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# Dyspraxia: The Current Reality in Mainstream Schools and Implications for Classroom Practice

**The author describes a study which examined the incidence of dyspraxia among mainstream primary school children in the west of Ireland. Definitions and educational characteristics of dyspraxia are discussed, and the impact of dyspraxia on primary school children is explored. The identification, underlying causes and diagnosis of dyspraxia are outlined. Information gleaned from the study is analysed with a view to developing intervention strategies to enhance provision for children with dyspraxia in primary schools.**

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**TREASA KIRK is an Inspector of schools in the West of Ireland with the Department of Education and Science.**

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## INTRODUCTION

> *I don't like having dyspraxia because it makes me fall over some of the time and I get sore knees. I can't do gym very well, at least the gym that they do, but I can do lots of things they can't. Sometimes I can fly! But no one picks me to be in their team and that makes me cry because they don't think I can play. And I forget things and people get cross. I'm not very good at writing but my teacher says I have a wonderful imagination and when she has time, she writes out my stories and puts them on the wall and that's really good. One horrid boy said I was stupid to have to get her to write for me. Is that true?*
>
> (Reflections of a seven year old child with dyspraxia, Macintyre, 2003, pp.47-48).

The trend towards inclusion has led to a greater awareness and interest in specific learning difficulties such as dyspraxia, more recently encompassed under the umbrella term Developmental Coordination Disorder (DCD). Dyspraxia is a disorder of sensory integration that interferes with the ability to think through, plan and execute sensory and motor tasks (Kirby and Drew, 2003). The difficulties associated with dyspraxia have been recognised for the last 100 years. This condition has recently attracted more attention since the establishment of various trusts, foundations and parents' movements in conjunction with the enactment of the *Education Act* (1998) and more recently the *Education for Persons with Special Educational Needs Act* (2004), and the resulting obligations on the state to provide an automatic response.

Following an extensive literature search it is apparent that there is a lack of research into the educational implications of dyspraxia in Ireland. Miller, Missiuana, Macnab, Malloy-Miller and Polatajko (2001) contend that research on children with DCD has been restricted due to problems of definition and identification.

## INCIDENCE

According to British statistics 6-10% of all children have some degree of dyspraxia or movement difficulty and of this six to ten per cent of children diagnosed, two per cent will be severely affected (The Dyspraxia Trust, 2000, cited in Macintyre, 2003a). Additionally, 50% of children with dyspraxia have another difficulty (Macintyre, 2003a) and there has been an 80% increase in the number of children who have been identified as having a specific difficulty which hinders their learning (Keen, 2001). It seems reasonable to assume that there are similar rates of incidence in Ireland.

There is general agreement in the research literature that boys and girls are affected in the ratio of 4:1 respectively and when girls have the condition they tend to be more severely affected (Dyspraxia Foundation, 1999). The incidence of boys in the small-scale survey conducted in the west of Ireland, described below, is similar to the gender distribution shown in many other studies of children with DCD (Miller et al., 2001; Missiuna, 1994). To date there are no definitive reasons why boys form the larger group, although boys also tend to be over-represented in other groups of children with learning disabilities and specific learning difficulty (Barnhart, Davenport, Epps and Nordquist, 2003). It is also suggested by Barnhart et al. (2003) that this difference might reflect higher referral rates for boys, as the behaviour of boys with motor coordination difficulties may be more difficult to manage at home and in the classroom.

## WHAT IS DYSPRAXIA?

The term ‘dyspraxia’ originates from the greek words “dys”, which means faulty and “praxis”, which indicates that body movement is the area of difficulty. The child with dyspraxia always presents with a spectrum of needs ranging from motor coordination, perceptual functions, learning abilities to emotional and behavioural difficulties. The Dyspraxia Foundation (1999) cited by Scottish Executive Education Department (2001) offers a comprehensive definition of dyspraxia as “an impairment or immaturity in the organisation of movement which leads to associated problems with language, perception and thought” (p.4). Macintyre (2001) stresses that dyspraxia is an enduring condition and children with dyspraxia have a consistently low level of motor performance.

