530

CRANFIELD INSTITUTE OF TECHNOLOGY

DEPARTMENT OF SOCIAL POLICY

MPhil THESIS

Academic Years 1985-7

NIELS E CHAPMAN

AN EVALUATION OF INSTRUMENTAL ENRICHMENT WITH REGARD TO ITS POTENTIAL FOR IMPROVING CHILDREN'S ADJUSTMENT TO SCHOOL

Supervisor: Dr Colin Fletcher

December 1987

AN EVALUATION OF INSTRUMENTAL ENRICHMENT WITH REGARD TO ITS POTENTIAL FOR IMPROVING CHILDREN'S ADJUSTMENT TO SCHOOL

Abstract

Instrumental Enrichment, an Intervention Program for Cognitive Modifiability, is a curricular package of methodology and materials designed to help teachers mediate in the learning experiences of pupils whose performance at school has been retarded by cultural deprivation. The originator of Instrumental Enrichment, Reuven Feuerstein, and the bulk of empirical research into his work, concentrates on the "thinking skills" aspect of how children process their perceptions of reality and takes little account of how they feel about those perceptions. Nonetheless, Feuerstein's theory seems to me to contain a blueprint for a more balanced approach to the curriculum, and in this thesis I seek to evaluate its potential for promoting affective and conative aspects of children's development as well as the cognitive aspect.

My evaluation is limited to a study of the effects of Instrumental Enrichment on children's adjustment to school; although increased psychological integration, which I find in many cases where pupils rate their adjustment as having improved, is hopefully manifest both inside and outside the classroom. Indeed, I go so far as to say that implementation of Feuerstein's methodology constitutes a political force in favour of the sovereignty of the individual learner and democratic procedures in education.

My first chapter is an attempt to furnish the reader with the theoretical background and terminology associated with Instrumental Enrichment. It is followed by a chapter which describes from a practitioner's perspective how Feuerstein's theory, especially his concept of the teacher as a mediator between children and their culture, translates into classroom tasks. The third chapter provides operational definitions of how the effects of Instrumental Enrichment were measured in the course of a two-year experiment on primary and secondary pupils in Buckinghamshire; it defines my use of the Child at School - a new behaviour schedule, the Repertory Grid Technique, and ability and attainment tests. In the fourth chapter, I record and comment on the mean ratings and scores obtained by Buckinghamshire pupils; results are subjected to analysis of covariance. Finally, I infer some support for the hypothesis that Instrumental Enrichment can improve children's adjustment to school, and note the implications of this finding for policies on curriculum planning and teacher training.

CONTENTS

THEORY AND TERMINOLOGY

The Report of the Committee of Enquiry into the Education of Handicapped Children and Young People (Warnock, 1978), the subsequent White Paper (Secretary of State for Education and Science, 1980) and the Education Act 1981, have repudiated the assumption, implicit in previous legislation, that making appropriate provision for children with special educational needs entails placing them in a modified environment; instead, whenever practicable, ordinary schools are now the focus of provision and the emphasis is on modifying individuals rather than falling back on what has been called the passive acceptant approach:

> The passive acceptant approach, which can be fundamentally humane, shapes such policies as placement in special homogeneously formed environments oriented toward the current level of functioning of the individual, reducing the nature and intensity of stimuli to conform to the apparent low capacity of the individual to respond to them, and structuring the environment in terms of types and levels of pressure in order to match the individual's limited adaptive response (Feuerstein and Jensen, 1980).

Such an approach is no longer acceptable in a society which is committed, "not merely to tending and caring for its handicapped members, as a matter of charity, but to educating them, as a matter of right and to developing their potential to the full" (Warnock, 1978, p.7). Indeed, a sharp distinction between "handicapped" and "normal" children is hardly acceptable either, because for educational purposes children with special needs are located on a continuum of ability and categorising them should not be allowed to circumscribe their progress along that continuum.

In practice, special educational provision entails giving some form of additional support, thereby affecting what is taught or how teaching is conducted, to help children overcome educational difficulties; but the aim of special education is no different from the aim of education generally. The aim is twofold:

> first, to enlarge a child's knowledge, experience and imaginative understanding, and thus his awareness of moral values and capacity for enjoyment; and secondly, to enable him to enter the world after formal education is over as an active participant in society and a responsible contributor to it, capable of achieving as much independence as possible (Warnock, 1978, p.5).

There is no question, in the light of the Warnock Report, of making provision that has been designed to do no more than match children's limited adaptive responses; each child's range of responses must be enlarged, no matter how small the steps in this process are. Moreover, it is important for children to discern how much progress they have made, and it is in this connection that Her Majesty's Inspectorate have criticised many special educational units for their "excessive concentration on routine remedial reading and basic arithmetical work" and their excessive adherence to individual programmes which curtail children's opportunities for learning to cooperate and work with peers (Bolton, 1981).

When children do not feel enhanced by the educational provision that has been made for them, they are at risk of becoming disaffected; if they have been separated from their peers into the bargain, then the "adverse effects of isolation and

segregation" referred to in Educational Opportunites For All? (Fish, 1985, p.5) are likely to exacerbate their predicament to such an extent that it is tempting for all concerned to become preoccupied with manifestations of difficulty rather than dealing with needs and preparing for fulfilment. Circular 1/83, issued a little over a year after the Education Act 1981, cautioned against preoccupation with difficulties; it said,

> The main focus should be on the child himself rather than on his disability. The extent to which a learning difficulty hinders a child's development depends not only on the nature and severity of that difficulty, but also on the personal resources and attributes of the child, and on the help and support he receives at home and at school. A child's special educational needs are thus related to his abilities as well as his disabilities, and to the nature of his interaction with his environment (Dept. of Education and Science, 31st January 1983, p.1).

Spoon-feeding children with a "narrow curricular diet" (Bolton, 1981) must give way, then, to an educative process which promotes interaction with the environment. This educative process must produce adaptability in children, because the environment is not static. An active modificational approach is required in education to enable children to adjust to the everchanging conditions of life. It is not an approach that has to be invented from scratch, but it must be developed and more widely discovered; there are only a few teachers I cherish from my own childhood who in retrospect seemed to be "living fearlessly out of the heart of themselves, their feeling and striving fully integrated with their thinking and willing" (Dunlop, 1984, p. 110) and who prepared me

for life in ways I can still appreciate. I suspect from my adult experience as an educator that many of the present generation of children would tell a similar story of precious few teachers putting pressure on them to enlarge their experience and imaginative understanding and all too many teachers being preoccupied with product oriented approaches concerned with notions of deficiency, competency, information acquisition and socialisation (Further Education Curriculum Review and Development Unit, 1980).

So, what I want here is not so much an introduction to something new but more a theoretical point of entry to an active modificational approach. If I tentatively accept Feuerstein's proposition that promoting a child's intellectual growth will increase her potential for successful adaptation, then Instrumental Enrichment, an Intervention Program for Cognitive Modifiability, along with Feuerstein's other works, might afford just such a point of entry.

