

CE-related research

A memorandum to the
Norsk Forum for Konduktiv Pedagogikk

Andrew Sutton

January 2007

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Contents

1. Introduction

The brief
Personal credentialling
Process of compiling this report
Scope and limitations
Two not-so-certain givens
Sources

2. Empirical outcome research

Paradoxes of research into Conductive Education
Reviews of empirical research
Three influential systematic reviews
Excluded studies
Research in Hungary
Some methodological questions
Medical research
Adults

3. Some 'other research'

Totality and dynamism of knowledge
Qualitative research
Families
Social administration
Educational research
Pedagogic research
Theoretical research
Historical research
The politics of research

4. Summative statement

5. An unsolicited footnote on possible research issues in Norway

Bibliography

Appendices

1.1 Introduction

The brief

To produce a detailed memorandum on CE-related research.

Personal credentialing

I have been involved with Conductive Education since 1979, during which time the knowledge and understanding of the system, in its psychological, pedagogic, social, historical, philosophical and ethical spheres, has been major professional concern, particularly the practical identification, creation and use of such knowledge has been a central concern. To this end the personal attempt to collect everything written or otherwise recorded on Conductive Education developed into the National Library of Conductive Education.

Over the course of the last twenty-seven years I have managed, languages permitting, at least to skim-read almost everything in that collection. It is unlikely that anyone will be able to do that again.

Process of compiling this report

Preparation of this memorandum was proposed last month but personal circumstances have meant that I could collect, collate and write up this report only over the last week of January. It was expected that three working days' equivalent would suffice for this task: in the event it required nearer six.

This survey of the field had to be 'quick and dirty' rather than offering a formal and deeply considered academic document and should be read as no more than a preliminary overview of the field. Along the way issues have arisen which, though outside the immediate brief, still merit further examination, Attention will be drawn to these as they arise.

Scope and limitations

This report is therefore to be regarded as only a 'scoping report'

There is far more written material around research into Conductive Education than is generally thought (certainly far, far more than one would think from looking at the limited references cited by most articles on the topic). The conductive 'literature' remains generally unstructured (Sutton, 2006a) and most of those who research in this field fail to identify what might be already there. It has also to be acknowledged that much of what has been written is of at best middling quality. Some is outright poor. Judgement on this is left to readers of this survey who follow up specific references.

Most of the research work cited here was carried out in a flurry of activity over the years between the late eighties and the early 'noughties'. Research activity in this area is now generally on the wane. Most research has been reported in the English language, though this survey also makes reference to materials written in Norwegian, Swedish, German and French. While this survey does not claim to be wholly exhaustive it does seem likely that no studies of significance have been missed.

Given the immediate interests of the Norsk Forum the focus here is upon research and enquiry into Conductive Education for children and their families – as indeed has been the bulk of research effort. Notwithstanding, the much smaller field of research into conductive provision for adults (conductive rehabilitation) has been briefly remarked.

Studies of programmes purporting to offer Conductive Education or work according to its supposed principles, but without the benefit of conductors trained to work in this way, have not been included, though the existence of this work is acknowledged as a research issue. Dissertations and theses have not been included in this preliminary survey of the literature.

Two not-so-certain givens

The expression ‘CE-related research’ depends upon two unquestioned givens: ‘Conductive Education’ and ‘research’. In effect, both of which raise important questions that require attention at the outset.

What is meant here by ‘research’? The present review adopts the position that ‘research’ covers formal academic study carried out within an academic discipline and reported in an appropriate manner. Research may be empirical or theoretical. ‘Research’ is not confined to before-and-after measures or to group comparisons. This point should hardly merit mention, except that there has been a strong vein of implicit opinion around Conductive Education that acts as though this are indeed so.

What is meant here by ‘Conductive Education’? The English mistranslation ‘Conductive Education’ has gained wide international currency and almost every study cited in the present review has adopted this over-general term – and suffered corresponding confusions. It would have been better had the world followed András Pető and thought in terms of ‘conductive pedagogy’, elaborated later by the Institute that he founded as ‘conductive upbringing’. The Norsk Forum is the world’s *only* extant conductive body to style itself (correctly) with the term ‘conductive pedagogy’. This brings opportunities and responsibilities. Later in this memorandum specific consideration is given to Norwegian matters.

For the meantime, to avoid clouding the narrative, this memorandum will utilise the conventional term ‘Conductive Education’ – but readers should recognise that in almost every instance this usage will be problematical. Sutton (2006b, p. 3) has proposed how this distinction might be productively expressed in the Norwegian language, by distinguishing between *konduktiv pedagogikk* and *konduktiv opplæring*.

Sources

It would have been impossible to have reviewed this field without the facility of the National Library of Conductive Education in Birmingham, the world’s only open-access collection of relevant materials, and the knowledgeable facilitation of Gillian Maguire, its Librarian. Especially, given the constraints upon time, my own physical familiarity with this material was also a vital factor.

Considerably recourse was made to the Library’s most recent select bibliography on research but, due to differing criteria, for the present task this was considerably supplemented from other class marks and outside sources to create the corpus of work identified in this memorandum.

1.2 Empirical outcome research

Paradoxes of research into Conductive Education

Nearly twenty years of formal research into the outcomes of Conductive Education have left a strongly perceived impression in professional and official circles that Conductive Education at best offers no advantages over existing measures to provide for children with cerebral palsy.

The major paradox is that this impression contrasts with twenty years experience of families (and disabled people themselves) who report very much to the contrary. It also contrasts with the judgements from of many practitioners and theoretical advocates (whose positions tend to be more liable to the accusation of partiality or bias that are those opposed to Conductive Education

An important responsibility for research is surely to explain and resolve this major paradox.

There is a second, minor paradox, reflected in the structure of this memorandum. The question of outcome research has been accorded a leading position here, because that is what most people want to read about. This is the aspect of research that has attracted the greatest resources and had the greatest effect (largely negative) upon the field. This point will be elaborated upon in the next chapter when in considering ‘other research’.

