Chapter 3

DESCRIBING THE SAMPLE

It is generally accepted that behavior in any domain (i.e., cognitive, affective, psychomotor) is the product of many influences. To have a fuller understanding of human development, one should consider the full range of possible influences. Perhaps the strongest support for this point of view has been seen among those individuals interested in child development from a total-development perspective. While working both independently and cooperatively, professionals from such fields as developmental psychology, exercise physiology, medicine, biomechanics, physical education, and sociology have provided data adding to our understanding of total human development and behavior.

(Gabbard 1992, p. 3)

Introduction to Chapter

In the literature review, a considerable number of authors referred to heterogeneity as a feature of clumsiness. This chapter presents the collected data in a mainly descriptive way, attempting to provide a total perspective on the children in the study. This is consistent with Gabbard's view of using a multi-faceted approach to the study of child development (cited above), which accommodates the assumption of heterogeneity. In presenting this perspective, the chapter provides important background information for subsequent analysis, giving a detailed overview of the characteristics of the sample. Furthermore, the chapter addresses directly the first research question:

A) Is there a set of identifiable features which are common to clumsy children?

and

seeks to verify or modify the model presented in Chapter 1, which describes the levels of causality associated with clumsiness.

The chapter is organised to consider the following categories of measurement parameters: anthropometric measures - indicating body composition and proportions; fitness parameters - stamina, speed, strength and flexibility; the results of the McCarron Assessment of Neuromuscular Development (MAND test); psychosocial background - including a self-concept inventory, family demographics and aspects of health status; and, responses to the remedial program. In the main, data are presented in graphical or tabulated form, presenting information based upon simple statistical procedures. The exception to this is an examination of the response to the remedial program, in the form of pre and post test results, providing an opportunity for a statistical analysis of any effects on the children which may be due to the program.

ANTHROPOMETRIC MEASURES

Measurement of the physical structure of the body is a valuable guide to research in human movement. Body structure, composition and proportions have a significant effect on human physical performance. All human dimensions can be measured using anthropometry, a systemised method of taking observations of the body for scientific purposes. Anthropometric measures taken on the children were as follows: height, weight, skinfolds, relative sitting height, brachial index and crural index. The results of these measurements can be seen for: individual subjects [3.1] in Appendix 13; the group percentile rankings in Table 3.1, Figure 3.1 and Figure 3.2; and scores for comparison with a normal population in Figure 3.3.

Table 3.1 : Percentile Rankings of Anthropometric Measures

Name [3.1] (abbreviations used in some graphs)	Height	Weight	Skinfold[3.2]	Relative Sitting Height	Brachial Index	Crural Index
Jack (Ja)	55	87	20	9	1	18
Ross (Rs)	50	45	45	18	1	70
Graham (Gm)	10	45	10	1	1	15
Lance (L)	85	72	60	8	1	100
Bruce (Bc)	50	28	10	78	42	20
Dennis (De)	70	100	20	18	1	1
Darcy (Da)	50	100	5	1	1	1
Ivan (I)	80	100	5	70	1	2
Robert (Rb)	60	72	5	35	28	2
Brian (Bn)	85	100	10	50	1	5
Jill (Ji)	25	95	5	1	1	1
Ann (A)	100	92	20	50	1	1
Greta (Gt)	85	100	20	58	1	95
Rachel (Ra)	87	82	35	100	1	1
Emma (E)	40	78	20	23	1	50
Cloe (Cl)	95	100	15	100	1	3
Connie (Co)	50	5	5	17	1	15
Median	60	87	15	23	2.8	5
Range	10 to 100	5 to 100	5 to 60	1 to 100	1 to 42	1 to 100

3.1 The names of the children have been changed in order to accommodate anonymity.

3.2 Skinfold percentiles are established inversely to their magnitude, i.e., a lower ranking indicates a greater proportion of adipose tissue.

Table 3.1 shows each of the children's anthropometric profiles by reading across the horizontal lines of results. However, group results are represented more clearly using graphs in Figures 3.1 to 3.3 which follow.

BODY BUILD AND STATURE

The first three anthropometric measures establish a child's body build and stature. Figures 3.1 and 3.2 indicate the children in this sample are heavy, with well above average amounts of body fat. Most of the children are taller than children in the same age group, although the magnitude of the percentile rankings for height is less than the other two indicators. However, analysis of Table 3.1 and Figure 3.1, reveals 14 of the children are of average height or above, with 8 of those in the top 3 deciles for this dimension. Therefore, it would be reasonable to describe the group as mainly larger children with levels of body fat well above average.

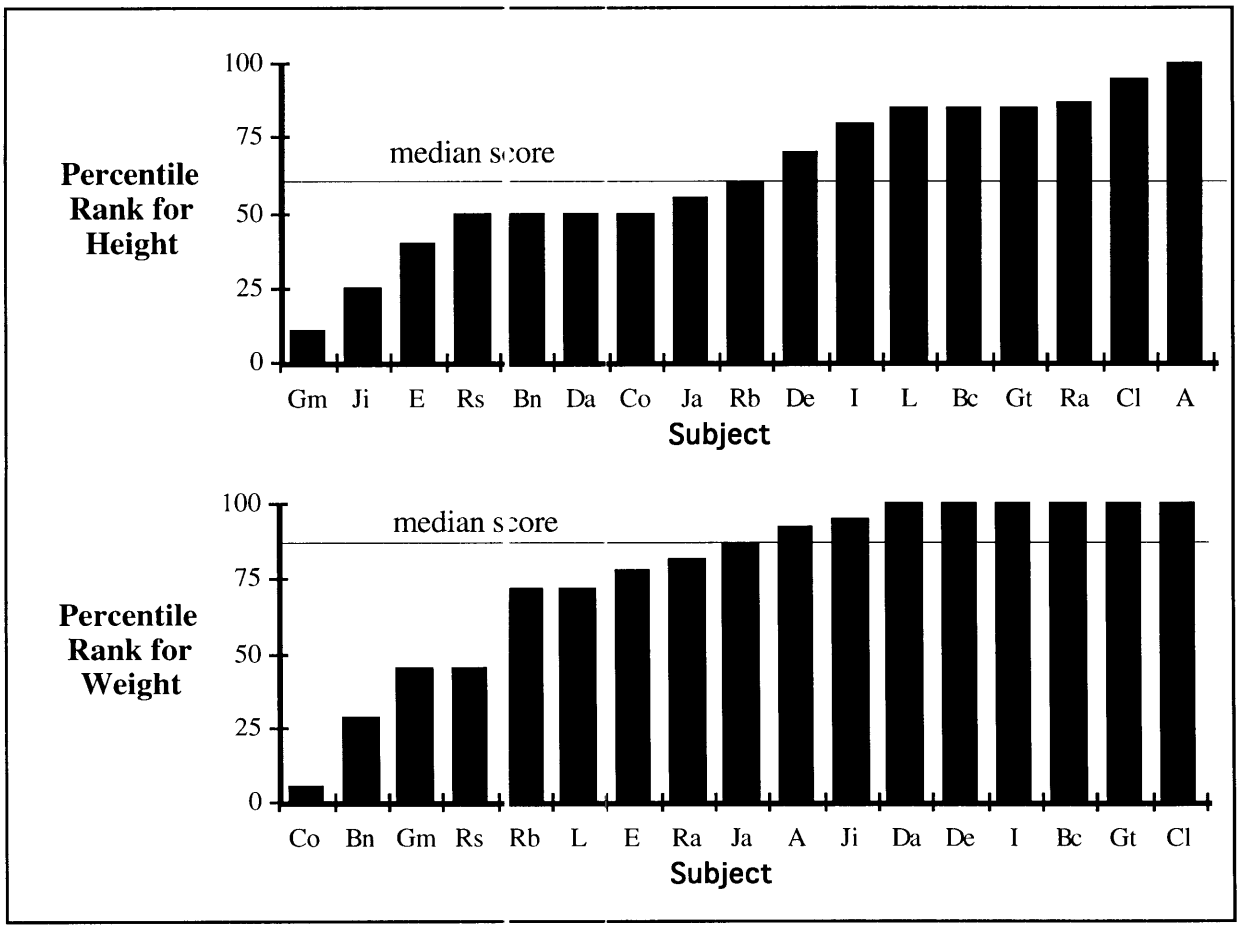

Figure 3.1 : Height and Weight Characteristics

Excess body fat can affect adversely the performance of a physical skill, both from a biomechanical and physiological aspect. It serves as a mechanical disadvantage in movement, as well as detracting from the efficiency of providing the energy to generate that movement. Body fat is manifested in both weight and skinfold readings and its level is a cause of concern for the majority of children in this group. Percentile rankings reveal body weight well above

