Chapter 7

SUMMARY, DISCUSSION AND CONCLUSIONS

Clumsiness is a movement disorder that is characterized by an impaired ability to perform purposive skilled movements, generally in the absence of an obvious neurological disorder ... the disorder can be manifested in different aspects of motor behavior ... it should be mentioned that no two clumsy children are alike; there is a great variety of motor problems among clumsy children.

(Schoemaker & Kalverboer 1990, p. 241)

Introduction to Chapter

Every child should be given an opportunity to maximise his or her potential for movement development, particularly the child with motor difficulties, as the consequences are more far reaching than just a lack of physical prowess. Without help, clumsy children may suffer from a range of emotional, social and learning problems that will disadvantage them throughout life. Frequently, there is a lack of importance attributed by teachers to movement skill, combined with a lack of ability to identify and program for a clumsy child. This is ascribed usually to inadequate teacher training and the failure of school systems to recognise the problem. The apparent scant concern for these children is demonstrated by the scarcity of trained specialist physical education teachers in the primary schools and a dearth of systematic screening procedures for motor difficulties.

The variable nature of clumsiness is implicit in the statement by Schoemaker and Kalverboer (1990) above. The literature has confirmed consistently that there are many causes of a child being categorised as clumsy. Because of this variable nature, the condition cannot just be isolated by using a single label to diminish it to a perceived single problem. The combination of such effects as the cyclic nature of underlying causality, characteristics of the child, and the environment, are all contributing factors. This multiplicity of causes should be identified prior to treatment and a number of therapeutic approaches need to be considered. In addition, tests designed to screen for, and assess the extent of, a child's clumsiness often have problems with their effectiveness. Despite uncertainty in diagnosing the exact cause of an individual's motor difficulty, doing something to assist is clearly of benefit. It is vital that as much as possible is done to identify clumsy children and establish programs to improve their movement skills.

This study has investigated various aspects of the clumsy child in taking an holistic view and the findings are synthesised in this final chapter. The chapter is organised to examine and

summarise the study, giving both an overview and discussion of the findings, utilising four sections. Firstly, there is a description of the focus of the research, the general research theme and research questions. Secondly, the chapter summarises the findings of the study, providing a synopsis of the results from Chapters 3, 4, 5 and 6. The third section describes the implications of the investigation, for the causal model presented in Chapter 1, for practical purposes and for future research directions. Finally, the chapter concludes with a brief epilogue.

THE FOCUS OF THE RESEARCH

The approach taken by this study of the clumsy child was in accord with the theoretical base identified in the literature. This theoretical base centred mainly on motor control mechanisms and a broader view of the functioning of the child in an holistic sense. In addition, the approach acknowledged mild and somewhat unidentifiable neurological dysfunction, in particular motor planning deficit, as the underlying problem for most clumsy children. This was coupled with multiple and variable causes, and equally varied outcomes of the condition. The general thrust of the literature reaffirmed continually the heterogeneity of the condition as a main feature. Therefore, in order to gain a better understanding of clumsiness, it was deemed appropriate to investigate a large number of parameters of the condition as is possible in one study. This was taken as the general theme of the research and formed the basis upon which the research questions were set. The questions were:

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

It was expected that the answer to the first of these research questions would reveal a wide range of characteristics, confirming the notion of heterogeneity in the condition. Although useful in understanding the problem, the resultant information was of little value diagnostically, as the number of features identified were extensive. The subsequent research questions were investigated to provide more focussed answers:

(B) How do the identified features group together in terms of the capacities and competencies of clumsy children?

(C) Do clumsy children group together in more discrete sub-types based upon these identifiable features?
- If so, what are the characteristics of these groupings and/or which features show prominence in formulating the groups?

(D) How do these features manifest themselves and affect the individual child with motor difficulties?

A corresponding and complementary theme accompanied these questions which attempted to verify or modify, against the findings of this research, the model presented in Chapter 1 summarising the causes and consequences of clumsiness.

In analysing the data to answer those research questions, an unexpected trend, uncovered due

to the exploratory nature of the investigation, led to a divergence in the planned lines of enquiry. This supplementary study provided a further research question:

E) Do Clumsy Children Exhibit More of a Tendency to be Task-Specific in Their Motor Abilities than do Normal Children ?