In the common discourse, professional, public and political, the question of research into Conductive Education is almost invariably taken as meaning the comparison of outcomes of conductive programmes with those of existing services – with the grail of what can or cannot be considered as ‘scientific’ being randomised, double-blind cross-over trials. Little or no account is usually taken of broader questions surrounding such methodology in the fields of education, social science and the health sciences. Conductive Education has nevertheless been challenged – sometimes coerced – to submit itself to ‘proof’ on this basis.

Little or no account tends to be given to the often unquestioned nature of the evidence-base for *existing* practices and, systems and philosophies and to the very wide range of enquiry and methodologies that legitimately constitute research in these fields. Further consideration of such extensive matters lies outside the immediate brief for this report but still merits serious attention by those concerned with specific questions of research into Conductive Education.

Perhaps uniquely, Conductive Education has been judged on the basis of comparative outcome research – and the judgement has not been positive.

Reviews of empirical research

There have been so many studies now of the outcomes of Conductive Education that the simplest way to deal with them is not by mentioning them all individually but to winnow the field in the usual academic manner, through research reviews. In the ‘early days’ of Conductive Education outside Hungary there were a number of informal reviews of the emerging corpus of research studies, the reviews initially as informal as the studies that they reviewed (for example French and Nommensen, 1992, Logan, 1993; Sutton, 1994a; Stukat, 1996). *The pervasive conclusion of such reviews was that comparative empirical research into Conductive Education had produced no demonstrable advantages over other ways of doing things.*

To epitomise this general finding it is worth quoting in full the complete Abstract of a review carried out at the end of this period, by Pedersen (2000) at the Norwegian University of Science and Technology in Trondheim.

Conductive Education (CE) in the treatment of children with cerebral palsy (CP), it is claimed, promotes independent motor functioning as well as having a positive effect on the development of a number of other skills. Such claims have excited the media, parents and professionals alike to campaign for the introduction of CE into the healthcare system. An appraisal of the (few) available studies, however, failed to produce empirical support for such claims. Conductive Education would not seem to be any more effective than traditional methods. Where advantageous results in favour of CE have been reported, they can probably be attributed to the very intensive training involved and the strict criteria used for selecting particular CP children for the method. Furthermore, given that CE is also very expensive when compared with traditional methods, it would seem more logical (and more economical) to invest money and resources into improving existing intervention methods.

Recent years and the emerging social imperative of 'evidence-based practice' have seen the appearance of more formal systematic reviews

Three influential systematic reviews

Three of these extensive reviews, all of them explicitly 'medical', have been commissioned by official or quasi-official bodies seeking evidence-based guidance upon whether conductive programmes merit support. All have been written in authoritative, indeed magisterial style. All three have been widely available on the Internet (following internal reorganisation the Alberta Heritage Report no longer is no longer on line, but remains accessible in hard copy). Additionally, the AACPD report has been published in the widely read and highly respected international journal *Developmental Medicine and Child Neurology*.

The three reviews cover much the same ground, according to slightly differing formal review criteria. Their conclusions are broadly the same, though stated with slightly differing emphases.

Alberta Heritage Medical Research Foundation

This review, the first of the three, is the only one that might be judged to merit the description 'magisterial', having made the greatest effort to be balanced and to offer positive practical suggestions for future research activity. The report (Ludwig *et al.* concluded *inter alia* as follows.

Unfortunately available scientific literature does not show this approach to be superior to, or more effective than other treatment methods; nor does it establish which versions of CE should be looked at further. The research evidence, while not establishing that CE is more effective than other forms of therapy for children with CP, does seem to indicate that children in the CE groups kept pace with their peers receiving other therapies

But, for example...

Qualitative methods of research could be used to study outcomes of CE. All of the studies reviewed were quantitative, even those attempting to examine parents' perceptions. It is clear from the work that was reviewed that there is very little

understanding of the CE experience for children and perceived value to parents. Quantitative data cannot tell the whole story. Rigorously applied qualitative methodologies would help shed some light on this.

A fuller extract from this report is provided in *Appendix I*

This review, like others, struggled at times to understand Conductive Education but the emphasis on qualitative research quoted above reflects a humane breadth of perspective. More innovative still is a sharp awareness of the importance of ‘manualising’ the actual conductive intervention in a given study (the need for a ‘practice manual describing exactly what was done), without which nobody can tell how ‘conductive’ the practice under investigation actually was. Without this too, of course, the study is immediately unreplicable.

New Zealand Evidence-based Healthcare Advisory Group

It was perhaps a little surprising to see a New Zealand health body commission such a review since Conductive Education in New Zealand is provided to a large part within the state education system. The report (Zhang *et al.* (2003). concluded *inter alia* as follows.

Implications for practice. . The present literature does not provide good evidence for the effectiveness of conductive education. There is no evidence to indicate that conductive education is more effective than other conventional approaches. The effectiveness of conductive education for children with cerebral palsy is not clearly established.

Implications for research. There is a need for well-designed randomised controlled studies, with relatively large sample size, clearly defined intervention of conductive education, clearly defined study population, adequate period of follow up and well standardised outcome measures.

Implications for purchasing and policy decisions. There appears to be no evidence to indicate that conductive education is more effective than conventional programmes or treatments. Decision making around the purchasing [of] conductive education needs to consider a range of other factors such as me cost, suitability and accessibility of the intervention.

A fuller extract from this report is provided in *Appendix II*

Oddly, though Alberta Heritage’s report was mentioned in the New Zealand review, the fact that it had already comprehensively reviewed the field was not!

It is interesting to see how this report was promulgated. Following discussion, the New Zealand Evidence-based Healthcare Advisory (2003) published a ‘Considered Judgement Form’ which concluded bluntly as follows.

Evidence statement. The present literature does not provide clear evidence for the effectiveness of conductive education as described in the reviewed papers. The evidence does not indicate that conductive education is more effective than other conventional approaches. The effectiveness of conductive education for children with cerebral palsy is not clearly established.

Purchasing recommendation. Do not purchase at this stage, but the decision will be reviewed when new evidence is available.

