REACH Journal of Special Needs Education in Ireland, Vol. 13 No. 1 (1999), 35–46.

An Evaluation of the Teodorescu Perceptuo-Motor Programme of Handwriting for Children with Visual-Perceptual Difficulties

When teachers are asked about the amount of time their pupils spend writing each day, they all acknowledge that a fairly substantial amount of time is spent on this activity. When asked how much time they spend actually teaching handwriting, they are almost apologetic in their response. The programme described here should encourage teachers to reconsider the place of handwriting within the curriculum.

KIERON SHEEHY is a lecturer in the Special Education Department at St. Patrick's College, Drumcondra, Dublin. LOUISE JENKIN is a paediatric occupational therapist at Chelsea & Westminster Healthcare NHS Trust, London.

INTRODUCTION

A child's success in learning to write is of vital importance in his/her experience of school. Within a school day a child spends, on average, one third of her time involved in language related handwriting tasks (Alston, 1995) and a further proportion on handwriting in relation to mathematics and other studies. For many children the thousands of hours which they will spend writing is not a positive experience. A United Kingdom study of over two thousand 11 year old children found that 20% of boys and 10 % of girls "hated writing." In addition, 37% of boys and 23% of girls claimed to write as little as possible and only when they had to do so (APU, 1991, cited in Alston, 1995).

Whilst the teaching and assessment of reading has received a great deal of attention in recent years in both the United States and United Kingdom, there is a lack of concern about the importance of handwriting within schools' curricula (Sheffield, 1996) and it is rarely given the attention that its importance merits (Alston, 1995). Possibly as a result of this neglect, dissatisfaction has been expressed with the writing abilities of children during their early classes in the U.K. (DfE Report, 1992-94) and with the preparedness of teachers to teach the topic (Sheffield, 1996).

PROBLEMS WITH HANDWRITING

It has been estimated that 46% of 6 and 7 year olds have difficulties with letter formation (Alston, 1995) and handwriting problems are one of the most common reasons for referring school aged children to occupational therapists in North America (Tseng & Cermat, 1993).

There is conflict over how to help these children to develop the skills that they need. Many authorities advocate that by the age of 7 children should be starting cursive writing (Sassoon, 1983). Such a style is associated with more fluent writing development (Karlsdottir, 1997). However, in many schools the child must master print before progressing to a cursive hand. Children who struggle with print may never be taught cursive writing (Wolsen, 1991, cited in Wann, Wing & Slovik).

PERCEPTUAL-MOTOR SKILLS

When a child learns letter formation in early schooling s/he relies heavily on visual information for guidance of movement and self correction. Before learning to produce a motor pattern to form a specific shape, number or letter, a child needs an internal image of what the desired form looks like. This idea is then used for determining the correct motor pattern. Certainly, teaching approaches which focus on developing a precise image of the way in which strokes are formed are highly successful (Berninger et al, 1997).

It is however the integration of perception and motor skills which is crucial to the child's success. The development of visual perceptual skills alone is not associated with handwriting mastery, whereas tactile-kinaesthetic and visual-motor development, and motor planning appear to be more closely related to significant increases in skill (Tseng & Cermat, 1993). This suggests that handwriting is primarily a perceptual-motor act (Chapman & Wedell, 1972; Furner, 1969; Sovick, 1975; Ziviani, Hayes & Chant, 1990; all cited in Tseng & Murray, 1994).

Children who learn to write well have well developed and integrated perceptual-motor skills and these skills enable them to learn to write quickly (Laszlo and Bairstow, 1985). Poor handwriters score less well than good handwriters on most of the perceptual-motor tests. Motor planning is particularly important for poor handwriters (the ability to plan /trace/imitate forms) and contributes significantly to the legibility of their handwriting (Tseng & Murray, 1994).