The information gathered, through addressing these research questions provided some useful information for teachers and others who deal with clumsy children. As a result of investigating the research questions, the model summarising coverage of causes and consequences of clumsiness in the literature (see Chapter 1 - Figure 1.1), is modified to reflect more accurately the conclusions and reported essential trends in the literature. Where the literature lacked theoretical frameworks and studies which considered the multi-dimensional nature of clumsiness, this study took a comprehensive approach in testing across that multi-dimensional range.

SYNOPSIS OF THE FINDINGS

This section summarises and syntheses the findings of the study. It is organised into two sub-sections, namely, a summary of the results from each of Chapters 3, 4, 5 and 6, and a synthesis and interpretation of those results into an integrated set of findings.

DESCRIBING THE SAMPLE

Chapter 3 presented data on the study group in a mainly descriptive way, providing a comprehensive view of the children. In presenting this view, the chapter contributed to an assessment which gave a detailed description of the group and important background for further analysis. The chapter indicated that, in general, children in the study were larger than their peers, with high levels of body fat and exhibiting some biomechanical disadvantage in the proportions of their limbs. Height, weight and skinfold readings all tended to characterise the group as large and overweight children with few exceptions. The proportionality measures suggested that the lower limb segments of the group differed slightly to the normal population, while the upper limb indices differed considerably from the norm. This disproportion in the upper limb segments (i.e., low brachial index), coupled with excess body fat, would suggest a disposition to inefficient movement patterns even if all other dimensions were normal.

With the exception of flexibility, all fitness parameters measured determined the group as deficient in stamina, speed and strength. This would detract from efficient physical performance. However, the high levels of flexibility, seen in most of the children, could be attributable to weakness of the musculature, evident in the measures of the other fitness parameters. This hyperflexibility, without strong supporting structures, allows a large range of joint movement and subsequent loss of muscular control, with consequent disadvantages to

efficient movement. In addition, the low endurance levels combining with excess body fat, would affect severely the efficiency of the cardiovascular system during physical activity and predispose the children to a number of other health risks. The results of the MAND test gave cause for concern and confirmed this lack of proficiency in movement patterns. The motor quotient or NDI showing the children had mild to moderate disability in neuromuscular proficiency levels is further evidence of inefficient control of motor functioning.

The family environments of the children were, in the main, unlikely to have caused limitations to normal opportunity for participation in physical activity. However, hereditary disposition and high incidence of birth trauma seemed likely to have been causal factors in the movement difficulties. In addition, there was a high incidence of associated learning difficulties in the group, compared with the general population. Remarkably, the incidence of health problems or referrals to other health professionals was absent in the study group. Similarly, the children were shown as normal on self-concept ratings and subjective judgements of their self-worth. This implies that their feelings of self-worth did not determine their lack of movement ability and, conversely, their inability in movement was not detrimental to their feelings of self-worth. These findings directly contradict the association between self-worth and motor performance which is generally accepted as being strongly correlated.

The inclination of clumsiness to be heterogeneous in nature, evident in the literature, was upheld in the findings of Chapter 3. However, in addressing the first research question: **Is there a set of identifiable features which are common to clumsy children?** This chapter, although not able to answer the question conclusively, did provide useful pointers to further analysis. Chapter 3 showed that the clumsy children in this study could be described as possessing a broad group of attributes. Although these attributes are numerous, they help to characterise the clumsy child with the following:
• being tall and heavy;
• body composition high in subcutaneous fat;
• exhibiting mechanical disadvantages in the proportions of limb segments;
• possessing poor fitness levels, i.e., lacking stamina, speed and strength;
• showing high levels of flexibility;
• possessing low neuromuscular ability;
• a likelihood that other members of their families are clumsy;
• have associated learning difficulties;
• likely to have experienced a difficult birth;
• demonstrable positive response to remedial programs; and,
• accompanying perceived attitudinal changes in response to a remedial program.

