the effect of the program on their child. The majority perceived a boost in skill and confidence, fifteen the former and fourteen the latter. Thirteen parents saw an improvement in their child's motivation. Of those children whose parental response was not positive, none were negative (i.e., none saw a detrimental effect on any characteristic), and only one child was unaffected on all three characteristics.

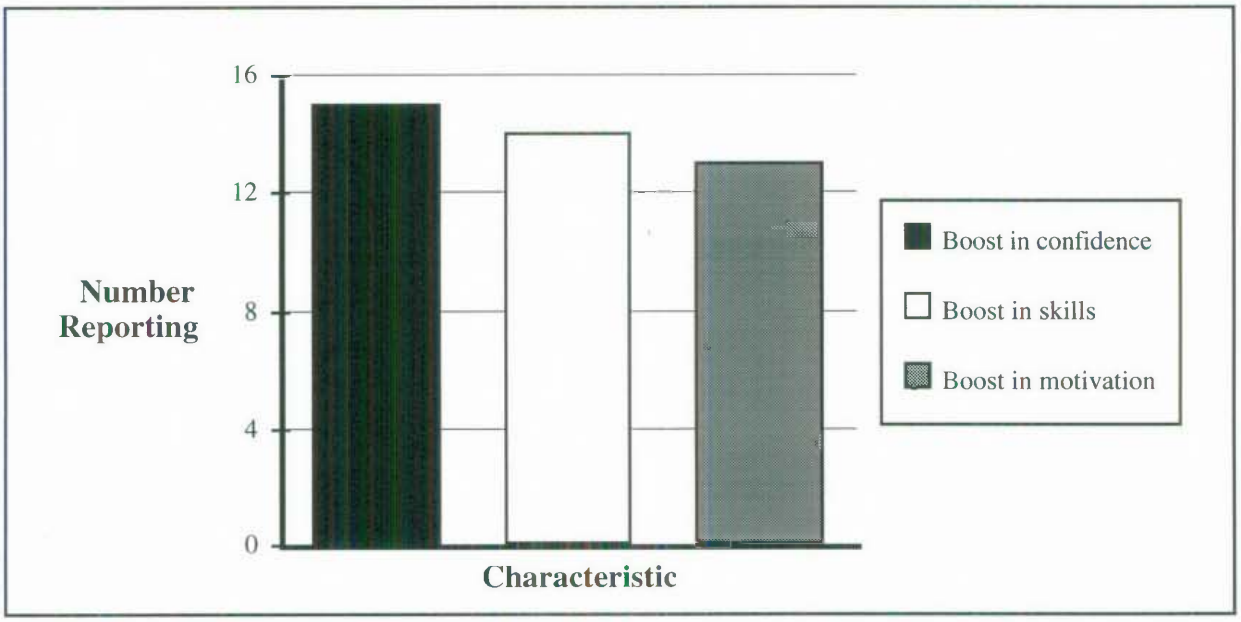

Figure 3.11 : Parent Perceptions of the Effects of the Remedial Program

One criticism of questionnaires, such as the one used for this study, is often the respondent gives the answer they think might please, particularly if the interviewer has been responsible for the program being evaluated. However, the positive trend shown in Figure 3.11, about the effects of the program, was reinforced by the instructors' comments. They reported consistently an improvement in skill levels, a rise in confidence and motivation of the children which enabled them to take on tasks previously not tackled. Further reinforcement of the parental views about the effects on the children came about during the course of the program through unsolicited comments to the program and research directors.

All the sources of information in this sub-section, suggest successes for the Gymstart program in terms of it being an enjoyable and effective activity. In isolation, information gained from any one of these sources, could be viewed with caution and interpretations somewhat premature. In combination, information from the following: the questionnaire; the instructors' reports; the attendance and homework task records; and anecdotal evidence, can be interpreted to conclude some success in implementation and effect.

SCREENING PROCEDURES

The screening procedures were conducted essentially for two purposes. The first purpose was to provide readily available diagnostic information on the children and for the instructors to

plan the initial sessions of their individual programs. The second purpose was to provide information that allows a comparison to be made of the child's performance at the start of the program and at its conclusion. In addition, the instructors were able to become familiar with the children and their reactions to a variety of tasks during this process.