As a group, children with dyspraxia are likely to be of average or above average intelligence and do not have a global developmental delay (Macintyre, 2001). As with other specific learning difficulties, there is a significant discrepancy between their performance in their domain of difficulty and their abilities in other areas. While dyspraxia is a disability, those affected do not appear disabled. Kirby (2000) aptly highlights that the child with dyspraxia or DCD “often feels like a square sausage in a round sausage machine, never quite fitting in and always going at a different pace to his peers” (p. 31). Because children with dyspraxia look the same as other children and have a hidden handicap (Kirby, 2002), they are often denied the same understanding that other disabilities would bring. This can be an additional isolating handicap and cause children to be either left out of games or grudgingly admitted to these activities. Performance in daily activities that require motor coordination is substantially below that expected of the child’s age and this motor delay significantly interferes with academic achievement and activities of daily living (American Psychiatric Association, 1994).

Lam and Henderson (1987) and Barnett (1992) cited in Dussart (1994) highlight that fine motor coordination tasks such as putting on a shirt, tying shoe laces and manipulating buttons can take children with dyspraxia three times as long in comparison with children who do not have movement learning difficulties. It should be noted that the demands made upon the equilibrium of a child with dyspraxia when riding a bicycle are great (Macintyre, 2001). Daily experiences such as problems in manipulating cutlery, a tendency to spill drinks and parents' reaction to such clumsiness may lead to stressful dining situations (Sprinkle and Hammond, 1994). With lowered perceptions of physical competence, heightened anxiety towards participation in physical play and sport and the social implications of being the last one to be chosen for teams and exclusion in the playground, there is general agreement in the literature that many children with movement coordination difficulties have a lower global self-worth than their normal peers (Sprinkle and Hammond, 1994). It is likely that parents' and teachers' acceptance of a child with motor coordination deficiencies is a significant factor in influencing a child's perception of himself/herself.

Mæland, and Søvik, (1993) recognise the start of school as a crucial period for the learning of motor skills, as it is during this period that coordination problems will be exposed, particularly during drawing, writing, free play and physical education activities. Due to their clumsiness in bumping into and dropping things and their difficulty with gross and fine motor tasks, there is a high possibility that the child with dyspraxia may be the isolated low-status member in the co-operative group. Some children with motor difficulties exhibit the behaviours of either class clown or bully to compensate for their feelings of inadequacy (Sprinkle and Hammond, 1994). It is suggested in the literature that in order to make an accurate diagnosis, a comprehensive assessment is required by a multi-disciplinary team including a paediatrician, occupational therapist, physiotherapist, speech and language therapist and psychologist. It is of paramount importance for the child with dyspraxia that early identification and remediation procedures are well under way to ensure "that youngsters with this condition do not underachieve, lose their self-esteem and become victims within their peer group" (Portwood, cited in Hunt, 1998, p.15).

## TERMINOLOGY

'Dyspraxia' is a generic term used to describe different types of dysfunction involving movement. A wide variety of labels and criteria have been used to describe children with dyspraxia in occupational therapy, medical and educational literature. The term "clumsy child syndrome" coined by Gubbay (1985) has now become a derogatory term and is rarely used by professionals and researchers worldwide. The two most commonly used terms in recent times are "dyspraxia" and "developmental coordination disorder" or DCD.

Kirby and Drew (2003) clearly differentiate between the terms dyspraxia and DCD. They propose that the child with dyspraxia has a praxis/planning difficulty and does not know what to do or how to move, while the child with DCD has difficulties with coordination

and execution. Burton and Miller (1998) believe that the child with DCD knows what to do but does not do it very well. Despite these subtle differences in definition, the terms are used interchangeably in the literature and among professionals.

The four criteria, as outlined by Dunford, Street, O'Connell, Kelly and Sibert (2004), used to guide any medical or clinical diagnosis of dyspraxia, are:

**a) Motor coordination required in the performance of daily activities is substantially below that expected given the person's chronological age and measured intelligence.**
**b) The impairment significantly interferes with academic achievement and activities of daily living.**
**c) The disturbance is not due to a general medical condition (e.g. cerebral palsy, hemiplegia or muscular dystrophy) and does not meet the criteria for a pervasive developmental disorder.**
**d) If mental retardation is present, the motor difficulties are in excess of those usually associated with it.**

## CHARACTERISTICS OF DYSPRAXIA

Macintyre and Deponio (2003) provide a useful summary of indicators for teachers, which has been adapted and expanded in **Figure 1.**