average, as a general trend. Similarly, the percentile rankings for the sum of two skinfolds measured on the children (see Table 3.1), show most children with above average levels of body fat at those measurement sites. When estimating percentage body fat as a proportion of total body weight, using all four skinfold measures taken, the results show only a very slight decrease in adiposity but ostensibly the trend is confirmed. The percentage of body fat for each subject can be seen in Figure 3.2, where the band across 15% to 18%, depicted by the lighter lines, indicates an acceptable level of body fat in children (Hills 1991b). Eleven of the children are above that acceptable zone, with the remainder at or below it. All the girls in the group have percent body fat above the upper limit of acceptability. Of the eleven above 18% there are 5 children with a percentage body fat of 24 or greater, these children could be considered to be obese.

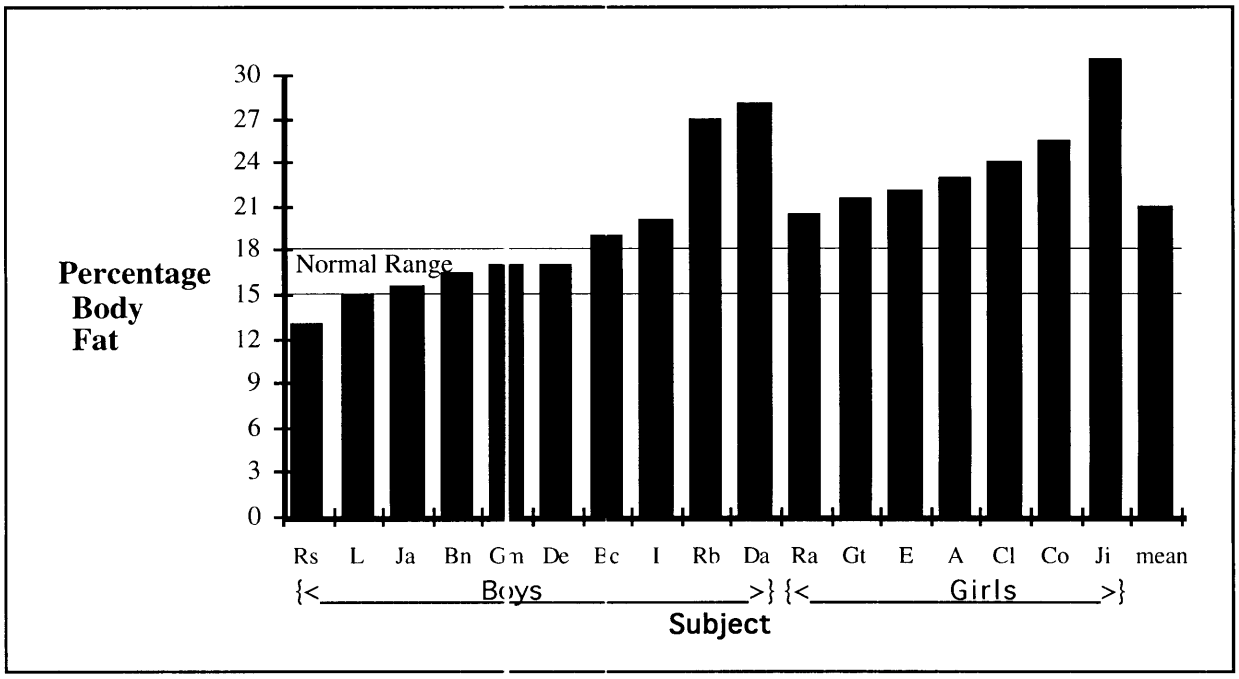

Figure 3.2 : Levels of Body Fat (as a percentage of total body weight)

PROPORTIONALITY

Proportionality can affect performance biomechanically, in that some proportions may be suitable or unsuitable for different types of movement task. Indices of proportionality are calculated using measures of limb and trunk segments. In this study, three measures of proportionality were considered important. Firstly, the proportion of the trunk length (crown to rump) to standing height, termed Relative Sitting Height, which is an index calculated by dividing the former length by the latter and the result multiplied by 100. For example, a trunk length which was exactly one half of standing height would elicit a Relative Sitting Height of 50. Secondly, the proportion of the forearm to the upper arm (i.e., shoulder to elbow), termed the Brachial Index, was determined by dividing the former length by the latter and the result multiplied by 100. A Brachial Index of 100, indicates that the forearm and upper arm are of equal length. Thirdly, the Crural Index was computed, this provides an indication of the

proportions of calf to thigh lengths, and is calculated by dividing the former length by the latter, the result multiplied by 100. Similarly, a Crural Index of 100, indicates that the calf and thigh are of equal length. The three indices calculated for each child and the mean for the group, can be seen in Figure 3.3.