The first purpose was achieved through the administration of the screening procedure during the pre test. The results of this test, provided a basis for comparison and a ready diagnostic profile. An example of a profile generated for the instructors by this procedure can be seen in Appendix 10. The second purpose was achieved through administration and comparison of the screening procedure conducted during the pre test and the post test.

Pre and Post Test Results

Figure 3.12 compares the group means on the seven measures taken, at the start and at the end of the program. The data were analysed using the doubly multivariate form of MANOVA, as implemented in SPSS. The analysis was doubly variate as there were seven dependent variables with repeated measures on each. The multivariate effect of time, as the within subject factor was significant (F = 6.5; DF = 7, 10; p = <.004) according to the Pillai Trace, Hotelling Trace, Wilks Lambda and Roy Largest Root criteria. The univariate results of the analysis are summarised in Table 3.6.

Table 3.6 : Screening Test Results and Analysis

Test Item	Pre-Test Mean	Post-Test Mean	Difference Mean	Standard Deviation	F Ratio (df 1,16)	Level of Significance	ETA Square
Shuttle Run	16.724	16.318	.4059	.7717	4.702	.046*	.22714
Dynam. Bal.	9.412	10.412	1	3.063	1.096	.311	.06415
Static Bal.	4.706	6.529	1.824	2.896	12.83	.002*	.44511
Thrw/ Catch	2.176	2.235	059	.831	0.197	.668	.01176
Stand. Jump	102	111.588	9.588	8.544	33.97	.000*	.67981
Dots/Circles	23.176	25	1.824	4.704	10.22	.006*	.38986
Station. Hop	26.059	27.24	1.176	18.748	0.423	.524	.02580

* significant at the 0.05 level

The linearity assumptions of MANOVA were checked by inspection of scattergram plots of pair-wise sets of dependent variables which proved generally satisfactory. The univariate assumptions of normality were checked by inspection of normal probability plots and computation of Z-scores for cell-wise skewness and kurtosis indices. Again these proved satisfactory with all but the standing broad jump (pre test) score falling within the ± 3 range

(Hair, Anderson, Tatham & Black 1995). The assumption of homogeneity of variance/covariance matrices was not tested statistically because the time effect had only two levels, i.e., pre and post test (Tabachnick & Fidell 1989).

The data analysis revealed some significant differences between test items on the trials. Closer examination of these items in Figure 3.12 in conjunction with Table 3.6 shows improvement on the shuttle run, the static balance task, the placing of dots in circles and the standing broad jump, and little or no change in the other three items. The findings of this analysis provides some statistical support for previous positive comments on the program's effectiveness. However, caution should be taken with the interpretation of these results due to the small sample size and the absence of a control group for comparison. Changes occurring during the period of the Gymstart program, may be due to maturation or other variables not controlled for in this study.