Cognitive modifiability is Feuerstein's label for a state of susceptibility to intellectual growth. He holds that this state obtains when children have access to a rich array of stimuli together with the creative intervention of more experienced human beings (Weller and Craft, 1983, p.11). I shall return later to Feuerstein's concept of creative intervention, which he calls "mediation," and explore how he aims to render children with learning difficulties, "retarded performers," more modifiable. I shall pay particular attention to how teacher-mediated learning

experiences are meant to equip children with the tools for intellectual autonomy and self-esteem, and also to how learning experiences are bound up with the cultural contexts in which they take place. But first, let us take a closer look at the concept of cognitive modifiability and the perspective it offers on why children with learning difficulties are limited in their ability to adapt.

Cognitive Modifiability

To arrive at the concept of cognitive modifiability, Feuerstein had to discredit a tenet that was once a corner-stone of the empirical tradition; he had to demonstrate that perception could not be adequately explained in terms of passive reception, and that the mind was "furnished with active powers of creative conjecture without which the information provided by the senses would remain disorganised and chaotic" (J. Miller, 1983, p.10). Feuerstein's demonstrations emerge from his clinical work: I have attached the case history of "C" to the end of my thesis (Appendix 1). "C" provides an elegant example of a profoundly handicapped young person with a glimmering of "intrinsic curiosity," in whom Feuerstein kindled powers of creative conjecture.

"C," according to Feuerstein's analysis, was such a retarded performer in respect of his cognitve functioning that he did not have the prerequisites for adaptation; he seemed destined for a protected life in an environment where demands would be kept at a

minimum. But what are the prerequisites for adaptation and why are they dependent on cognition? Furthermore, how might experience of adaptation in its turn enrich an individual's cognitive development, so that the individual becomes more modifiable than he ever was?

According to Vurpillot, an adapted human being must interpret all the information which is available before predicting what the outcome of the current situation would be if he did not intervene, in order to anticipate how it would change if he undertook one or another course of action, and to evaluate what consequences such outcomes would have for him. Adaptation implies, therefore, the conjoint involvement of multiple processes (trans. Gilham, 1976, p. 21). Vurpillot puts evaluation of the current situation under the heading of "perception," whereas the process of referring to previous situations and making conjectural models to display possible changes is assigned to internal "representation." She treats "memory" as an adaptive process too, because it allows observed relationships between sequences of events to be stored and thereby makes it possible for learning to be transferred as well as simply cumulated. Finally, she says, "intelligence" is involved at the level of strategies and decisions when it is necessary to choose from amongst all the information available that which is relevant, and from amongst all the possible courses of action that course which it is preferable to adopt. What is interesting, as regards the first of the two questions I posed above, is that Vurpillot concludes from her deliberations that all of the processes which are prerequisites for adaptation are also

components of cognition and none of them is completely independent of the others.

Now that internal representation has been mentioned, this is a convenient juncture to note Feuerstein's recommendation that children should at least have reached the representational level of thinking and should preferably be towards the end of what Piaget called the period of concrete operations (Beard, 1969, Ch.3-Ch.6), which usually prevails until children are about eleven years old, before they are expected to use the instruments in his programme. It is a recommendation which raises a perennial question pertaining to the concept of cognitive modifiability: is there a ceiling, determined by some inherent immutableness, on how far certain children can go up the continuum of ability; or is there no fixed limit to the extent to which cognitive structures built at a younger age can go on evolving into integral parts of more advanced structures? Rephrasing the question in Feuerstein's terminology, I should ask: is the human individual a closed system or an open system?

Some educational writers are inclined to portray the child with learning difficulties as one who reaches a ceiling during the period of concrete operations:

> The final stage of "formal" operations, when his thinking can extend beyond the here and now to the possible and the hypothetical, to the potential rather than the real, will almost certainly never be reached by the slow learner. If such children are given a curricular diet of formal, verbal, non-practical

> lessons, then, motivational factors apart, neither effective learning nor transfer is likely (Williams, 1970, p.22).

Not many of the teachers with whom I am acquainted would go along with Williams' closed system diagnosis and prescription without wanting to add qualifying remarks about the ubiquitous experience of occasionally observing children who make exceptional progress despite earlier indications to the contrary. Nevertheless, most of them seem to be fairly comfortable with the deficit model of remedial education, wherein their chief task is "plugging gaps." Only a few look deeper than the ordinary diagnostic level, where they are concerned with the absence of particular skills or gaps in knowledge, and search for more radical means of promoting the process of learning in their pupils. It is not that the majority never bemoan the passive, dependent cogntive style of their slower learning pupils, but that they do not expect children with learning difficulties to become autonomous thinkers and therefore do not expect to find any means of diverting them from their current patterns of development.

Feuerstein's expectations are far more ambitious. He expects the child with learning difficulties to be vulnerable to all kinds of influences, because he regards human individuals as open systems. In particular, he expects the teaching of his intervention programme to make enduring changes in the child's cognitive structure which are not simply accelerated maturational transitions, nor specific to a given set of circumstances, but alterations to her manner of interacting with sources of

information. Such changes will rarely come about by chance, since exposure to stimuli alone tends to produce islands of learning rather than a coherent set of alterations to the overall capacity to learn.

So experience must be set in a meaningful context for a child to reach a state of cognitive modifiability; it is mediation that facilitates "the generation of continuous growth by rendering the organism receptive and sensitive to internal and external sources of stimulation" (Feuerstein, 1980, p.9). There is more to this than an axiom to the effect that well thought out teaching constructs a framework for learning. Feuerstein is arguing that once cognitive development has been sufficiently charged by enriching experiences of mediated learning, it has its own impetus and it pervades individuals, thereby preparing them for future encounters with their environment at the same time as adaptation to their current situation is under way. He explains his argument by analogy to a river, "whose stream not only determines the movement of its waters (content) but also carves the bed (structure) along which the waters flow" (1980 p. xvii). But in what sense are the changes which mark a child's cognitive development structural changes? By attempting to answer this question, we may get the measure of just how ambitious Feuerstein's expectations are.

I shall begin the attempt by quoting from an article which presents a definition of structure that is peculiar in its detail to Feuerstein and Jensen; they claim that rendering a person more

modifiable entails making a change in that person's cognitive structure,

> inasmuch as it corresponds to the three characteristics of a structure, namely: (1) A strong relationship between the part and the whole. That is, each experienced event will not have a restricted effect on the organism in the direction of a task-bound change, but will affect the totality of the organism and thereby better prepare him to adapt to new situations. (2) A propensity to become involved in processes of change. Each newly acquired experience may undergo processes of transformation, thereby enlarging the existing schemata of the organism, making them ready for new experiences as they become constantly transformed through the double process of assimilation and accommodation. (3) Finally, a self-perpetuating, autoregulative quality of the process is made possible. Once the process is set into place by some external intervention or internally determined change, it is perpetuated and continues according to specific needs and the interaction of the organism with them.
> (Feuerstein and Jensen, 1980, p.407)

Feuerstein uses the words "assimilation" and "accommodation" in the same way that Piaget does, which is what we should expect once we know that his early work of thirty years ago was inspired by "two great masters of the Genevan school, Professor Jean Piaget and Professor Andre Rey" (Feuerstein, 1980, p.xx). Hence, assimilation denotes the incorporation of new objects and experiences into existing schemata; whereas accommodation denotes the modification of schemata, as a result of new experiences having precipitated new cognitive structures. But Feuerstein imputes structural attributes to schemata in a way that goes beyond Piaget's conception of them as sequences of physical or mental acts (Beard, 1969, p.ix). For Feuerstein, it is not just schemata that are altered as assimilation and accommodation

combine to produce adaptation, it is the schematist himself who is modified. Cognitive modifiability, then, is a state of susceptibility to intellectual growth wherein particular instances of adaptation have been transformed beyond inclusion in or extension of existing schemata to produce a mental infrastructure with its own dynamic and capable of sustaining the transfer of learning to new experiences.