**Figure 1: A Summary of Indicators for Dyspraxia**

| Summary of Indicators | Descriptor |
|---|---|
| ***A. Motor Co-ordination*** | |
| ● Poor muscle tone | ● Difficulties with written tasks and motor coordination skills; may not be able to run, hop or jump; art work immature, difficulty using scissors, rulers, compasses |
| ● Poor postural control, stability and balance | ● Poor trunk rotation and body balance, floppy limbs caused by poor muscle tone around joints; poor at dressing; slow and hesitant in most actions |
| ● Poor regulation in the amount of strength and speed used | ● Poor pencil grasp resulting in spidery writing or the opposite and erratic sizing of letters |
| ● Difficulty in planning ahead, in carrying out a sequence of movements | ● Difficulty in knowing what to do or in anticipating the events of the day and making sequential preparations; unable to remember or follow instructions; poor short-term memory |
| ● Difficulty in generalising | ● Difficulty in adapting one learned movement to another situation |
| ● Ipse-lateral hand use | ● A lack of co-ordination between the two sides of the body and avoidance of actions, which require crossing the midline of the body. |
| ***B. Perceptual Function*** | |
| ● ouch defensiveness | ● Poorly developed sense of touch; shying away from contact, over-protecting personal space, tending to be irritable if nudged; anxious and easily distracted; reacts to stimuli without discrimination |

| | |
|---|---|
| • Lack of clear bilateral dominance | • No clear picture of a stronger side; confusion about which hand to use; mixed dominance leading to directional confusion e.g. reversal of letters, numbers and words; difficulty in asymmetrical movements such as tying laces, using cutlery, colouring while holding the page still with one hand. |
| • Poor spatial awareness & visual perception | • Experiences confusion in estimating distances; difficulty in discrimination; no understanding of spatial prepositions, poor understanding of three dimension |
| • Poor body awareness | • Difficulty in making accurate spatial judgements and in the timing and coordination of actions e.g. stumbling, tripping, fumbling to grip, unable to catch or kick a ball; difficulty with identification of body parts e.g. Draw-a-man; difficulty with puzzles and orientation in space |

(Adapted from Macintyre and Deponio, 2003)

## ANALYSING THE STUDY DATA

In order to gain an insight into the incidence of dyspraxia in Galway/Mayo primary schools, a questionnaire was developed and distributed to a random sample of 60 mainstream primary schools of varying sizes including 20 Gaeltacht (Irish-speaking) schools. An Irish version of the questionnaire was developed for Gaeltacht schools. A structured interview schedule was used.

In order to explore trends and possible intervention strategies in the Irish educational system, structured interviews were conducted with a paediatrician, an occupational therapist, an educational psychologist and also with Dr. Christine Macintyre, University of Edinburgh, who has written extensively on this subject and provided in-career development training for teachers in Ireland. These interviews served to clarify and confirm research findings and issues in relation to the causes and incidence of dyspraxia.

Seventy percent of the Gaeltacht schools (14 schools) and 67.5% of non-Gaeltacht schools (27schools), where English is the medium of instruction, responded to questionnaires. In relation to the number of children diagnosed with dyspraxia in the schools surveyed, 19.5% of the total number of schools (12 schools) confirmed at least one case. Of the eight children presenting with dyspraxia, 87.5% were boys and were equally divided between Gaeltacht and non-Gaeltacht schools, although the Gaeltacht schools only provided 34.1% of the overall responses to the survey. All of the children identified with dyspraxia had a formal diagnosis and the age of diagnosis varied from 3-4 years to 11 years as outlined in **Table 1** below. Children were most frequently diagnosed between the ages of four to seven years by occupational therapists. It is interesting to note that psychologists were reported to have diagnosed two children with dyspraxia. This contradicts the response made by the educational psychologist interviewed, who stated that "a psychologist recognises dyspraxia but does not generally make the formal diagnosis, instead usually writes a statement such as 'indicative of dyspraxia' in the psychological report. A referral is also made to a paediatrician, occupational therapist or the developmental coordination disorder team".

**Table 1: Questionnaire Responses completed by Principals**

| School | Incidence | Gender | Age when diagnosed | Diagnosed by: |
|---|---|---|---|---|
| *Non Gaeltacht (27 schools)* | 4 pupils | All male | ● -4 years | ● Occupational therapist and paediatrician |
| | | | ● years 2 months | ● Occupational therapist, paediatrician and speech and language therapist |
| | | | ● years 6 months | ● Paediatrician |
| | | | ● years | ● Psychologist |
| *Gaeltacht (14 schools)* | 4 pupils | 3 male, 1 female | ● years | ● Psychologist |
| | | | ● years | ● Occupational Therapist |
| | | | ● 1 years | ● Occupational Therapist |
| | | | ● 9 years, 2 months (female) | ● Occupational Therapist |

The survey undertaken does not necessarily reveal an entirely accurate picture as it is based on the numbers of children already formally diagnosed in the schools surveyed. The data received in relation to suspected cases is largely dependent on principals' awareness and understanding of the signals and symptoms of dyspraxia, as reflected in the comment "Bheadh amhras orainn faoi chúpla duine ach níl muid cinnte." ("We would wonder about some children, but we are not sure.")