CHILDREN WITH PERCEPTUAL-MOTOR PROBLEMS

If handwriting is primarily a task which requires the integration of perception and motor skills, it is not then surprising that children with perceptual - motor problems find handwriting particularly difficult to master (Penso, 1993). It has also been suggested that many children are not kinaesthetically ready to acquire formal handwriting skills by age 6 years. Some studies state that as many as 33% of children need to wait until their kinaesthetic awareness has developed before learning to write at around 7 years of age (Laszlo & Bairstow, 1985).

Typically children with perceptual - motor problems will present poorly formed handwriting with inconsistent character sizing, erratic spacing, reversals and inversions of letter shapes and combinations of print and capitals (Sassoon, 1993). Children may exhibit these difficulties for a variety of reasons, such as delayed motor development, poor pre-school experiences (Bissex, 1980) or more cognitive influences such as poor integration of the sensory process influencing perception and motor planning (Alston, 1984) which cause children to have poor proprioception.

THE TEODORESCU PERCEPTUO-MOTOR PROGRAMME

The Teodorescu programme originated with Professor Teodorescu in Romania where, as in other European countries, cursive writing is introduced at an early age. The Teodorescu programme aims to provide structured experience for the young child which will improve her/his perceptuo-motor ability through practice and training. It is designed to help children with perceptual motor problems and to give a perceptual - motor framework in which to develop handwriting skills (Teodorescu & Addy, 1996). It is claimed that the programme is both formative and diagnostic (Addy, 1996) enabling the teacher to observe difficulties that can be subsequently remedied using the additional suggestions within the programme.

The Teodorescu programme is a combination of graded perceptual and motor tasks and consists of 410 graphic exercises divided into 24 sections within five A5 booklets. It begins with very simple hand-eye co-ordination exercises. For example, the child is required to discern a point on a page and place a coloured spot over it using a felt pen. Later the child is taught that a line has a beginning and an end and she must learn the control of starting and stopping the pencil.

The importance of form is then explored. Given a frame of reference such as the shape of a square, triangle or circle, the child is encouraged to draw a circle within

or outside this. Practice develops the kinaesthetic information and the child is guided to transfer these skills to new situations and other forms.

The organisation of figure-ground perception is developed by allowing the child to experiment in colouring a series of overlapping sheets; the child must highlight the shape that is the most prominent to her. This is usually developed by 5 years of age (Bryant, 1974). Orientation and directionality are also explored within the exercises. Direction and orientation in space become vital when a child begins reading and the interpretation of letters is required (Bryant, 1974). Understanding position in space enables the child to distinguish between rotated and reversed letters; penmanship problems are often due to problems with spatial organisation. By teaching sequence, space, orientation, size and form awareness the Teodorescu programme is designed to enhance these skills and hence the child's handwriting.

The programme also purports to develop the intrinsic muscles of the child's hand by varying the patterns required and thus encouraging a continuity of fluent movement. The motor skills developed through these fine finger activities, along with the perceptual dimensions, are graded in such a way as to expand and refine those elements required for effective handwriting and to assist cursive letter formation .

Professor Teodorescu's research concluded that children aged between 4 years 6 months and 5 years 6 months are generally the most responsive age group. Recent evaluation of the programme by Addy (1996) in the U.K. did not produce conclusive findings as a mixture of children was used as participants and the exposure to the programme was poorly controlled.

This current study considered the programme's effectiveness specifically for children with perceptual-motor difficulties, the group of children for whom it was designed. The hypothesis proposed was that children who used the Teodorescu Perceptuo – Motor Programme would make significant gains in handwriting and perceptual skills in comparison to children following a traditional classroom approach. The null hypothesis was that there would be no difference between the two conditions.

METHOD

Participants

Twenty children (ten boys and ten girls) were selected from a list of all children with visual perceptual problems referred from two reception classes to a paediatric occupational therapist. The children met the following criteria:

a) **between 5 and 6 years of age;**
b) **referred for occupational therapy treatment;**
c) **identified as having visual perceptual difficulties by a referring agency;**
d) **had no underlying medical condition;**
e) **had no other identified learning difficulty.**

Ethics

Teachers and parents gave informed written consent for the children to participate in the study. Confidentiality was maintained and the research was run in accordance with the Data Protection Act.

