The special program will be conducted by Physical Education staff and students at the Newling Campus of UNE commencing in late July. Children will be required to attend on Tuesdays and Thursdays between the hours of 4:15 - 5:15 pm and transport will be the responsibility of the parent/caregiver. Your child will receive an individually designed program of instruction, on a one-to-one teacher/student ratio basis, to improve both fine and gross motor skills. More extensive diagnostic testing will be carried out with the children for a number of related areas.

Would you please contact the Physical Education Staff at UNE to enrol your child in this very worthwhile project. Please phone **73 4368 or 734233** .

Sincerely,

Arthur Turnbull
Lecturer
Physical Education Area

Petra Simpson
Associate Lecturer

APPENDIX 6

Guidelines to Instructors for Reporting

(Extract from STME 392 Movement Studies 2 - Unit outline for students)

STME 392 Semester 2, 1993

Assessment

This report comprises **15%** of your final grade and is **Due on Thursday 11th November.**

A professionally presented report on your 'special student' and the program you have implemented.

A. Include a copy of your lesson plans, student profile (see attached sheet for the areas you might include in profiling the child - all categories on the sheet will not necessarily apply to your child or the program you designed), homework cards and an evaluation of your special student including evaluation of the progress you and your partner made over the semester. This is targeted for parents and possibly the schools and should be separate from part B (so start a new page!). If you prepare your report in the Newling MacLab, please indicate which file so we can access your report - for copying purposes.

B. Please include a **short** general 'response' to the clinic setting. What did you gain from the experience, what did you think was positive, negative and in what way the clinic could be improved from your point of view
If you think it appropriate, include constructive criticisms from the point of view of your 'special student'.

This report should be professionally presented, in an appropriate form to go to parents and teachers. No report should exceed 1500 words + attachments (eg. lesson plans).

In your final report you may use the following categories of assessment to comment on your child's progress:

1. Balance - Static, Dynamic

2. Locomotion - Walking, Running, Jumping, Hopping, Step-Skipping

3. Hand-Eye Coordination - Throwing, Catching, Bouncing, Kicking, Striking or Batting

4. Fine Motor - Pencil work, Manual dexterity

5. Rhythm - Smoothness of movements, Movement to music

6. Social Interaction/Response to the Program - Attention, Effort/Cooperation, Temperament, Interaction with others

7. Other Categories

Adapted from Smith and Larkin (1988)

APPENDIX 7

PROTOCOLS FOR ADMINISTERING THE DIAGNOSTIC PRE & POST TEST

The screening test battery for testing in the field (on the school site) consisted of the following items of assessment :

1. Standing Broad Jump (source, Bruininks 1978) - as for Appendix 2
2. Stationary Hop in 50 centimetre Square (source, Hoare 1992)
3. Dynamic Balance (source, Bruininks 1978) - as for Appendix 2
4. Static Balance (source, Bruininks 1978) - as for Appendix 2
5. Agility Run (source, Barrow & McGee 1979) - as for Appendix 2
6. Throw and Catch (modified and adapted from - Hoare 1992; Bruininks 1978)
7. Hand-Eye Dominance - as for Appendix 2
8. Placing Dots in Circles (source, Bruininks 1978)

Where <u>different</u> from Appendix 2, the protocols and procedures appear on subsequent pages in the above order.

2. Stationary Hop in 50 centimetre Square (source, Hoare 1992)

Stationary Hop
In this task the child is required to hop continuously on one foot (within a 50 centimetre marked square) as many times as possible to a ceiling of 50 hops (Denckla, 1974). There must be vertical clearance between the child's foot and the ground on each hop. The task is conducted on both the preferred and non-preferred leg providing for a maximum possible score of 100 hops. The trial is concluded if any part of the foot protrudes on or over a line. Give the child a second trial if they score less than 10 on either foot.

STATIONARY HOP

Trunk lean excessive resulting in unstable hopping
Arms stabilise rather than assist upward drive
Limited extension in the joints of the lower limb throughout propulsion
Heavy, flat footed landings
Limited rebound between hops
Height and rhythm of hops is inconsistent

6. Throw and Catch (modified and adapted from - Hoare 1992; Bruininks 1978)

CATCH

Difficulties tracking the path of the bal
Inability to keep eyes focused on the ball
Unable to position the body correctly to time the interception
Hands are not moved in response to the position of the ball
Closes eyes or turns head as ball approaches
Ball trapped to the chest or body
Weight not transferred on follow through

Catch
The child stands behind a line three metres from the tester who throws a tennis ball at a height between the child's waist and shoulders (as per Bruininks, 1978). Each child is given 10 trials catching with both hands, 10 with the preferred and 10 with the non-preferred hand. The maximum possible score is 30 catches. The catch is only considered successful if the child catches it cleanly and does not trap the ball to their chest or body.

SUBTEST 5 / Item 3SF

Catching a Tossed Ball with Both Hands

The subject stands on the standing mat and, with both hands, catches a tennis ball tossed underhand from a distance of 10 feet (3 meters), as shown in Figure 22. The number of correct catches is recorded.

Trials: 1 practice, 5 recorded

ADMINISTERING AND RECORDING

Say: **Stand on the mat and catch this ball with both hands when I throw it to you.** Give the subject one practice trial. Stand behind the strip of masking tape and slowly toss the ball underhand in a slight arc so that it comes down between the subject's shoulders and waist. Then say: **Catch the ball with both hands each time I threw it to you.**

Count the number of correct catches made in five trials. A catch is incorrect if the subject:

a. misses the ball or traps it against the body, as shown in Figure 24
b. steps off the mat
c. catches the ball with one hand.

If the subject misses the ball because it is thrown above the shoulders, below the knees, or outside the subject's reach, readminister that trial. Between trials, repeat instructions as necessary.

On the Individual Record Form, record the number of correct catches.

The Bruininks protocol was adapted to conduct the test item. However, scoring was simplified to a rating of unsatisfactory, borderline and satisfactory, based on five trials. The mat was not used as throwing was also assessed. Assessment of catching was made using a combination of Hoare's and Bruininks' recommendations for evaluation, as an aid to judgement and scoring. Assessment of underarm throwing was made on smoothness of action, appropriateness of the velocity, accuracy and body segment assistance to the throw, e.g. opposing leg action.

8. Placing Dots in Circles (source, Bruininks 1978)

SUBTEST 8 / Item 7SF

Making Dots in Circles with Preferred Hand

The subject makes a pencil dot inside each of a series of circles. The number of circles dotted correctly in 15 seconds is recorded.

Trials: 1 practice, 1 recorded

ADMINISTERING AND RECORDING

Clip the Student Booklet to the clipboard and have red pencils ready to use. Say: **When I say go, take the red pencil in your (right/left) hand and make one dot in each circle as fast as you can.** Demonstrate by tapping with the eraser end of the pencil in a left-to-right progression in the practice circles. Then say: **Now you try it here** (point to practice circles). Have the subject make one dot in each of the practice circles. It is not necessary for the subject to make dots from left to right. Then say: **Make one dot in each of these circles** (point to circles below line). **Put a dot in as many circles as you can as fast as you can. Ready, go!**

Begin timing when the subject touches the pencil to the paper. After 15 seconds, tell the subject to stop.

In the Student Booklet, record the number of circles dotted correctly. Do not count circles without dots or circles with two dots. Transfer the number to the Individual Record Form.

APPENDIX 8

GYMNASIUM CIRC UIT PLAN FOR ADMINISTERING

THE DIAGN OSTIC PRE & POST TEST

HOPPING SQUARE (RED)

STEPS

DOTS IN CIRCLE (RED) *WEST CORRIDOR* **CATCH & THROW (RED)**

DOORWAY *DOORWAY*

<<<<<<<<< SHUTTLE RUN (RED) >>>>>>>>>>>>>>

DOMINANCE (RED)

GYMNASIUM

STORE ROOM **STATIC BALANCE (RED)** **DYNAMIC BALANCE (RED)** **BROAD JUMP (RED)** **BROAD JUMP (BLUE)** **DYNAMIC BALANCE (BLUE)** *CHANGE ROOM* **STATIC BALANCE (BLUE)**

<<<<<<<<< SHUTTLE RUN (BLUE) >>>>>>>>>>>>>>

DOORWAY *DOORWAY*

DOTS IN CIRCLE (BLUE) *DOOR WAY* **HOPPING SQUARE (BLUE)** *DOOR WAY* **CATCH & THROW (BLUE)** *LABORATORY* **DOMINANCE (BLUE)**

APPENDIX 9

RECORDING SHEET FOR DIAGNOSTIC PRE & POST TEST

SCREENING TEST RECORD

CHILD : TESTER :

Tick - PRE-TEST POST-TEST

ITEM	(CIRCLE SCORE/CATEGORY)
SHUTTLE RUN	Secs ....
CROSS DOMINANCE	NO YES - CHILD IS left/right EYED AND left/right HANDED
DYNAMIC BALANCE	No. of STEPS = ... WITHOUT FALTERING
STATIC BALANCE	SECS = ...
THROW AND CATCH	TECHNIQUE IS : (circle) SATISFACTORY BORDERLINE UNSATISFACTORY
STANDING BROAD JUMP	cm. = ...
DOTS AND CIRCLES	Number .....
HOPPING IN SQUARE	RIGHT = 27+ 26 25 24 23 22 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LEFT = 27+ 26 25 24 23 22 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
RATING SCORE (coordinator only)	NUMBER OF ITEMS RATED AS : SATISFACTORY BORDERLINE UNSATISFACTORY

APPENDIX 10

SAMPLE SKILL PROFILE DERIVED FROM PRE TEST

1ST ATTEMPT PROFILE

Ann

APPENDIX 11

LESSON PLAN PRO FORMA

(Adapted from Smith and Larkin, 1988)

STME 392 CLINIC SAMPLE LESSON PLAN

Lesson No._____

Name:_____ Date:_____Time:_____

Student's Name_____

Evaluation of Lesson No._____ An in-depth report of your student's performance in the last lesson. This will lead to your general aim for this lesson.

_____
_____
_____
_____
_____

GeneralAim:_____
_____
_____
_____

Equipment:_____
_____
_____
_____

Lesson Plan

Warm up: - If you are leading, please note your warmup activities. 10 minutes approximately.

_____
_____
_____
_____
_____
_____
_____
_____

Developmental

Specific Aim:_____

Activity(s)_____

Time: (approx 30 mins)_____

CONCLUDING GAME:_____

HOMEWORK:_____

Use Index Cards for your student's homework assignment to be given to your student at the end of your lesson.

