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Effective Assessment and the Improvement of Education

A Tribute to Desmond Nuttall

Patricia Broadfoot and Roger Murphy



Effective Assessment and the Improvement of Education

Originally published in 1995, this volume brings together twenty classic contributions from the work of Desmond Nuttall as an educational researcher, thinker and policy adviser. A full commentary by two of his former colleagues who knew him well accompanies the text. They have set out to explain and explore the essence of his contribution to others. Much in the book is as relevant today as when the articles were written; put together they form a formidable collection. The book was published in the year after Desmond's death. It is hoped it will remain a fitting tribute to him. It will remind his friends of his classic ideas and brings together in one volume contributions that students of education may have missed.



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Roger Murphy and Patricia Broadfoot



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By

Roger Murphy
and
Patricia Broadfoot



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Preface

Desmond Nuttall died tragically, at the age of 49, on 24 October 1993. He had by then had an enormously distinguished career as an educational researcher and was well known throughout the world amongst educationalists working in his field. Since his death there have been a large number of tributes to him including a special memorial conference organized by the British Educational Research Association in conjunction with the University of London Institute of Education on 10 June 1994.

In this book we have gathered together a set of twenty of his publications, which we think illustrate some of the major themes of his work as an educational researcher. Although these papers were written over a twenty year period there are many issues and themes contained within them that are highly pertinent now. We consider that this collection represents a classic statement of Desmond Nuttall's key ideas and viewpoints. His work has already had a major impact on national and international policy debates about education, and we hope that this collection will help to keep it in the mind's of those he wished to influence.

As two of his former friends and colleagues we have put together this collection as our tribute to someone we continue to think highly of and now miss. We hope that it will be used widely both by those who knew him and by others who missed out on that privilege.

Roger Murphy and
Patricia Broadfoot
September 1994

Section 1

A Great Record of Educational Achievement



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A Great Record of Educational Achievement

Desmond Nuttall had a remarkable twenty-six year career in educational research, primarily as a researcher but also as a manager, an administrator and a policy adviser. His central concern was educational assessment, and through this interest he was closely involved in work focused upon improving the effectiveness of schools, teachers and pupil learning.

His own educational progress had always been outstanding. Starting his formal schooling at the Parents' National Education Union School at Desmoor, he went on to be awarded a scholarship to Bradfield College. From there he won an open exhibition, in 1963, to Trinity Hall, Cambridge, where he gained a First Class Honours Degree in Psychology, followed three years later by a PhD. His PhD thesis on 'Modes of thinking and their measurement' (Nuttall, 1971a, see also Paper 1) paved the way for his life's work, which was clearly fired by his interest in both the assessment of educational achievements and the promotion of educational opportunities and systems which heighten the success of all learners, whatever their individual characteristics (see Paper 2). Indeed, throughout his whole career he managed to hold onto the worthy ideal of promoting educational excellence for all through improved assessment arrangements:

Many young people are very dissatisfied when they come out of the examination hall realizing that all they were able to do was a bit of one question and a small part of another. We want to give them an opportunity to feel that they have achieved something worthwhile. (Nuttall, 1987a, p. 381)

The UK education system has often been blighted by an artificial division between policy-makers, researchers and practitioners. Career routes often tend to trap talented individuals within one of these domains, thus exacerbating communication gaps that can be such an obstacle to the successful development of educational policies and

practices. Desmond Nuttall was able to move freely between such areas, both in terms of the positions that he occupied, but also even more significantly in the networks he developed as he got alongside and worked with people working in different parts of the education system. In one of many recent tributes to him Harvey Goldstein has written that 'it was amazing how Desmond seemed to know almost everybody working in education, and not merely in Britain' (Goldstein, 1993). By many different accounts he was approachable, hard working, insightful, a team player as well as an individualist, and able to communicate his ideas in a way that made a wide range of people stop, think again, and in many cases change their minds. He was not just a brilliant researcher, but he also had a particular skill in relating research to practical problems, and in particular to the harsh realities of educational practice and the messy and cut-throat political dimension of fighting for change (Murphy, 1994).