The final sentence will be wryly familiar to those who have sought help in funding conductive programmes of a size that might admit to evaluation of the sort often demanded – only to be told that such help cannot be funded till the required proof is already to hand (provided presumably free of cost). It offers a paradigm example of this widely experienced Catch-22.

AACPDM

The evidence reports of the American Academy of Cerebral Palsy and Developmental Medicine are claimed to aggregate everything published about the outcomes of an intervention, gauge the credibility (that is the strength of the internal validity) of that evidence, and identify gaps in the scientific knowledge. This particular report (Darrah *et al.*, 2003) includes studies rather less well constructed than those in the other two. It concluded *inter alia* as follows.

In summary the present literature does not provide conclusive evidence either in support of or against CE as an intervention strategy. The limited number of studies and their weak quality makes it impossible for the literature alone to guide decision-making regarding CE...

A fuller extract is provided in *Appendix III*.

Unexpectedly perhaps, even though the Alberta Heritage and the AACPDM reviews were carried out in the same Canadian province, the second one completed made no reference to the existence of the first.

The longer extracts from these three reviews, appended to the present report offer a flavor of the originals. There is no substitute however, for a complete and critical reading of each report in its entirety. These are the parts of the reviews most likely to be read by hurried professionals and academics. It is possible, however, that many of those who use these reviews to justify the judgement 'Conductive Education doesn't work' will not have even done this.

Excluded studies

Many empirical outcome studies into Conductive Education have failed to be identified by or meet the criteria of even the more generous systematic reviews, not least because of their qualitative methodologies or quasi-experimental design. Outcome studies without a control group may still be of interest, however, to researchers and to others, for all sorts of specific reasons. Examples of such studies include: Heall (1972), Sigafos *et al.* (1991), Weber and Rochel (1992), Lie and Holmes (1996), McQueen and McLellan. (1996), Johnsen (1997), Elliassen (1999), Blank and von Voss (2002), O'Shea (2002), Worsley and Fitzgerald (2004), Vermeer *et al.* (2006), Peerson (2006)

Some methodological questions

General tendency failure to demonstrate effect has lent itself all too readily to the interpretation that 'Research shows that Conductive Education' doesn't work'. The maxim that 'absence of evidence is not evidence of absence'. has usually been studiously ignored when reporting, reviewing or interpreting studies comparing outcomes from conductive programmes, however well or badly constructed the studies. Put another way, there has been bias in interpreting the results and the persisting paradox between the widespread favourable experience of Conductive Education and the

results of outcome research has yet to be explained. One logical explanation's interpretation is that widely used research paradigms have been inappropriate here (as perhaps in other fields of rehabilitation and special education – further exploration of this important matter lies beyond the present brief).

Wider methodological issues in the direction of research on Conductive Education have been examined over the years by the present author (for example, Sutton 1987; 1988, 1993). These include the need to 'first catch your rabbit' (being sure that it is indeed Conductive Education being evaluated, as something substantively different that insists upon using its name) and the necessity of creating paradigm-appropriate evaluative methodologies.

With more specific respect to methods, various authors have posed a number of basic problems. (Dowrick, 1995; MacKay, 1996; Llewellyn *et al.*, (1997). Lebeer (2002) has made a thoughtful contribution within the wider context of the ecology of rehabilitation in general. More specifically MacKay (1993) has proposed a different statistical approach. Woolfson (1999) linked a review of the equivocal results of outcome studies of various early interventions for cerebral palsy (not just Conductive Education) with criticism of researchers' reliance upon traditional measures of children's progress. She also offered positive suggestions about going beyond child outcomes, to utilise family-focussed outcomes and mixed-method research. In a subsequent paper (Woolfson, 2001) she outlined a much-needed and long-overdue shift in evaluative paradigm, to analysis of parent-child interaction.

Proponents regard Conductive Education as an example of a wider paradigm of the dependence of development upon social interaction (Minnis *et al.*, 1990). Conductive Education has yet, however, to generate an articulate system of evaluation within this paradigm. Horváth *et al.* (1997) reported using procedures that could represent such a dynamic assessment but their report did not make clear how precisely this was done and though data-collection was mentioned its results appear not to have been published.

None of this of course is to deny the potential of randomised, double-blind cross-over trials involving conductive services, though *a priori* questions about their practical possibility may be legitimately raised. But much preliminary work needs to be done, not least creation of relevant input and outcome measures – and there will remain pervasive questions such as matching and sample size.

Catanese (1995) has retold a well-exercised anecdote to typify what he sees as the approach of many researchers to evaluating Conductive Education.

I heard this story at a national Australian Psychologist's Society conference in 1993, given by an eminent Sydney professor when describing the direction of modern research in psychology.

A lady was walking down a city street the other evening when she came across a well-dressed man, on his hands and knees under a street light, appearing to be looking for something. Being a good Samaritan, she asked the man what was wrong. He replied that he had lost his keys to his car and office. The woman offered to assist him look for the lost items, After approximately five minutes or so of unsuccessful searching the woman asked 'Are you sure you lost your keys in this area?' The man responded 'I think I dropped them over by the fence, over there', pointing to a dark area a few meters away. The woman incredulously responded, a little angry having spent some time looking for the items in the obviously wrong place, 'Why are you not looking over there?' The man responded 'It's dark over there and I can't see. It is

easier to look over here, where the light is, and therefore I am looking here because I can see.'

Research in Hungary

It is often asked 'But surely there was research done in Hungary?' The answer, at least in the sense that most in Western academe would count as research, has to be – No. Reasons for this are various. András Pető was not a researcher in any modern sense of the word. Nor was his successor, Mária Hári, nor others who have held managerial posts at the Pető Institute over the years of internationalisation. They were practitioners. The Pető Institute has been a 'college' (*főiskola*), a non-degree-awarding institution, so the Hungarian profession of conductor was a non-graduate profession without opportunity of developing its own post-graduate research wing. The Institute's often tetchy relationships with outside institutions did not permit the involvement of the highly qualified research workers in rehabilitation and special education, of which there are many in Hungary, from participating in joint research activity into any aspect of Conductive Education. And anyway, over the years Conductive Education in Hungary was just 'there', part of the scenery, an already existing system within the state's provision for disabled children. Like other established programmes, such as paediatric physiotherapy, it did not therefore need (crises apart) to have continually to seek 'proof'. (This situation might now change for Conductive Education along with other public services in Hungary, with the arrival of Western economics and the inevitable demand for 'evidence-based practice').