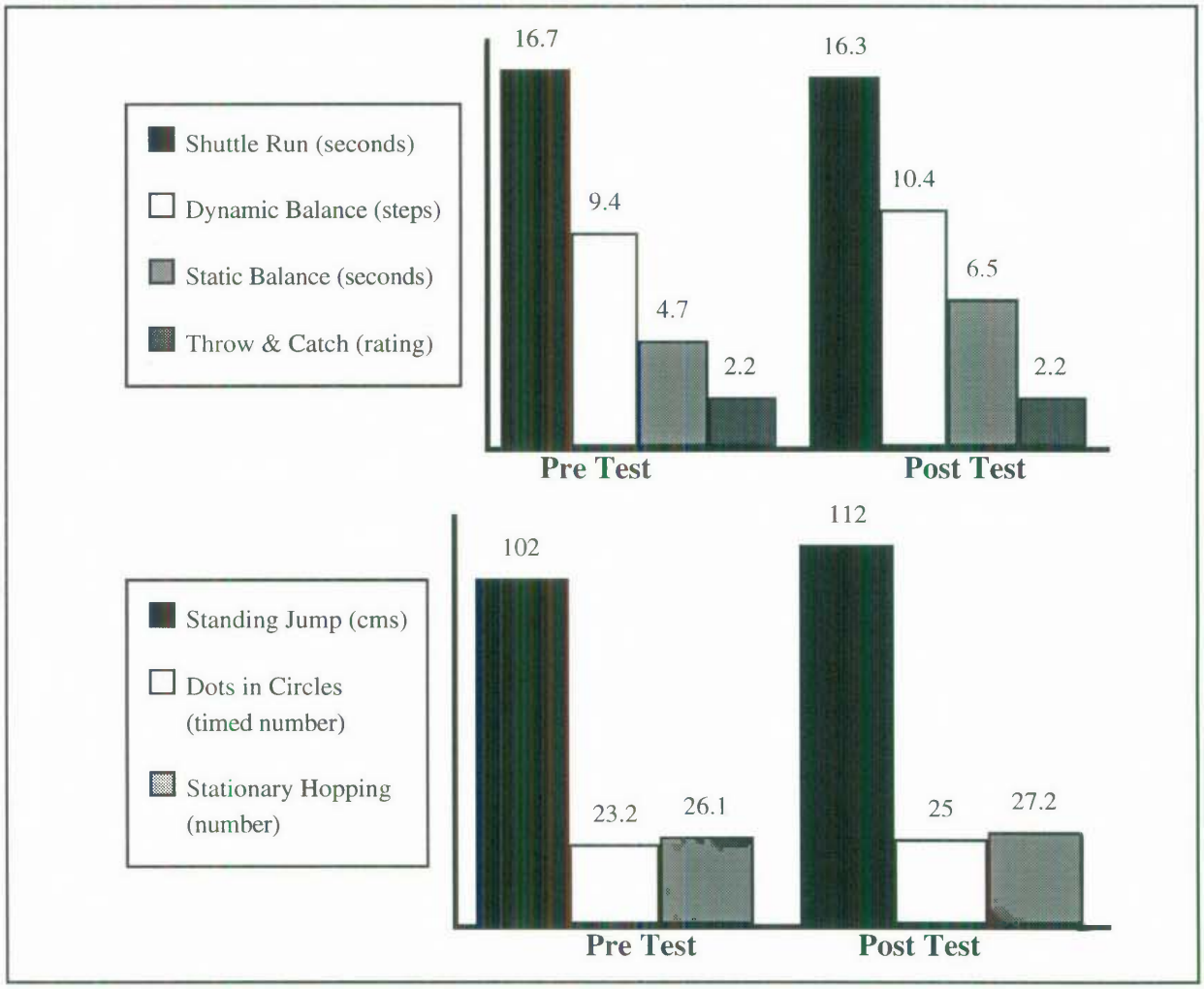

Figure 3.12 : Pre and Post Test Comparison of Mean Scores

Given the caution needed when interpreting analysis of data in this exploratory study, further statistical analyses were undertaken to confirm or refute the significance of the MANOVA analysis of the pre and post tests. These analyses revealed some interesting trends,

specifically in the correlational analysis across items in the screening procedure. These observations led to further scrutiny of the data and the creation of an additional line of enquiry. This line of enquiry was directed by a further research question:

(E) Do clumsy children exhibit more of a tendency to be task-specific in their motor abilities than normal children?

A supplementary study was entered upon, in the form of a comparison of the study group with a normal population of children. In considering the plan to address the research questions and general theme, presented in Chapter 2 (see Table 2.4) this new line of enquiry would be seen as a major offshoot to the first phase of the process and a sub-set of research question (A). This supplementary study extends one important aspect of the descriptive analysis of the study group into a more detailed statistical analysis. Due to its specific nature and interpretations justifying more than a chapter sub-section, this post hoc investigation is reported separately in the next chapter - 'Analysis of the Screening Test'.