AI'PENDIX 12

Intercorrelation Matrix for Subjects (cases)

PEARSON CORRELATION MATRIX

	Ja COL(1)	Rs COL(2)	Gm COL(3)	L COL(4)	Bc COL(5)
COL(1)	1.000				
COL(2)	0.981	1.000			
COL(3)	0.993	0.985	1.000		
COL(4)	0.951	0.973	0.972	1.000	
COL(5)	0.958	0.972	0.975	0.965	1.000
COL(6)	0.953	0.935	0.951	0.890	0.951
COL(7)	0.939	0.913	0.937	0.869	0.948
COL(8)	0.980	0.978	0.982	0.946	0.984
COL(9)	0.950	0.958	0.970	0.943	0.984
COL(10)	0.973	0.983	0.979	0.957	0.975
COL(11)	0.964	0.963	0.974	0.938	0.975
COL(12)	0.961	0.953	0.962	0.901	0.961
COL(13)	0.974	0.990	0.979	0.975	0.952
COL(14)	0.950	0.943	0.954	0.907	0.964
COL(15)	0.986	0.971	0.989	0.956	0.959
COL(16)	0.970	0.959	0.966	0.918	0.954
COL(17)	0.985	0.979	0.987	0.949	0.950

	De COL(6)	Da COL(7)	I COL(8)	Rb COL(9)	Bn COL(10)
COL(6)	1.000				
COL(7)	0.949	1.000			
COL(8)	0.973	0.972	1.000		
COL(9)	0.959	0.943	0.980	1.000	
COL(10)	0.957	0.933	0.987	0.973	1.000
COL(11)	0.971	0.965	0.986	0.977	0.980
COL(12)	0.945	0.981	0.980	0.962	0.965
COL(13)	0.925	0.900	0.960	0.937	0.973
COL(14)	0.923	0.957	0.971	0.963	0.959
COL(15)	0.950	0.925	0.973	0.959	0.966
COL(16)	0.934	0.963	0.977	0.942	0.962
COL(17)	0.950	0.919	0.972	0.962	0.978

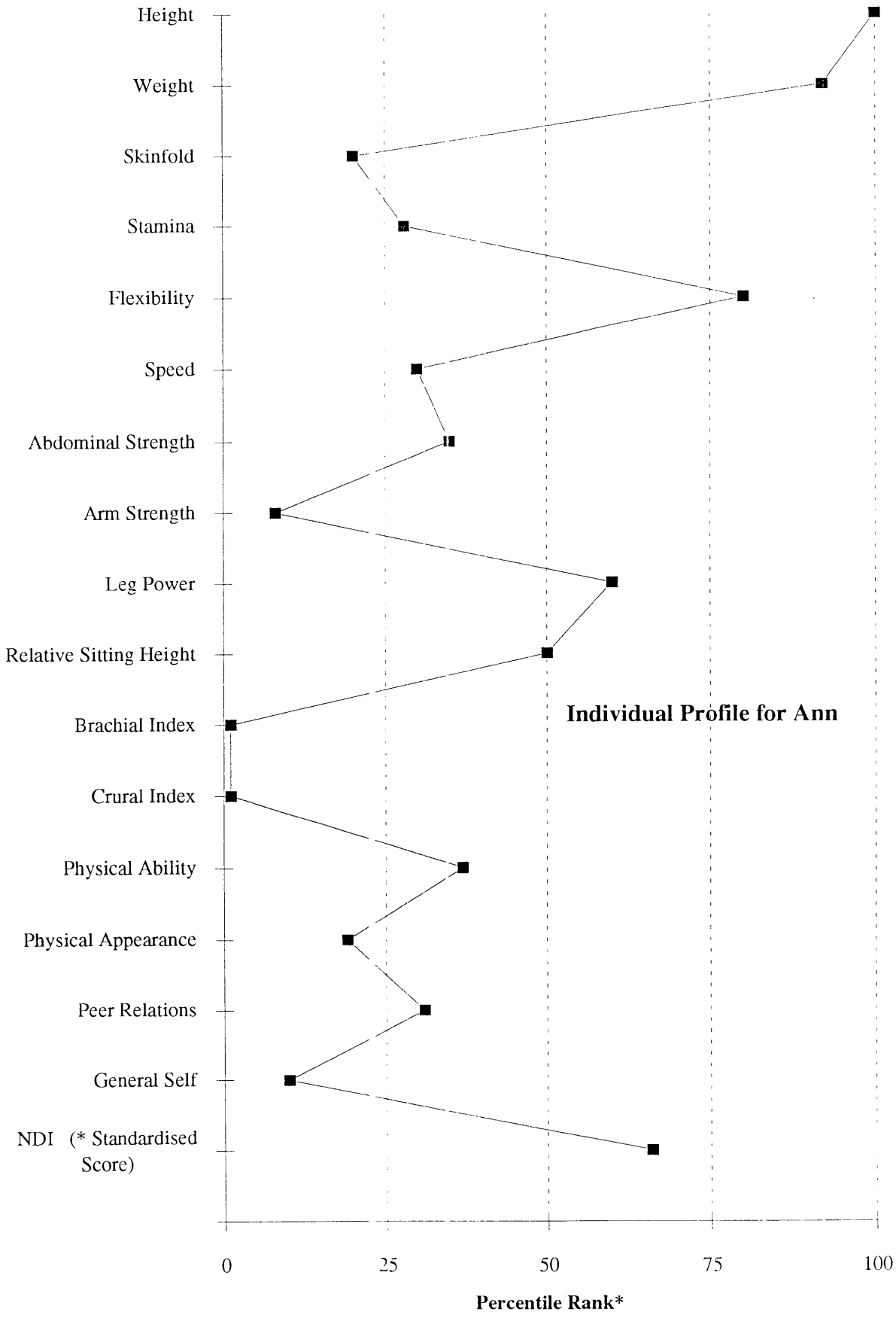
	Ji COL(11)	A COL(12)	Gt COL(13)	Ra COL(14)	E COL(15)
COL(11)	1.000				
COL(12)	0.971	1.000			
COL(13)	0.962	0.927	1.000		
COL(14)	0.948	0.985	0.909	1.000	
COL(15)	0.962	0.947	0.971	0.948	1.000
COL(16)	0.967	0.982	0.949	0.974	0.966
COL(17)	0.969	0.955	0.975	0.942	0.986