THE SUPPLEMENTARY STUDY

Further analysis of the results of the screening procedure used in the Gymstart program revealed an interesting trend, namely. correlation coefficients that were computed across the screening procedure items revealed 1.o significant correlationships between any of the test items. As a consequence, the scope of the study was extended to explore these findings further, in order to compare the resu ts of the Gymstart group with that of a sample of the normal population. Correlation coelficients were then computed from the results of the screening procedure measures taken on this sample population. The new correlation matrix showed significant correlations between some of the test items. The highest correlation was between Dynamic Balance and Static Balance with partial correlations suggesting a significant direct relationship between these two aspects of motor ability. Leg Power and Running Speed were also correlated significantly with partial correlation contributing strongly to the relationship. There were other significant correlations between test items, but no others maintained their significant relationship under the scrutiny of partial correlational analysis.

In practical terms, a relationship between like abilities, e.g., static balance and dynamic balance or leg power and running speed, might reasonably be expected. The relationships in these two examples can be explained in both practical and statistical terms. However, the lack of correlation between motor abilities of children in the main study group, compared with abilities which seem to transfer across in the normal group, suggested that clumsy children have a different disposition. The findings of Chapter 4 concluded that clumsy children exhibit more of a tendency to task-specific in their motor abilities than do normal children.

THE CLUSTER ANALYSIS

The relevant data were analysed, using a cluster analysis technique, to establish whether the children could be grouped into types, according to the results of the testing. In addition, those variables which played a vital role in determining groupings was of value in identifying important characteristics. In doing so, this identification of aspects of measured characteristics and of the children, was seen to be useful in answering research questions (B) and (C). Moreover, it can be maintained that clumsy children can be sorted into more homogeneous groups, when classified on the basis of a number of determinants and that number of determinants can be collapsed into a more meaningful and practical set of characteristics.

Clustering of the variables provided confirmation that NDI, flexibility and brachial index are important indicators. It is likely that children who exhibit this combination of characteristics will experience some difficulties in movement. The significance of these findings can be viewed in conjunction with the results presented in the descriptive chapter. Specifically, that

these three measures were prominent also in describing the study group and may well be important characteristics of clumsy children. Given that they also played a vital role in clustering the groups of subjects, these parameters are among those considered as identifiable features of clumsiness, thereby substantially addressing the first research question.

In grouping clumsy children into possible sub-types, the cluster analysis used the seventeen variables to group children basically into three categories. Firstly, there was a grouping based principally upon NDI and Crural Index with secondary importance given to Skinfold rating. Secondly, a grouping emerged which was based upon Brachial Index, Flexibility and General Self. Thirdly, a category of cases which proved individuals or pairs to exhibit strong independence from those more homogeneous groups, became evident. Table 7.1 shows the main features of these clusters.

Table 7.1 : Features of the Clustering of Cases

Cluster	Membership	Most Compatible Variables	Incompatible Variables
1	9	Low NDI Low Crural Index	Relative Sitting Height Height, Leg Power General Self
2	4	Low Brachial Index High Flexibility High General Self rating	Crural Index Stamina
3	2	Low Brachial Index Weak Arm Strength Mid-range Stamina Low Skinfold rating Average Height Weight (heavy)	Crural Index Abdominal Strength.
4	1	Distinguishing features : High Physical Ability Scale Very Low in Leg Power & Weight	Not Applicable
5	1	Distinguishing features : High Crural Index Low Relative Sitting Height Average Skinfold	Not Applicable

The subjects in the largest cluster formed a group as a result of closeness formed by the NDI and Crural Index and were least alike in Relative Sitting Height, Height, Leg Power and General Self measures. The next cluster formed as a result of closeness in Brachial Index,

Flexibility and General Self. They were least alike in the Crural Index and Stamina variables. The paired cluster formed as a consequence of affinity in Brachial Index, Arm Strength, Stamina, Skinfold, Height and Weight. They were least alike in Crural Index and Abdominal Strength. The most independent subjects in the remaining two 'clusters' were distinguishable due to their ratings in Physical Ability, Leg Power, Weight, Crural Index, Relative Sitting Height and Skinfold. Although these variables were not necessarily those at the extremes of the percentile ranks reported in Chapter 5, Table 7.1 illustrates the variables that differentiated these individuals.