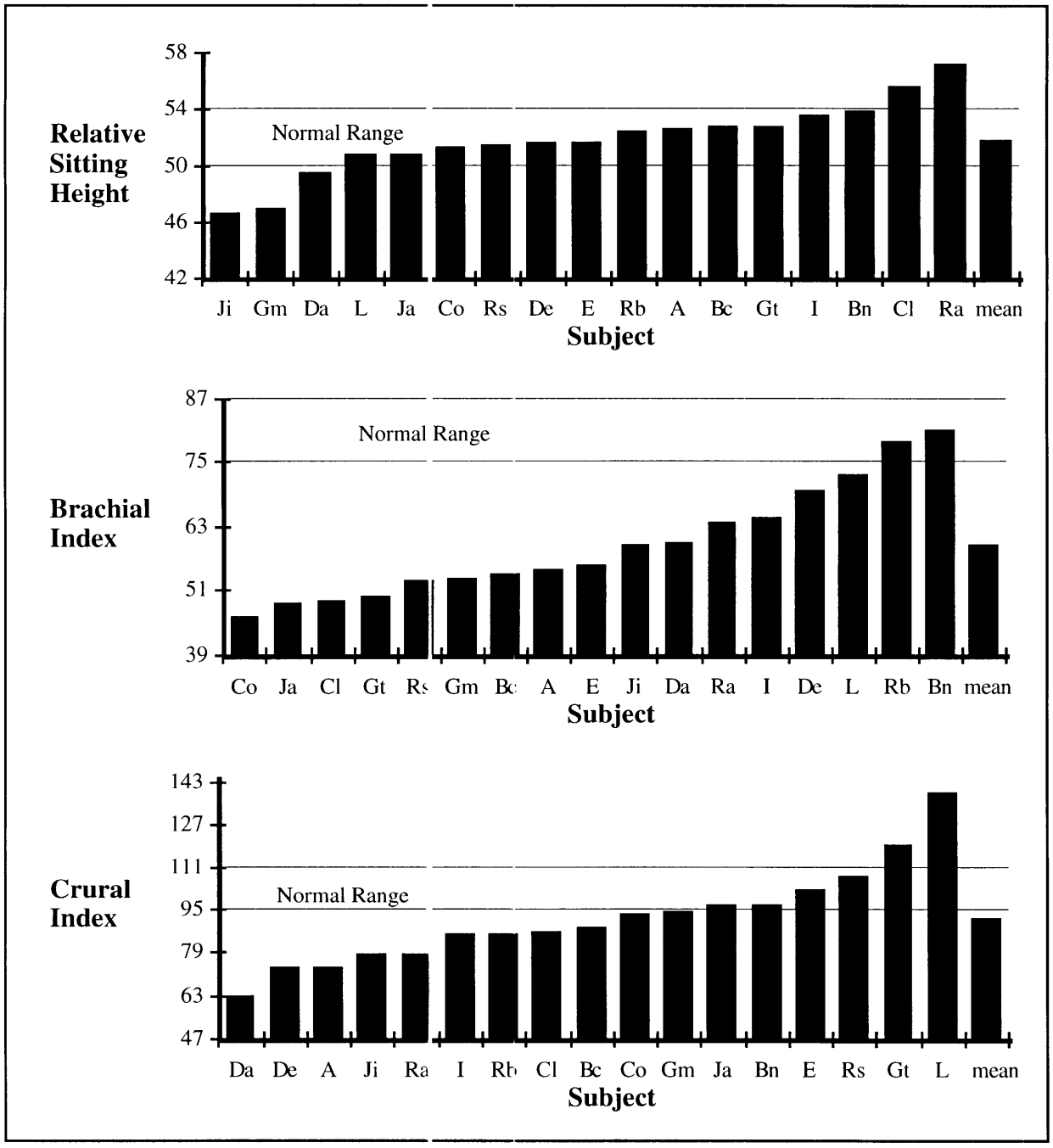

Figure 3.3 : Proportionality Measures

Analysis of Table 3.1 reveals low percentile rankings for Relative Sitting Height and Crural Index, with very low rankings for Brachial Index. However, raw data for these indicators are perhaps more pertinent to analyse, given that the only available normative tables are based on limited samples and do not report rankings for children younger than 8 years. In addition, it may be more useful to use general comparative approximations for each index, given that, for

the majority of indices documented (Blanksby, Bloomfield, Ackland, Elliott & Morton 1994), the distributions are not dissimilar for each age group or gender. Indices, which could be viewed as 'normal' for comparative purposes, are as follows :

- Relative Sitting Height - Mean of 52 with a standard deviation of 2
- Brachial Index - Mean of 81 with a standard deviation of 6
- Crural Index - Mean of 103 with a standard deviation of 8.

These are indicated in Figure 3.3 with bands labelled 'Normal Range'.

Comparison of the derived 'Normal Range' with the children scores and group mean, show both similarities and differences. The Relative Sitting Height for the study group has a mean of 52 and standard deviation of 3, compared with a mean of 52 and standard deviation of 2 used to typify the normal population. Albeit a slight difference, statistically this does not differ from the normal population ($p > 0.05$). The Crural Index for the study group has a mean of 92 and standard deviation of 18, compared with a mean of 103 and standard deviation of 8 used as an indication of normality. In this case the difference is greater with the Gymstart group proving significantly lower ($p < 0.001$) than the norm. Although, in practical terms the differences in relation to performance may not have a significant effect, except between extremes of the two populations and where other capacities are equal.

However, when comparing a Brachial Index mean of 60 and standard deviation of 11 for the study group, with a mean of 81 and standard deviation of 6 used as a norm, the difference is significantly lower ($p < 0.0001$) for the clumsy group when compared to the norm. This group of children is considerably different in Brachial Index measures from the normal population. The proportion of forearm to upper arm in the general population of children is in the ratio of 4 : 5 approximately, whereas in the study group it is in the ratio of 3 : 5 approximately. This is a distinct difference and a difference which would provide distinct biomechanical differences in movements of the upper limb, particularly flexion at the elbow. This means that, with a proportionally shorter forearm, the children may well possess a mechanical advantage for strength movements, assuming that the muscle insertion remains unchanged, as it does under fairly static conditions. Under dynamic conditions though, they ought to demonstrate an advantage for strength movements but a disadvantage for speed and power movements, since the latter depends as much on movement speed as on force development. Therefore, as many of the movement tasks involving the upper limb, are likely to be dynamic, power or speed oriented, this mechanical difference is probably a disadvantage, especially as the musculature of the children seems to be generally weak.

OVERVIEW

Analysis of the anthropometric measures taken proved the children to be of ponderous build, with body composition high in subcutaneous fat and exhibiting some mechanical disadvantage in the proportions of their limb segments. Height, weight and skinfold readings all tended to characterise the group as large and/or overweight children, with few exceptions. Proportionality measures indicated that the Relative Sitting Height and Crural Indices of the group fell close to those of a normal population, while the Brachial Index readings suggested a considerable divergence from the norm. This disproportion in upper limb segments, coupled with excess body fat (shown in the next section), would point to a predilection to mechanically inefficient movement patterns, even if all other parameters were considered normal.

FITNESS PARAMETERS

Physical fitness, in its broadest sense, has a considerable effect on the ability to participate in physical activity. Some components of fitness contribute also to the control and execution of a given task, e.g., arm strength would have an influence on the ability to throw a ball. Measures of the children's physical performance considered important for this study, which could collectively be termed fitness parameters, were taken. They were: aerobic capacity (stamina), speed, abdominal strength (and local endurance), upper body strength (arm strength), flexibility (at the hip) and leg power. These parameters can be seen as follows: individual subjects in Appendix 13; the group percentile rankings in Table 3.2 and Figures 3.4. and 3.5.

Table 3.2 : Percentile Rankings of Fitness Parameters

Name	Stamina	Flexibility	Speed	Abdominal Strength	Arm Strength	Leg Power
Jack	39	60	60	32	21	14
Ross	34	80	7	10	12	15
Graham	46	45	30	38	13	3
Lance	23	25	8	25	35	10
Bruce	39	90	19	14	25	40
Dennis	30	85	0	10	7	14
Darcy	0	65	12	4	3	36
Ivan	35	65	30	32	33	35
Robert	18	97	15	52	11	2
Brian	86	80	33	40	62	5
Jill	30	65	80	23	9	45
Ann	28	80	30	35	8	60
Greta	3	85	6	25	5	50
Rachel	54	80	70	75	57	65
Emma	41	90	45	70	16	25
Cloe	40	35	7	60	8	90
Connie	12	90	15	45	9	1
Median	34	80	19	32	12	25
Range	0 to 86	25 to 97	0 to 80	4 to 75	5 to 62	1 to 90

Table 3.2 shows each of the children's fitness profiles by reading across the horizontal lines of results. However, percentile rankings for the group on single parameters is presented more clearly in Figures 3.4 and 3.5. These graphs indicate low fitness levels overall, with certain exceptions both in subject profiles and in the single parameter of flexibility. However, it can be stated that the fitness level of the group, in general, is poor and would detract from efficient physical performance.