## INTERVIEWS – MAIN FINDINGS

The following issues were raised during the interview process:

- **Diagnosis of dyspraxia generally takes place during primary school age.**
- **Teachers provide many referrals, particularly at the third class stage (8-9 years), due to difficulties with penmanship.**
- **There is a strong bias towards the team approach to diagnosis, although it is interesting to note that the teacher is not included by non-educationalists in the diagnostic process, except at the referral stage.**

- **Referral is mainly made by middle class parents, a factor which has implications for children with dyspraxia of lower socio-economic status in the west of Ireland.**
- **There is a need to develop further links between occupational therapists and teachers in mainstream primary schools**
- **The higher incidence of dyspraxia in recent years may be due to changes in society and child-rearing practices, as some children appear to have fewer opportunities for gross motor activities and experience difficulties crawling on wooden floors. The lack of physical exercise and an increase in the levels of obesity among children may also be factors.**
- **The interviews with the various health and education professionals confirm the feedback received from the principal teachers in the questionnaires that there is a much higher incidence of boys presenting with dyspraxia than girls.**

## STRATEGIES FOR INTERVENTION

Arising from a review of the literature and an analysis of the research undertaken on dyspraxia, a number of intervention strategies are outlined to enhance provision for children with dyspraxia in primary schools.

### Educational Planning for Individual Pupils

Each child with dyspraxia requires a tailored package to meet his/her needs. Through the educational planning process for individual pupils, his/her strengths and priority learning needs will be identified, needs assessed, goals decided upon and progress monitored and reviewed in a systematic and consistent manner. Dr. Christine Macintyre, in the interview undertaken, highlighted the importance of teacher observation as a dynamic assessment tool in the statement "There is a need for teachers to use a checklist to record children's achievements and difficulties." Kirby (2000) cautions that unless the gross motor problems are addressed, the fine motor difficulties persist.

### Teaching Strategies and Approaches

The quality of teaching and differentiation remains a prominent influence on the educational achievements of all children with dyspraxia. Effective teaching is more complex than "simplifying the worksheet" (Macintyre and Deponio, 2003, p. 89). It is "the attitude, approach and structure that makes flexibility possible" (SCCC, 1993, cited in Macintyre and Deponio, 2003, p. 89). A teacher of a mainstream class in which there is a child with dyspraxia should be aware that children with dyspraxia need:

- a structured classroom environment
- to be seated in direct view of the teacher and chalk board
- suitable seating at appropriate height to ensure that both feet can rest on the floor

- a slanting surface for both reading and writing activities. consideration needs to be given to correct handwriting posture, finger exercises and practice in controlling the precise movements needed to form letters.
- an uncluttered personal designated work area with suitable lighting
- encouragement and praise
- clear, specific, unambiguous instructions
- explicit teaching of organisational skills through the use of visual prompts, lists, reminders, timetables, concept maps
- modified teaching equipment e.g. a large ball in a physical education skills lesson or a rubber triangular grip for a pencil, the use of yellow paper for text in order to prevent glare, the use of highlighters to chunk information in texts
- opportunities to self-regulate and clarify his/her thinking and ideas by talking about his/her experience
- alternative means of recording and assessment e.g. computer, specifically differentiated worksheets, oral transcripts
- assignments broken down into manageable steps
- simplified and limited written homework assignments
- regular co-operative pair work experiences

While Boon (2001) argues that children with dyspraxia find it easier to develop cursive handwriting, Ripley (2001) and Portwood (1999) recommend that children with dyspraxia need additional guidelines and support in acquiring handwriting skills. The occupational therapist interviewed suggested that "specific structured handwriting schemes should be used in schools and pen and paper copying and tracing activities should be avoided." Early intervention is crucial. Macintyre (2003a) emphasises the importance of intervening by the age of five or six in order to avoid children thinking negatively of themselves and losing self-esteem, as movement underlies all learning.