When the clustering of cases is combined with results from the descriptive analysis, the potential of certain variables as possible discriminators of clumsiness becomes much stronger. In identifying parameters as such, only if they appear consistently with, and can be supported by, the other two methods of analysing the data used in the study is it possible to suggest potential discriminating characteristics. Prominent in meeting this criteria are flexibility, brachial index and NDI. These emerge with the potential to provide observable features in identifying the clumsy child.

CASE PROFILES

In the in-depth analysis, provided by individual case studies, more evidence emerged to support the identification of characteristic features in clumsy children. In addition, further important features came to light, as a consequence of the conclusions drawn from the in-depth analysis. The research question which asked how the identified features of clumsiness manifest themselves and affect the individual, was answered in broad terms due to the comprehensive nature of the information gained in the reporting of individual cases.

The conclusions from the case profiles suggested at least one person in the families of the three profiled children showed signs of clumsiness. This endorsed the conclusions identified in the literature and typified the group trend, which suggested an hereditary factor is evident in a substantial proportion of clumsy children. Similarly, all three children in the case studies had experienced birth trauma, once again representative of a large minority of the study group and endorsing literature opinions. These factors, coupled with indicators of mild to severe motor disability from the MAND test results may suggest indeterminate neurological damage.

The case study children selected also typified the group, in that generally the home environments were supportive, in terms of an atmosphere of care and concern for the children's needs. However, in the three cases, there was a background of some difficulty in early childhood, which may have affected their motor development. This history of difficulty could be linked across the three cases as forms of movement deprivation, due to a variety of factors which limited their opportunity for physical activity.

Attributes in body dimensions and proportionality in the cases examined, demonstrated both a similarity and contrast in features, exemplifying the findings of the cluster analysis. Commonality existed in biomechanica disadvantages of one kind or another, all having a low brachial index and diversity existed across height, weight and skinfold readings. However, a good deal of similarity was found in the fitness levels of the three children described in the case profile chapter. The level of fitness in each case, characterised by low levels of stamina, strength and power, is seen as detrimental to efficient physical performance. These indicators of physical capacity are representative of the study group, in particular the proportionality profiles which suggest some mechanical difficulty for movements involving limb segments. Graham, Ann and Lance had motor impairment levels of some concern, with the main indicator used for overall neuromuscular development, i.e., NDI showed mild to moderate disability levels. All three children tended to be task specific in their motor abilities, endorsing the findings of the supplementary study. These levels of motor impairment would decrease the capacity to plan and control for efficient performance of movement tasks and they are consistent with trends shown by the study group. Conversely, two of the children were cross dominant, which was not typical of the group, where the incidence of cross-dominance was similar to that of the general population. The analysis of the children's performance through video and instructor observations, reveals similarities and differences. All three children have difficulties with balance, coordination and ball skills. The extent of problems encountered and the combinations of coordination inabilities were diverse. All three responded well to the remedial program, showing positive attitudes towards all aspects of the remediation, once again typical of the group response.

All three children had a different self-description profile across the four factors measured. Contrary to the literature, this area of assessment for the study, in general revealed little about the nature of the clumsy child. The instrument used, the small sample or the ages of the children are all factors which may have contributed to the lack of noteworthy findings in the analyses. However, in terms of other indicators of socialisation, two trends were apparent in the three children in the case study. Firstly, very positive relationships with other children in the program and high levels of cooperation and personal attributes, were reported by the instructors. Secondly, all observers reported rises in the children's confidence as a consequence of participation in the program. In general, this inclination could also be seen in the group as a whole, although the second trend was reported more frequently. However, perceived successes of the Gymstart program with these three children could also be due to individual attention or its novelty value, rather than to any consequential effect of the program's structure.

SYNTHESIS OF RESULTS

Combining the sources of data analysis from the four results chapters, presented in both qualitative and quantitative ways, provided a comprehensive view and multi-faceted analysis of the children. These combined results indicated that children in the study were, in general: larger than their peers; with high levels of body fat; some mechanical disadvantages in body proportionality; and, demonstrated the tendency for task-specificity coupled with low levels in motor proficiency. With the important exception of flexibility, most physical capacity parameters determined the group as disadvantaged for efficient movement skills. The higher levels of flexibility evident in most of the children was seen to be a disadvantage for efficient movement. This hyperflexibility, without strong support from the musculature, detracts from the efficiency of physical performance The most important of the parameters measured were: a mild to moderate rating on NDI, showing a lack of neuromuscular development and control; high flexibility rating, indicating potential for weakness in articular joint actions; and low brachial index, suggesting a biomechanical disadvantage in movements involving the upper limb. These three attributes, established the basis for identification of characteristics of clumsy children and the possibility of sub-types.