Let us return to the question about the sense in which cognitive changes are of a structural nature. We have now examined Feuerstein's definition of structure and how it contributes to his concept of cognitive modifiability. What we have not yet done is identify the parameters of cognition which are supposedly subject to structural change. This is such a formidable task that I have only tackled it on a highly selective basis in the experiment described later, concentrating on "level of efficiency" in so far as it is revealed by children's adjustment to school rather than on more specific parameters. However, it would be putting the cart before the horse to discuss the tenability of the theoretical position the task leads to before the task itself has been performed, so I shall turn directly to Feuerstein's model of how cognition may be analysed according to seven parameters.

The Cognitive Map

Feuerstein calls his model for analysing mental acts "the cognitive map" (1979, p.122; 1980, ch.5). The cognitive map comprises the following parameters of analysis: content, operations, modality, phase, level of complexity, level of

abstraction, and level of efficiency. I shall give a brief description of each of them.

1. Content. Assessment of a child's cognitive functioning is often coloured by whether the child is familiar with the "universe of content" on which she is required to operate. Familiarity will depend largely on the priorities set by her culture, and the extent to which those priorities have fashioned her experiential background and her educational history. Failure to solve a problem may thus be due to lack of familiarity with the subject matter in hand rather than any underlying cognitive deficieny.

2. Operations. Operations are strategies for organising, transforming, manoeuvring and acting upon information. They seem to me to have a reciprocal relationship with schemata, serving as matrices and expressions of cognitve structure in turn, although traditionally, as Weller and Craft point out, "this area is deemed rather impervious to interpretation" (1983, p.15). It is certainly difficult to get to grips with the operations parameter as a whole, but it is relatively easy to identify individual operations.

Feuerstein took a piecemeal approach when selecting the materials he intended to infiltrate into children's cognitive operations, and several of the instruments in his Instrumental Enrichment programme are named after specific operations. This said, it should also be acknowledged that Feuerstein did not pretend that this piecemeal approach amounted to teasing out individual

operations in such a way that they could be dealt with in isolation. Even in the first instrument, Organisation of Dots, the list of operations shows how much Feuerstein was aware of the intricate relationships between operations; it reads, "Organisation of the field with articulation and segregation; differentiation and segregation; categorization; anticipation and representation; inference; induction and generalization" (1980, p.138).

3. Modality. Modality refers to the language or medium of communication which is prominent in a learning transaction. In our repertoire we have verbal, numerical, symbolic, pictorial, diagrammatic and gestural modalities amongst others. If we can identify which of these had been adopted when a learning transaction aborts, we can experiment with an alternative modality. Individuals may not be able to perform or learn with equal facility in different modalities (Weller and Craft, 1983, p.15). In order to find the appropriate locus for intervention, educators must know whether a child's learning difficulties can be traced to weaknesses in certain modalities or whether there is a more fundamental cognitve deficiency affecting operations.

4. Phase. Kendler asserts that all theories of thinking, "motor or central, behaviourist or phenomenological, dealing in the second-signal system or using computer models, postulate internal processes that intervene between the presentation of the problem and its solution, between the input and output, or between the stimulus and the response" (in De Cecco, 1969, p.361). Phase is a

parameter which Feuerstein uses to reduce the web of internal processes to a few accessible routes. In problem solving, the route from input of data to output of a solution passes through a stage where data are elaborated by cognitive operations. Affective and motivational factors add another dimension to the route from input to output and preclude its being represented as a straightforward linear one. Elaboration is therefore a sort of cross-roads and it appears at the centre of the figure Feuerstein draws to represent its relationship to the input and output phases.

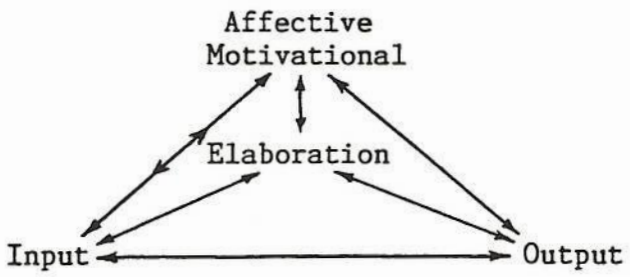


Figure 1. Relationships among the three phases of the mental act (1980, p.75).

Furthermore, elaboration is the crucial phase for educational intervention since, if a child is able to elaborate, she can "bypass the barriers obstructing the regular channels of input or output" (Feuerstein, 1980, p.75). The example of Helen Keller, who bypassed blindness, deafness and muteness to function cognitively at a level which allowed her to graduate cum laude from Radcliffe College, Cambridge, Massachusetts, is the most famous in educational history (Encyclopaedia Britannica, 1978, Micropaedia 5). However, the barriers are not often as obvious as those which handicapped Helen Keller. They can be insidious; for instance,

difficulties arising from a child's having selected information impulsively during the input phase can easily be mistaken for elaborational difficulties if testing is not diagnostic. Feuerstein finds that,

> The nature of the elaborational process in disadvantaged, low functioning adolescents is very often obscured by the presence of behavioral deficiences at the input and output levels. Failure to take into account these peripheral deficiencies contaminates our assessment processes and results in our frequent inability to realize that elaborational capacities are intact and appropriate and that failing responses are, in many instances, caused by the use of incorrect data or the incorrect expression of adequate elaborational functions. (1980, p.76)

5. Level of Complexity. The complexity of a mental act depends on "the quantity and quality of units of information it contains" (1979, p.124). Weller and Craft substitute "the nature and amount of the information involved" for Feuerstein's wording, but I doubt the accuracy of their translation because in this context quality has a more precise meaning for Feuerstein: "The quality of the information is a function of its degree of novelty" (1979, p.124).

6. Level of Abstraction. Feuerstein claims that a hierarchy of levels of abstraction can be established, using as a criterion the distance between each mental act and the objectives or events on which it operates. Direct operations on objects, such as in sorting activities, demand a low level of abstraction; whereas discerning relationships "between purely hypothetical propositions without reference to real or imagined objects or

events" demands a high level of abstraction (1979, p.124).

7. Level of Efficiency. A child's level of efficiency might not correspond to the capacity he has, according to the other six parameters, for grasping and elaborating problems. This is because, while efficiency is a function of the other parameters, it can be reduced by extraneous factors of a task-intrinsic or a task-extrinsic nature.

I suggested, in my description of phase, that lack of motivation or disproportionate anxiety may disrupt a child's efficiency in performing a task. The child may have acquired the knowledge and skills necessary for the task, and yet he is distracted from making use of his preparation or too debilitated to do so.