Desmond Nuttall was always interested in teaching, research, and bringing about educational change. His career involved a number of moves often between quite different types of educational organizations, and yet his work, his interests and his basic passions remained with him in whatever position he was occupying. Immediately after the end of his own schooling he returned to school to spend a year teaching in a secondary modern, and then went straight on to the University of Cambridge for his first degree.

He then began his professional career in 1967 taking up his first post as a researcher at the National Foundation for Educational Research — a body set up in the early 1950s, in part at least, so that policy-making might be informed by relevant research. The commitment by the government to involving the educational research community in the discussion of policy issues was to endure until the late 1970s. For Desmond Nuttall it became, and remained, the abiding principle of his work and hence the first and central theme in any attempt to understand and assess its significance. At the NFER he quickly moved up through a number of research grades, becoming a Principal Research Officer and Head of the Examinations and Tests Research Unit from 1971 to 1973.

Desmond Nuttall's first move to another organization was to become a Senior Educational Researcher in the Schools Council Central Examinations Research and Development Unit in 1973. This body, which was closed down in 1983, is now looked back upon as the most significant representation of the three-way partnership between teachers, local education authorities and central government which characterized educational policy-making and implementation in England throughout

the post-war period until the mid 1970s. The Schools Council was above all, a body that recognized the key role that teachers inevitably play in influencing the shape and quality of the education system. In recognizing the critical importance of high quality professionalism, it gave teachers a voice in national debates. It also conducted extensive research aimed at exploring how teachers' professionalism could best be mobilized in the process of educational innovation and change (Plaskow, 1985). The fact that Desmond Nuttall chose to work in such an institution is highly significant. It both reflected and reinforced his existing commitment to the development of teachers' skills as a key ingredient in the search for improved educational quality. He emerged from his involvement with that organization with the commitment to working with, and for, teachers to make educational research practical and useful in the classroom — a commitment that became the second defining principle in his professional life. In subsequent years, when he was much in demand as a speaker on in-service courses, as a consultant to local education authorities and as a writer in the popular educational press, this was a reflection of Desmond Nuttall's ability to engage with teachers in a way that was relevant to them and of his enthusiasm for linking research with practice.

Desmond Nuttall's early professional experience in these two very different organizations also resulted in a commitment to the third defining principle of his work — the importance of assessment as an instrument of educational reform. He became convinced both that it was assessment that held the key to promoting equal opportunities and hence social justice in education and that many aspects of current practice resulted in quite the opposite effect. Initially, Desmond Nuttall's concerns in this respect focused on the role of examinations and on the technical ways in which these might be improved to achieve greater equity and utility. His move to the Middlesex Regional Examining Board for the CSE in 1976 testified to his belief at that time that the kind of novel examining techniques which had become the hallmark of so much CSE work — especially school-based syllabus development and continuous assessment — were the key to success in this respect (see Paper 3). Although later developments were significantly to broaden and moderate this commitment, Desmond Nuttall never lost his early commitment to examination reform as a critical element in the search for both higher levels of quality and a greater realization of equality in the education system and this constitutes the third informing principle of his work.

In 1979, Desmond Nuttall moved to The Open University (OU) to take up a Chair in Educational Psychology. His heaviest involvement

in using the distance learning apparatus of the Open University was to disseminate training for the new GCSE examination to teachers. Desmond Nuttall's commitment to linking research to both policy and practice and his enthusiasm for achieving changes through examination reform provided clear testimony to the three principles which were already characterizing his professional work.