What there *have* been, aplenty, are the much quoted 'statistics' of child outcomes from the Pető Institute, often stated in terms of leaving to attend local schools. Unfortunately, not least because of unstated criteria, these figures convey little or no meaning acceptable in the terms of research (see Maguire and Sutton, 2004, *passim*, for further attention to this point and several examples)

In the days of the first internationalisation of the conductive movement there were also retrospective surveys of children and their families returning from spells in Budapest (for example: Hill, 1990: Lion, 1994).

Medical research

From Israel, Ornoy *et al.* (1997) have provided a rare example of empirical medical research into the effects of Conductive Education outside Germany.

Rochel (1996, 1999) has described the medical evaluation of children undergoing a conductive programme in Germany. In that country Conductive Education has been renamed *konduktive Förderung* in an attempt to increase its potential acceptability and fundability amongst medical authorities. An empirical study by Blank and von Voss (2002) has concluded that it is rightly so construed but the funding has still not been forthcoming. Albrecht (1997) has briefly described the positive collaboration between orthopaedic surgeons and conductors working in a clinic in Germany.

Lebeer (1998) has embedded Conductive Education in more wide-ranging study of developing function despite significant brain damage/deformation and (2002; 2005) sought to contextualise neuro-plasticity within a broader ecological perspective on human development.

Adults

Though strictly speaking outside the brief for this report, the much smaller field of adult conductive rehabilitation has attracted a small body of empirical outcome research, for example Endres *et al.*,

(1990), Laver (1995), Cott and Wright (2001), Brown, (2005). Similar methodological issues as apply to research into Conductive Education with children appear to be relevant here too.

1.3 Some ‘other research’

The totality and dynamism of knowledge

It should not be inferred from the previous chapter that empirical outcome research holds some sort of primacy over ‘other research’ aspects such as those will be dealt with below. Indeed, as will be suggested in this report, the knowledge generated by *all* kinds of academic enquiry interrelates, and a problem for empirical research may be that it has been rushed forward prematurely, before qualitative and theoretical work has helped define the questions that it should be asking and the domains in which it should be asking them. Hence the inverted commas around the expression ‘other research’. It is not ‘other’ but, along with empirical outcome research part of an integral whole.

And once research is permitted to include beyond-the-child, illuminative, ecological, humanistic aspects, then it can also be safely construed as a dynamic process. ‘Conductive Education’ by its very nature, is not a static entity but changes over time in response to, among other things, developments and changes brought about (in the child or the family, for example), by the process itself, even potentially by the very process of research.

How this may be of importance in research at PTØ-Senteret will be returned to in Chapter 6.

Qualitative

Some of the outcome studies have been mixed in methodology in that they have utilised some qualitative data. Against a background of interest in health research in general (Chesson, n.d.), qualitative investigation of Conductive Education has been urged by O’Hanlan (n.d.) and Llewellyn *et al.* (1997) to define its outcomes.. The family studies by Read and Lind mentioned below are extended examples of this in practice.

Such studies have yet to be subject to comprehensive review within a conductive context. To be fair, methodology for systematic review of qualitative research is only just emerging. When it does, this will be an important task for researchers into Conductive Education.

In the meantime, a qualitative-quantitative research strategy, in which the former helps identify and interpret the latter, and *vice versa*, would offer a basis for a positive strategy of generating firmer knowledge about Conductive Education, its nature, processes and outcomes.

Families

Several empirical studies have included measures of parental and family outcomes, with at best equivocal results.

Wholly qualitative studies have been used in the United Kingdom and in Sweden to explore families’ experiences and understandings with respect to Conductive Education, by Read (1992, 1995) and by Lind (including 2000, 2002, 2003).

Social administration

An extensive study in Belgium (Delobbe and Bonani, 1992), centred on the work of Centre La Famille, included investigation of the centre's epidemiological base, the objectives of centre and families, the views of disabled adults, the children's destinations on leaving and their families views of the process. The conductive process itself was examined, along with possibilities for professional training in Belgium and prospects of spreading La Famille's approach to other centres.

In the United States, Wiley *et al.* (2005) have attempted an evaluation of a conductive service according to the terms of reference of public administrators in that country, using methodologies that might be easily repeated elsewhere.

Educational research

A rare example of a survey of actual educational practices in the name of Conductive Education was undertaken by Davies-Isaacs (1992). More recently, Fergusson and Wilson (2004) have provided an informal, illuminative report of conductive work with pre-school children at a single school. Major professional discussion and a host of practical difficulties relate to the relationship between Conductive Education and educational inclusion but there has been no formal research yet published. Schenker (2005) has reported experience of integration from Conductive Education into the mainstream. A project to implant a conductor within a mainstream school in England is being described in terms of action research. (Baker and Sutton, 2006).

Given the context of Norwegian Conductive Education within *habilitering*, outside the education system, no further consideration will be given to educational research within this introductory scoping document.

Pedagogic research

Pedagogic research in this field has yet to find its identity and define its scope. There has been no review of the diverse and scattered literature (much of it fragmentary) covering the actual pedagogy within Conductive Education, nor does there appear to have been formal investigation by pedagogic means, though this would appear essential given the stated pedagogic essence of the approach. Similarly, there appears to have been no formal research and development (R&D) involving the conductive-pedagogic method.

Material that simply *describes* conductive-pedagogic processes and practices lies outside the brief of the present report and will not be examined here.