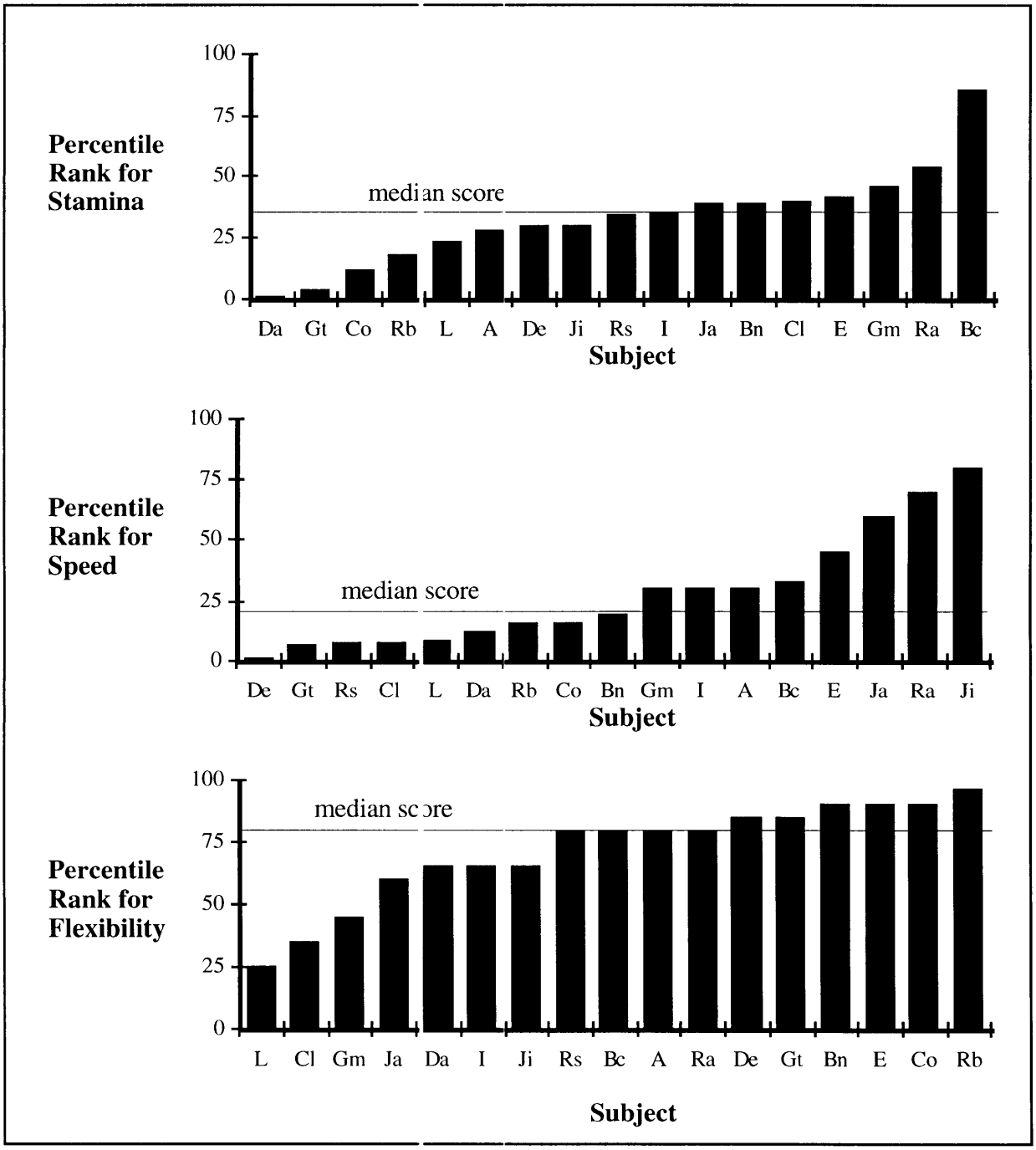

Figure 3.4 : Stamina, Speed and Flexibility

The only exception to the trend of low fitness, in terms of parameters measured, would be in the high levels of flexibility at the hip (see Figure 3.4). However, this result may well be

esoteric, as flexibility can be a consequence of poor musculature. Certainly, this group, with its high levels of body fat and low levels of strength, has a musculature so weak that it can allow a large range of joint movement. This phenomenon of a 'hyper-extensible' type in children experiencing movement difficulties has been reported by Larkin (1994)[3.3]. Considering these factors, the contrast in the magnitude of this parameter, compared to the other five, is not surprising.

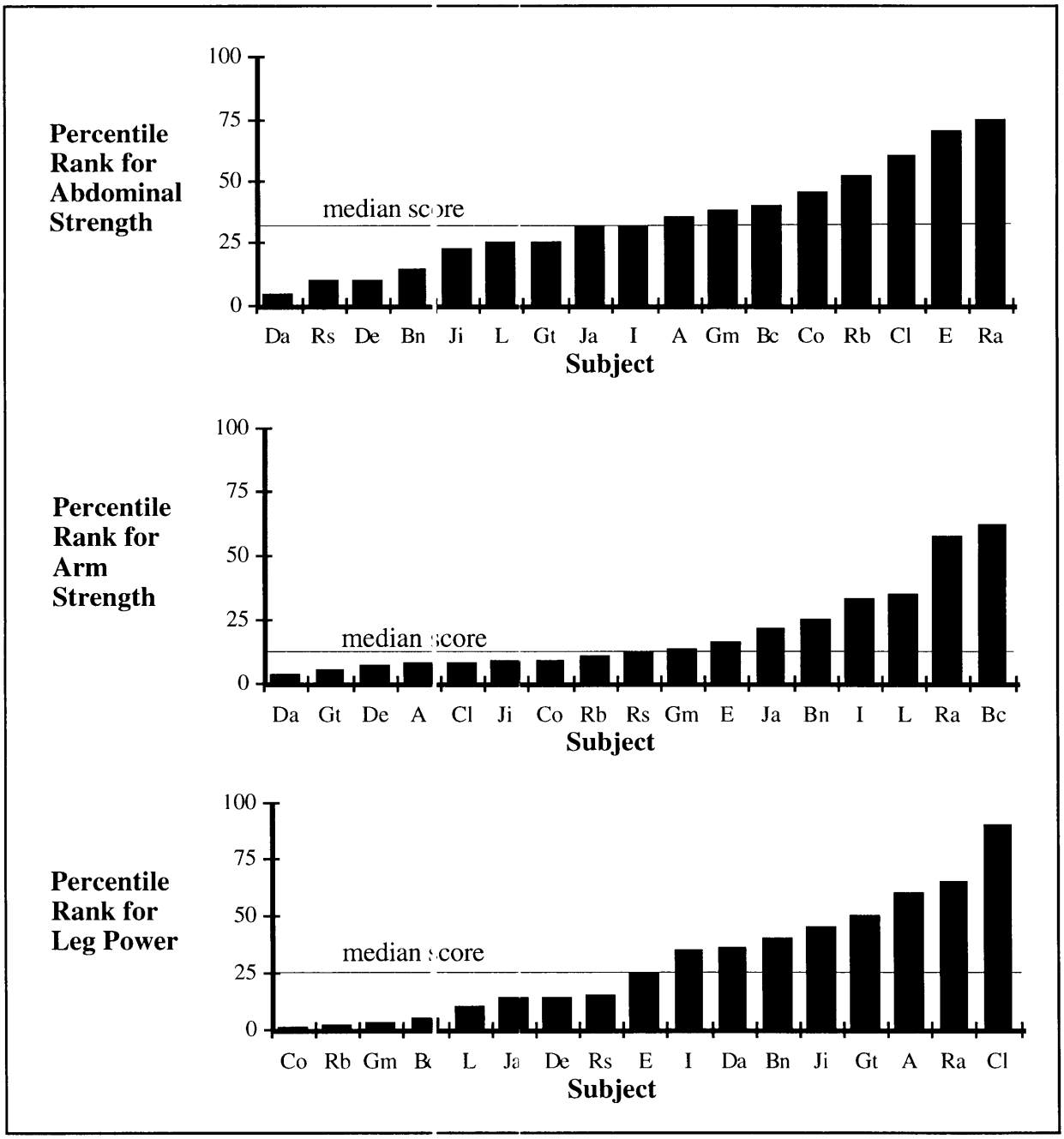

Figure 3.5 : Strength and Power Indicators

3.3 However, this research has not yet been documented formally and requires further confirmation.

There are three exceptions, in terms of subjects, which tend to be aberrations in deviation from the group trend (see Table 3.2). Brian and Emma would have a profile which is not completely acceptable but one which may be expected in a normal group of children. Only Rachel has a fitness profile that would be conducive to a reasonable level of physical performance. Otherwise, the children either have a profile which is consistently low over the six parameters, e.g., Graham; or have some parameters at an extremely low level, e.g., Greta.