But the period Desmond Nuttall spent at the Open University was also one of enormous ferment in English education (see Papers 4–7). It was a time when the old consensus between teachers, LEAs and central government was beginning to break down in the light of a growing realization both that the education system was failing significant numbers of students and that it was very hard to know how and why — or even to what extent — this was the case, given that so little was known about what was taught, to whom, when, and to what standard in the system as a whole. The establishment of the Assessment of Performance Unit in 1974 (Paper 6), which was designed to monitor national standards and, in particular, to identify instances of underachievement, is now seen, with hindsight, as a clear reflection of this concern. Equally symptomatic were the somewhat desultory attempts to find out what was actually being taught in schools via Circular 14/79 and the rash of documents issued by various statutory bodies at the same time (for example, HMI, Schools Council) concerning what a proper curriculum entitlement might be. Youth unemployment, the oil-crisis, the 'winter of discontent' of 1973 were all straws in a wind of change that was to challenge the easy consensus of the past and would result in radically new demands being made on the education system. Chief among these demands would be the need to raise the overall level of educational achievement nationally by raising the level of achievement of the young school-leaver and by encouraging more and more pupils to remain in education beyond the statutory leaving age. Other related demands which were to grow steadily in significance during the 1980s were rooted in the experience of national financial stringency and the consequent awakening on the part of both politicians and public that the education system must be accountable for the investment of national resources that it represented. Concerns for demonstrable efficiency and value for money gradually evolved during the 1980s into the more general preoccupation with the promotion and demonstration of quality which has become the hallmark of educational policy at all levels in the 1990s.

It was this policy context that provided the background for Desmond Nuttall's work during his time at the Open University and subsequently it was the canvas that united a number of more specific

studies concerned with assessment at every level of the system — of pupils, of teachers, of institutions, of national systems and internationally — studies which in every case were informed in differing proportions by the same abiding three themes of Desmond Nuttall's work — making research relevant for policy-making and informing teachers' practice through new ways of conceptualizing and using assessment.

Desmond Nuttall's move to the Open University coincided with the period when assessment research issues ceased to be largely the preserve of examination boards and government research bodies. It was the time when the potential power of assessment as an instrument for exacting accountability came to be recognized. It was no longer primarily a selection device with attempts at reform being focused on the efficacy of examinations in this respect. The language of grades and marks, results and standards became the language of accountability, a policy tool which could be used to represent institutional and system quality. The covert practice of using assessment to manipulate and control the curriculum which had long been characteristic of English education became increasingly overt as the government came to realize the coercive power of 'high-stakes' assessment. The increasing prominence which was not confined to England but was typical of most of the Anglophone countries — had the associated consequence of opening up many new research opportunities in this field and of catapulting key researchers in this area — of which Desmond Nuttall was already one — into a potentially very influential role. In short, it was a time when the combination of new requirements which were being made on the education system, a new political ideology and a new conceptualization of the potential significance of assessment in that system, combined to produce a whole range of novel challenges in the field of assessment research.

The first of these for Desmond Nuttall was his exploration of the potential of other approaches to student assessment. His edited book *Assessing Educational Achievement* (Nuttall, 1986b), brought together a host of new thinking on this topic. Some of this thinking concerned the technical matters of assessment quality which had been so much a hallmark of Desmond Nuttall's work from the beginning (see Paper 12). More traditional concerns with validity and comparability became blended with issues relating to utility and how far different approaches to examining fulfilled the goals for which they were being used (see Papers 8 and 9). The work on the GCSE and the very different context of the vocational qualifications both attracted sustained scrutiny from Desmond Nuttall as he wrestled with issues of moderation, comparability and practicability. In particular, his seminal 1987 paper 'The

validity of assessments' (Paper 14) both reflected a growing international concern with this issue at the time and significantly raised the quality of scholarly debate in this respect.

In 1984, however, Desmond Nuttall had bid for and won, joint responsibility for the national evaluation of government-funded pilot record of achievement schemes. His involvement with this project, spurred as it was by his interest in social justice and assessment reform, was the beginning of a new stage in Desmond Nuttall's work, an involvement which reflected the sea change which was to take place in the field of assessment as a whole.