Here I should also like to suggest that while conative and affective factors can be defined as extraneous to cognitive factors, the nature of the interaction among factors is not restricted to one or two disrupting a third. Interaction can be productive, resulting in compound factors such as the blend of intent and willpower Phillips calls "purposive striving" (in Dunlop 1984, p.107). Indeed, it can be argued that interaction among conative, affective and cognitive factors produces the dynamics of development, or what Dunlop calls the "thrust out" towards new experiences of beauty, cognitive satisfaction and love (1984, p.98).

Feuerstein has reservations about this argument, because he does not believe that all cognitive processes necessarily depend on a "purposeful and intentional orientation of the organism." He hesitatingly concedes that conative and affective factors are important in so far as "the organisational activity of the organism is, at least in its early stages, a product of a volitional, intentional and purposeful effort on the part of the individual" (1980, p.102). But he tends to neglect the potential of conative and affective factors for promoting efficient cognitive functioning and concentrates instead on their deleterious properties. It is a bias I regret, albeit that it facilitates his single-minded exposition of "the role of emotional factors in producing cultural deprivation and its detrimental effects on cognitive development" (1980, p.45).

Perhaps Feuerstein would seem less ambiguous in his treatment of conative and affective factors if I were to detach emotion from them, in the way that Strasser does:

> emotion represents a sinking back, in the face of a good or evil presented as absolute, to the level of primary mechanisms indicated by the strong physiological disturbance expressive of the emotional state. Behaviour in the strict sense of the term disappears and elementary movement takes its place. (trans. Wood, 1977, p.31)

Emotion, in the sense made technical by Strasser, "involves an abdication of the sovereignty of the human spirit and often leads to movements ill-adapted to the situation." Emotional action is therefore not intentional; it is an impulse "without a conscious

goal but with an awareness of the general possibility of being fulfilled" (Strasser, trans. Wood, 1977, p.28). The affective factors which Feuerstein credits with organisational activity, on the other hand, are characterised by their intentionality.

Since "emotion" would usually be subsumed by "affective factors," it may be more convenient to adopt Strasser's stratification of feelings into pre-intentional, intentional and meta-intentional levels, when distinctions are required. These three levels of feeling relate to one another in the way that stages on a continuum do, as I have tried to indicate by the following examples: at the pre-intentional level, the individual is disturbed by an emotion or feels unease; at the intentional level, she feels attracted to a source of gratification for herself; at the meta-intentional level, she experiences a "drive toward that which is beyond self," a passion charged with the power of conation and ready for creative expression (Lersch, in Strasser, trans. Wood, 1977, p.281). Progress from one stage to the next is not automatic; it may be blocked. Feuerstein points out that while he can shift his focus from "cognitive dissonance" to "a feeling of compatibility" by inverting the concept, the practical transition from the pre-intentional to the intentional level is not always so simple:

> The definition of problems and the search for their solutions is strongly contingent upon the presence of a feeling of cognitive dissonance (Festinger, 1957) and disequilibrium (Dewey, 1933; Piaget, 1952), generated by the incompatibility or incompleteness of data in a given situation. A feeling of compatibility is derived

> through the grasp of the relationships either between objects present, or between a given object or event and previously stored information. However, even if the problem is experienced and incompatibilities are felt and registered, a search for solution may still be lacking if no need to change the situation in order to restore the disrupted equilibrium is felt. (1980, p.95).

What Feuerstein calls the "automatization" of behaviours, a process of familiarisation with universal components of tasks which leaves individuals free to concentrate on components requiring "vigilance," is the antidote for such blocking of the need to restore disrupted equilibrium. Because it encourages concentration on relevant details, it also helps develop efficient cognitive functioning. Before I discuss antidotes any further, though, I must describe a number of deficient cognitive functions besides blocking.

The Inventory of Deficient Cognitive Functions

I shall not describe all of the deficient cognitve functions Feuerstein describes; his list, by his own admission, (1980, p.72), is neither definitive nor exhaustive, anyway. Instead, I shall pick out the details of a few key deficiencies which have a direct bearing on children's adjustment to school. For the remainder of Feuerstein's list of deficiencies, please refer to the separately published inventory attached to the end of my thesis (Appendix 2).

While the cognitive map afforded us a means of analysing thinking, the inventory of deficient cognitive functions relates to and

helps us identify "the prerequisites of thinking" (Feuerstein, 1980, p.72). In so far as a checklist of the prerequisites of thinking can be said to anticipate a model of thinking, we can say that the inventory anticipates the map; but the inventory is not a model in its own right. At first appraisal, it is only an incomplete checklist to aid educators in their attempts to diagnose the reasons behind children's manifest levels of performance. Ultimately, however, the inventory is inextricably linked to the inception of the entire Instrumental Enrichment programme. Feuerstein developed the programme with the intention of fostering and correcting those cognitive functions that neglect had rendered deficient; moreover, he was determined that children's retarded performances should be attributed wherever possible to unmodified cognitive functions rather than petrified low intelligence:

> All too often, a child's failure to perform a given operation, whether in the classroom or test situation, is attributed either to a lack of knowledge of the principles involved in the operation or, even worse, to a low intelligence that precludes his understanding of the principles. What is over looked is that the deficiency may reside not in the operational level or inthe specific content of the child's thought processes but in the underlying functions upon which successful performance of cognitive operations depends. For example, underlying the operation of classification are a number of functions such as systematic and precise data gathering, the ability to deal with two or more sources of information simultaneously, and the necessity to compare the objects or events to be classified. Failure to correctly classify objects or events may either be caused by an inability to apply the logical operations governing classification or may result from deficiencies in the underlying functions that are presupposed in the operation. (1980, p.71).

Let us now look beyond Feuerstein's example concerning the operation of classification, at key deficiencies which impede cognitive operations generally.

"Narrowness of the mental field" is a deficiency which is characteristic of culturally deprived children. It is an impediment to conceptualised operational thinking because it drastically limits a child's capacity for assimilating and accommodating information. Memory is thus constricted; where there is a narrowness of the mental field, "there is a loss of fragments of previously acquired information once the individual changes the focus of his attention to other information derived from the same source" (Feuerstein, 1980, p.93). Feuerstein illustrates this aspect of the culturally deprived child's predicament by describing the "short blanket" phenomenon, wherein the child repeatedly uncovers her legs in order to cover her head and vice versa.

Not surprisingly, children with a narrow mental field tend not to have faith in their memories. They feel more secure if there is an extrinsic locus of control which allows them to adopt a passive role in processing information, "which makes them dependent on what will happen to them rather than on what they can make happen to themselves and to others" (Feuerstein, 1980, p.94). In other words, these children consider themselves to be recipients rather than generators of information, and this in turn may act as a depressant on their self-esteem. Consequently, they fight shy of responsibility for their own learning and experience difficulties in adjusting to school.

Faced with children experiencing difficulties in adjusting to school, many teachers will exercise greater control than they would normally so as to pre-empt behaviour that is potentially distressing for the children or disruptive in terms of classroom management. Excessive control by teachers may in the long run remove the need from children to pause and consider what their priorities are. In recognition of this danger, each of Feuerstein's instruments has what is supposed to be a habit-forming slogan on its cover: "Just a minute, let me think."