Macintyre (2003a) points out the importance of task analysis and of the need for teachers to break down a faulty movement pattern into its component parts and to gradually re-teach each in a systematic manner. She highlights that teachers need to explain the sequence of movement e.g. what happens first, next and at the end. Such an approach is crucial in enabling the child to internalise the spatial pattern of the movement, as the child needs to feel kinaesthetically where the body parts are in relation to one another. Opportunities could also be provided for children with dyspraxia to improve their self-image through non-competitive physical activities. Kirby (2000) lists a number of suitable games for children with dyspraxia including hopscotch, canoeing, trampolining, badminton, hiking, swimming, cookery, riding, photography, chess and judo.

**Specific Curricular Areas**

**(a) Physical Education**

The strand unit 'Movement' in the 'Gymnastics' strand of the *Physical Education Curriculum* (1999) indicates that movement can be developed sequentially and proposes that tasks should be set to match the children's stage of development. There is a need for "a wide variety of movement activities appropriate to the level of development of the child" (*Physical Education Curriculum,* 1999, p. 2). Using large apparatus indoors or out

of doors allows children to demonstrate their competence in carrying out the basic movement patterns of walking, running, jumping, swinging and climbing. Macintyre (2003) recommends the spinning cone as a useful piece of equipment in assisting children with dyspraxia develop an awareness of their backs.

**(b) Mathematics, Language and Visual Arts**

It is important that schools consider the links that exist between physical education and other subjects. The *Primary School Curriculum: Introduction* (1999) strongly advocates the crucial importance of ensuring that language is a consistent concern in the planning and implementation of programmes for all children. This would be particularly pertinent for children with dyspraxia. Through movement the child develops estimation skills and learns important cognitive and language skills e.g. through, under, over, between and around obstacles (Lerner, 2003). There is a valuable potential for the development of gross and fine motor skills in Visual Arts. In order to build finger strength and flexibility, Portwood (1999) and Kirby (2002) suggest using play-dough, clay, finger painting and tearing paper.

**(c) Music**

Movement in music has the potential to extend children's coordination, balance and suppleness (*Music: Arts Education: Teacher Guidelines, 1999, p. 59)*. Muscular activity is closely linked to musical elements such as pulse, tempo, rhythm and dynamics. The use of music as a kinaesthetic activity is achieved through "singing action songs, playing singing games, tapping rhythms, moving to music and playing in time while simultaneously listening to others, following directions or reading from notation" (*Music: Arts Education: Teacher Guidelines,* 1999, p. 2). The use of puppets would also enhance children's experiences.

## CONCLUSION

The changes in modern society together with parenting skills and practices have implications for children with movement learning difficulties. We have become largely a sedentary society and prefer to travel in cars, use car seats, walkers, and watch television and videos. For the child with dyspraxia who is unlikely to crawl, walks late and who has poor hip stability, sequencing and rhythm skills, we are unintentionally compounding their difficulties. It is therefore more important than ever to diagnose the child with dyspraxia as early as possible. Teachers in primary schools are in a key position not only to assist with early identification but also to provide early intervention programmes to enable children with dyspraxia experience success in the development of co-ordination and movement skills.

This paper has summarised current research on the characteristics, possible causes and incidence of dyspraxia internationally. The small-scale research study undertaken confirms previous research that there is a higher incidence of dyspraxia among boys than girls. The strategy for intervention based on the results of the research data is outlined. It is evident that quality of teaching remains a pre-eminent influence on the educational

outcome for children with dyspraxia. This study poses challenges for educators as suggested in the words of Jean Houston (1982)

> "Ironically, we are all too often educated *out of* rather than *into* an awareness of our body. The active, indeed the wriggling, child's body is urged to '*sit still'* to restrain its natural impetus toward movement and exploration as it is confined to chair and school desk …" (pp. 2-3).

## *REFERENCES*

American Psychiatric Association (APA) (1994) Motor Skill Disorder 315.40: Developmental Coordination Disorder, *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (4th ed), Washington, DC: Author.

Barnhart, RC, Davenport, M.J., Epps, S.B. and Nordquist, V.P. (2003) Developmental Coordination Disorder, *Physical Therapy* http://www.ptjournal.org/includes/printit.cfm (29th January 2004).

Boon, M. (2001) *Helping Children with Dyspraxia*, London: Jessica Kingsley.

Burton, A. and Miller, D. (1998) *Movement Skill Assessment*, Champaign, IL: Human Kinetics.