The Pilot Records of Achievement in Schools Evaluation (PRAISE) project was to last five years. Desmond Nuttall's involvement in the detailed study of schools grappling with changes in their assessment policies and procedures and his contribution to the two influential reports which resulted from the project led him to explore the more fundamental implications of such reforms both technically (see Paper 10) and in terms of general, but profound questions concerning the relationship between assessment policy and the promotion of school quality (see Paper 13).

Early in the decade, Desmond Nuttall had begun to work in the area of school self-evaluation (Nuttall, 1981b), a field in which the research group he led at the OU was to subsequently publish extensively and prove very influential as the later collection *'Studies in School Self-Evaluation'* (Nuttall, Clift and McCormick, 1987) was to demonstrate.

Another related strand in Desmond Nuttall's work at this time concerned the developing government interest in introducing teacher appraisal. Once again it was Desmond Nuttall who so typically sought to inform the debate from a research perspective (see Paper 11) and to integrate that debate within the larger discussion of the relative merits of formative and summative evaluation. The issues, as always for Desmond Nuttall, were practical ones — to generate research insights and understanding so that policy, and the goal that policy is ultimately intended to serve, of making education more effective, would be guided in the right direction.

Desmond Nuttall's time at the OU was a time of ferment for him just as it was for everyone interested in assessment. It was a time when new horizons were opening up when the government was actively seeking research input to guide their understanding of new developments such as records of achievement, teacher appraisal and school self-evaluation. When the old certainties concerning the role, purpose and potential of assessment were being fundamentally challenged,

Desmond Nuttall was strategically placed to take full advantage of these opportunities in leading teams that carried out a programme of research that contributed significantly to the conceptualization and implementation of such developments.

Desmond Nuttall's move to the ILEA in 1986 again coincided with a significant change in the policy climate, a change that was to be marked above all by the 1988 Education Reform Act. Although the Act confirmed the status of assessment as a policy issue, it also represented a quite novel commitment to using assessment as the currency of an educational market as the driving force of the system on an unprecedented scale. Desmond Nuttall found much that was challenging in this new climate. He wrote extensively on the assumptions underpinning national assessment arrangements drawing on his extensive technical knowledge to critique both the conception and the practicability of the arrangements (see Paper 16) just as he had done many years before in relation to the APU (see Papers 4, 6 and 12). So significant were Desmond Nuttall's contributions perceived to be in this respect that he rapidly became regarded as an authority internationally on issues of national assessment, sharing his insights in the United States and Australia in particular and playing a significant role in influencing assessment policy formulation in those countries (see Paper 18).

Desmond Nuttall also found much to interest him in the much higher profile than before of international comparisons. His work over a period of years on the OECD indicators project resulted in a series of publications (for example, Paper 19) which include some of his most perceptive and novel contributions to assessment thinking. Yet despite his notable national and international success at this time, Desmond Nuttall was fundamentally at odds with the new development in establishment thinking. He was at odds with the crude use of performance indicators in league tables of school and local authority performance. His championship of the 'value-added' approach as a more just and meaningful representation of institutional achievement was a reflection both of his enduring concern for technical quality in assessment and of his equally long-standing concern with using assessment to improve education. Desmond Nuttall saw nothing in the punitive and misleading use of assessment information to inform a spurious educational market which was likely to lead to such an outcome. He became an outspoken critic of government policy, a spokesman for a profession overwhelmed by the impositions of an alien political philosophy but unable, often to articulate a response. Right up to the time of his death in October 1993, Desmond Nuttall was using his speaking and writing to articulate clear and realistic alternatives (see Paper 20).