By exhorting children to think, Feuerstein hoped to shift the emphasis in schools away from manipulating children and towards instilling in them a sensitivity to the sort of discipline which arises not from external forces but from the values intrinsic to an activity. Nash sought a similar shift in 1966, saying that schools must educate children to appraise social rules rationally and to submit themselves to the discipline inherent in valued activities because of their interest in those activities and not just because a teacher had succeeded in arousing them from "a pervading lethargy only by dramatic tricks or colourful gimmicks" (In Docking, 1980, p. 36). Feuerstein would agree with Nash that the disciplined child is one who has attained "an autonomous power of attention and interest," and he would further argue that the route to attaining such power is through mediated learning experience. For him, valued activities must not only be interesting, they must derive from a child's cultural heritage and broaden her mental field. As I assume Margaret Thatcher realised when she complained that schools were, "not teaching

children their heritage, not teaching them right from wrong," (Panorama, 17th February 1986) the disciplined child is a child who can tap her cultural heritage. For a child to be consistent in her judgements of what is right and what is wrong, she must transcend the narrowness of her mental field and actively engage with her culture:

> What is required is a change from a passive episodic grasp of reality to an active mode of interacting with the environment by operating on and transforming experiences and, thereby, detaching oneself from the constraints and limits imposed by the sheer sensorial perception of the world. (Feuerstein, 1980, p.103).

"Episodic grasp of reality" is a key deficient cognitive function in its own right, although most of the deficiencies Feuerstein describes could be subsumed under its heading. It is epitomised by a lack of comparative behaviour in children, which confines their experience of events to seemingly unique and unconnected fragments set in the concrete here and now. Since the generation of information is contingent on individuals needing to evoke, compare, order and re-order objects and events that are remote in space and time, children with an episodic grasp of reality will feel perplexed if they are asked to identify relationships in their environment for themselves; a teacher's insistence on such children's becoming active generators of information, rather than passive recipients, is liable to cause distress or to provoke resistance at first.

Few children have an entirely episodic grasp of reality, and even the most retarded performers exhibit a limited readiness to respond to incompatibilities and pick up hints that problems exist from time to time. The trouble is, they are often thwarted by another key deficient cognitive function, "impulsivity." The impulsive and unsystematic nature of their exploratory behaviour confounds their incipient problem solving:

> When presented with a number of cues that must be scanned, the individual's approach is so disorganised that he is unable to select those cues whose specific attributes make them relevant for a proper solution. (Feuerstein, 1980, p.77).

Conceptual impulsivity during the input phase, then, is characterised by what Feuerstein calls a "probabalistic-accidentalist" approach to whatever cue is offered (1980, p.79). It indicates that a child is unaware of her need for data in addition to the information she already has in hand, and it presages the use of blurred, fragmentary and incomplete data. During the elaboration phase, impulsivity results in excessive use of trial and error where, instead of "internalized processes marked by a high degree of flexibility" being developed, an "unplanned externalized motor approach" (Feuerstein, 1980, p.105) or what a drama therapist might call "acting out" behaviour (Moreno, 1974) is adopted. Output will inevitably be distorted by impulsivity during the earlier phases of mental activity.

Even if a child inhibits her impulsivity during the input and elaboration phases, impulsive output may yet displace her logical conclusions and prevent her from giving them immediate expression. In these circumstances, a "secondary impulse" (Strasser, trans. Wood, 1977, p.29) usurps the child's intentions and might produce bizarre results comparable with those produced by emotional disturbance at the pre-intentional level of feeling. This happens most often when output is expected in an immediate modality, such as speech, without sufficient rehearsal. If the child subsequently realises that her output was far from what she intended, her self-confidence will suffer. After repeated failures, she is likely to feel reluctant about voicing solutions to problems and will not always reveal that she has answers on the tip of her tongue.

Inconsistencies in a child's problem solving performance may provide an examiner with a wealth of differential knowledge about the child's cognitive functioning. Peak performances may indicate strengths, such as preferred modalities of output, whereas troughs in performance may indicate either weaknesses or interference from secondary impulses. Obversely, if a child's performance is consistently poor, she may be deficient in one or more of the fundamental cognitive functions. For example, "lack of, or impaired, interiorization" means that she will hardly be able to represent a future to herself and therefore she will seldom raise her performance to reach remote goals.

Conventional psychometric test procedures obscure the inconsistencies in a child's problem solving performance by summarising scored responses in the form of a quotient, an index, a percentile, or an average. Indeed, it is often implied in test rubric that,

> failure on easier tasks makes success at more advanced levels not just improbable but also meaningless as a random aberration from the established level of performance. Viewed in this way, the episodic appearances of correct responses to more difficult questions (the "peaks of performance") are seen to be nonrepresentative of the individual's capacity. (Feuerstein, 1979, p.33)

Feuerstein challenged this view, because it confuses a child's manifest level of functioning with her capacity for modifiability (1979, p.32; 1980, p.61). His challenge led to the development of the Learning Potential Assessment Device (LPAD), which is used in clinical settings to compare children's cognitive functioning after they have been taught how to perform on test materials with their cognitive functioning prior to intervention.

The LPAD is not widely used outside clinical settings, because it has not emerged as a scaled battery of tests and it is unwieldy. Nonetheless, in so far as it facilitates a dynamic form of assessment that takes account of children's most modifiable and least predictable behaviours, it has an advantage over psychometric tests which only yield static measurements. Like the cognitive map and the inventory of deficient cognitive functions, the LPAD focuses on "the process of learning rather than its

product and, accordingly, on the qualitative rather than the quantitative dimensions of the individual's thought" (Feuerstein, 1980, p.61). In other words, the LPAD tests the extent to which children are instructible rather than how much they have been instructed in the past (Vygotsky, 1962).

By testing, teaching and testing again, educators and psychologists can learn about the conditions which render a child more instructible; they can observe how she adapts to new situations more and more efficiently and they can infer from this that she has attained a state of cognitive modifiability. Knowing which conditions are likely to promote cognitive change does not amount to knowing how a child will change under certain conditions, however. This may not matter, so long as intervention helps the child who has hitherto been passive and listless to discover the energy she needs to play an active part in forming what Feuerstein and Jensen call the "trajectory" of her life course (May 1980, p.402). Fletcher found a metaphor for this argument; he asked, "what if we tap a layer of gas instead of the oil we were drilling for? We can continue our exploration at deeper levels but, meanwhile, we will surely make use of the alternative source of energy we came upon first." (In conversation, 17th March 1986). What does matter, though, is that we do not mistake Instrumental Enrichment for a "prescription for intervention" (Hobbs in Feuerstein, 1980, p.ix) which has a precise effect of a "cold, considered, cerebral" nature on children's adjustment to school (Griffiths, 1985, p.291).