	Cl COL(16)	Co COL(17)
COL(16)	1.000	
COL(17)	0.959	1.000

NUMBER OF OBSERVATIONS: 17

AI'PENDIX 13

INDIVIDUAL P ROFILES OF THE CHILDREN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Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Ann
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Brian
0
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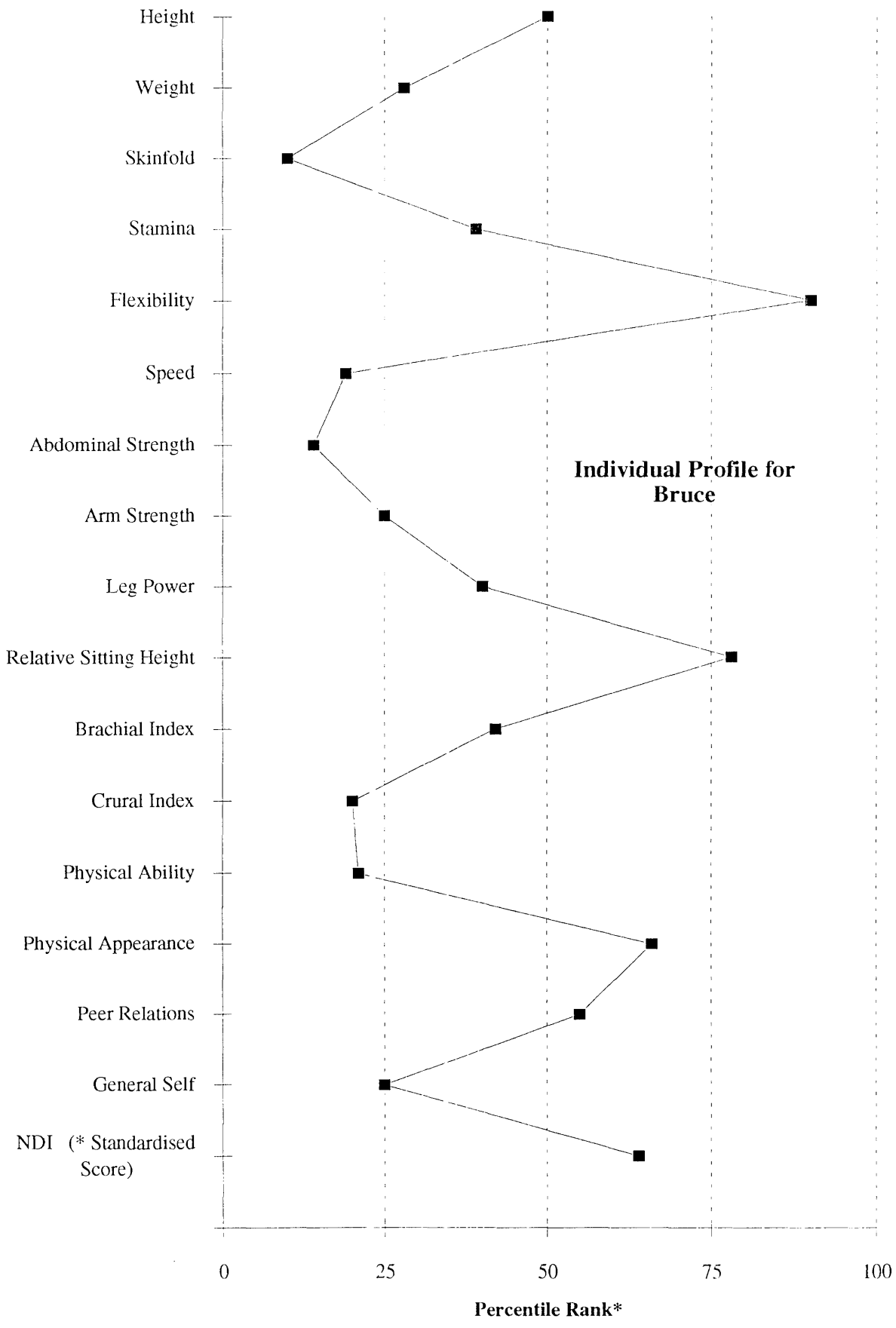
75
100
Percentile Rank*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Leg Power
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Brachial Index
Crural Index
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Physical Appearance
Peer Relations
General Self
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Individual Profile for Bruce
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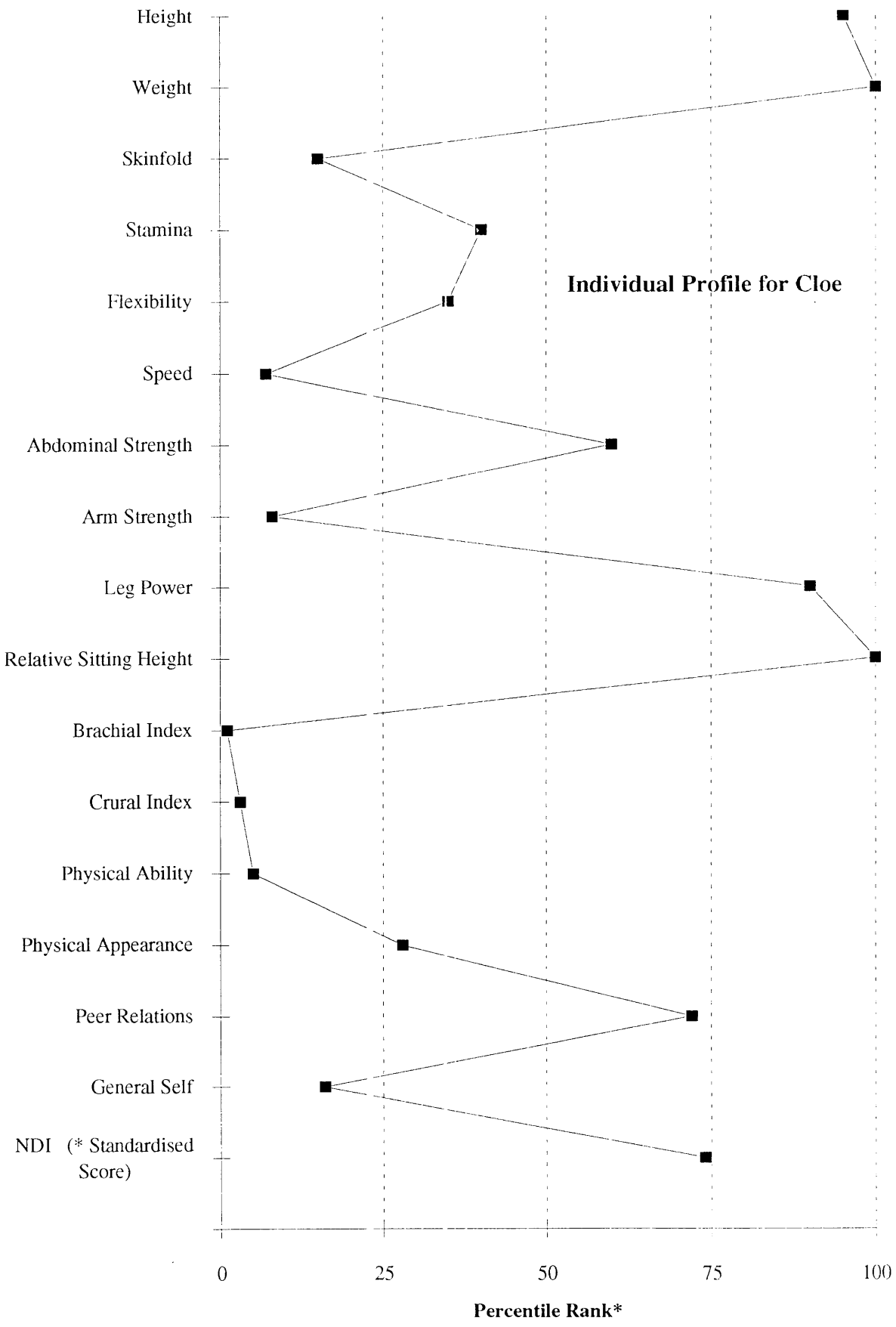
75
100
Percentile Rank*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Weight