At the same time, Desmond Nuttall's disillusion with government thinking spurred him to continue working on quite a different research front. Social justice is not a topic currently in evidence on the policy agenda. It remained, however a major theme within Desmond Nuttall's work as part of his overall vision of a more equitable society and of the key role of assessment in creating this. The research he instituted whilst at ILEA reflected both his own goals and those of that Authority. Both were equally unfashionable projects concerned to identify the relative achievements of boys and girls, different ethnic groups and different parts of the Authority revealed striking new insights and significant instances of underachievement. Research, which in other circumstances would have had important implications for national as well as local educational policy, but which with the abolition of ILEA, had little impact. By contrast, the well-developed tradition of school effectiveness research within ILEA (see Paper 15) also found a willing and expert champion in Desmond Nuttall. The question of how schools could be made more effective enabled him to draw on several decades spent refining his technical skills in research design and analysis, the capacity to integrate a range of different elements which was rooted in a rich variety of research experience.

Desmond Nuttall's interest in school effectiveness research reflected in a profound way what was perhaps the most abiding characteristic of his work namely the desire to make a difference. For him the academic kudos gained by publishing in prestigious journals and being a pillar of the scholarly community was not an end in itself — although this he certainly achieved. Above all, his commitment was to using research to change policy and hence, practice. His was an engaged scholarship. Desmond Nuttall never sought to be far removed from the issues of the policy arena yet the quality of his work was never corrupted by its pressures for quick solutions and easy answers. The sustained contribution to national assessment policy issues over more than twenty years that this volume illustrates is not just an intellectual achievement. It is a testimony to the character and moral quality of a person who, in his commitment to service and social reform, embodied the best of the English public school tradition by which he was so deeply influenced in his own education. A descendant of George Henry Lewis — the consort of George Eliot and a great nephew of Octavia Hill, one of the founders of the National Trust, Desmond Nuttall's own contribution to improving the individual and collective life of his fellow citizens cannot be in doubt.

Section 2

The Papers



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Nuttall, D.L. (1973) ‘Convergent and divergent thinking’ in Butcher, H.J. and Pont, H.B. (Eds) *Educational Research in Britain*, London, ULP.

Introduction

This first paper in our collection, which was published in 1973, drew substantially upon Desmond Nuttall’s recently completed PhD (Nuttall, 1971a). It has an important place in this collection in terms of the way in which it foreshadows some of the major concerns that were going to be fundamental to his work in the next twenty years. It presents a review of an area of psychometric research, which had been hugely significant in debates about intellectual development, innate abilities, and the provision of educational opportunity. Whether or not there was a case for regarding human intelligence as a single human ability, or whether there were other discrete attributes, such as ‘divergent thinking’ was a question that had a critical place to play in such debates. Also the whole question of whether such things could be adequately captured in psychometric tests in a way that had wider validity was also controversial and critical. Lastly but no-less crucial was the question of how much such attributes, if it was reasonable to regard them as separate attributes, were determined innately or as a result of experience.

What is particularly interesting about this article is not only the way in which it engaged with, and contributed to, those debates, but also the way in which, in doing so, it raised, out of a psychometric context, some of the concerns that were to become central to Desmond Nuttall’s work in educational assessment in the years to come. First and foremost the article demonstrates a high level of scholarship as over sixty, mostly very recent, publications are dissected, rigorously analysed and compared. All of this brings to mind some comments in Michael Barber’s contribution to an obituary which appeared in *Education* on 29 October 1993, commenting upon Desmond Nuttall’s

performance at the last conference he attended at the Centre for Policy Studies in September 1993 (see Paper 18),

He was prepared to speak up only in favour of ideas for which there was firm evidence in the research. The significance of his contribution at the conference was thus not a matter of the strength with which he expressed his own opinion, it was its foundation in research. None of the other speakers could match him. Lord Skidelsky made a formidable intellectual case for a market-style curriculum; Anthony O'Hear argued that the classics needed to be restored to the curriculum; John Marenbon argued for a minimal curriculum; Sir Ron Dearing defended his report; only Desmond cited the evidence. He quoted the British research in depth. He demonstrated a remarkable grasp of research in the Netherlands, Australia, the United States and Scotland. He knew he would not change the minds of the committed ideologies on either side; his expressed aim was to convince the pragmatists, including, he hoped, Sir Ron Dearing.