Feuerstein himself sometimes writes as if he has been misled by his own devices into believing that creative intervention in a child's learning experience can be reduced to what Griffiths calls a "means-end calculation" (1985, p.290). For instance, he states that the joint purpose of the cognitive map and the inventory of deficient cognitive functions is to explain cognitive behaviour "by analysing its components, and locating and interpreting any weaknesses that may occur" (1980, p.113). In doing so, he overplays the empirical evidence gathered from his work with the LPAD and isolates thinking from feeling. Consequently, he risks alienating British educationalists on two counts: for one thing, the view expressed in a Southern Examinations Group booklet on the new GCSE examination, "that we know little if anything about the way in which children think, " (Burke, December 1985) is widely held; and for another, Griffiths' assertion that "human intelligence is not divided into the hard, calculating scientific part and the soft, expressive artistic part," (1985, p.291) has become an influential tenet in many secondary schools' reappraisals of divisions in the curriculum. Primary schools already have a long history of recognising that thinking and feeling are interrelated and of reflecting this recognition in the way they organise their pupils' learning experiences.

An effective intervention programme for cognitive modifiability must harness the goal-oriented and organising properties of feelings. If Instrumental Enrichment modifies children's cognitive make-up, it does so in the presence of feelings that only individual children can know and experience directly. We can

guess at children's probable intentions, and the rational viewpoints they hold, from the feelings they express. But we must remember that what children say may only be the tip of the iceberg in respect of their cognitive functioning, and we can expect Feuerstein's quest to locate and interpret cognitive deficiencies to founder on hidden obstacles occasionally.

Recent hypotheses about the human brain's functioning have not produced an alternative framework for intervention against which we might judge Feuerstein's programme for promoting cognitive development. The commonest hypothesis of the early nineteen-eighties posits a loose federation of modules concerned with perception and behavioural concert, yielding information to a more central system responsible for collation and integration. Of the more central system Jerome Fodor, Professor of Pyscholinguistics and Philosophy at Massachusetts Institute of Technology, says,

> I suppose that that's the kind of system that mediates problem solving and higher cognitive processing at large. I have no idea how that works, nor am I convinced that the currently available theoretical and experimental techniques are very likely to throw much light on that question. (ed. J. Miller, 1983, p.98).

So, is Instrumental Enrichment wildly beyond the state of the science as far as cognitive development psychology is concerned? And even if it is not, can retarded children's learning about their own thought processes help them to think? Fodor is of the opinion that most thought processes are inaccessible, in which case any programme addressed to them is likely to be a shot in the

dark; there is no biological need for massive introspectability, convenient as it might have been for educationalists and psychologists. Nevertheless, there are a few things about thought which do seem to have been reported with some accuracy and Fodor concedes,

> It may be that what you get out of introspectability is the possibility of conscious correction. Insofar as one can look at one's thought processes, they're sensitive to instruction and re-examination and self-criticism. (ed. J. Miller, 1983, p.94).

This concession falls short of Feuerstein's aim toward a cultivated sort of self-correction faculty which would ultimately be exercised spontaneously, without its having to enter a child's consciousness. However it corresponds to my own observations of how children's spontaineity initially appears to be impeded by Instrumental Enrichment, because the programme heightens individuals' levels of self-directed attention or "objective self-awareness" (Eiser, 1980, p.9).

Too little is known about the languages of thought, or the mechanics involved in the human brain's functioning, for anyone to say whether Feuerstein's instruments are intrinsically valuable for helping a retarded child to correct herself unconsciously. With regard to teaching conscious self-correction, though, Feuerstein gives a plausible account of how the Instrumental Enrichment programme counteracts impulsivity by introducing planning behaviour to children, step by step. He says that while the steps are being learnt, there is a concomitant change in

"conceptual tempo" which results in children's adopting a more ponderous "cognitive style" (1980, p.265). But it does not necessarily follow that, once planning and synthesizing behaviours have been instilled or cultivated, they will be available to children for spontaneous recall when fresh encounters with the environment demand them. As Brennan reminds us in Curricular Needs of Slow Learners (1980, p. 155), children who find learning a frustrating and difficult process "do not easily acquire insight, relate different aspects of learning or generalise established learning in new situations."

Perhaps feelings make a considerable difference to the transferability of learning. When a teacher uses Feuerstein's instruments in a direct attempt, of the means-end calculation sort, to change a child's cognitive structure, I should expect any increase in the child's modifiability to be allied to a side-effect whereby the child has come to feel more positively about herself as somebody who can make use of what she has learnt. By dint of placing materials designated as "tools for thinking" at a child's disposal, the teacher imparts confidence in the child's potential and esteem for her as an active learner. It is an approach which contrasts with the behaviour modification techniques derived from learning theory psychologists. While the latter seek to manipulate children into making pre-determined changes in their behaviour, the Instumental Enrichment route to cognitive modifiability entails a relationship between teacher and pupils which is analogous to the relationship between a master-

craftsman and his apprentices: the tools of the craft are not withheld for the use of the initiated alone, but are shared components in a collaborative learning exercise which may result in developments that surpass those anticipated.

However, children do not have the wealth of experience and knowledge a master-craftsman can bring to bear on his problem-solving. Feelings might enhance the transferability of learning by serving as synergists to thinking, and introspection might foster self-correction, but children also need a reservoir of information to draw from. Even the most willing and insightful nine-year-old child will barely have begun to tap her cultural inheritance and learn from others' experience as well as her own, which is probably another reason for Feuerstein's lower age limit as regards when the Instrumental Enrichment programme should be started:

> One may use Henri Bergson's illustration (1919) describing the relationship between past and future as similar to the relationship betwen the taut bowstring and the distance of the arrow's trajectory. The more taut the string, the further the arrow is projected; the more remote the past to which an individual can refer, the further he can project himself into the future, planning and working constructively toward it.
> (Feuerstein, 1980, p.30)

But some children arrive at school with only the most tenuous of references to the past and correspondingly little aptitude for planning and working toward their futures. Hence, they are ill-prepared "to relate specific events to a broader system of meaning and purpose" (Feuertein, 1980, p.44) and they must struggle from

one episode in their lives to the next, unable to make sense of the rules others expect them to follow. Feuerstein calls the symptomatology of these children "cultural deprivation." He uses this label ambiguously, as Wolfe Mays has pointed out (1985, p.155), sometimes treating the notion of cultural or intellectual deprivation synonymously with mental handicap without commiting himself to a position on the inevitable question of how much nature sets the scene for nurture. I shall therefore look more closely at what cultural deprivation might mean.

Cultural Deprivation

Cultural deprivation not only stunts the acquistion of information and skills but also "the development of the prerequisite cognitive schemata to enable an individual to derive maximum benefit from direct exposure to sources of stimulation" (Feuerstein, 1980, p.19). Geertz goes so far as to say that the human brain is "dependent upon culture; that it probably could not exist and that we could not function outside of culture" (in J. Miller, 1983, p.208). The most plausible explanation I know for these assertions runs as follows:

> practical and social knowledge, the rules of proper action, the actual processes of thought, might not be in an individual's possession at all. All these things might be properties of the social-collective of the human group. In so far as the group has a social structure, so does the system of rules, so does the body of knowledge. (Harre in J. Miller, 1983, p.165).