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Stamina
Flexibility
Speed
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Arm Strength
Leg Power
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Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
0
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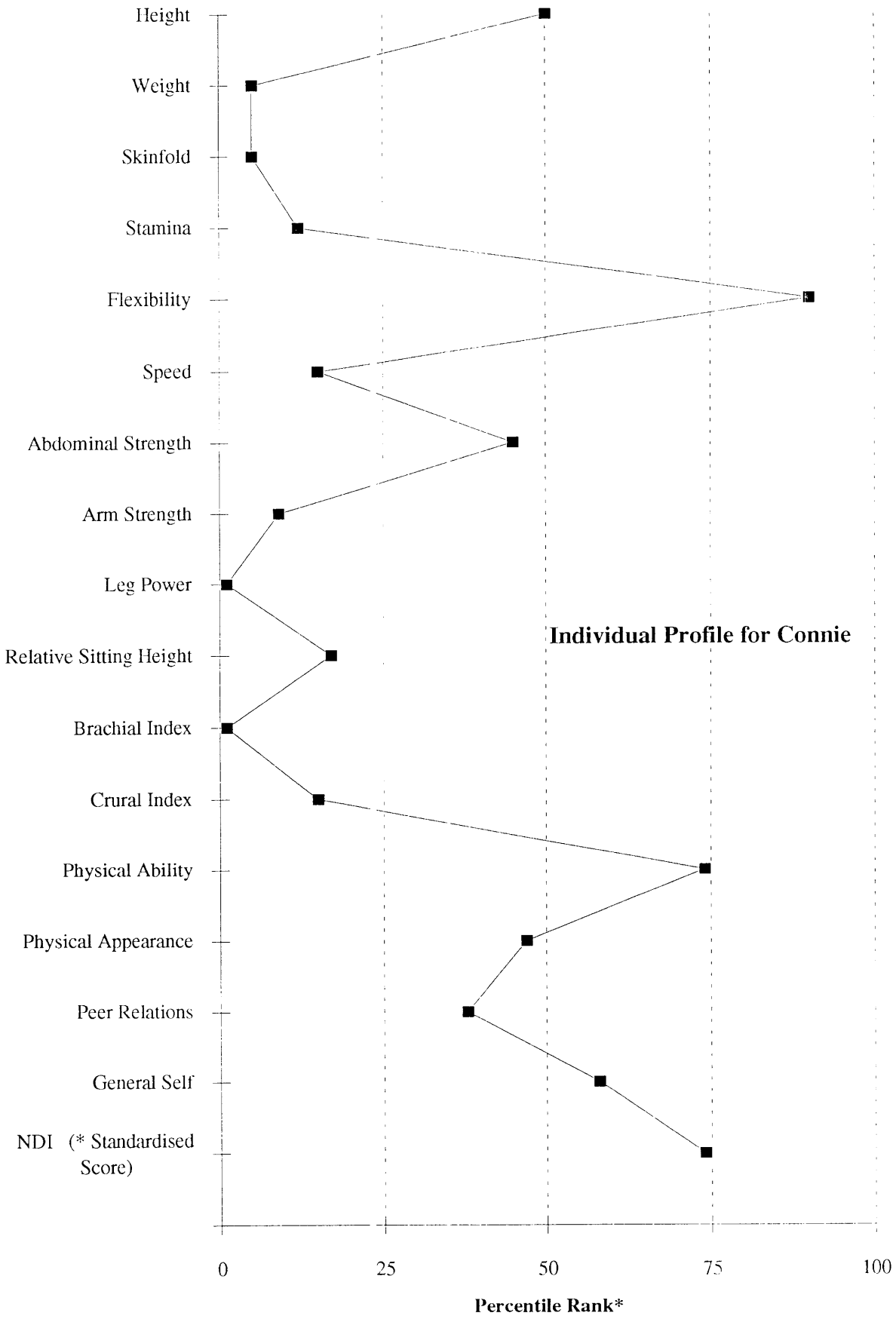
75
100
Percentile Rank*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Physical Appearance
Peer Relations
General Self
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Individual Profile for Connie
0
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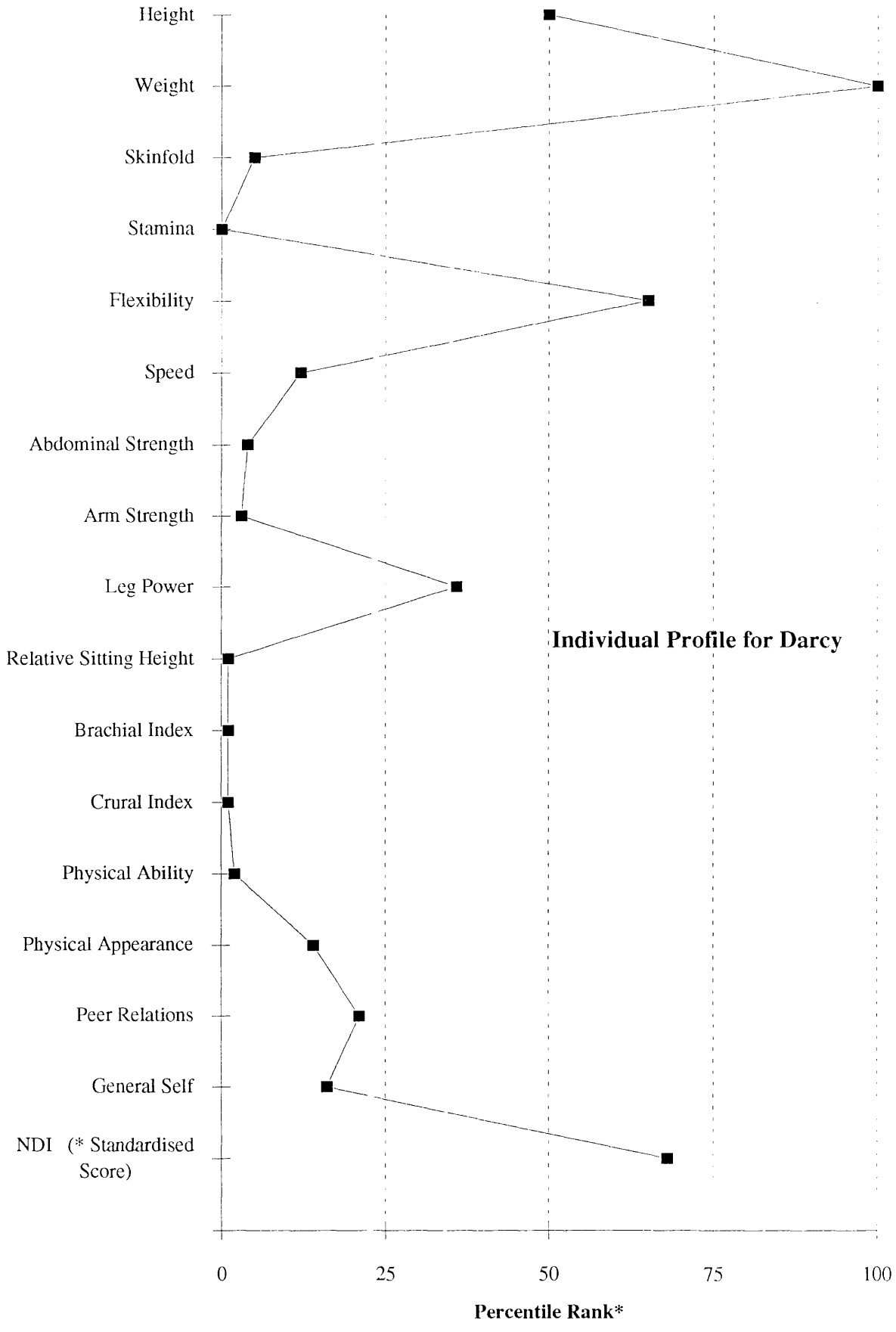
50
75
100
Percentile Rank*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Crural Index
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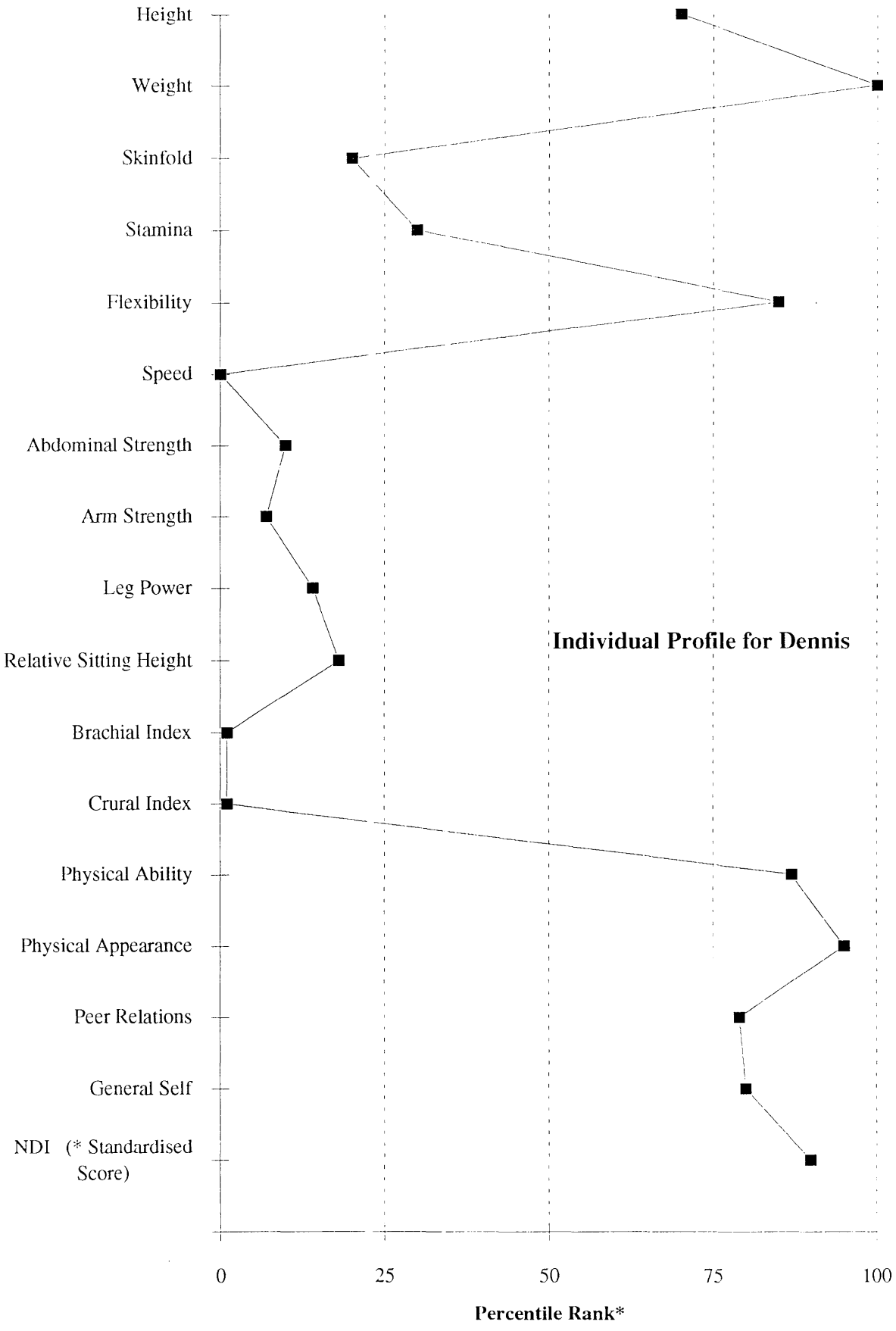