Procedure

The experiment was conducted over a two month period as shown in Table 1. During the first month, Group A (ten children, 5 boys and 5 girls) received the Teodorescu Programme whilst Group B received the normal class programme. After one month Group A received the normal programme and Group B received the Teodorescu programme.

TABLE 1:
THE DESIGN OF THE TWO MONTH EXPERIMENT

	Programme Month 1	**Programme Month 2**
Group A	Teodorescu	Normal
Group B	Normal	Teodorescu

Measures taken

At the start of the study and at one month and two month intervals the children were assessed using two measures:

1. **The Children's Handwriting Evaluation Scale (C.H.E.S.):** This is a criterion referenced tool which has been standardised on 1365 4-11 year olds. It measures rate and quality of handwriting.

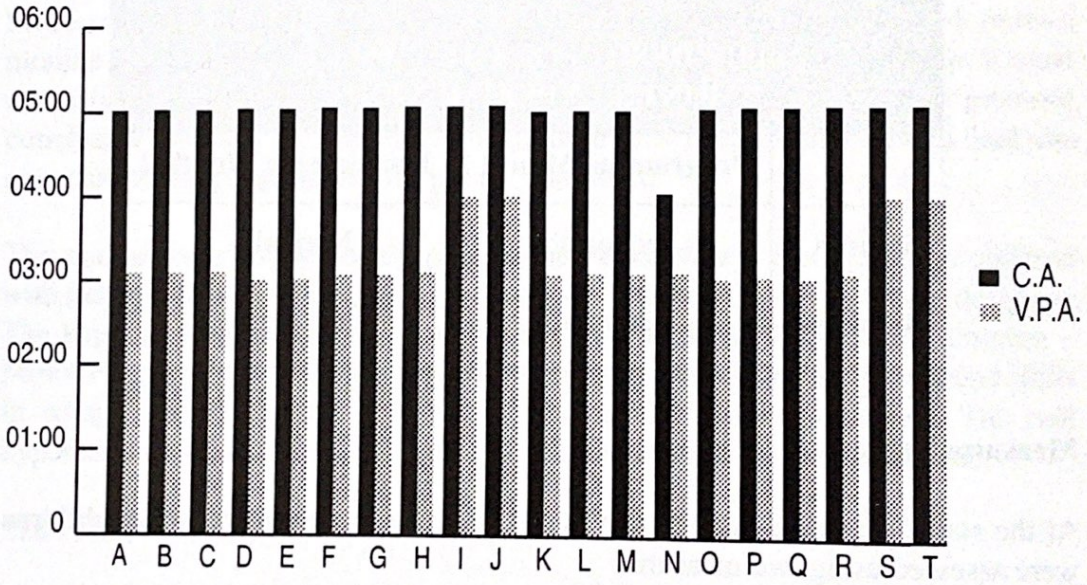
2. **The Test of Visual Perceptual Skills – Revised (TVPS-R, Gardner, 1987):** This standardised and norm-referenced test is an established measure of a range of visual perception skills.

The programmes were implemented by two classroom teachers. At the start of the first month, Group A were given 8 booklets from the Teodorescu Perceptuo-Motor Programme. Teachers presented the booklets twice daily before break time and after lunch for 30 minutes. The children worked systematically through the programme. Group B spent the same periods of time on the school's traditional handwriting programme, a series of graded exercises leading towards establishing printed letter formation.

RESULTS

It can be seen from Chart 1 that, as expected, all children beginning the study had poor visual perceptual development relative to their chronological ages.

CHART 1:
The chronological and visual-perceptual ages of children beginning the study



The mean improvements for each group during the two month period is summarised in Table 2.