The rules of cognitive development, according to Harre, are "cultural artefacts" (in J. Miller, 1983, p.163). While the

fundamental cognitive processes of man, "the kinds of thinking your brain makes possible, both peripherally and centrally, are essentially the same the world over" (Geertz in J. Miller, 1983, p.201; Cf Gardner, 1983, p.319, on universal "raw intellectual competences"), different cultures mobilise them in different ways to produce reasoning and sensitivity to information in individuals as befits their location in the social structure and their alloted "right to display certain pieces of knowledge" (Harre in J. Miller, 1983, p.165).

Although Feuerstein is at pains to distinguish cultural difference from cultural deprivation, he identifies children who have been transplanted into cultures radically different from their own as being particuarly at risk of sustaining cognitive deficiencies on account of their not knowing the rules necessary for becoming "modified by direct encounters with the new culture" (1980, p.41). He sees culturally different children as needing compensation for the loss of continuity or constancy they have experienced, lest they degenerate into "social pathological" modes of behaviour or otherwise become victims of cultural deprivation. For him, compensation should take the form of "cultural transmission both in the home and at school" (Feuerstein and Hoffman, 1982, p.61).

The Committee of Inquiry into the Education of Children from Ethnic Minority Groups, under the chairmanship of Lord Swann, saw the practice of teaching children their culture in a different light:

> The role of education cannot be and cannot be expected to be to reinforce the values, beliefs and cultural identity which each child brings to school - indeed such an education would surely be as rooted in one culture as much of the traditional Anglo-centric curriculum is at present. (Swann, 1985, 2.5).

The Committee spurned the idea of cultural preservation in favour of recognising that "all cultures are dynamic," but it did go on to suggest a policy to counter cultural deprivation:

> We would instead wish to see schools encouraging the cultural development of all their pupils, both in terms of helping them to gain confidence in their own cultural identities while learning to respect the identities of other groups as equally valid in their own right. (Swann, 1985, 2.5).

It is a commonsensical policy, but children who have already become disaffected would most likely remain hesitant about trusting their schools' encouragement (Evans, 1981), perhaps suspecting that they were being offered "another brick in the wall" (Pink Floyd song, 1982) which protects the status quo and restricts their scope for self-determination. Feuerstein's message for these children is that rejecting cultural imposition from your teachers is like cutting off your nose to spite your face; you can use the "bricks" of culture to build a foundation for self-determination rather than a containing wall. His argument is that, in order "to modify oneself, to free oneself by one's own autonomous decision and volitional act - one must have previously had the benefit of cultural transmission." Conversely, one's capacity to choose is reduced by cultural deprivation (Feuerstein and Hoffman, 1982, p.61). Teachers need have no

qualms about contributing judiciously to their pupils' cultural make-up, then; even if Godber's comments, on the price many pupils currently pay for accepting the curriculum, give them pause for thought:

> The street level culture is held back, in order for you to aspire.....
> As soon as you start doing an "O" level, you are filtered through somebody else's culture. (South Bank Show, 20.4.86)

Perhaps the price of an advantageous location in the social structure, and the number of disaffected pupils, will go down if there comes a time when the vision the Schools Council submitted to Lord Swann becomes a reality:

> Whatever the make-up of the locality, the pupils or the staff, however homogeneous or heterogeneous, the interplay of cultures and the world form the backdrop against which we act out our lives, and must be represented fully and compulsively in every facet of the curriculum. A curriculum that is not multicultural would prepare pupils for an unreal society and world; and involve them in a relearning process outside school; it would be an anachronism and an irrelevance since it would fail to prepare pupils for the real world. (Swann, 1985, 6.2.1.).

Meanwhile, how can children be helped to overcome cultural deprivation and to become more modifiable? For Feuerstein, the difference between a child who is readily modifiable and a child who has the "inadequate cognitive development syndrome of cultural deprivation" (1980, p.18) is chiefly determined by the amount and quality of mediated learning experience each child has had. In Feuerstein's scheme of things, genetic endowment and organic

malfunction, together with cultural difference and several other "distal etiological factors," are no more than remote background influences on whether a child will be culturally deprived in comparison with the ascendancy of mediated learning experience (see "Distal and proximal etiologies of differential cognitive development," Appendix 3.).

Feuerstein does of course recognise that neurophysiological and neurochemical factors produce different thresholds to stimulation in children, but he sees these constitutional factors as barriers to mediated learning experience rather than as inherent limits to intellectual growth. This is why he says the significance of mental handicap is best understood in terms of how much it deprives a child of cultural input and the opportunity to elaborate on data. For example, he has the following to say about children with Down's syndrome:

> Certainly, the hypotonicity of the children produces a considerable delay in their ability to seek out stimulation, which, together with their general slowness in behaviour and development, produces a restricted environmental input. Even the available stimulation may be only partially registered if it does not reach the amplitude, intensity, and frequency necessary to penetrate the barriers present in these children. Thus, it is reasonable to assume that much of the extero- and proprioceptive stimulation that is actually absorbed by the system is of a diluted quality and is insufficient to produce modification. Unless otherwise instructed, parents of Down's syndrome children tend to provide these children with less stimulation than that which their normal children receive, and, in so doing, they inadvertantly produce even greater deprivation. (1980, p.54).

The presence of a mediator, somebody who intentionally frames, filters and schedules stimuli, is the critical factor in a child's learning to transcend her immediate concerns and reach out for her cultural heritage. It is not necessary for either of the parties participating in the mediating process to "formulate the rationale or specific intention" underlying their interaction (Feuerstein, 1980, p.22); so, neither of them is tied to any preconceived commitment, except that the mediator will lead the child to venture beyond the here and now, in space and time. Such an open-ended model of educational exchange will not allow us to pre-judge the learning potential of children according to expectations associated with certain types of handicap or the aetiology of their difficulties. This is the reason for Feuerstein's broad use of "cultural deprivation," and it is also my own reason for using labels loosely and interchangeably where retarded performers are concerned.

What matters in practice is that the amount of time a child must spend with professional mediators should be judged, "by relating specific aspects of a pupil's learning difficulties to the teaching of an appropriate curriculum" (Her Majesty's Inspectorate, 1985 draft copy of an extract of some of the advice concerning the revision of government Circular 4/73 relating to staffing for pupils with special educational needs on statements). This concept of a child's entitlement to teacher time is not meant to translate directly into the amount of time a pupil has in a one-to-one situation with a specialist teacher, but it represents a step forward from simply specifying teacher-pupil ratios. If it

is to be included in guidelines or regulations for local education authorities, as advice at the time of writing suggests, then some of the credit is surely attributable to Feuerstein's presentation of teachers as mediators and the criticality of mediated learning experience. My next chapter will deal more with how the concept of teachers as mediators translates into classroom practice.

A PRACTITIONER'S PERSPECTIVE

I have taken my pursuit of Feuerstein's theory almost as far as I intend to for the time being. Now I want to explore the Instrumental Enrichment programme from a practitioner's perspective. My first step in this direction might have been to analyse and describe Feurerstein's classroom materials, but he himself anatomises all fifteen instruments in a lengthy descriptive chapter (1980, Ch.7) and in the Teacher's Guides which complement the five hundred pages of paper and pencil exercises for distribution to pupils (sample pages attached as Appendix 4). So, rather than superfluously stripping the programme down to its bare bones, my purpose here is to concentrate on how the articulation of its bones affects flesh and blood; I want to deal with the experiential significance of what is meant to happen as a result of intervention for cognitive modifiability.