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Darcy
0
25
50
75
100
Percentile Rank*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Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Dennis
0
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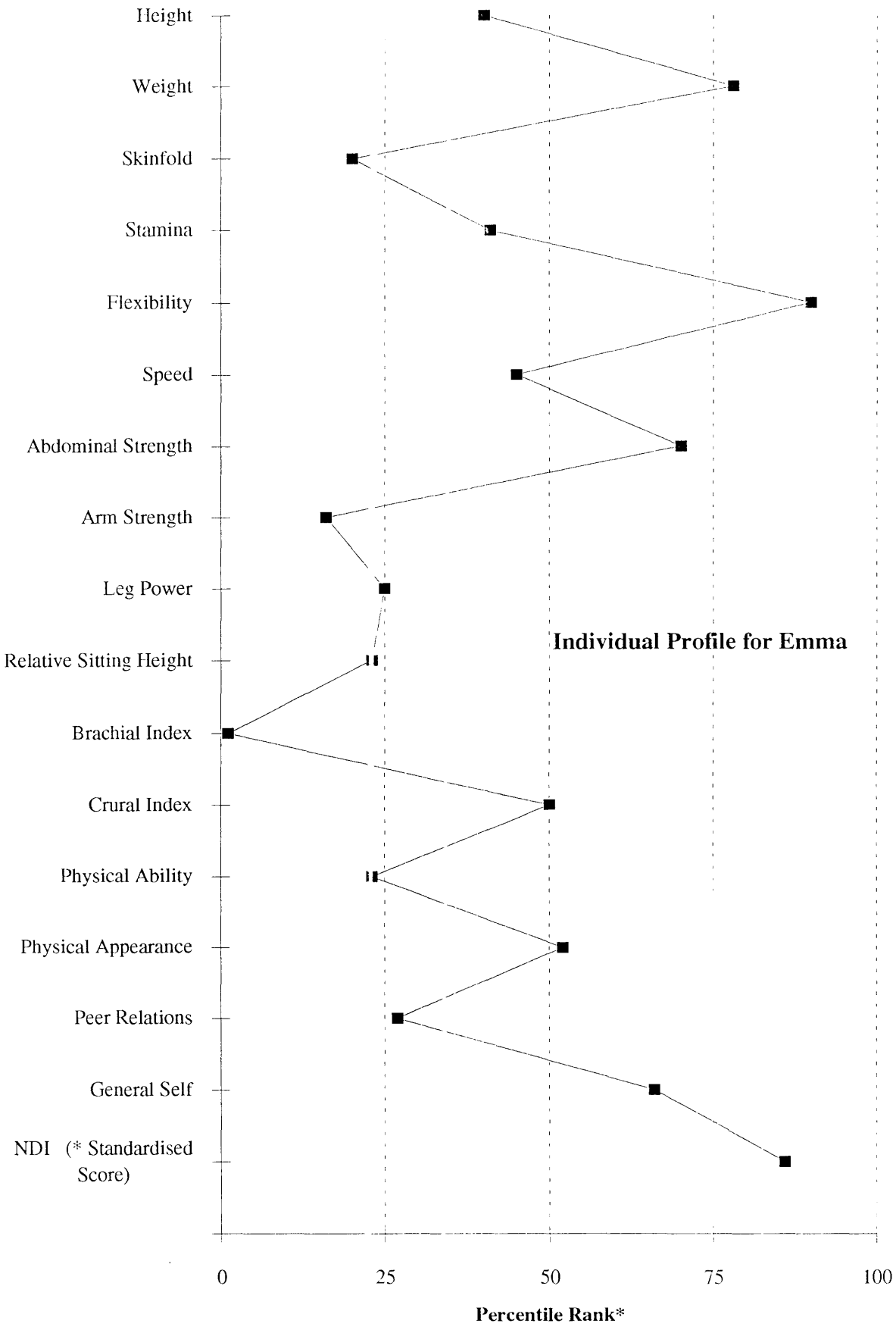
75
100
Percentile Rank*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Stamina
Flexibility
Speed
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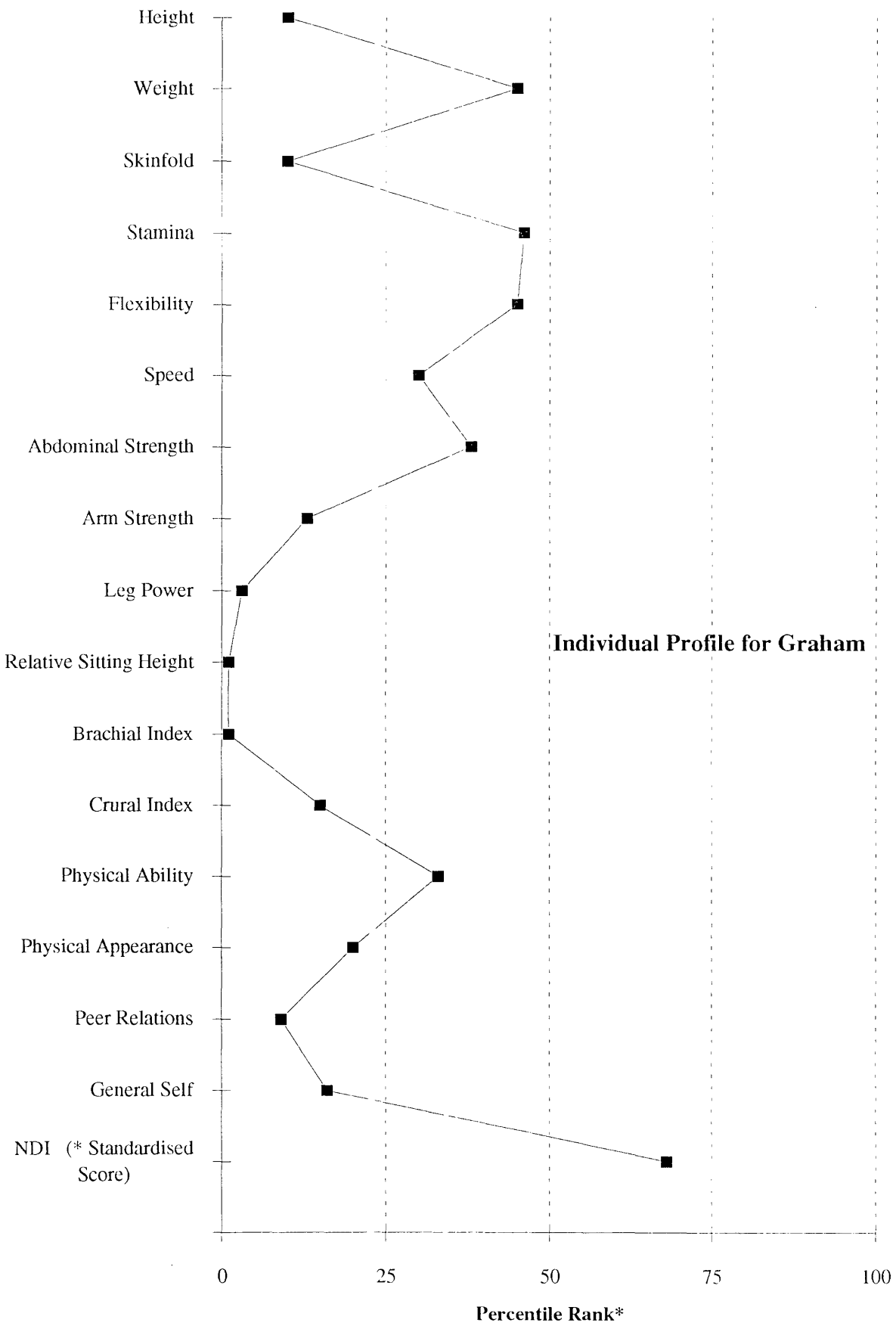
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Emma
0
25
50
75
100
Percentile Rank*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Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Graham
0
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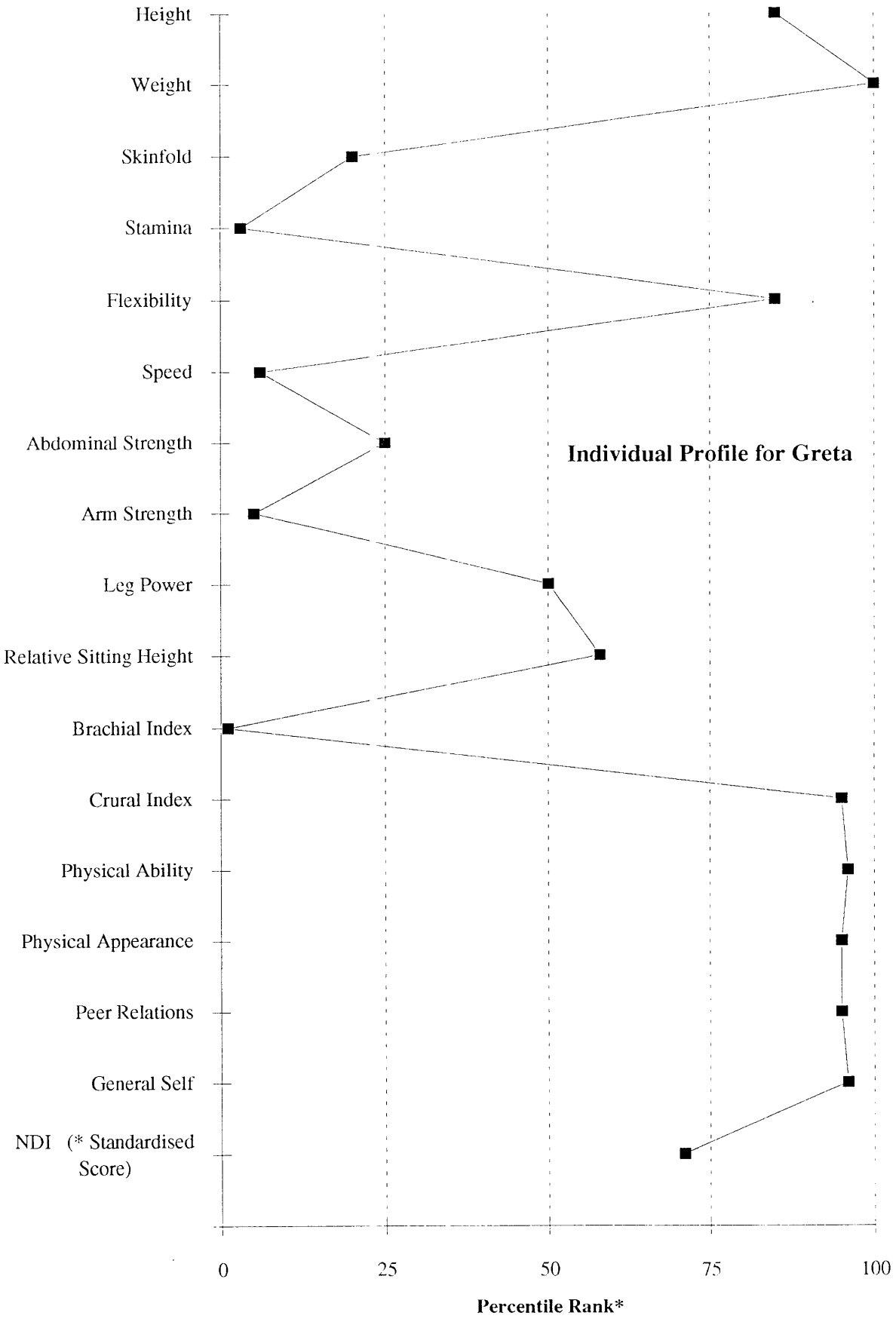
50
75
100
Percentile Rank*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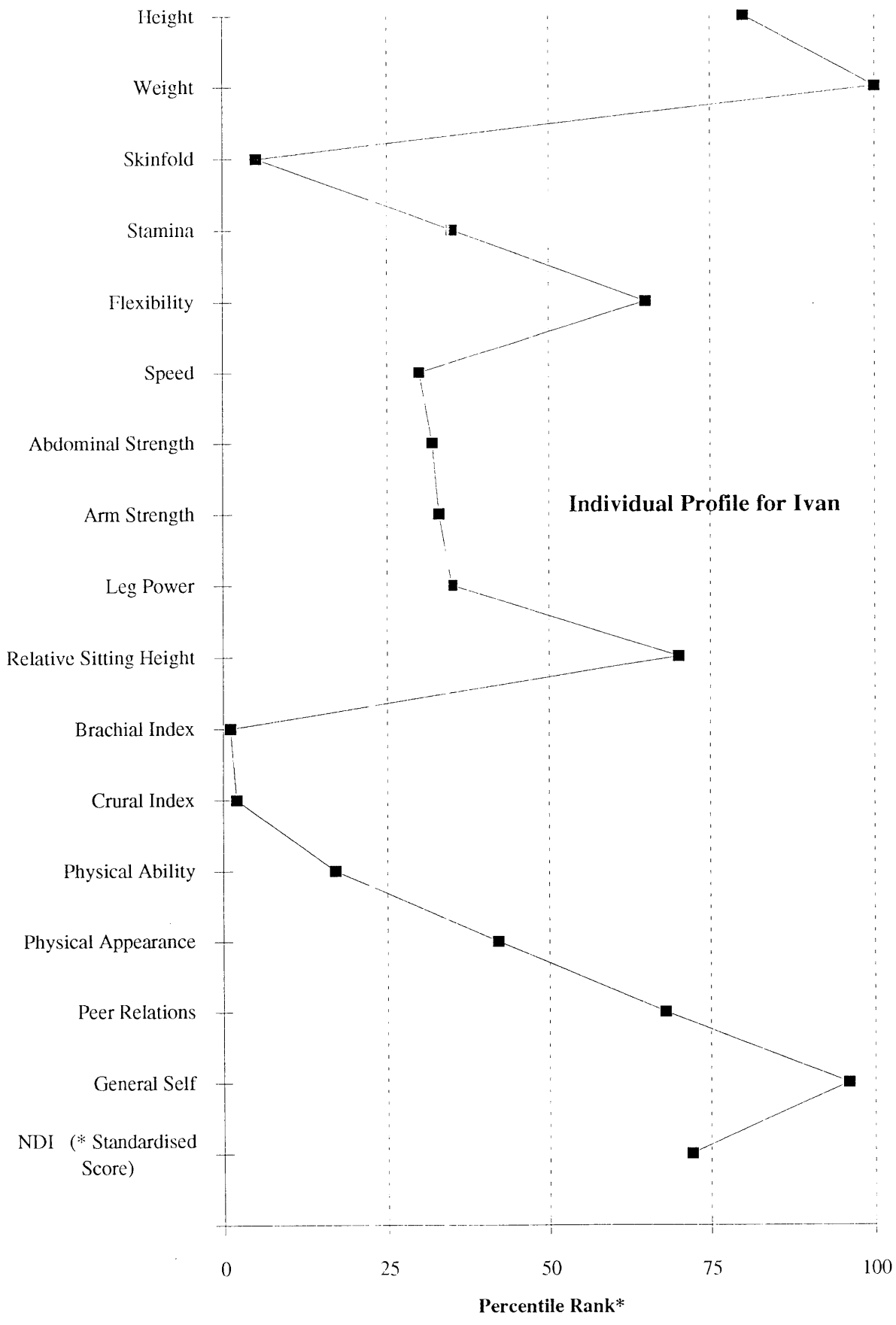