TABLE 2:
MEAN IMPROVEMENT IN VISUAL PERCEPTUAL SKILLS IN THE TWO MONTH PERIOD

	Month 1	Month 2
Group A	5.1 Teodorescu	5.7 Normal
Group B	1.5 Normal	4.5 Teodorescu

Table 2 suggests that Group A improved in comparison to Group B during month 1. In month 2, Group A continue to make progress. Group B, now using the Teodorescu programme, make an improvement on their previous progress.

There is a significant difference between the A1 and B1 conditions ($P<0.05$ Mann Whitney-U). This suggests that the Teodorescu programme is effective, as the group using the Teodorescu programme outperform the traditional classroom method group. This effectiveness is further supported as the difference between B1 and B2 is also significant ($p<0.01$ Wilcoxon – r). The B group's performance improves significantly once the Teodorescu programme is used.

Overall comparison of progress with the Teodorescu Programme versus the traditional method (A1 B2 vs A2 B1) just fails to reach significance. One reason for this may be that the skills picked up by Group A during their first month continue to affect their progress when taught by the traditional method.

HANDWRITING

Changes in handwriting were evaluated using measures of rate and quality.

Rate

Table 3 shows the mean improvements in rate over the two month period.

TABLE 3: MEAN IMPROVEMENTS IN RATE		
	Month 1	**Month 2**
Group A	7.8	2.5
Group B	2.5	4.2

Comparing improvements in A1 vs. B1, a significant difference is seen ($p<0.05$ Mann Whitney U). This suggests that the group experiencing the Teodorescu programme improved their handwriting rate to a greater extent that those taught by the traditional school method. No significant differences were found between B2 and A2. There was a significant difference between A1 and A2 ($p<0.05$) where the increase in handwriting speed did not continue after the Teodorescu programme ceased.

Quality

Mean improvements over the two month period are shown below in Table 4.

TABLE 4: MEAN IMPROVEMENTS IN QUALITY		
	Month 1	**Month 2**
Group A	1.1	.6
Group B	.7	.8

No significant differences emerge from comparisons of any of the above periods. This may be due to a lack of effectiveness of the Teodorescu programme or because the measurement scale used was not sensitive enough to pick up the improvements that occurred.

DISCUSSION

Participants given the Teodorescu programme make significant improvements in their visual perceptual skills within a short period of time. There is also some evidence to suggest that they continue this improvement once the programme has ceased. The results regarding handwriting are less conclusive. A significant improvement in rate is found for Group A during their exposure to the programme. This progress is not maintained once the programme is stopped. It could be that there is a ceiling effect here and a rate is reached above which children cannot progress. This would also explain why Group B improved their rate of handwriting with the Teodorescu programme but did not reach a significant level. Their writing speed increased slowly in the B1 period leaving less room for dramatic improvement in the B2 period.

The quality scores are inconclusive. No significant improvements were found. It may be that the Teodorescu programme produces no greater improvement in writing quality than the standard classroom approach. Another possibility is that the result is a reflection of the insensitive nature of the measures being used to assess quality or possibly that significant improvements in quality would follow later on from the advances in perceptual and motor skill development.

Running such an evaluation presents a number of challenges. The children and the teachers involved reported that they found the Teodorescu programme very enjoyable and consequently preferred it to the standard practice. So there were differences in the motivation levels of the participants.

It was envisaged that as the children tackled the exercises they would be sitting at a table of the appropriate height with a correctly sized chair and in an optimum position for writing. This was difficult to enforce and observations of the groups noted that it was not uncommon for children to kneel on their seats, twist their hands, turn books or even stand up and bend over the exercises. Although corrected by the teacher, these variations could significantly influence the children's writing development, particularly quality.

The project could not control for practice at home or for the influence of other teaching such as during art and physical education sessions. However, the use of a partly related design may have reduced this effect to some degree.

Teachers noted that after the programme several children displayed improvements in other fine motor areas such as scissors skill, model making and craft work.

Teachers also reported improvements in concentration levels and attention to task. However these may have been the result of normal developmental improvements.