Theoretical research

Sutton (for example 1986, pp.164-170) has pointed out the very close parallels between Conductive Education and Soviet psychology, pedagogy and neuropsychology, and especially with the works of Vygotskii, Luriya, Leont'ev, Gal'perin and Makarenko). From European perspectives Berger (1991) and Pijning (1997) have elaborated upon Conductive Education in the light of Leont'ev's Activity Theory. From a quite contrary psychological standpoint, Presland (1990) interpreted Conductive Education through behavioural eyes. These topics in no way exhaust the sort of research areas and questions legitimately to be directed towards Conductive Education. Sutton (1987) offered an early selection.

There is nothing irrelevant, abstract, ‘academic’ about relevant theoretical research: ‘A good theory is a most powerful practical tool’.

One of the most important theoretical issues still to be publicly resolved, to which robust theoretical investigation is an essential component, is the boundary to be drawn around the practices that might legitimately attract the description ‘conductive’ and especially their delineation from so-called ‘principles of Conductive Education’. Until this is clarified, major decisions will remain confused not only for potential users of the system, existing professionals and public institutions but probably for future empirical researchers too. The only major examination of this distinction was made by Cottam (1994). Persisting confusions around the world urge strongly that the question be addressed (not least, as will be remarked in Chapter 6, in the specific instance of Norway).

Historical research

Much of the historical discourse around Conductive Education – not least in Hungary – has been at the level of myth rather than history. There is, however, the beginnings of a conductive historiography, dealing both with the early story in Hungary and developments outside that country. Examples include Hári (abridged English edition: 2001), Rosenberg (1994), Forrai (1999). Sutton (2006c) has proposed a periodisation of conductive history.

Politics of research

Academic research never occurs in a social vacuum. Social-science and educational research, even the apparently most objective, may be especially subject to political pressure. Conductive Education has been introduced to Western countries sometime in the face of glaring political and micro-political hostility.

The highly influential ‘Birmingham Research’ (for example: Bairstow, *et al.* 1993; Hur and Cochrane, 1995a, 1995b) has been accused of fragrant political interference and intellectual dishonesty but has yet to be subject to full forensic examination in its own country. British criticism, though extensive, tended to be at face value – examples included Hári, (1993); Lambert (1993), Sutton, (1993a, 1993b); Russell (1994) – but Conductive Education having been successfully publicly discredited, the issue was soon pushed aside. In Australia, the issue remained active for a little longer and Catanese (1995) made a telling examination of the matching of groups in that study (Zhang *et al.*, 2003 also picked up on this in their systematic review). Further, the National Health and Medical Research Council (1993) had used the findings of that study to give a negative judgement on adopting Conductive Education in Australia. There followed a major public scandal, including extensive media coverage, an enquiry in the Australian Senate and criticism by the Commonwealth Ombudsman of the ‘academic competence and research procedures of the NH&MRC’ (Prigg, 1995a; 1995b).

(An influence of the Birmingham report has slipped quietly into Norway, at least on the books *via* the report of Lofterød *et al.*, 2000), and has won official recognition – the supposed and much quoted applicability of Conductive Education to only one-third of children with cerebral palsy. This will be returned to before the end of this report.)

The statement that only around one-third of children with cerebral palsy might benefit from conductive Education is based on one of the dubious deductions of the Birmingham Report. Micro-politics (that is with existing professions and structures) have been much discussed but little investigated. In Malmö, Mallander (2004) gained funding up a two-year project to examine conductive pedagogy in Sweden in the light of the question ‘Why does it seem to be so difficult for alternative methodologies to gain a foothold in established habilitation?’ This study appears to have

been abandoned in its early stage. In Wolverhampton, Morgan and Hogan (2005) interviewed educational administrators in the English Midlands responsible for gate-keeping parents' access to public funding for conductive services. They found that, though 'research' was mentioned (especially the Birmingham Research) a cardinal factor in decision-making was in fact lack of understanding of issues involved (about disability itself as much as Conductive Education) and the tacit understanding of their own workplace. In Sweden, Lind (for example 2003) has found that habilitation professionals misunderstand Conductive Education, largely in terms of a motor programme.

There have been no formal studies as yet on the political role of parents in the spread of Conductive Education – or on the politics of research into Conductive Education.

1.4 Summative statement

It is often said about research into Conductive Education, 'Research has shown...' The present state of academic knowledge favours the contrary view, 'Research has *failed* to show...'

A considerable corpus of studies has accumulated but it has, to use the word of the AACPD, simply 'aggregate' (which I take to mean 'piled up', unconnectedly). It has as yet to cohere into an academic literature.

A step in this direction would involve critical reviews in fields outside comparative outcome research. Along the way, it would be helpful if researchers were to make greater effort to acquaint themselves better with the field under investigation.

Without advance of formal knowledge on a broad front specific research modalities will continue in danger of distortion, as has happened with comparative outcome research.

Empirical research into the outcomes of Conductive Education requires new research questions, new outcome measures (in perhaps unfamiliar domains) and new methodologies. These require a sounder, qualitative and theoretical grasp of the field under study and exploration of research tools already in operation in other fields (such as clinical and developmental psychology).

Despite the now considerable amount of research activity represented in the bibliography of this report (and granting that this cannot be an exhaustive collection), at the beginning of 2007 research into Conductive Education remains in its infancy.

The internationalisation of Conductive Education began only in 1986 but events have moved fast in those twenty-one years. Research reports, however, lie in the public record and it can happen that those who do not know the field, and who think of Conductive Education as a simple, single monolithic way of doing things, will fail to see that they refer to a world that has gone. Particularly, researchers have seemed hung up on Hungary Hungarians. It is high time that new research questions took account of the internationalisation of Conductive Education and the realities of the twenty-first century.

As research reports often conclude. 'More research is needed', But *please*, not more of the same...

1.5 An unsolicited footnote on possible research issues in Norway

I have now concluded this report on the lines requested. I will, however, continue a little and indulge in the luxury of venturing a little beyond my specific brief to offer a few outsider's observations on Norwegian issues deserving of attention from future researchers, whether in the presently proposed project or elsewhere (in no particular order of importance).