His performance was brilliant, the highlight of the conference. It was his finest hour. You might disagree with any or all of it; but to do so effectively you would have to be able to cite a comparable body of evidence.

This would be very difficult, for Desmond Nuttall had an unrivalled knowledge of the research. He had a powerful, investigative mind and an entirely balanced approach to research. Unlike so many, he was always open to the persuasion of the evidence. (Barber, 1993, p. 327)

Apart from commitment to pushing forward knowledge, understanding, and educational policy through empirical research, Desmond Nuttall also in this article covers some of the core concerns of his later work. These included the measurement concerns related to the reliability or validity of test scores, the nature of human mental abilities and the extent to which they could be adequately represented by global or disaggregated sub-test scores, the effects of context, test format and other variables on performance, the ability of teachers to assess pupil abilities as an alternative to the use of standardized tests, and the dangers of reading too much into test results, which taken at face value may be quite misleading.

All of this sets in place a framework for Desmond Nuttall's later work on educational assessment. Examinations like psychometric tests can mislead their users, and are prone to all of the interference that can

severely limit the reliability and validity of their results. A detailed scrutiny of the characteristics of any assessment situation will almost always reveal factors that will advantage some of those being assessed and disadvantage others. If one really wants to know about the ability and achievements of a particular learner then the assessment procedures need to be very sensitive to that learner's other unique characteristics which are liable to influence the outcome of a standard assessment procedure. It is instructive to contrast one phrase from the conclusion to this paper,

There is therefore an urgent need for more reliable tests whose content is more relevant to the interests and abilities of the groups for whom the tests are designed . . . (Nuttall, 1973a, p. 129)

with passages in a recent volume by Gipps and Murphy (1994) on equity in educational assessment. Their emphasis upon the need to relate assessments to the relevant experiences and culture, of the individual being assessed, echoes some of the concerns voiced so strongly in Desmond Nuttall's early work, concerns which were to continue to influence much of his work in subsequent years.

Educational tests and assessments can at one level be viewed as simple and straightforward means of generating data about the abilities and achievements of individual learners. However Desmond Nuttall's work, along with that of other researchers working in this area in the period since the early 1970s, has shown that there is an acute need to attend to the broader characteristics of individual learners: to recognize the context bias that is so frequently built into assessments and so to seek for that those optimize the chances of individual learners revealing their real capabilities.

In an assessment which looks for best rather than typical performance, the context of the item should be the one which allows the pupil to perform well; this would suggest different contexts for different pupils or groups, an awesome development task. (*ibid.*, p. 274)

CONVERGENT AND DIVERGENT THINKING

While the analysis of thinking processes has a long tradition in British philosophy, stemming from the work of Hobbes in the seventeenth century (see

Shouksmith, 1970), it is only relatively recently that processes other than logical reasoning have had any experimental or psychometric investigation. Despite isolated attempts to test imaginative thinking (for example, Hargreaves, 1927), it was not until the early 1960s that the 'creativity' testing movement established a major foothold. The work of Torrance (1962) and Getzels and Jackson (1962) were mainly responsible for stimulating work in this country, and they themselves owe a major debt to Guilford's formulation of his Structure-of-Intellect model (Guilford, 1956 and 1967).