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Greta
0
25
50
75
100
Percentile Rank*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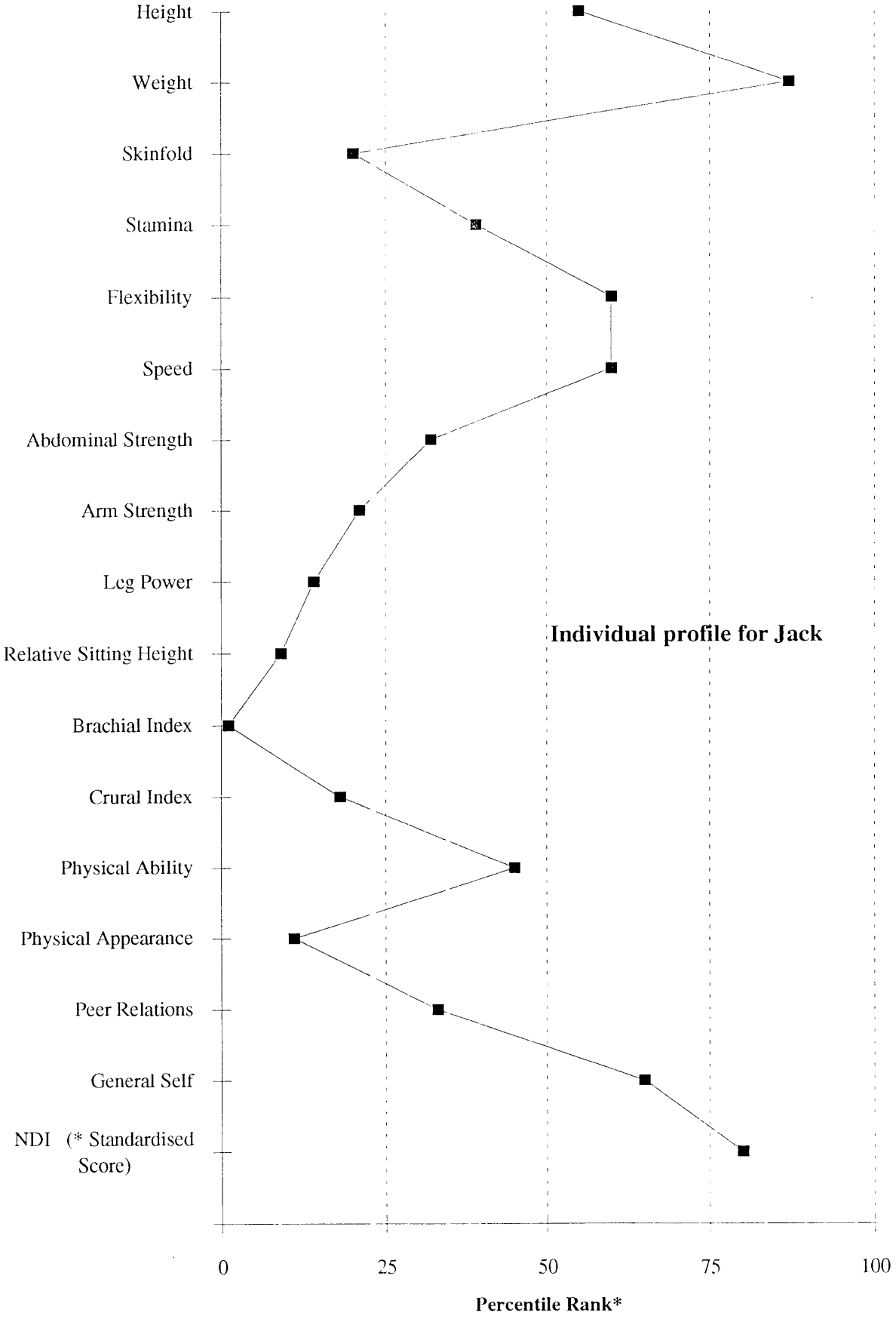
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Ivan
0
25
50
75
100
Percentile Rank*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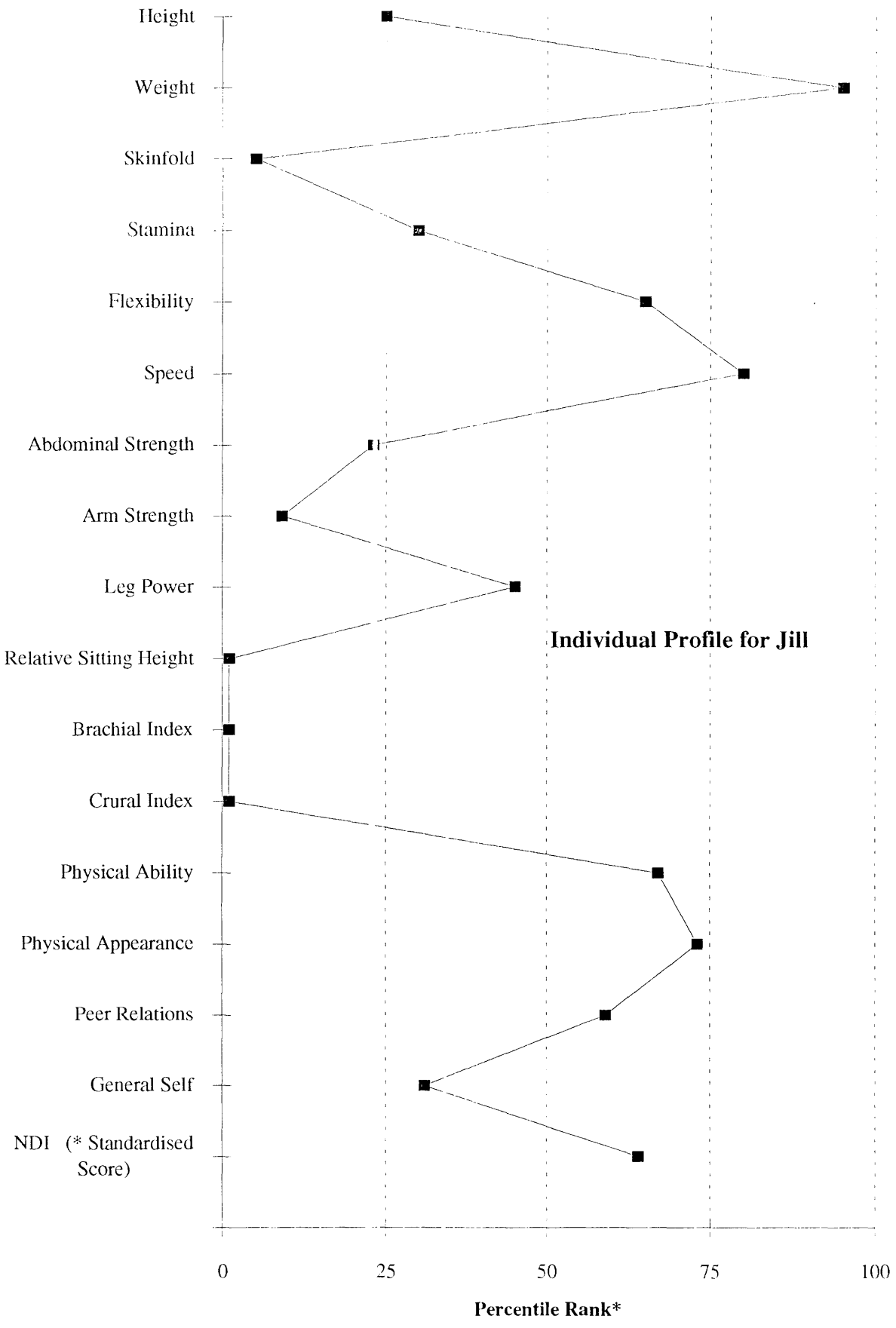
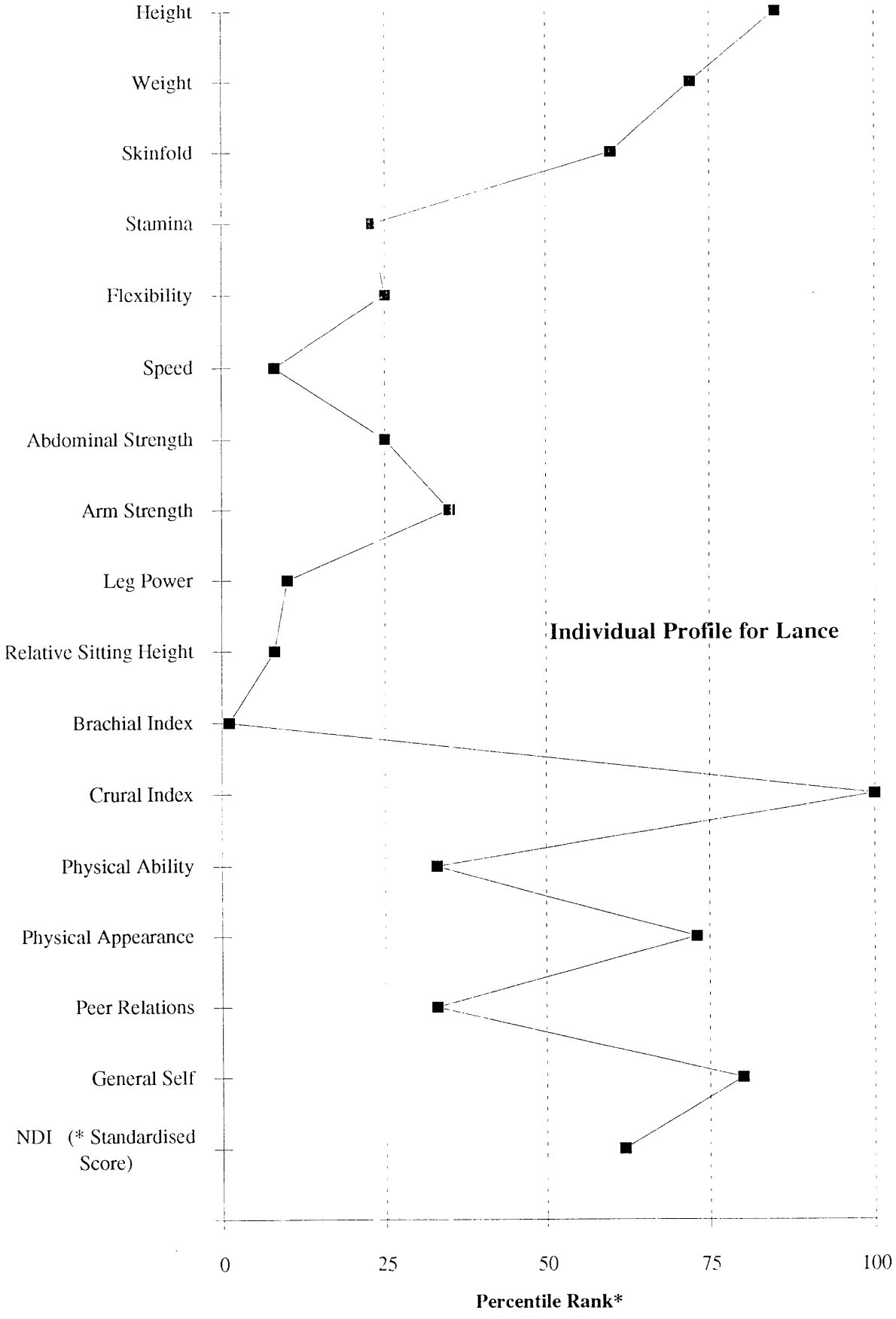
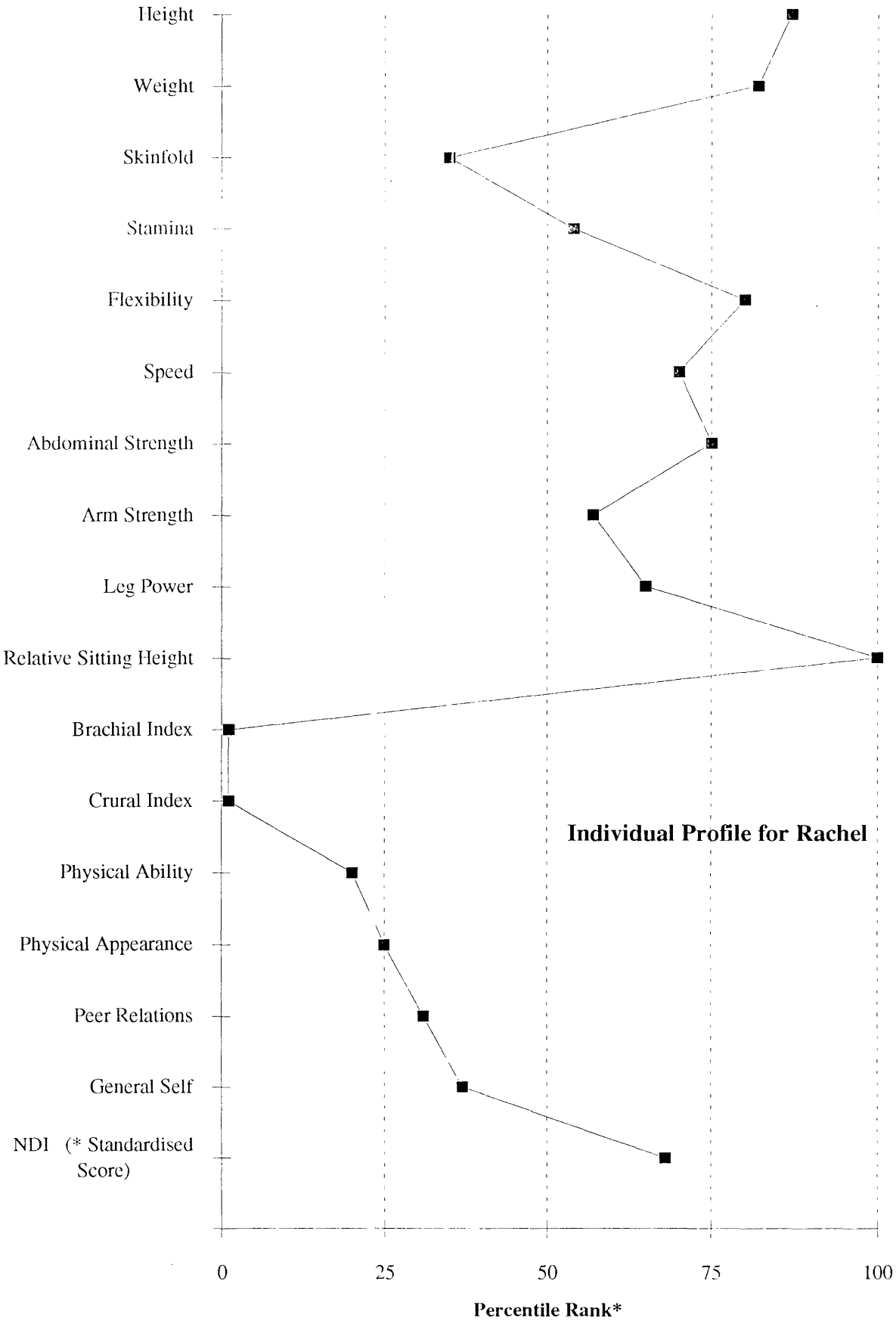
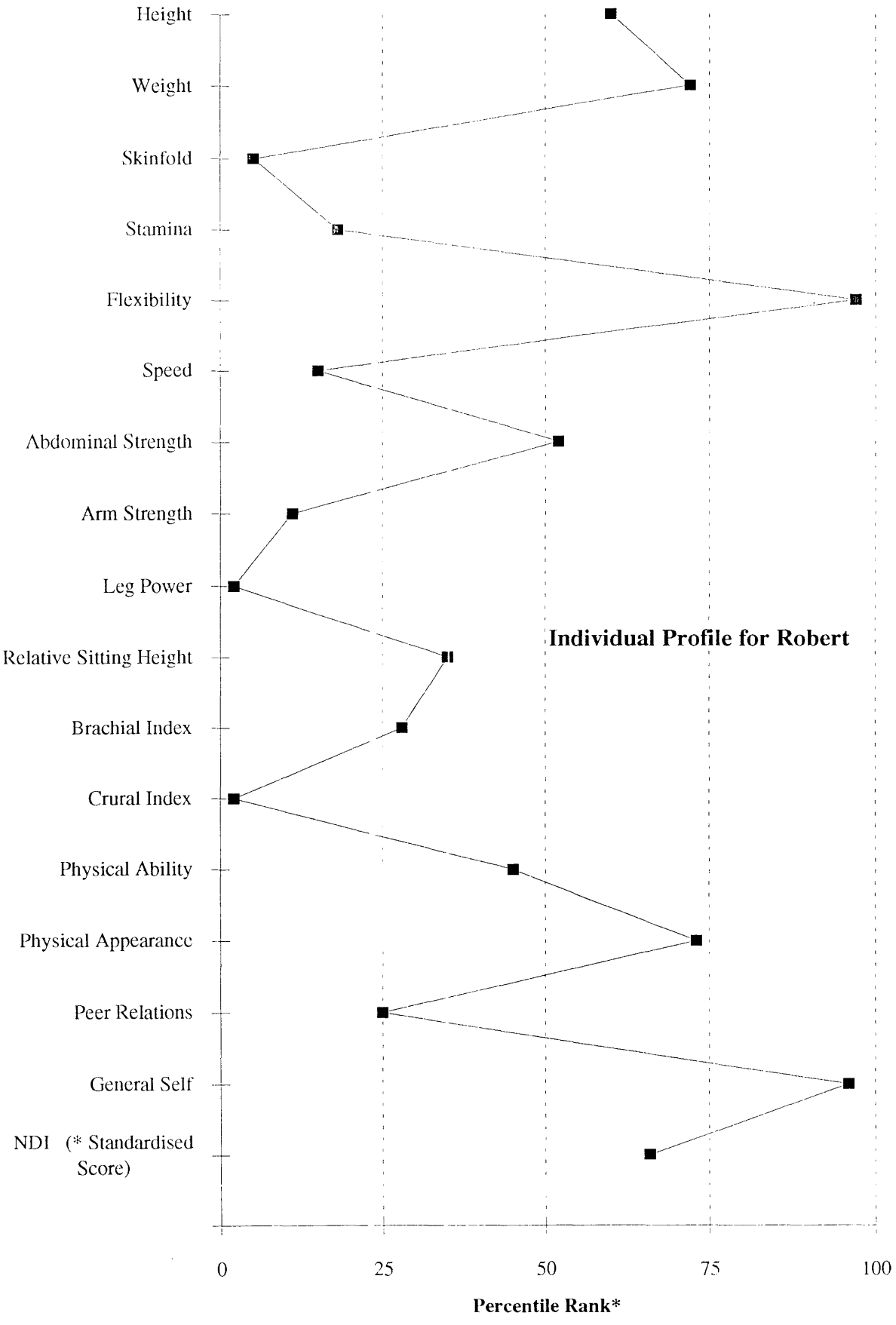
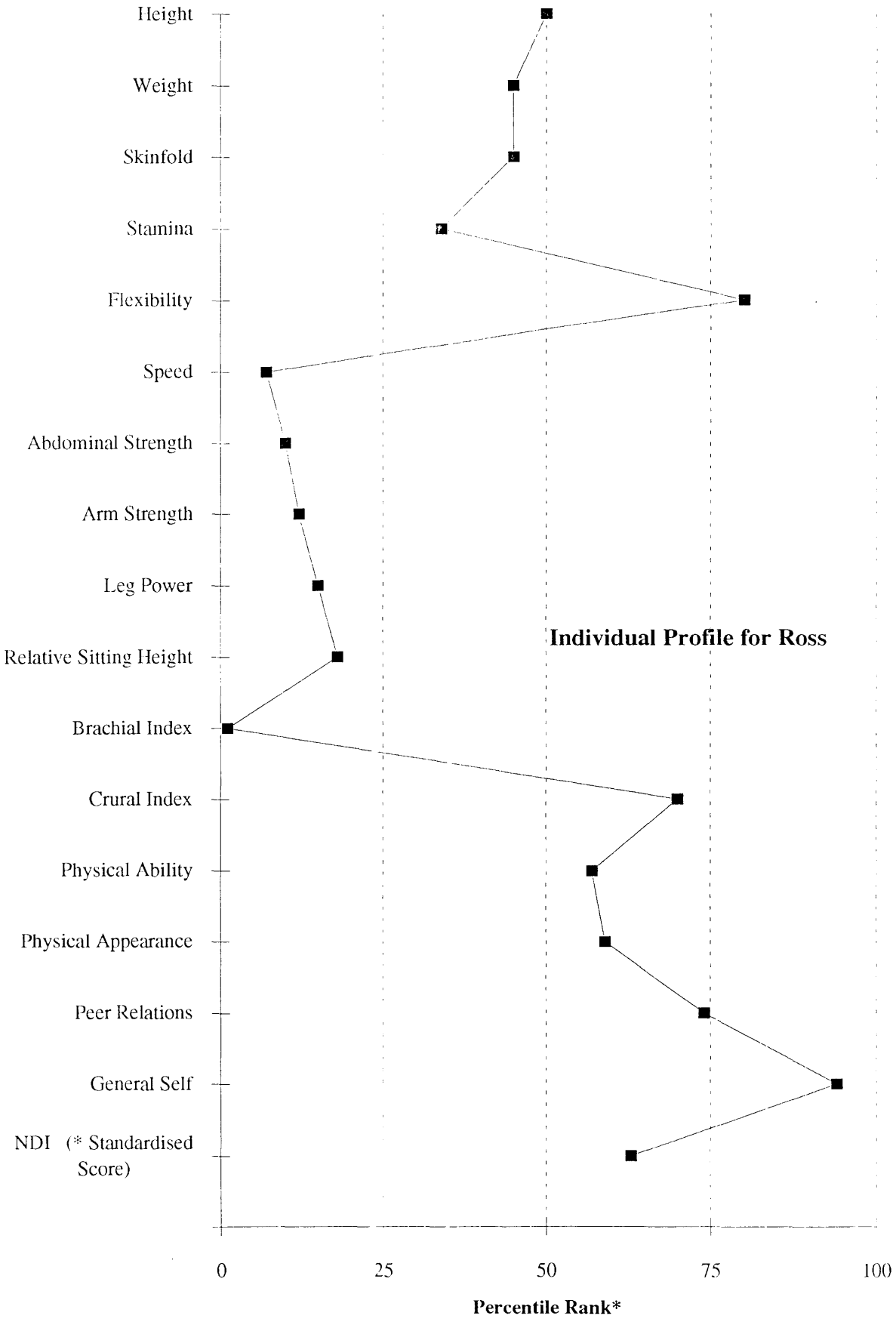
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual profile for Jack
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Jill
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Lance
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Rachel
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Robert
0
25
50
75
100
Percentile Rank*