The 'principles'. There is a long tradition of interest in Conductive Education in Norway, stretching back to the late eighties. The conductive movement in Norway is, however, as divided as it is in many other parts of the world. There is a growing literature in the Norwegian language and this has recently been consolidated in a well presented monograph (Billington, 2003), there have been several small scale practical experiences – one subject to comparative evaluation (Bjorn-Lian, 1993) – and there is the larger presence of the training course at Peto-Nord. Given that trained Norwegian conductors will be available in growing numbers in coming years clear reasons for distinguishing the supposed principles from Conductive Education proper will likely soon be required to answer the inevitable critical question ('So, what's the difference?').

One ought also to correct the statement that the expressions *konduktiv opplæring* and *konduktiv pedagogikk* are synonymous. They are so only if one does not understand the distinction.

The habilitering model. I have to admit that I am not wholly aware of the terms of reference of this service model. *Inter alia* it offers a multidisciplinary service – but conductive habilitation in Norway is provided in an *uni-disciplinary* way. It appears as much concerned for family as for child rehabilitation – an enormous strength – but one wonders how far to date, without a native conductive workforce, the potential within this dual focus is being fully realised. Then there is the on-off model of service delivery. Block conductive placements are increasingly common under a variety of designations around the world, including 'periodic' and 'interval' Conductive Education. This has been remarkably under-described but the recent evaluation at Petø-Nord by Persson's team has been a major breakthrough in illuminating this way of working and its effects for its clients. Evaluating the outcomes of conductive block placements, both immediate and longer-term, is probably uniquely possible in Norway given the stability that comes from state funding. The possibilities of building upon this work are legion.

A dynamic service. The most extraordinary change is likely to come about in the workings of PTØ-Senteret, in its processes and particularly how it will be experienced by its clients. It is reasonable to expect that in the circumstances there may also be changes, qualitative and quantitative in its outcomes. These changes will me about with the transition from an exclusively Hungarian to predominantly Norwegian workforce. There is an important R&D exercise to be undertaken here. Further, as for any before-and-after measurements that are taken, it will be important to realise in their analysis that any changes.

The 'Lofterød report' Conductive Education in Norway was very fortunate in the process, recommendations and reception of this report, not just in respect of the state funding of conductive habilitation but also in the far-sighted proposal to establish three-year college-level basic training in Conductive Education. But the years are passing and it is now seven years since the report's publication. These years have not been without developments in Norway that might cloud the picture. These include Billington's elaboration of a knowledge base that is not that in which conductors are trained, and establishment of a professional training course in Tromsø supposedly creating a shorter path to Conductive Education than that followed by the Norsk Forum. It may be that the Lofterød report needs refreshing. At the very least, its statement

that only around one-third of children with cerebral palsy might benefit from Conductive Education is based on a highly questionable deduction of the Birmingham Report and it would be advantageous formally to re-examine this expectation.

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APPENDIX I

Alberta Heritage Foundation for Medical Research

SUMMARY OF CRITICAL APPRAISAL OF PRIMARY AND PARENT STUDIES ON CONDUCTIVE EDUCATION

Of the primary studies reviewed only one study randomly assigned the children to either a control or CE intervention group). In two of the studies, children in the CE group were matched with children in the control group on various characteristics including severity of CP and cognitive ability). One study included a control group but without matching. In two studies, no control group was included. The samples were convenience samples of children already enrolled in the programs. All studies were based on small sample sizes.

Of the parent studies only one included a control group. The other two parent studies were descriptive with very small sample sizes.

The criteria described by Lonigan, *et al.* (for empirically supported treatments were used in this review to determine the strength of evidence. The criteria are described in the methodology section (Appendix A).

According to the first set of criteria, for CE to be considered a 'well-established psychosocial intervention for childhood disorders' the results of *at least* two well-controlled studies conducted by different investigators would need to show that CE is superior to alternative treatments, or equivalent to an already established treatment. In addition the use of treatment manuals is preferred, and sample characteristics must be clearly specified.

No two primary studies demonstrated that CE is superior to alternative interventions. Each study seemed to be looking at a different model of CE. Results of the four "well controlled" studies utilizing quasi-experimental designs are mixed. Three of the studies were conducted by the same group of investigators and the one that was not did not demonstrate statistical differences between the CE group and the control group who received special education programs. In fact, in their study Bairstow *et al.* reported that there was evidence of deterioration in hip movements in the children in the CE group that was not evident in the control group. The parent studies do not meet this criterion either, as no two studies were *well-controlled*.

According to the second set of criteria, for CE to be considered 'a probably efficacious psychosocial intervention for childhood disorders', the outcomes of two studies showing that CE was more effective than a control group, *or* two group-design studies meeting criteria for well-established treatments (conducted by the same investigator) would be required. The studies should use treatment manuals, and sample characteristics must be clearly specified.

Using this set of criteria, CE cannot be considered 'probably efficacious'. The three primary studies conducted by the same group of investigators did not establish that CE was better than the interventions received by the control groups. Coleman *et al.* found no significant main effects; however, they did report that the children in the CE group showed a consistently larger improvement than the children in the control group based on gross motor, fine motor, receptive language, grooming, and feeding outcomes. Catanese *et al.* found that the children in the CE group had significantly improved gross motor performance, fine motor performance and activities of daily living; however, the children in the control group showed a greater improvement on cognitive tests. Reddihough *et al.* stated that children involved in the CE-based programs made similar progress to those involved in traditional programs. Once again, the parent studies do not meet this criteria as only one study used a control group.

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CONCLUSION

The purpose of this review was to examine the empirical evidence of the effectiveness of CE and derive conclusions from existing research literature. Because of the major limitations of all studies to date, evidence on the efficacy and effectiveness of CE is sparse and of poor quality. The efficacy of CE is not established, nor is the nature of CE well defined as it is a fast-developing educational approach.