In his now famous presidential address to the American Psychological Association, Guilford (1950) criticized existing tests of ability as being too limited in their scope and suggested that, in the study of creativity, tests to measure the fluency, flexibility and originality of thinking would be required. He and his colleagues proceeded to develop tests of these abilities and in later formulations of his model, they were classified in the Operations category of Divergent-Production. In general, each test presents a problem situation in which there are many, if not an infinity of, appropriate responses, requiring the individual to 'diverge' in his thinking. Divergent-Production thus stands in stark contrast to the remainder of the five Operations categories (Cognition, Memory, Convergent-Production and Evaluation) where there is usually a unique correct answer to the test problem to be chosen from among five alternatives. In tests in the category of Convergent-Production, the candidate has to produce the answer in his own words rather than to choose an answer as in a multiple-choice item, but the term 'convergent thinking' is most commonly used now to cover all those situations where the problem has a unique correct solution, whether the candidate has to generate his own response or merely to select it.

In the following review, convergent thinking is used in this broad sense. The review concentrates on five major areas: whether divergent thinking can be considered a unitary trait, the relationship of divergent and convergent thinking abilities, the validity of divergent thinking tests, the influence of environmental and educational conditions on performance in divergent thinking tests, and factors affecting the reliability of such tests. A number of studies, of course, produce evidence relating to several of these issues.

Is Divergent Thinking a Unitary Trait?

The majority of divergent thinking tests give rise to more than one score. Almost invariably, one score is simply the total number of responses produced, disallowing any responses that clearly do not meet the requirements of the problem (the fluency score); another very common score is for originality, which, in an attempt to avoid subjective judgment, is usually based on the statistical infrequency of the responses. A flexibility score is sometimes used: it consists of the number of different categories of response that a candidate uses and often gives rise to problems in defining the categories.

Nuttall (1971) found very high correlations between fluency, flexibility and originality scores within any one test, the median intercorrelation for four tests being 0.74. Ward (1967) and Fee (1968) in their reanalyses of the data of Wallach and Kogan (1965) found that uniqueness (originality) scores loaded on the same factor as fluency scores, although Ward's analysis also gave rise to a factor, accounting for only 6 per cent of the variance, on which fluency scores loaded but uniqueness scores did not. The factor analysis of Child and Smithers (1971) revealed that fluency and originality scores from the same tests always loaded on the same factor and the same is true, with minor exceptions, in the factor analysis of Richards and Bolton (1971) who also used flexibility scores with two of their tests. In both cases, the flexibility score loaded with the fluency score.

The method used to score divergent thinking tests thus seems to be largely irrelevant and Dacey, Madaus and Allen (1969) concluded from their own results that 'the task-specific measures are highly related, almost to the point of being redundant' (p. 263). No British study has produced results that in any way support the idea of separate factors of fluency, flexibility and originality that cut across tests, although this is implied by Guilford's model.

Although the correlations within a test may be high, the same is not necessarily true of correlations between tests. Many researchers write of divergent thinking as though it were a single dimension and have tended to add scores from different divergent thinking tests to produce a single score, even though the correlations among the tests have sometimes been quite low. For example, Getzels and Jackson (1962) formed a composite score from scores on five divergent thinking tests, all predominantly verbal in nature, and contrasted this score with IQ even though the correlations among the divergent thinking tests were of the same order as those between the divergent thinking tests and IQ. Hudson (1966), too, formed a composite score from scores from the Uses of Objects Test and the Meaning of Words Test even though these tests had a correlation of 0.30, little higher than their correlations with convergent thinking measures.

The most important single piece of evidence in favour of a single factor of divergent thinking stems from the work of Wallach and Kogan (1965). Their composite score based on fluency and uniqueness scores from each of five tests had internal consistencies of up to 0.93, but all their tests, administered individually under game-like conditions, required verbal responses even though some of the stimulus material was visual. Fee's reanalysis (1968) did suggest some slight differentiation between 'verbal' and 'visual' divergent thinking, but Ward's (1967) did not.

When tests sampling a wider range of content are used, there is a growing body of evidence to suggest that divergent thinking is far from being a unitary dimension. Lovell and Shields (1967), working with a group of fifty 8–10-year olds all with IQs greater than 140 on the WISC verbal scale, found that their divergent thinking tests (those used by Getzels and Jackson) defined