Height
Weight
Skinfold
Stamina
Flexibility
Speed
Abdominal Strength
Arm Strength
Leg Power
Relative Sitting Height
Brachial Index
Crural Index
Physical Ability
Physical Appearance
Peer Relations
General Self
NDI (* Standardised Score)
Individual Profile for Ross
0
25
50
75
100
Percentile Rank*

AI'PENDIX 14

SUMMARY OF McCARRON ASSESSMENT OF NEUROMUSCULAR DEVELOPMENT

(Source - Parker 1993, pp. 16-17)

Summary of McCarron Assessment of Neuromuscular Development (MAND Test)

1. Purpose

The McCarron Assessment of Neuromuscular Development (MAND) was designed as a standardised and quantitative procedure for assessing fine and gross motor abilities. The assessment procedures were specifically designed for the following purposes:

1. To provide developmental norms on a selected sample of fine and gross motor skills for normal individuals 3 1/2 years of age to young adult.
2. As a component of an early childhood education screening procedure to identify children with potential developmental problems.
3. As a clinical instrument to describe the motor deficits of children with neurological dysfunction.
4. As a component of a work evaluation system to predict the work potential of the adult mentally disabled.
5. As a research instrument to describe changes in motor behaviours associated with various physiological pathologies.

Test Development

The inclusion of a particular motor task in the MAND was based on a consideration of two components: (i) neuropsychological theory and (ii) the systematic investigation of specific criteria. The selection and refinement of the assessment procedures was completed over a five-year period. During this time, many motor tasks were selected from a theoretical perspective and used on a trial basis; but then subsequently deleted because of limitations in meeting the specified criteria. The ten motor tasks retained in the present version of the MAND withstood several revisions and continuous empirical evaluation. The preliminary tasks were systematically administered to a wide age range of normal and neurologically impaired children as well as to mentally disabled adults. The individual's behaviour was carefully observed on each task to determine whether or not the procedures were sufficiently sensitive to identify psychomotor disabilities. When a particular task appeared to be satisfactory from a clinical perspective, the tasks were administered to a larger sample and the performance scores were then statistically analysed with various techniques including multiple regression and factor analytic methods.

Neuropsychological Theory

The theoretical perspective of a dynamic, interacting, neurological system with a complex organisation served as a working hypothesis for the selection of motor tasks. The capacity to perform motor behaviours is contingent upon the integrity and functional dynamics of the brain. Sensorimotor activities involve some of the most complex cortical mechanisms, and a generalised disturbance in the dynamics of the nervous system can be readily discerned for those forms of cortical activity with the most complex organisation (Luria, 1966). When there is a dysfunction of any part of the cortex comprising one or more of the complex feedback systems involved in the organisation of voluntary movement, a dysfunction in motor behaviours may be observed. Generalised neurological dysfunction or specific dysfunction in the areas of the brain involving motor functions can be most readily discerned in a sequence of tasks that require the execution and organisation of movement. The selection of a particular psychomotor task for inclusion in the MAND was based on such a dynamic, interacting theory of brain functioning.