OVERVIEW

Given that there are only slight divergences in some individuals, it is still reasonable to reinforce the initial conclusion that the fitness levels of the group are low. With the exception of flexibility, all the fitness parameters measured determined the group as lacking stamina, speed and strength. However, the high levels of flexibility present in most of the children could possibly be attributable to meagre levels of musculature. As a consequence, this could be disadvantageous as hyperflexibility, without a sound musculature, could allow too large a range of joint movement with loss of muscular control. The excess levels of body fat would disadvantage the group also in the efficiency of their cardiovascular system, during physical activity. In addition, low levels of fitness in combination with body fat levels evident in the study group would predispose the children to a number of other health risks.

NEUROMUSCULAR DEVELOPMENT ASSESSMENT

The children's neuromuscular development was assessed using the McCarron Assessment of Neuromuscular Dysfunction (McCarron 1982).

THE TEST PROCEDURES AND RESULTS

The McCarron Assessment of Neuromuscular Dysfunction (MAND) test is a "standardized and quantitative method of assessing psychomotor skills" (McCarron 1982, p. 25). It was administered to the children, providing the following indicators of motor development: neuromuscular development index (NDI) - with fine and gross motor components; persistent control factor score (PC); muscle power factor score (MP); kinesthetic integration factor score (KI); and bimanual dexterity factor score (BD). In order to understand exactly what these various scores indicate, a brief explanation follows.

The NDI is a composite score of ten test items, five gross motor and five fine motor tasks. The NDI can be likened to a motor quotient, and can be considered similar to other quotients used to assess aspects of development, e.g., Intelligence Quotient. The factor scores are derived from combinations of two MAND tasks (or test items) and can be summarised from McCarron (1982) as having the following sub-indicators:

- Persistent Control - focussing attention; inhibition of extraneous movement; integration of perceptual skills; regulation of hand-arm movement; maintenance of body position; and

providing continuous regulation of those movements. Involves rod sliding and finger to nose tasks.

- Muscle Power - healthy functioning of the skeletal muscles; timing; and coordination. Involves hand strength (dynamometer) and dynamic contraction of leg muscles in jumping tasks (Standing broad jump).
- Kinesthetic Integration - balance; orientation of body in space; and proprioception. Involves dynamic balance and static balance tasks.
- Bimanual Dexterity - precise coordination; hand-eye coordination; and two-hand coordination. Involves a bead threading and nut and bolt assembly tasks.

Scoring

The result of scoring the ten items of motor tasks determines the NDI, which is based on a mean of 100 and a standard deviation of 15. The four factor scores are based also on a mean of 100 and a standard deviation of 15 (McCarron 1982). In addition, the scores on the five gross motor items and the scores on the five fine motor items were added separately and amalgamated into two composite scores. To facilitate comparison with the study group, Table 3.3 shows interpretation categories at and below the general population range, provided by McCarron (1982), for the NDI and the four factor scores. In addition, similar categories have been derived for the purposes of this study for the fine and gross motor components.

Table 3.3 : Comparative Scores from the MAND Test

Interpretation Category	NDI	PC	MP	KI	BD	Fine Motor	Gross Motor
General Population	85-100	85-100	85-100	85-100	85-100	36-65	36-65
Mild Disability	70-85	70-85	70-85	70-85	70-85	20-35	20-35
Moderate Disability	55-69	55-69	55-69	55-69	55-69	5-19	5-19
Severe Disability	Below 55	Below 55	Below 55	Below 55	Below 55	Below 5	Below 5

The results of the MAND test can be seen for individual subjects in Appendix 13; the group scores in Table 3.4; NDI scores in Figure 3.6; and comparative data for fine and gross motor components in Figure 3.7. Analysis of Table 3.4 and Figure 3.6 provides the opportunity to establish the degree to which the group or individuals suffer impairment to their neuromuscular control system. The MAND scores, with its interpretations derived from Table 3.3, can be used to profile each child (see Table 3.4) and the group through the NDI scores (see Figure 3.6). In general, the results give cause for concern, with some children categorised as severely disabled on some items of assessment, e.g., Jill on two items.

Table 3.4 : Motor Factor Scores from the MAND Test

Subject	SCORE and RATING				
	Neuromuscular Development Index	Persistent Control	Muscle Power	Kinesthetic Integration	Bimanual Dexterity
Jack	80 MilD	100 Norm	80 MilD	65 ModD	85 Norm
Ross	63 ModD	85 Norm	70 MilD	65 ModD	50 SevD
Graham	68 ModD	85 Norm	80 MilD	55 ModD	95 Norm
Lance	62 ModD	75 MilD	75 MilD	65 ModD	50 SevD
Bruce	64 ModD	90 Norm	65 ModD	45 SevD	75 MilD
Dennis	90 Norm	85 Norm	90 Norm	80 MilD	90 Norm
Darcy	68 ModD	90 Norm	70 MilD	55 ModD	60 ModD
Ivan	72 MilD	85 Norm	85 Norm	70 MilD	60 ModD
Robert	66 ModD	60 ModD	75 MilD	65 ModD	75 MilD
Brian	64 ModD	65 ModD	90 Norm	70 MilD	50 SevD
Jill	64 ModD	85 Norm	85 Norm	50 SevD	45 SevD
Ann	66 ModD	85 Norm	70 MilD	65 ModD	60 ModD
Greta	71 MilD	80 MilD	80 MilD	80 MilD	45 SevD
Rachel	68 ModD	110 Norm	65 ModD	55 ModD	65 ModD
Emma	86 Norm	100 Norm	75 MilD	80 MilD	100 Norm
Cloe	74 MilD	95 Norm	85 Norm	55 ModD	60 ModD
Connie	74 MilD	80 MilD	80 MilD	65 ModD	75 MilD
Median	68	85	71	65	66
Range	62 to 90	60 to 110	65 to 90	45 to 80	45 to 100
	KEY :	Norm Normal Population	MilD Mild Disability	ModD Moderate Disability	SevD Severe Disability

It can be stated that the neuromuscular ability levels of the group, in general, are low and would detract from efficient control during physical performance. Although none of the children are severely disabled on the NDI (or motor quotient), ten are moderately disabled and five have a mild disability rating (see Figure 3.6). There are exceptions to this trend, with some scores tending towards normal. Unfortunately, other scores or profiles indicate critical levels of disability. The exceptions are in terms of an individual profile and on a single factor across the group. Specifically, Dennis' individual profile could be considered as normal and the scores on persistent control results in twelve of the group scoring normal ratings (see Table 3.4). Exceptions occur also at the lower ends, with deviations from the study group on individual profiles, e.g., Rachel is moderately disabled on four scores yet scores at the upper end of normal range on the fifth. Furthermore, Brian's scores range from the category of severely disabled on one item through to normal on another.