The Teodorescu programme is progressive and each section relies on the skills acquired through previous exercises. It is designed to be used over a longer time period than the one month exposure experienced by the children in the current study. A longer study might also be useful as the basis of future investigation. It has been stated that the prospects for future research in the area of handwriting are promising (Graham & Weintraub, 1996) and it is to be hoped that evaluations of programmes such as the Teodorescu programme will form part of this work.

CONCLUSION

This research suggests that, for children who have not fully mastered the prerequisite visual-perceptual skills for handwriting instruction, the Teodorescu Perceptuo-Motor Handwriting Programme can produce significant development in the children's visual perceptual skills, and possibly rate of writing, in a relatively short period of time.

REFERENCES

Addy, L. (1995). *Evaluation of the Teodorescu Perceptuo-Motor Handwriting Programme.* Unpublished MA Thesis, University of York.

Addy, L. (1996). A perceptuo-motor approach to handwriting. *British Journal of Occupational Therapy, 59* (9), 427.

Alston, J. (1984). *The handwriting file: Diagnosis and remediation of handwriting problems* (2nd ed.). Wisbech, Cambridge: LDA.

Alston, J. (1995). *Assessing and promoting writing skills.* Stafford: NASEN Enterprises Ltd.

Berninger, V.W., Vaughan, K.B., Graham, S., Abbott, R.D., Abbott, S.P., Rogan, L.W., Brooks, A., & Reed, E. (1997). Treatment of handwriting problems in beginning writers: Transfer from handwriting to composition. *Journal of Educational Psychology, 89,* (4), 652-666.

Bissex, G.L. (1980). *Gnys at work: A child learns to write and read.* Cambridge, MA: Harvard University Press.

Bryant, P.E. (1974). *Perception and understanding in young children: An experimental approach.* London: Methuen.

Children's Handwriting Evaluation Scale (C.H.E.S.) (1998). Dallas,TX: Texas Scottish Hospital.

Department for Education (1992-94). *Annual Report.* London: DfE.

Gardner, M.F. (1987). *Test of Visual Perceptual Skills-Revised.* Burlingame, CA: Psychological and Educational Publications.

Graham, S. & Weintraub, N. (1996). A review of handwriting research: Progress and prospects from 1980 to 1994. *Educational Psychology Review, 8* (1), 7-87.

Karlsdottir, R. (1997). Comparison of cursive models for handwriting instruction. *Perceptual and Motor Skills, 85* (3), 1171-1184.

Laszlo, J. & Bairstow, P. (1985). *Perceptual motor behaviour: Developmental assessment and therapy.* London: Halt.

Penso, D.E. (1993). *Perceptuo-motor difficulties: Theory and strategies to help children, adolescents and adults* (Therapy in Practice Series, No 34). London: Chapman & Hall.

Sassoon, R. (1983). *A practical guide to children's handwriting.* London: Thames and Hudson.

Sassoon, R. (1993). *Teach yourself handwriting.* London: Hodder and Stoughton.

Sheffield, B. (1996). Handwriting: A neglected cornerstone of literacy. *Annals of Dyslexia, 46*, 21-35.

Teodorescu, I. (1981). *The Teodorescu perceptuo-motor programme.* Unpublished research, York University.

Teodorescu, I. & Addy, L.M. (1996). *Write from the start**. Wisbech, Cambridge: LDA.
(*previously published as the Teodorescu perceptuo-motor programme)

Tseng, M.H. & Cermat, S.A. (1993). The influence of ergonomic factors and perceptual-motor abilities in handwriting performance. *American Journal of Occupational Therapy*, *47* (10), 919-926.

Tseng, M.H. & Murray, E.A. (1994). Differences in perceptual-motor measures in children with good and poor handwriting. *Occupational Therapy Journal of Research 14* (1), 19-36.

Wolsen, J. (1991). Drawing and handwriting difficulties. In J. Wann, A.M. Wing & N. Slovik (Eds.), *Development of graphic skills: Research perspectives and educational applications.* London: Academic Press.