In addition, evidence to support the identification of characteristic features in clumsy children, emerged from the descriptive analysis and the individual case studies. Some features or trends from these analyses were not easily quantified. Consequently, although pointing to important characteristics they were not able to be included in the statistical analysis. However, it is necessary that hereditary factors, birth trauma, movement deprivation and associated learning difficulties, are identified as discernible features which emerged in varying combinations across the group. Conversely, the incidence of health problems or indications of low self worth was generally uncharacteristic of the group.

CONCLUSIONS

The notion of heterogeneity as a characteristic of clumsiness was confirmed by the findings of this study. However, the findings suggest also that clumsy children can be sorted into more homogeneous groups, when classified on the basis of a number of variables. In addition, those variables can be reduced and described as a manageable and practicable set of characteristics, which may be useful n the identification of the clumsy child. In addressing the research questions associated with those issues, the following conclusions can be made:

1. Clumsy children can be identified as likely to possess any combinations of the following characteristics: they are taller and heavier compared with their age peers; body composition high in subcutaneous fat; mechanical disadvantage in the proportions of limb segments; poor fitness level, particularly lacking stamina, speed and strength; high levels of flexibility; low neuromuscular ability; other members of the family who are clumsy; associated learning difficulties; have experienced a difficult birth.

2. Clumsy children can be characterised more specifically and definitively as: presenting with low neuromuscular ability and motor control; displaying more task-specificity in motor abilities than their normal peers; showing a level of hyperflexibility in combination with weak musculature, as to be detrimental to efficient movement; exhibiting some biomechanical disadvantage, probably of the upper limb.

3. There is a possibility that sub-types of clumsy children can be identified on the basis of neuromuscular control determinants or on certain physical capacities but the causes of clumsiness remains multi-dimensional.

However, because it is unclear whether the sample in this study may or may not bw representative of the population of clumsy children, caution should be taken in generalising the findings.