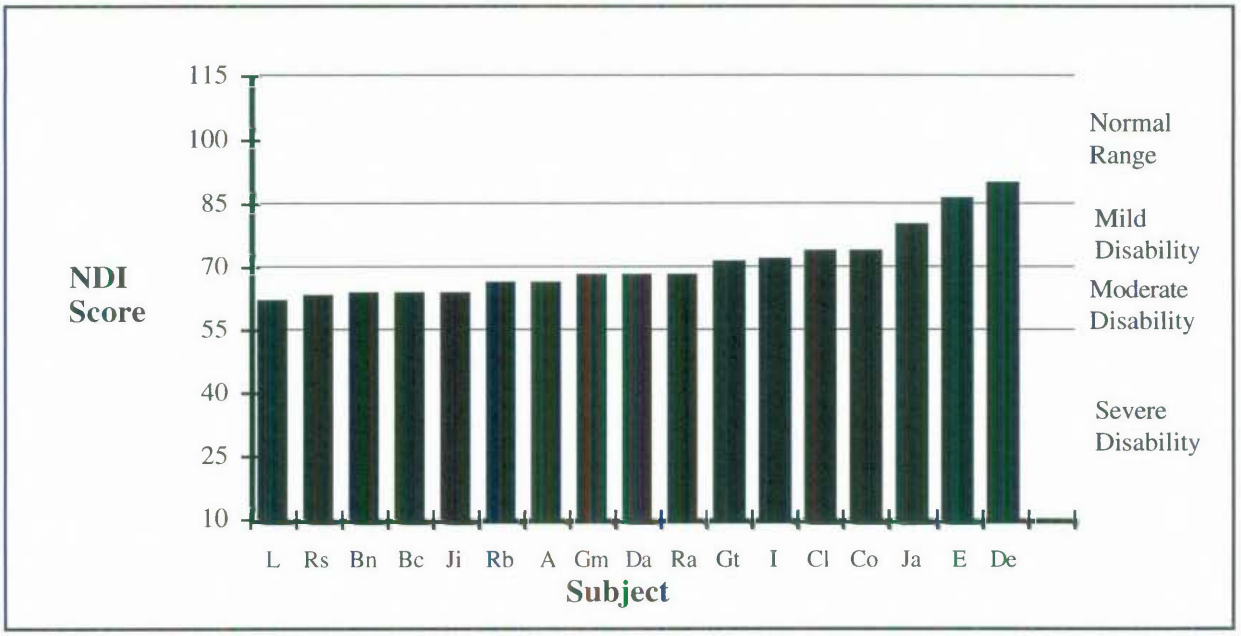

Figure 3.6 : Neuromuscular Development Index Scores from the MAND Test

Fine and Gross Motor Differences

Comparisons of the fine and gross motor components of the NDI with that of a normal population can be seen in Figure 3.7. Although these two components cannot merely be added to form the NDI (because of the complex scaled scoring system of the MAND), the relative contributions of fine and gross motor skills to the group's overall motor quotient can be gathered. The study group's fine motor rating compares more favourably with the normal population than their gross motor rating in that it lies around the mild disability to the lower end of normal. Whereas, the group's gross motor skills are clearly below the norm with all children at best considered to have a mild disability.

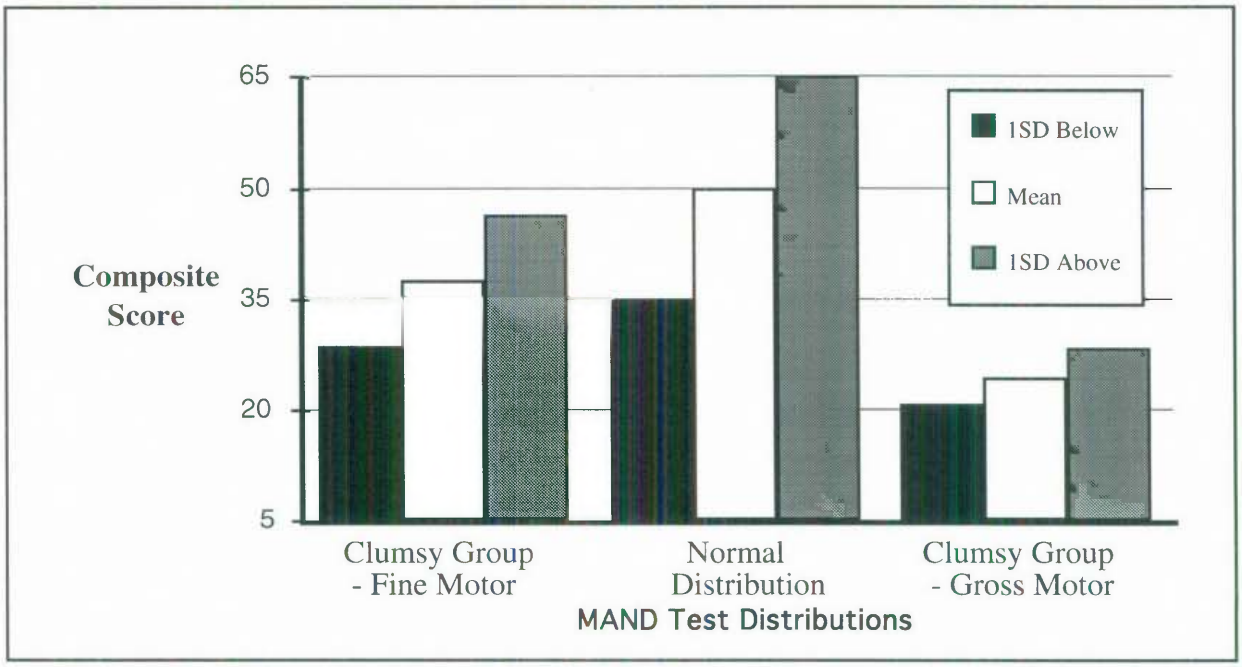

Figure 3.7 : Fine and Gross Motor Composite Scores from the MAND Test

OVERVIEW

The results of the MAND test give cause for concern, with some children regarded as severely disabled on some items of assessment. Although the motor quotient (NDI) showed none of the children are severely disabled overall, moderate and mild disability ratings can seriously affect motor functioning. In comparing the fine and gross motor components of the NDI within the group, the findings indicate lower levels of gross motor function compared with fine motor. However, even the fine motor skills of these children lacking, in general. There is no doubt that the neuromuscular ability levels of the group are low and would further detract from efficient control of movement actions.

PSYCHOSOCIAL BACKGROUND

Selected psychological, sociological and developmental information was gathered on the children, through the follow-up parent questionnaire and four measured scales of a standardised self-concept inventory. This section reports on that information in the following two sub-sections, namely: family, health and developmental background; and results of the Self-Concept inventory.

FAMILY, HEALTH AND DEVELOPMENTAL BACKGROUND

A parent questionnaire (see Appendix 17) was administered[3.4] approximately three months after the conclusion of the Gymstart program. The information relevant to this section is summarised in Figure 3.8, with three exceptions, namely: the incidence of health problems; referrals to other health professionals; and, parental educational background. Exclusion of the health information on the graph is due to the distinct lack of incidence or referral of the children for any problems which may have affected their participation in physical activity. Only one child had a serious health problem, that being the blood disorder spherocytosis, which could have contributed to movement deprivation. This child, and the consequences of this condition, are described in Chapter 6. The parents' educational background was so diverse that it was impractical to categorise this in any coherent fashion, suffice to say that there was no discernible pattern that would enable families to be grouped in any way. The ages of the children can be seen in Table 3.5.

Family demographics, from the bottom three clusters of factors in Figure 3.8, show no perceivable trends which may have a causal effect on clumsiness. The number of single parent families, the number of children in the family and the age position of the child in the family, are all characteristics which could be described largely as normal. Even the features

3.4 It should be noted that only 15 interviews took place, as two families moved away in the interim. The questionnaires were posted with follow-up telephone calls but only one was returned. Therefore, this section reports on the families of 16 children.

with greater magnitudes, i.e., two children in the family and families with both parents at home, are likely to be found as a high incidence factor in any group of families in the community local to the study group. Consequentially, the family demographics would not seem to point to an environment more likely to cause some impediment to movement accessibility.