CE has been surrounded by controversy since its first introduction to other countries. Parents, health and educational

professionals are highly motivated to help this group of children with severe difficulties and are drawn to CE. CE is an approach that offers hope. The hope that may have been created by the mass media and anecdotal reports of success for children with CP, is to date not supported by the research literature. Unfortunately available scientific literature does not show this approach to be superior to, or more effective than other treatment methods; nor does it establish which versions of CE should be looked at further. The research evidence, while not establishing that CE is more effective than other forms of therapy for children with CP, does seem to indicate that children in the CE groups kept pace with their peers receiving other therapies. Other than the issue of decreased hip mobility identified in the Bairstow *et al.* study, which was not reported in any other study, no harm from CE was identified.

There is a need for rigorous studies and program evaluations of CE. True-experimental designs that control for extraneous variables such as the influence of extraneous events, maturation bias, testing and instrumentation bias, statistical regression, selection biases, attrition and diffusion of intervention would require control and experimental groups where subjects are randomly assigned. At the very minimum, careful matching of groups to equate the subjects or hold extraneous variables constant needs to occur.

Most studies on CE provide little information about the characteristics of subjects and rely on small samples. These are important considerations for future evaluations. In addition, the programs and therapeutic interventions need to be described at length, and it is desirable as noted by Lonigan *et al.* to utilize treatment manuals that provide a detailed description of the interventions. These authors state that ‘manualized treatment not only allows statements to be made concerning specific interventions but also provides the necessary detailed description and standardization for replication, dissemination, and adequate training of therapists’.

It would also be useful in studies on CE to isolate the two main components of CE (the inclusion of pedagogy and conduction) and evaluate their effectiveness. This could be accomplished through comparing children who receive the isolated component, such as the presence of a conductor, to those who did not.

Outcome measures for the evaluation of CE need to be comprehensive. An outcome model proposed by the National Advisory Board on Medical Rehabilitation Research includes domains of pathophysiology, impairment, functional limitations, disability and societal limitations. Parental outcomes such as parental satisfaction, parental coping and learning merit examination in future research. Clinical outcomes could also be measured and included in any discussion of program effectiveness.

Qualitative methods of research could be used to study outcomes of CE. All of the studies reviewed were quantitative, even those attempting to examine parents' perceptions. It is clear from the work that was reviewed that there is very little understanding of the CE experience for children and perceived value to parents. Quantitative data cannot tell the whole story. Rigorously applied qualitative methodologies would help shed some light on this.

Both quantitative and qualitative methods have complementary strengths that could be used in evaluation research. Information obtained from more than one methodological viewpoint can be advantageous in any research. For example, parents have tended to rate CE higher than what can be substantiated from standardized outcome measures on the children in many studies. Qualitative studies may provide an understanding of the outcomes parents consider important for their children.

Finally, it is important in any research studies on CE to conduct evaluation in the setting CE has been adapted to. CE is practised differently in different countries due to different social contexts. Most adaptations of CE have not involved residential treatment (as originally practiced in Hungary); some use conductors only, while others use multi-disciplinary teams. Outcomes and conclusions from research conducted in other countries, or from other programs may not be transferable to other settings. Local evaluation of CE is imperative. Future research needs to be undertaken which attempts to identify the efficacy and relevance of the approach of programs offering CE in Alberta. To conclude, until necessary steps are taken to rigorously evaluate CE in local settings the empirical legitimacy debate on CE will remain unresolved in Alberta.

APPENDIX II

New Zealand Evidence-based Healthcare Advisory Group

6.2 Effectiveness of the conductive education programmes

The available controlled studies do not provide good evidence for the effectiveness of conductive education programmes. All studies have considerable weaknesses as discussed in section 6.1. A randomised controlled study, with evidence level '1', concluded that children involved in conductive education-based programmes made similar progress to children involved in traditional programmes.

Statistically significant differences of some measures between intervention and control groups were reported in some studies. Among these statistically significant results, some of them were favourable to the conductive education group, but others were favourable to the control group. There is no clear pattern that can be concluded from the results. The clinical significance of these statistically significant results is unknown. In addition, compared with the total numbers of variables tested in each study, the variables with the statistically significant differences were relatively few. For example, in Bairstow's study, only 8 of 47 variables tested showed statistically significant differences between the intervention and control groups. Among them, 6 variables were favourable to the control group while 2 variables were favourable to conductive education. These results need to be interpreted cautiously.

Overall, the controlled studies included in this review suggest that children involved in conductive education-based programmes made similar progress to children involved in other non-conductive education-based programmes. Taking methodological weaknesses (see section 6.1) of each study into account, there is no evidence to indicate that conductive education is more effective than other conventional programmes. The effectiveness of conductive education for children with cerebral palsy is not clearly established.

6.3 Safety of the conductive education programme

Even though a deterioration in hip mobility among children receiving conductive education was reported in one study, this finding has not been repeated in other studies. Therefore, available studies may not strongly indicate that safety is a main issue of conductive education programmes. Parents should seek appropriate medical advice for the conditions of their children.

6.4 Cost effectiveness

The cost effectiveness of conductive education cannot be directly discussed in this report as no cost effectiveness studies were found. However, the high intensity of conductive education could lead to high costs. There have been a very small number of visits to conductive education providers in the 2002/2003 financial year, the gross cost per visit in ACC data was about \$4,050 to \$4,252 for the 'education support-teacher aide' and \$1,012 to \$9,483 for 'training for independent living'.

6.5 Limitations of the review

The number of controlled studies evaluating the effects of conductive education is limited. These available studies

vary in the intervention described, patient population, outcome measures and study design. Therefore, this review only tries to address a broad research question about the general effectiveness of conductive education. A reasonable attempt, including hand searching of citations, has been made to find published reports from relevant medical literature databases and internet sources, but no attempt was made to identify unpublished studies and studies published in the languages other than English. Papers in non-medical literature databases may be missed. Publication bias has not been discussed in this review. Qualitative studies were not included.

7. Conclusions

Implications for practice. The present literature does not provide good evidence for the effectiveness of conductive education. There is no evidence to indicate that conductive education is more effective than other conventional approaches. The effectiveness of conductive education for children with cerebral palsy is not clearly established.