IMPLICATIONS

This section discusses the implications of the study's findings in terms of the following: the causal model; practice; and, future research. It is organised in three sub-sections which cover these areas.
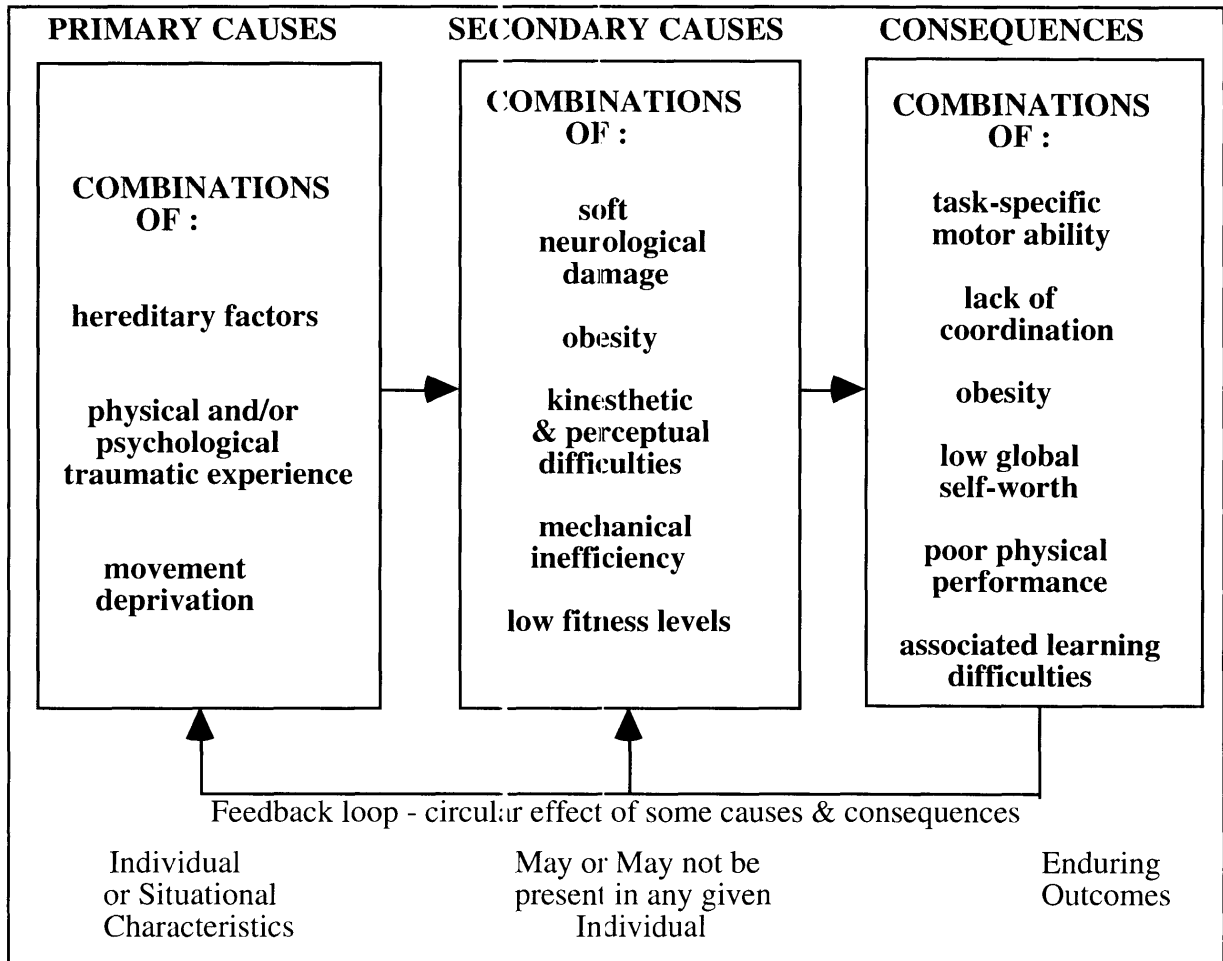
THE CAUSAL MODEL

Further to the conclusions formulated in the previous section, the model postulated in Chapter 1 (Figure 1.1) can be modified. Although the causal model might have been considered only conceptual as a framework, in that it infers a good deal of its theoretical basis from an amalgamation of the findings in the literature, it has still been a useful guide for analysis. In addition, only tentative conclusions as to its legitimacy as a theoretical framework can be made due to the sample population size used to test its validity. Notwithstanding these limitations, important changes to the causal model have emerged from this study, they are as follows:

- Developmental delay is removed as a secondary cause, as no evidence for a lack of maturation as a factor in the cause of clumsiness in this study was apparent. Conversely, maturity indicators showed the children to be skeletally advanced and socially normal. The literature points also to the delay theory being ostensibly disproved.

- Cross-dominance or lateralisation is removed as a secondary cause. The study suggested the children's handedness traits and incidence of cross-dominance is close to the normal population.

- Low global self-worth is removed as a secondary cause, as this study showed that the children's confidence and self-concept measures are similar to the normal population. However, when considering the consistent reports in the literature of a strong link between these factors and clumsiness, it may be that low self-worth would be an outcome of clumsiness in later years but not a direct cause.

- Kinesthetic problems were specified with the perceptual difficulties, as they would seem from the literature and the results of the MAND test in this study to be the most common perceptual problems in clumsy children.

- Obesity appears now in both the secondary causes and consequences as it acts in both capacities, i.e., obese children are mechanically disadvantaged or movement deprived as a consequence of their obesity and clumsy children may become obese because of their lack of opportunity or disadvantages for movement experiences.

- The feedback loop has been added to illustrate the possible circular effect of many consequences and even secondary causes themselves, like obesity, become similar to the primary causes, e.g., obesity may cause movement deprivation, the impact of poor coordination may result in traumatic social experiences.

- The important finding of the supplementary study that task-specificity in the motor domain would seem to be a further distinguishing feature of clumsiness adds another dimension to the model not included initially.