Lateral Dominance

One item on the screening procedure which could not be retested for response, improvement etc., was determination of hand and eye dominance. Rather, this was checked on each trial for confirmation, or otherwise, in the event of dominance not yet being established. From the initial and repeated procedures: eye; hand; and therefore, cross-dominance, was determined. Figure 3.13 shows that there are ten children in the group who exhibit dominant right sidedness, two who exhibit dominant left sidedness and five who are cross dominant.

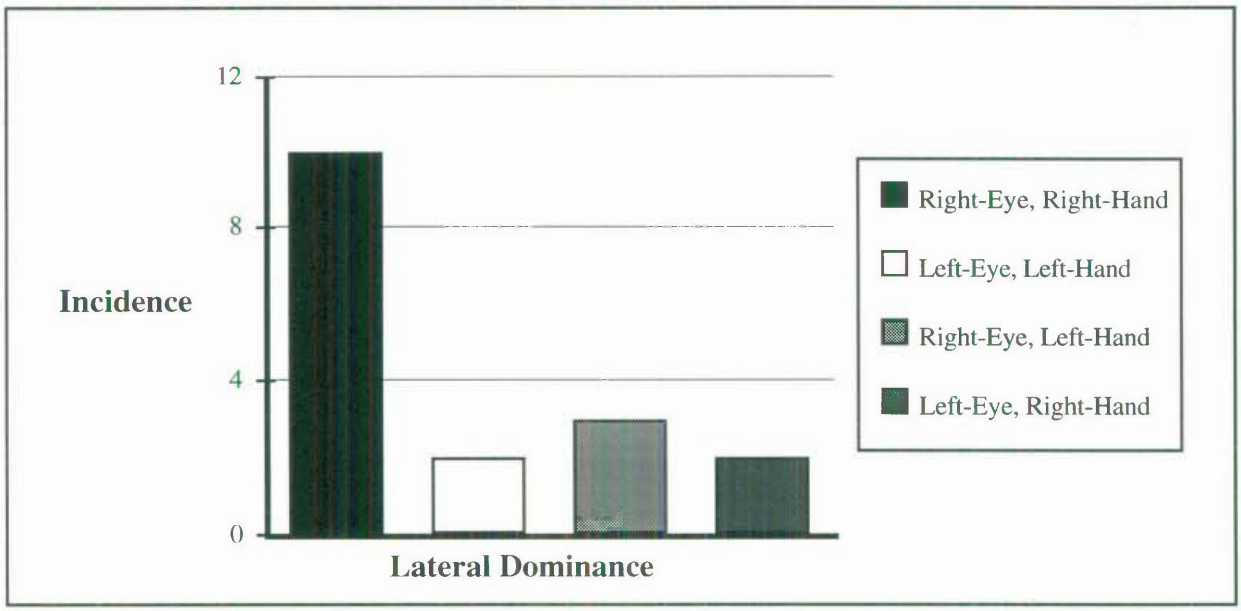

Figure 3.13 : Dominance of Eye and Hand in a Group of Clumsy Children

In comparison to trends for dominance in the general population of younger children (Gabbard 1992), this group is not unusual in its distribution of lateral preferences, i.e., right side dominance accounts for approximately 60% and hand-eye cross dominance

approximately 27% of children at age seven (Whittington & Richards 1987), compared with 59% and 29% in the study group.

OVERVIEW

Much of the descriptive data suggests the Gymstart program to be successful. The success in the eyes of the children is evidenced by their willingness to participate and cooperate in all facets of the program. Regular attendance, motivation to learn and task completion were particular features of the children's reaction to the program. Categorical comments from the instructors in regard to participation and cooperation levels, confirmed these features as indicating successful implementation. In addition, parental comment was very positive about the effect of the program on their child, the majority reporting a boost in skill, confidence and motivation.

Screening procedures were conducted for a number of purposes: to provide diagnostic information on the children; to provide a comparison of the child at the start of the program and at its conclusion; and to give the instructors an opportunity to become familiar with the children. Comparison of the group means on the seven measures taken, at the start and at the end of the program, revealed significant differences on four of the seven items between the pre and post test. The screening procedure also determined hand and eye dominance. Ten children in the group exhibit dominant right sidedness, two have dominant left sidedness and five are cross dominant. In comparison to trends for dominance in the general population of younger children, this group is not unusual in its distribution of lateral preferences.