Implications for research. There is a need for well-designed randomised controlled studies, with relatively large sample size, clearly defined intervention of conductive education, clearly defined study population, adequate period of follow up and well standardised outcome measures.

Implications for purchasing and policy decisions. There appears to be no evidence to indicate that conductive education is more effective than conventional programmes or treatments. Decision making around the purchasing [of] conductive education needs to consider a range of other factors such as the cost, suitability and accessibility of the intervention.

APPENDIX III

The AACPDm evidence report

STRENGTH OF EVIDENCE

The confidence the reader can place in the collective findings from a body of literature depends on various factors: the strength of the internal validity of the results (i.e. the level of evidence and the conduct of the study); how extensively the population has been sampled (i.e. number of different studies and number of participants); and the consistency of results across the studies.

In this review of 15 studies, only four of the studies were at Level I or II, and thus the conclusions drawn from the results must be considered with caution. Small sample sizes, poor descriptions of the interventions and/or measures used, and lack of power calculations led to many studies being rated as weak in conduct.

Sample

Often the inclusion/exclusion criteria were inadequately described. Most studies had small sample sizes, increasing the probability of a Type n error, i.e. reporting a non-significant difference when a true difference is present. Finally, most studies reported samples with children of varied cognitive and motor abilities, decreasing the likelihood of detecting a treatment effect for a specific type of client.

Interventions

The interventions were usually poorly described, with no clear indication of the content of the program. In four studies it was unclear who provided the intervention, in seven studies the intensity and frequency were not described. Most interventions could not be replicated, given the information provided.

Measures

Although standardized measures were often used, 'in-house' measures fabricated for the study, or rating scales with no report of reliability or validity were also used. In addition parts of measures were used in isolation, or modified slightly for the study. As the aim of CE is directed towards functional independence in all domains of development, an array of measures at the levels of Functional Limitation/Activity, Disability Participation, and Societal Limitations/Context Factors, validated for this population, could feasibly be used to capture change in motor, social, communication, and educational skills.

Power calculation

No study reported a power calculation, making it impossible to estimate the probability of a Type II error.

CONCLUSIONS ABOUT EVIDENCE

This body of evidence represents 966 different individuals. This number of study participants is misleading because 626 participants come from a descriptive study 19 from the Budapest Institute, and another 109 children participated in a mail-out survey. With these two studies removed, the number of participants represented in this reviewed literature is 231. This modest total sample, coupled with the lack of description of the study population and the heterogeneity of many study populations, make it difficult to discern if a specific treatment works for a specific type of child.

Part A of Table V and VI represents the strongest studies in the review, both in research design and conduct of the study. The majority of the results in these tables reveal no difference in outcome between the CE intervention group and the control group or pre-post CE group results. Of the 20 statistically significant outcomes, 10 were in favor of the CE and 10 favored the control group. No one outcome of interest consistently showed improvement in the CE group across the studies. Although the majority of outcomes of interest in Table VI Part B showed some improvement for the CE group, it must be restated that substantial threats to internal validity were identified in the majority of these studies. In the absence of statistical analysis, proportional improvement of any item across the children in each study was placed in the improvement column, regardless of clinical or statistical significance.

Summary and directions for future research

Implementation of conventional (i.e. Hungarian) CE is difficult because of limited written information to guide practice. Dr. Hari's book provided the best description of the original program of CE. However, persons working with children with motor dysfunction need to reflect on whether the program described is 'transplantable', or whether it should be modified to accommodate different cultural and educational models. For example, original CE programs did not advocate the use of any assistive devices except specified CE equipment. This restriction made sense when schools were not wheelchair accessible, and a child could attend school only if they walked independently. This situation differs from the contemporary model that assumes school accessibility and encourages the use of assistive technology. If an intervention strategy is adapted to cultural normative values, the researchers need to clearly describe the similarities and differences compared with traditional CE programs. Researchers need to determine essential characteristics of a CE program - supervision by a conductor trained in Hungary, group work, the use of a task series and rhythmical intention. A standardized definition of the parameters of CE is needed, as well as research that analyses each of these components individually. Unfortunately, most of the studies in this review did not describe their intervention in enough detail to identify whether there were common characteristics across studies. The intensity of programs varied considerably, and a conductor was not involved in the implementation of all programs. A clear understanding of the minimum parameters of CE-based intervention would standardize the techniques used across studies.

Just as important as standardization of intervention is the need for well-defined samples of children with similar abilities. Traditionally, studies of therapeutic interventions have used small samples with varied abilities, ages, and comorbidities. While such a heterogenic sample approach increases the generalizability of positive results, it confounds the results of studies that report no significant difference. There may have been specific children in the sample for whom the treatment was very effective, but the effect was lost in the group data. It is now commonly accepted that CP is merely an umbrella term for children with brain damage in the developmental period, from multiple and different etiologies and with varying degrees of abilities, but investigators continue to study intervention for children with CP 'en masse', grouping different types of children together. Research needs to be focused on identifying optimal intervention strategies for a very clearly defined clinical profile, i.e. the best fit between a child and a specific intervention.

In summary, the present literature base does not provide conclusive evidence either in support of or against CE as an intervention strategy. The limited number of studies and their weak quality makes it impossible for the literature alone to guide decision-making regarding CE. At first glance a review with inconclusive results can be frustrating because it does not provide one definitive answer. However, even an inconclusive review serves two important purposes. First, it helps families make better-informed decisions regarding CE intervention as a choice for their child. In the absence of strong evidence of its effectiveness, parents must consider other important aspects of intervention such as cost, accessibility, time, and the effect of the intervention on family dynamics. The focus on CE intervention in education, function and activities of daily living may fit with the needs of many families. Second, a review of the literature assists researchers to identify what is needed in future research studies. If well-designed and methodologically sound studies of CE are to be attempted, clear definitions of the intervention and standardized outcome measures with evidence and validity need to be used.

Publishing history

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This text has been reformatted from an original knol, published in October 2008.

There has been nothing of substance published in the three years since October 2008, though time will doubtless come to update this review.

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