- Associated learning difficulties has been added to the consequences due to the incidence in the study group and supportive literature. Learning difficulties are not given a more prominent place in the model, as to do this would be contradictory to the central definitions of clumsiness, suggested in Chapter 1. However, the importance of the association between more academic learning difficulties and motor difficulties cannot be ignored. Research on the link between motor development and other forms of development has only recently considered difficulties with the motor domain as a primary cause of difficulties in other domains (Bushnell & Boudreau 1993), rather than prevailing view which suggests it is the reverse.

Figure 7.1 shows the variation to the model, with primary causes remaining unchanged, modifications to secondary causes and consequences because of the findings of this study.

PRIMARY CAUSES	SECONDARY CAUSES	CONSEQUENCES
COMBINATIONS OF : **hereditary factors** **physical and/or psychological traumatic experience** **movement deprivation**	**COMBINATIONS OF :** **soft neurological damage** **obesity** **kinesthetic & perceptual difficulties** **mechanical inefficiency** **low fitness levels**	**COMBINATIONS OF :** **task-specific motor ability** **lack of coordination** **obesity** **low global self-worth** **poor physical performance** **associated learning difficulties**
Feedback loop - circular effect of some causes & consequences		
Individual or Situational Characteristics	May or May not be present in any given Individual	Enduring Outcomes

Figure 7.1 : The Relationship Between Causes and Consequences of Clumsiness in Children (modified)

IMPLICATIONS FOR PRACTICE

This study has provided information which can assist in identifying the clumsy child. The implication for the teaching profession is that those dealing with younger children are now in a better position to identify those most at risk from movement difficulties. The information from this and other studies will assist the teacher to be able to do this. In practice, the education of primary school and physical education teachers through teacher training can now include more substantial preparation in identifying and programming for children with movement problems, in light of this study's findings and the process which brought about those findings. In addition, those teachers already in the system can be provided with in-service programs to develop the necessary skills and knowledge commensurate with their pre-service counterparts, as a consequence of growing awareness of these issues.

This study provides the sort of information which may be included in training and development courses or units of study for teachers. It would provide relevant content and strategies seen as useful for dealing with clumsy children. In particular, screening procedures and observational checklists may be developed as a consequence of the initial findings of this

and similar studies. The next step in providing relevant information and background is to conduct more specific research into issues arising directly and indirectly from this study which focuses on assisting teachers to identify and assist children experiencing movement difficulty.

IMPLICATIONS FOR RESEARCH

The research implications arising from this study can be categorised as follows: those which emerge as a direct consequence of the research findings; and, those which transpired indirectly, emerging more esoterically as a consequence of the research process.

Direct Research Implications

The most important research implications arising from this study are those which initiate recommendations for future studies. Principally, the findings of this study would indicate the following recommendations for the type of studies which may investigate the nature, identification and causes of clumsiness in children :

1. A study which investigates the anthropometric characteristics of clumsy children compared with their age peers could focus specifically on measures of body segments seen as important biomechanical factors in affecting movement skills. The study should compare a normal population with a clumsy population, be quantitative in nature and involve a substantial number of children across a range of age groups.

2. A study which develops a practical, reliable and valid screening procedure for teachers to monitor neuromuscular development in children could be undertaken. The study would compare results of using a checklist and screening instrument, based upon those used in this study, with standardised tests of motor dysfunction, such as the MAND test. The investigation should be conducted with a heterogeneous population of children across a range of age groups, its principal aim to test the predicability of the screening process for motor dysfunction.

3. A replication of the study undertaken as a supplementary to this study and reported in Chapter 4, is needed. Reinforcing the study with larger numbers of subjects, particularly with a clumsy population, to add statistical robustness to the findings.

4. A study which tests the revised causal model, using it as the theoretical framework which drives the investigation, would add to the growing body of literature on causality.

Indirect Research Implications

Indirectly this research has produced a number of issues surrounding the various facets of

clumsiness. These issues and recommendations for investigation are as follows :

1. Birth Trauma - a number of types of investigations could be undertaken into the effect that trauma at birth has on motor development. Studies of clumsy children, documenting case histories of their birth and their development during infancy could be of value in this sphere, as would longitudinal studies of infants subsequent to a traumatic birth.