Dunford, C., Street, E., O' Connell, H., Kelly, J. and Sibert, J.R. (2004) Are Referrals to Occupational Therapy for Developmental Coordination Disorder Appropriate? *Archives of Disease in Childhood*, Vol. 89, pp. 143-147.

Dussart, G. (1994) Identifying the Clumsy Child in School: An Exploratory Study, *British Journal of Special Education,* Vol. 21 (2), pp. 81-86.

Dyspraxia Foundation (1999) *Praxia Made Perfect 11*, Hitchin: Dyspraxia Foundation.

Gubbay, S.S. (1985) Clumsiness. In Vinken, J.J., Bruyn, G.W. and Klawans, H.L. (eds) *Handbook of Clinical Neurology*, New York: Elsevier, pp. 159-67.

Houston, J. (1982) *The Possible Human*, Los Angeles: J.P. Tarcher.

Hunt, P. (1998) *Praxis Makes Perfect II*, Herts: Dyspraxia Foundation.

Ireland (2004) *Education for Persons with Special Educational Needs Act*, Dublin: The Stationery Office.

Ireland (1998) *Education Act*, Dublin: The Stationery Office.

Keen, D. (2001) Specific Neurodevelopmental Disorders, *Paper presented at the Conference on the Needs of Children with Specific Developmental Difficulties*, Bishop Aukland, February 2001.

Kirby, A. (2000) Dyspraxia – A New or and Old Problem? *Special Children*, October, pp. 30-32.

Kirby, A. (2002) *The Hidden Handicap*, London: Souvenir Books.

Kirby, A. and Drew, S. (2003) *Guide to Dyspraxia and Developmental Co-ordination Disorders,* London: David Fulton Publishers.

Lam, Y.Y. and Henderson, S. (1987) Some applications of the Henderson Revision of the test of motor impairment, *British Journal of Educational Psychology*, Vol. 57, pp. 389-400.

Lerner, J.W. (2003) *Learning Disabilities: Theories, Diagnosis and Teaching Strategies* (9th ed), New York: Houghton Mifflin.

Macintyre, C. (2001) *Dyspraxia 5-11: A Practical Guide*, London: David Fulton Publishers.

Macintyre, C. (2003) *Play for Children With Special Needs,* London: David Fulton Publishers.

Macintyre, C. (2003a) Explaining Dyspraxia, *Learn: Journal of the Irish Learning Support Association*, Vol. 25, pp. 25-32.

Macintyre, C. and Deponio, P. (2003) *Identifying and Supporting Children with Specific Learning Difficulties: Looking Beyond the Label to Assess the Whole Child*, London: Routledge Falmer.

Mæland, A.F. and Søvik, N. (1993) Children with Motor Coordination Problems and Learning Disabilities in Reading, Spelling, Writing and Arithmetic, *European Journal of Special Needs Education,* Vol. 8 (2), pp. 81-98.

Miller, L.T., Missiuna, C.A., Macnab, J.J., Malloy-Miller, T. and Polatajko, H.J. (2001) Clinical Description of Children with Developmental Coordination Disorder, *Canadian Journal of Occupational Therapy*, CAOT Publications ACE.

Missiuna, C. (1994) Motor Skill Acquisition in Children with Developmental Coordination Disorder, *Adapted Physical Activity Quarterly,* Vol. 11, pp. 214-235.

National Council for Curriculum and Assessment (NCCA) (1999) *Primary School Curriculum: Introduction*, Dublin: NCCA.

National Council for Curriculum and Assessment (NCCA) (1999) *Physical Education Curriculum*, Dublin: NCCA.

National Council for Curriculum and Assessment (NCCA) (1999) *Music: Arts Education: Teacher Guidelines*, Dublin: NCCA.

Portwood, M. (1999) *Developmental Dyspraxia, Identification and Intervention: A Manual for Parents and Professionals* (2nd ed), London: David Fulton Publishers.

Ripley, K. (2001) *Inclusion for Children with Dyspraxia/DCD: A Handbook for Teachers*, London: David Fulton.

Scottish Executive Education Department (2001) *Understanding and Supporting Children affected by Dyspraxia DCD in Early Years: Guidance for Teachers*, Dundee, Afasic Scotland.

Sprinkle, J. and Hammond (1994, November) Family Relationships of Motor Impaired Children: A Case Study, *Australian Association for Research in Education Conference*, Newcastle, New South Wales.