SUMMARY

This chapter presented data on the study group in a mainly descriptive way, providing a comprehensive view of the children. In presenting this view, the chapter contributes to an assessment which gives both a detailed examination of the group as a discrete entity and important background information directing further analysis. The following major parameters were covered in the overview: anthropometric measures; fitness parameters; testing with the McCarron Assessment of Neuromuscular Development; psychosocial indicators; and the response to the remedial program. The notion of heterogeneity as a feature of clumsiness, evident in the literature, is confirmed in the findings of this chapter, although caution should be used in generalising from the findings as the sample population may not be representative of clumsy children due to its relatively small size.

The children in this study tended to be larger than their peers, with high levels of body fat and some mechanical disadvantages in their structure. The excess levels of body fat would disadvantage the children in a number of ways. As a biomechanical disadvantage, in particular when combined with limb segment disproportionality and a lack of strength and/or

hyperflexibility, it is likely to impair efficient movement patterns. Also, in combination with the low general or specific endurance levels, excess body fat would affect severely the efficiency of the cardiovascular system during physical activity. In addition, the neuromuscular ability levels of the group are low and would hamper further efficient control of movement for children who are overweight.

The family environments of the children are unlikely to have caused limitations to normal motor development. Hereditary disposition and the high incidence of birth trauma are much more likely to have been causal factors in their movement difficulties. Associated with their lack of motor proficiency was evidence of other learning difficulties in some of the children but the majority enjoyed a problem free medical history. The children were essentially normal on ratings of self-concept and other judgements of their self-worth. Neither was their level of self-worth a detrimental factor in their lack of movement ability, nor is their inability detrimental to their feelings of self-worth.

Much of the descriptive data suggests the Gymstart program to be successful and points to improvement in the children's skill, confidence and motivation as a consequence of participation and attitudinal change. The results of the screening procedures used to assess the program were encouraging, when evaluating the efficacy of the program. However, these results should be viewed in light of further analyses contained in Chapter 4, which reports on further analysis and exploration of trends emerging from the screening test data. In addressing the first research question:

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

this chapter points to attributes which may or may not characterise the clumsy child.

1. Attributes which may characterise the clumsy child are as follows :

- Ponderous build.
- Body composition high in subcutaneous fat.
- 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.
- Fitness level of the group was low, similarly detracting from efficient physical performance.
- Lacking stamina, speed and strength.
- High levels of flexibility.
- Neuromuscular ability levels of the group are low.
- Although fine motor skills of these children are generally lacking, the findings indicate lower levels of gross motor function compared with fine motor.
- Hereditary factor in this group of children, closely matches the reported one third of clumsy children having clumsy parents.
- High incidence of associated learning difficulties.

- Birth trauma is somewhat more prevalent.
- Willingness to participate and cooperate in remedial activities.

2. Attributes which may not characterise the clumsy child are as follows :

- Family environments are unlikely to have caused limitations to participation in physical activity.
- Incidence of health problems or referrals to other health professionals is absent.
- Self-concept of the group as not being a detrimental factor to the children's movement inabilities. In fact, the corollary is also true that their inabilities, as yet have not been detrimental to their self-concept.
- Distribution of lateral preferences are considered similar to the normal population.

As a result of the findings of this chapter, some descriptive features are beginning to emerge about the characteristics of the clumsy child. In identifying these features, the stated research question can be addressed, in part, and trends which may appear in the list presented suggest that there may a set of identifiable features which are common to clumsy children. In addition, information gained from identifying these features may confirm or alter the cause and consequence model in Figure 1.1. Synthesis of the changes needed to verify or modify that model occurs in Chapter 7, after each of the results chapters have contributed to that process.

Descriptive analysis alone cannot provide conclusive evidence without the support of appropriate statistical analysis of the data or in-depth case analysis. The next two chapters provide that additional statistical analysis and Chapter 6 considers case analyses.