2. Parental Attitudes - as a consequence of conducting interviews with parents of children in this study, the issues of parental attitudes towards: children who are low achievers in movement skills; the necessity of movement experiences in childhood; and, the type of movement experiences which are appropriate for young children, warrants further investigation. This could be carried out by continuing group research or case study analysis through extensive questionnaire and interview techniques.

3. Movement Deprivation - emerges as the single most important classifier of causality, to have not yet been investigated in any serious way. Movement deprivation of one kind or another covers issues from: physiological incapacity, as was the case with one of the children reported in case profile in this study; through environmental barriers such as living in high rise accommodation or remote rural settings, common in Australia; to lack of parental encouragement, suggested in point 2. The research techniques utilised in this study would seem the most appropriate for this wide ranging topic, i.e., a blend of descriptive, quantitative and case study methods.

4. Effectiveness of Remedial Programs and Instructional Strategies - in terms of program evaluation, the difficulty lies in the differing populations and approaches to remedial programming adopted in different locations. However, it would be possible to compare group instructional approaches with individualised programs, as would adoption of different strategies with children within the same program. Controls of treatment, non-treatment, clumsy and normally skilled children would need to be added to the techniques used in this study, as would appropriate numbers to render statistical analysis more reliable.

5. Maturational Lag - if developmental delay is to be dismissed completely, then systematic research into clumsy children across wider age spans is necessary. Two main issues of investigation need to be addressed: what is the maturity level of the clumsy child, i.e., can we gather more information on other measures of maturity than chronological age, e.g., radiological or sexual age?; does the clumsy child become a clumsy teenager and then a clumsy adult? A descriptive analysis of clumsy children covering all aspects of maturation at various stages of development would serve to investigate the first issue. The second issue would be best served with longitudinal studies, where small numbers are inevitable, supported by cross-sectional studies providing numerical rigour.

EPILOGUE

This study was conducted to investigate a number of issues associated with motor clumsiness in children. In conducting the study, an approach consistent with a humanistic attitude to dealing with children and an holistic approach to dealing with the employment of investigative techniques was taken. Given the constraints imposed by time, location and resources, the research and associated activities proved beneficial. The beneficiaries were the children themselves, the staff and students who participated in the Gymstart program and the investigator. The benefits were that some knowledge of the nature and causes of the condition was gained and that the investigative methods used in tandem were a valuable indicator to the appropriateness of research techniques which might be used for similar projects. Most of all, the study provided an awareness to everyone involved about the difficulties that children experience as they cope with disadvantages of any kind. This is particularly the case when the disadvantages are limiting children in their ability to participate in socially desirable pastimes. As with most learning experiences, the ensuing awareness has served also to enlighten the investigator to the fact that there is so much more to learn in this area.

In concluding, the words of the parents of one girl who participated in the remedial program encapsulates the plight of the clumsy child. Firstly, in the father's early comments and then leading to a more positive view from both parents. That positive view was particularly evident in the mother's summary, and, the impetus to do more is identified as a valuable aim for all those concerned with helping these children.

FATHER: *I think that it is just achieving and feeling more confident, she came home about eight weeks ago from school and a relief teacher who didn't do things the way it was normally done ... she came home in tears because she had done the wrong thing and missed the ball and other kids had laughed at her ... I thought you'll do better next time and I don't want her sitting out. But a couple of weeks ago she came home all happy and smiles, she did two home runs and now she has done it once or twice I'm sure she will be right! Because she certainly is not shy in class any more, she is more confident and sometimes even a leader in class.*

MOTHER: *I would like my children to have better basic skills than I have because it opens many doors, apart from anything else. And even if there is only one thing they are good at, if they are happy to be good at that, that's fine with me. I know there have been times in my life when people, a group of people like in College, or whatever. They say, let's go have a hit of tennis and they all have a wonderful time with their hit of tennis. Now, either you can go and have a hit and giggle session or not go depending on how you feel I suppose. But it is easier if you are competent , you don't have to be wonderful but if you can do the basics of it, it is definitely easier. I would like to see them (her children) at least reach that level where they can say, yes I will come.*