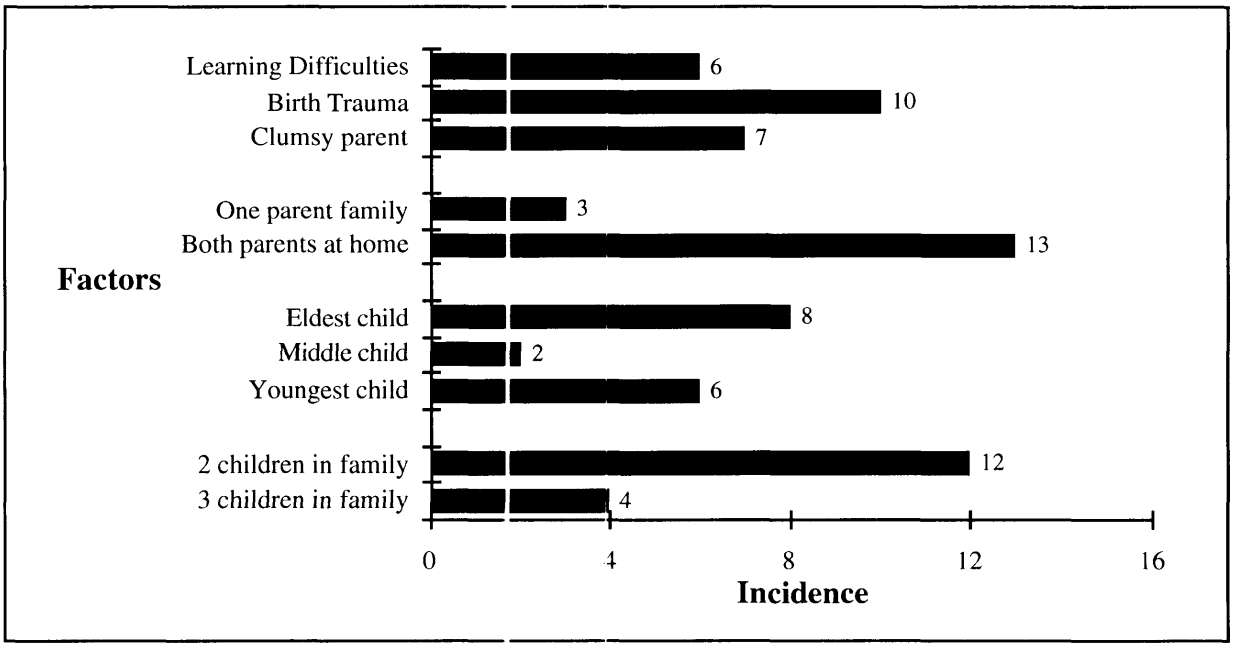

Figure 3.8 : Demographic Information

The trends in the top cluster of factors in Figure 3.8, despite being of lesser magnitude, are of more interest and relevance to the purposes of this study. These figures support documented research associating clumsiness with other factors, such as: learning difficulties (Vaessen & Kalverboer 1993); birth trauma (Walton, Ellis & Court 1962; Morris & Whiting 1971; Gubbay 1978; Arnheim & Sinclair 1979; Lifrak 1992); and, the incidence of clumsiness in other family members (Morris & Whiting 1971; Arnheim & Sinclair 1979; Hoare 1991). There is a higher incidence of learning difficulties in this group (approximately 35%) than in the general population (in the order of 4-10% - Eichstaedt & Kalakian 1993). The incidence of birth trauma in live-born infants has been reported at around 5-6% (Michelsson & Lindahl 1993) compared with almost 60% in the study group. Although there may be disparity in the interpretations of what constitutes birth trauma, the difference here is sufficient to be of some interest. There are few studies revealing the incidence of clumsy parents in a completely unbiased sample in the normal population, however, the hereditary factor in this group of children (approximately 40%), matches previously reported incidence in clumsy children (i.e., approximately 30% - Hoare & Larkin 1991b).

Despite the small sample size and possible discrepancies in definition between other studies and this one, in terms of what constitutes birth trauma or learning difficulties, the trends in

Figure 3.8 remain strong. The size of he difference between the study group's high incidence of associated difficulties, particularly birth trauma, and the normal incidence would to some extent counteract these limitations in making direct comparisons. At the very least these data suggest a confirmation of the trends on these issues which were reported in the literature and, therefore, contributing with other information gathered towards a description of the clumsy child.

SELF-CONCEPT INVENTORY

Four scales of the Self-Description Questionnaire 1 (Marsh 1990) were computed from the structured interview with the children and the following dimensions of self-concept were derived: physical ability scale; physical appearance scale; peer relations scale; general-self scale. These self-concept dimension scores can be seen for: individual subjects in Appendix 13; the group percentile rankings in Table 3.5; and, profiles of individual scales in Figure 3.8.

Table 3.5 : Percentile Rankings on Self-Concept Scales

Subject	Age (years)	SELF-CONCEPT SCALE Physical Ability	Physical Appearance	Peer Relations	General Self
Jack	6	45	11	33	65
Ross	8	57	59	74	94
Graham	6	33	20	9	16
Lance	7	33	73	33	80
Bruce	8	21	66	55	25
Dennis	6	87	95	79	80
Darcy	7	2	14	21	16
Ivan	6	17	42	68	96
Robert	7	45	73	25	96
Brian	6	57	86	49	96
Jill	6	67	73	59	31
Ann	7	37	19	31	10
Greta	6	96	95	95	96
Rachel	8	20	25	31	37
Emma	6	23	52	27	66
Cloe	7	5	28	72	16
Connie	6	74	47	38	58
Median	NA	37	52	38	65
Range	NA	5 to 96	11 to 95	9 to 95	10 to 96

Analysis of Table 3.5 and Figure 3.9 shows the study group to be ostensibly normal on these ratings, as a general trend. Three of the dimensions have profiles which illustrate an

approximately even split above and below the 50th percentile, with only the physical ability profile having eleven children below the 50th (see Figure 3.9). Even that lowest scoring scale, when examined more closely, shows a distribution of individual scores that would not be unexpected in a normal group of children of this sample size.