Test Items

In the construction of a battery of psychomotor tasks used to differentiate neurological dysfunction children from normal children, there would appear to be some advantage in including both fine motor as well as gross motor tasks.

In the development of the MAND a series of tasks requiring fine motor or perceptual-motor integration skills were selected for investigation. The fine motor tasks are:

1. Beads in box
2. Beads on rod
3. Finger tapping
4. Nut and bolt
5. Rod slide

These tasks involve the use of arms and hands in fine motor dexterity. The separate use of the right and left hands are determined with activities such as placing beads in box, finger tapping, and rod slide. The coordinated use of both hands is determined with activities such as placing beads on a rod and a nut and bolt assembly task. The rod slide task is also used to observe significant behaviours such as impulsivity, distractibility, and extraneous body movements.

The gross motor tasks selected for investigation are:

1. Hand strength
7. Finger-nose-finger movements
8. Jumping
9. Heel-toe tandem walking
10. Standing on one foot

These tasks involve the coordinated movement of the entire body in a standing position, as well as the capacity to integrate kinesthetic cues and demonstrate effective muscle power skills. The underlying assumption is that a valid measure of motor skills can be operationally defined from a limited number of carefully selected motor behaviours that are representative of both fine and gross motor skills.

Developmental Norms

Developmental norms for the MAND were derived from a sample of over 2,000 normal individuals three and one-half years of age to young adult. The individuals were from low, middle, and upper middle socioeconomic backgrounds, according to De Wolfe's (1957) occupational index. Data was obtained in California, Illinois, Indiana, Kentucky, Louisiana, Pennsylvania, and Texas. Approximately 22 percent of the sample were from minority group backgrounds.

Reference

McCarron, L.T. (1982). MAND-McCarron Assessment of Neuromuscular Development, Dallas, TX: Common Market Press.

APPENDIX 15

Step by Step Overview of the

Cluster Analysis for the Variables

STEP	Group 1	Remainder (ungrouped)	Group 3	Group 4	Group 5
1	16.Fl 17.BI	1.W 2.H 3.RSH 4.LP 5.AbSt 6.Sp 7.St 8.UBS 9.SkF 10.CI 11.PR 12.PAb 13.PAp 14.GS 15.NDI			
2	16.Fl 17.BI	1.W 4.LP 5.AbSt 6.Sp 7.St 8.UBS 9.SkF 10.CI 11.PR 12.PAb 13.PAp 14.GS 15.NDI	3.RSH 2.H		
3	16.Fl 17.BI	1.W 4.LP 5.AbSt 6.Sp 7.St 8.UBS 9.SkF 10.CI 11.PR 12.PAb 15.NDI	3.RSH 2.H	14.GS 13.PAp	
4	16.Fl 17.BI	1.W 4.LP 5. AbSt 6.Sp 9.SkF 10.CI 11.PR 12.PAb 15.NDI	3.RSH 2.H	14.GS 13.PAp	7.St 8.UBS
5	16.Fl 17.BI 3.RSH 2.H	1.W 4.LP 5. AbSt 6.Sp 9.SkF 10.CI 11.PR 12.PAb 15.NDI	14.GS 13.PAp	7.St 8.UBS	
6	16.Fl 17.BI 3.RSH 2.H	1.W 4.LP 5. AbSt 6.Sp 9.SkF 10.CI 11.PR 15.NDI	12. PAb 13.PAp 14. GS	7.St 8.UBS	
7	16.Fl 17.BI 3.RSH 2.H 4.LP	1.W 5.AbSt 6.Sp 9.SkF 10.CI 11.PR 15.NDI	12. PAb 13.PAp 14. GS	7.St 8.UBS	
8	16.Fl 17.BI 3.RSH 2.H 4.LP	1.W 5.AbSt 9.SkF 10.CI 11.PR 15.NDI	12. PAb 13.PAp 14. GS	7.St 6.Sp 8.UBS	
9	16.Fl 17.BI 3.RSH 2.H 4.LP	1.W 5.AbSt 11.PR 15.NDI	12. PAb 13.PAp 14. GS	7.St 6.Sp 8.UBS	9. SkF 10. CI
10	16.Fl 17.BI 1.W 3.RSH 2.H 4.LP	5.AbSt 11.PR 15.NDI	12. PAb 13.PAp 14. GS	7.St 6.Sp 8.UBS	9. SkF 10. CI
11	16.Fl 17.BI 1.W 3.RSH 2.H 4.LP	5.AbSt 15.NDI	12. PAb 11.PR 13.PAp 14. GS	7.St 6.Sp 8.UBS	9. SkF 10. CI
12	16.Fl 17.BI 1.W 3.RSH 2.H 4.LP 7.St 6.Sp 8.UBS	5.AbSt 15.NDI	12. PAb 11.PR 13.PAp 14. GS	9. SkF 10. CI	
13	16.Fl 17.BI 5.AbSt 1.W 3.RSH 2.H 4.LP 7.St 6.Sp 8.UBS	15.NDI	12. PAb 11.PR 13.PAp 14. GS	9. SkF 10. CI	
14	16.Fl 17.BI 5.AbSt 1.W 3.RSH 2.H 4.LP 7.St 6.Sp 8.UBS 9. SkF 10. CI	15.NDI	12. PAb 11.PR 13.PAp 14. GS		
15	16.Fl 17.BI 5.AbSt 1.W 3.RSH 2.H 4.LP 7.St 6.Sp 8.UBS 9. SkF 10. CI 12. PAb 11.PR 13.PAp 14. GS	15.NDI			
16	All Grouped: 16.Fl 17.BI 5.AbSt 1.W 3.RSH 2.H 4.LP 7.St 6.Sp 8.UBS 9. SkF 10. CI 12. PAb 11.PR 13.PAp 14. GS 15.NDI				

Key

1. Weight - 1.W
2. Height - 2.H
3. Relative Sitting Height - 3.RSH
4. Leg Power - 4.LP
5. Abdominal Strength - 5.AbSt
6. Speed - 6.Sp
7. Stamina - 7.St
8. Upper Body Strength - 8.UBS
9. Skinfold Measure - 9.SkF
10. Crural Index - 10.CI
11. Peer Relations Scale - 11.PR
12. Physical Ability Scale - 12.PAb
13. Physical Appearance Scale - 13.PAp
14. General Self Scale - 14.GS
15. Neuromuscular Development Index - 15.NDI
16. Flexibility - 16.Fl
17. Brachial Index - 17.BI

AI'PENDIX 16

Step by Step Overview of the

Cluster Analysis for the Cases

STEP	Group 1	Remainder (ungrouped)														
1	Gm Ja	Rs L Bc De Da I Rb Bn Ji A Gt Ra E Cl Co														
STEP	Group 1	Remainder (ungrouped)												Group 3		
2	Gm Ja	Rs L Bc De Da Rb Bn Ji A Gt Ra E Co												I Cl		
STEP	Group 1	Remainder (ungrouped)								Group 3			Group 4			
3	Gm Ja	Rs L Bc Da Rb Ji A Gt Ra E Co								I Cl			De Bn			
STEP	Group 1	Remainder (ungrouped)						Group 3			Group 4			Group 5		
4	Gm Ja	Rs L Da Ji A Gt Ra E Co						I Cl			De Bn			Bc Rb		
STEP	Group 1	Remainder (ungrouped)						Group 3			Group 4			Group 5		
5	Gm Ja	Rs L Ji A Gt Ra E Co						I Cl			De Bn			Da Rb Bc		
STEP	Group 1	Remainder (ungrouped)						Group 3			Group 4			Group 5		
6	Gm Ja	Rs L Ji A Gt E Co						I Cl Ra			De Bn			Da Rb Bc		
STEP	Group 1	Remainder (ungrouped)						Group 3			Group 4			Group 5		
7	Gm Ja	Rs L Ji Gt E Co						I Cl Ra			De Bn			Da Rb Bc A		
STEP	Group 1	Remainder (ungrouped)							Group 3			Group 4				
8	Gm Ja Da Rb Bc A	Rs L Ji G E Co							I Cl Ra			De Bn				
STEP	Group 1	Remainder (ungrouped)							Group 3			Group 4				
9	Gm Ja Da Rb Bc A	L J Gt E Co							I Cl Ra			De Bn Rs				
STEP	Group 1	Remainder (ungrouped)						Group 3			Group 4			Group 5		
10	Gm Ja Da Rb Bc A	L Gt Co						I Cl Ra			De Bn Rs			Ji E		
STEP	Group 1				Remainder (ungrouped)				Group 3			Group 4				
11	Gm Ja Da Rb Bc A I Cl Ra				L Gt Co				De Bn Rs			Ji E				
STEP	Group 1				Remainder (ungrouped)				Group 3			Group 4				
12	Gm Ja Da Rb Bc A I Cl Ra				L Co				De Bn Rs Gt			Ji E				
STEP	Group 1							Remainder (ungrouped)				Group 3				
13	Gm Ja Da Rb Cl Ra De Bn				Bc A I Rs Gt			L Co				Ji E				
STEP	Group 1										Remainder (ungrouped)					
14	Gm Ja Da Rb Bc A I Cl Ra De Bn Rs				Gt Ji E						L Co					
STEP	Group 1										Remainder (ungrouped)					
15	Gm Ja Da Rb Bc A I Cl Ra De Bn Rs				Gt Ji E Co						L					
STEP	All Grouped															
16	Gm Ja Da Rb Bc A I Cl Ra De Bn Rs Gt i E Co L															

Key :

Jack	- Ja	Dennis	- De	Jill	- Ji	Emma	- E
Ross	- Rs	Darcy	- Da	Ann	- A	Cloe	- Cl
Graham	- Gm	Ivan	- I	Greta	- Gt	Connie	- Co
Lance	- L	Robert	- Rb	Rachel	- Ra		
Bruce	- Bc	Brian	- Bn				

APPENDIX 17

Parent Questionnaire

Questionnaire for Parents

Child:_____

DATE OF BIRTH_____ AGE _____

1. Number of children in the family _____
   Ages of children_____
   What position in the family is this child?_____

2. Are both parents living in the home? Yes/No
   What is the education level of each parent
   Father Yr 10 Yr 12 Tertiary
   Mother Yr 10 Yr 12 Tertiary

3. Was there any birth trauma?
   Forcept delivery? Y/N
   other complications_____
   _____
   gestation
   Less than 40 weeks _____
   Greater than 40 weeks_____

4. Would you regard yourselves as clumsy?

5. Has your child been referred to other professionals
   at School _____
   or Child Health Nurse _____
   Doctor _____

6. Does the child have other ailments?_____
   _____

7. Has there been a change in your child since the clinic in regards to;
   Confidence level Y/N_____
   Skills Y/N _____
   Motivation to participate Y/N _____

8. Any questions from the parents point of view?