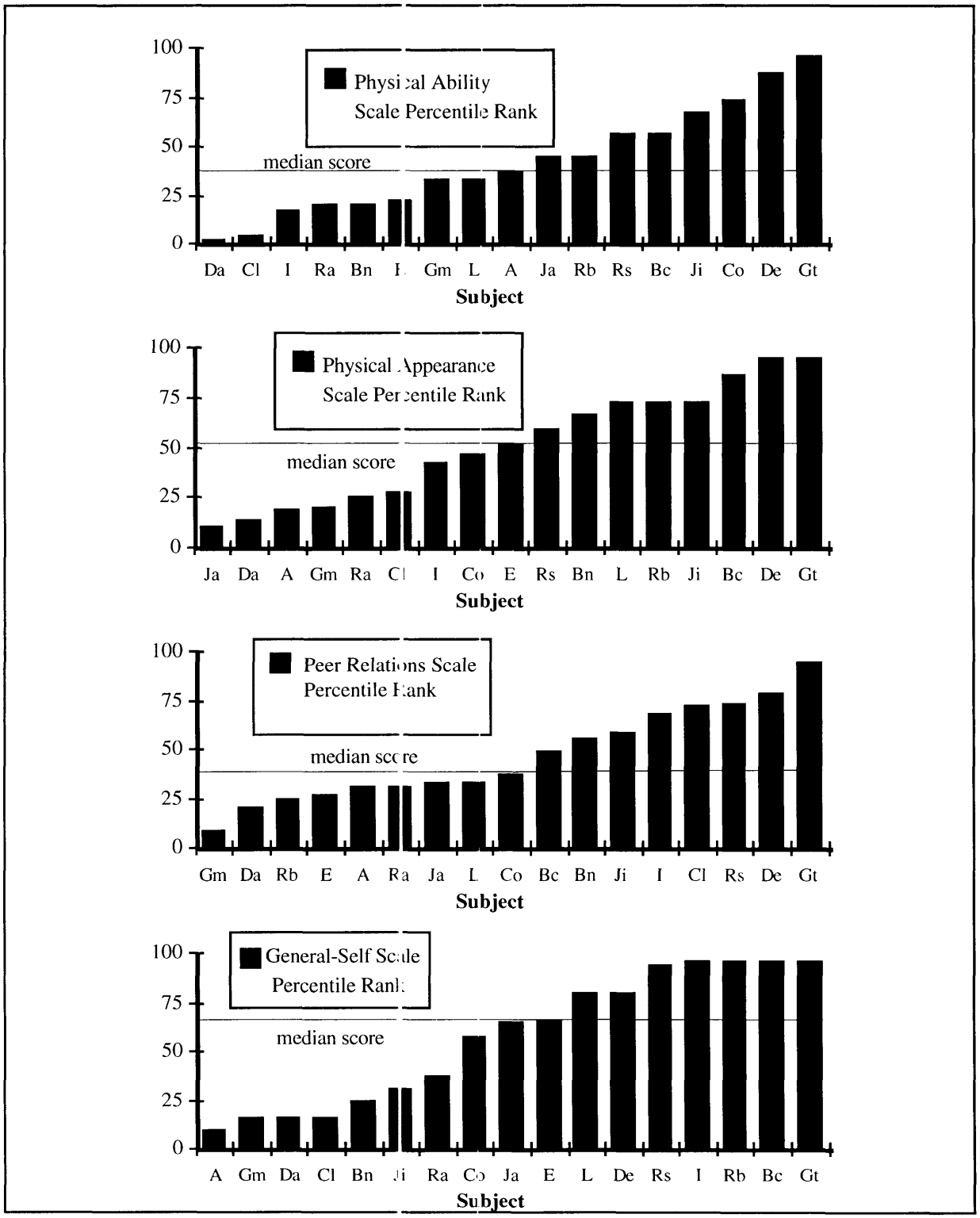

Figure 3.9 : Self-Concept Dimensions

Given that Marsh (1990) advised caution in interpreting the percentile ranked scores (i.e., only scores falling below the 25th percentile rank can be interpreted confidently as low or negative for the SDQ), then the profiles presented in Figure 3.9 are not a cause for alarm. The exceptions to this trend are in individual subjects, who have either a very low profile of the four scores or a very high profile (see Table 3.5). Both Graham and Darcy, have profiles that indicate they have a low opinion of themselves. All of Darcy's scores are below the 25th percentile and all but one for Graham. Conversely, Dennis and Greta seem to have a high regard for themselves, showing profiles of the four scores above the 75th percentile ranking, with all of Greta's scores falling into the top decile. However, although there may be concern for the former two subjects, or even Adam, the overall trend can be confirmed as approximating a normal population.

OVERVIEW

Family demographics of the study group show no characteristics which may have an affect on clumsiness. The incidence of single parent families, the number of children in the family, and position of the clumsy child in the family, did not differ from what could be expected in any selected group. Essentially, the family environments are unlikely to have caused limitations to participation in physical activity. However, the hereditary factor in this group of children matched closely the reported findings that one third of clumsy children have clumsy parents. There is also a high incidence of associated learning difficulties in the group, compared with the general population. Similarly, birth trauma is somewhat more prevalent in the study group than would be expected to occur normally. Conversely, the incidence of health problems or referrals to other health professionals, is remarkably absent in this group.

Four scales of a Self-Description Questionnaire 1 (Marsh 1990) were administered to the group and four dimensions of self-concept were derived. The children were predominantly normal on these ratings. Three of the dimensions have profiles which show an even distribution of scores, with the physical ability scale profile hinting, rather indecisively, towards a lower rating. The distribution of individual scores would not be unexpected in any group of children of this sample size, and all indicators from this major assessment focus point to the self-concept of the group as not being a detrimental factor to the children's movement inabilities. In fact, the corollary is also true, namely, that their inabilities as yet have not been detrimental to their self-concept.

RESPONSES TO THE REMEDIAL PROGRAM

The responses to the remedial program were assessed using five sources, these are: the children's attendance record; the homework record; information from the parent questionnaire; the instructors' reports; and, the pre and post test results. This section reports

the results of that information in two sub-sections: a general descriptive background; and summary data and initial statistical analysis of the measures used in the screening procedure.

GENERAL DESCRIPTION OF RESPONSE TO THE PROGRAM

Although the efficacy of the Gymstart program was not an integral part of this study, it was thought useful to analyse the response of the program by the children. Documented comments, informal anecdotal evidence and demographic data suggest the Gymstart program to be successful in its implementation and purpose. Success, in the eyes of the children, to a certain extent can be gauged by their willingness to participate and cooperate in all aspects of the program. Positive comments from the instructors in regard to these aspects, was a common feature of their reports. Furthermore, much can be gained by viewing the attendance and homework tasks record about the atmosphere generated during the program.

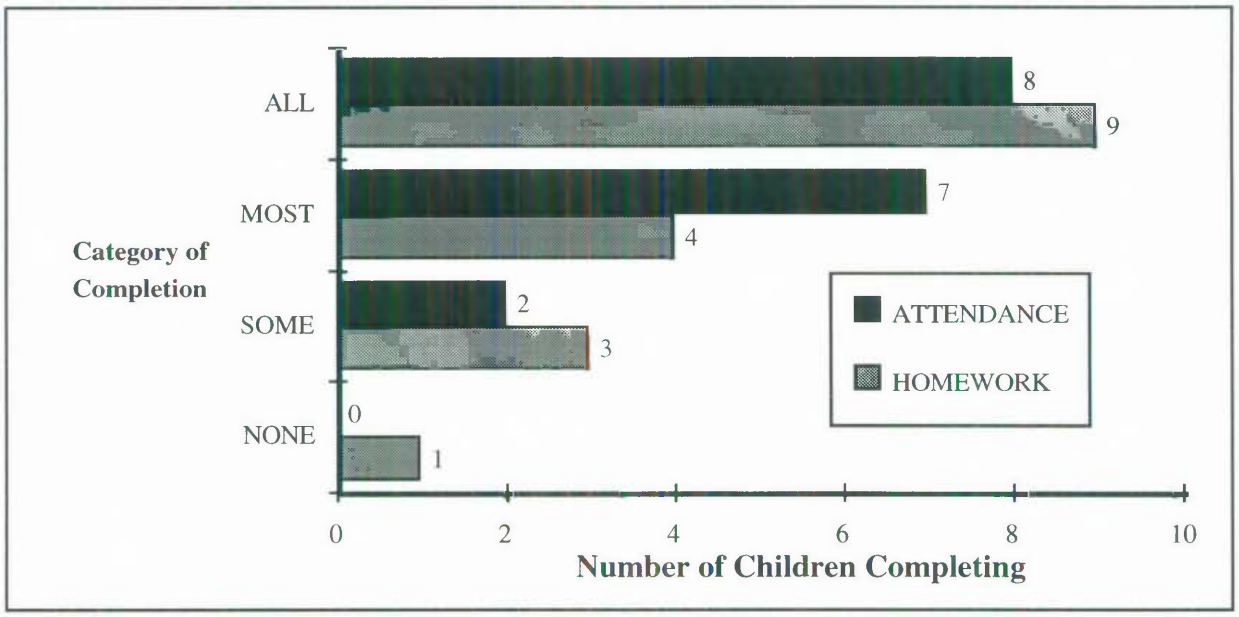

Figure 3.10 : Attendance and Homework Task Completion

Figure 3.10 shows the majority of children (n=15) attended all or most (at least 18/21) of the sessions and two children attended some of the sessions, both in the latter category attending sixteen sessions[3.5]. This regular attendance pattern points to the remedial program being enjoyable and/or beneficial to the child. In addition, the cooperation in completing tasks set as homework (see Figure 3.10), suggests further a perceived benefit of the activities by the child or parent. The results show a rate slightly less than attendance although there was still regular completion of homework tasks.

Parental perceptions of the effects of the program were addressed in the questionnaire and the responses are summarised in Figure 3.11. On face value, the parents were very positive about

3.5 The two children who dropped out of the program, in the first two weeks were not include in Figure 3.10, as no other information has been reported for them.