Let me begin by extending the anatomical metaphor a little, to say that although the bones of Instrumental Enrichment constitute a framework for mediated learning experience, they can become sites of stiffness and inflammation, just as in real joints seized by arthritis, if they are not adequately lubricated by the synovia of human exchange. The extent to which artificial lubrication, in the form of classroom techniques, can be substituted for heartfelt human exchange, is logically the extent to which Feuerstein's programme of intervention is teacherproof. But this equation misses an important point: Instrumental Enrichment was designed to stimulate teachers' need for involvement in children's

cognitive development (Feuerstein, 18th July 1985, lecture at Nottingham University), and treating Feuerstein's instruments as if they were a set of teacherproof intellectual levers would not reveal their intended potential.

Intervention to modify children's cognitive make-up demands both painstaking organisation and boundless spontaneity from the teacher. Organisation, because the teacher's most obvious contribution toward inducing structural change is the order he brings to children's perceptions of their experiences. Spontaneity, because, even if each child's profile could be known fully in respect of the seven parameters of the cognitive map, in practice it is mercurial persons and not profiles who present challenges in the classroom.

Intervention to promote cognitive modifiability and intellectual growth not only demands a daunting level of personal involvement and professional preparation from teachers but also takes them beyond the limits of what they know how to teach. In these circumstances, when it is no longer possible to talk confidently about teaching cognitive skills, it may be helpful for us to focus instead on trying to create optimum conditions for children to learn by a process Polanyi has called "tacit knowing." Tacit knowing is,

> an act of indwelling by which we gain access to new meaning. When exercising a skill, we literally dwell in the innumerable muscular acts which contribute to its

> purpose, a purpose which constitutes their joint meaning. (Polanyi, 1971, p.160)

Hansen posits that abilities as diverse as reading and swimming are acquired "tacitly" (1985, p.2). Could it be that the rudiments of cognitive modifiability are acquired by the same process? It is an attractive explanation since, as Polanyi claims for the theory of tacit knowing,

> It bridges the gap between the "I - It" and the "I - Thou" by rooting them both in the subject's "I - Me" awareness of his own body, which represents the highest degree of indwelling. (1971, p.160)

If I accept tacit knowing as an appropriate way of conceiving of learning that is beyond the limits of what I can teach explicitly, this confers a responsibility on me as a teacher for what I convey implicitly to children. My attitude, for example, is liable to up-stage a feebly delivered message. Faced with ambiguity of this sort, children might well respond as Buber did when he asked,

> How can I hear what you are saying, when what you are is drumming in my ears? (In Gibson, 1983, p.58)

Without integrity, the teacher becomes a mere transmitter rather than a mediator between his pupils and their culture. Reason becomes dissociated from feeling and there is a danger that,

> Means take precedence over ends, indeed, become ends as details of skills; methods, techniques and measurement replace concern for meaning, interpretation and purpose. (Gibson, 1983, p.54)

Gibson attributes this bleak scenario to what he calls "instrumental rationality," a philosophy which ignores the part feelings play in choosing ends whilst it emphasises the dominance of reason in selecting means to achieve those ends (Gibson, 1983,p.55). Were it not for Feuerstein's concepts of the teacher as mediator and the pupil as active participant in learning experiences, Instrumental Enrichment might at first glance be mistaken for a product of instrumental rationality designed to do little more than help teachers isolate cognitive operations as "entities that can be taught" (Feuerstein, 1980, p.122).

Feuerstein's instruments were in fact produced to succeed "a set of paradigms for teaching cognitive processes by means of a language-based program," a scheme which had proved disappointing because "teachers' capability of turning the paradigms into a systematic and sustained sequence of exercises was limited, and therefore the exercises were of no real meaning for the masses of children in need of a steady and continuous systematic intervention program" (Feuerstein, 1980, p.122). Feuerstein blames his own naivety for not having anticipated earlier that teachers who displayed a talent for enshrining their thinking in a curriculum would not necessarily be orientated to fostering operational thinking in children. Trials lasting more than two decades, with Instrumental Enrichment gradually approaching its present form, have subsequently led him to conclude that,

> Achieving the proper orientation requires special training and constant use and application. (1980, p.122)

My own formal training was spread over two years and amounted to three weeks of intensive instruction, including a few days from Feuerstein himself. It changed my orientation in two respects. First, it made me more aware of how particular cognitive operations contribute to the heuristics in children's lives and how interference from deficient cognitive functions can easily be mistaken for an immutable lack of operational capacity. Secondly, it helped me phenomenise that "quality of interaction between mediator and child" (Feuerstein, 19th July 1985, lecture at Nottingham University) which effective educational intervention so often seems to hinge upon. The first change inevitably informs my diagnostic and prescriptive practices, but it is the second change which resolves my conduct in the classroom into specific tasks.

Feuerstein's tasks for the teacher who wants to mediate in children's learning experience are as follows: communicating intentionality, negotiating meanings, fostering transcendence, instilling a feeling of competence, interpreting achievements, establishing psychological differentiation, encouraging sharing behaviour and reciprocity, issuing challenges and setting goals. I shall adopt them as headings, under which I shall attempt to further my exploration of what teaching Instrumental Enrichment entails.

Communicating Intentionality

Intentionality is a state of purposefulness which affects both teacher and pupils, and binds them in a reciprocal relationship. Feuerstein's interest in this state stems from his belief that children respond best to a teacher who clearly feels something is worth saying or demonstrating and who harbours confidence in their fitness to learn about it (18th July 1985, lecture at Nottingham University). Moreover, it is not just that children should see themselves as fitting targets for what their teacher intends; intentionality offers insight into why he intends it. Before children can gain such insight, however, their teacher must communicate intentionality. He can either communicate it subtly, by hints and gestures, or openly, by giving an exposition of a lesson's rationale.

Communicating intentionality is always an intricate task for the teacher, whether it is done subtly or overtly, because its thrust is like that of a double-edged sword: one edge impinges upon pupils, by making them aware of their teacher's view of their needs; the other edge exposes what the teacher intends to do about meeting pupils' needs, thereby yielding an opportunity for negotiation and alterations to the programme of work ahead. This opportunity is missing when a teacher unilaterally derives objectives from undisclosed aims and then attempts to make pupils submit to the discipline required for executing those objectives. Nonetheless, Feuerstein does not advocate that the teacher ought to totally eschew making children execute his objectives if they

are children who have failed to realise the virtue of his objectives for themselves. Perhaps the dual effect attributed to intentionality could also be seen as a reflection of ambivalence on Feuerstein's part toward controlling children's learning.

Instrumental Enrichment was designed as an intervention programme and not as a vehicle for the more radical forms of collaborative learning (described in Docking, 1980), but it was also designed to take account of Feuerstein's respect for children's feedback in the classroom. Hence, Feuerstein wanted intentionality to satisfy two apparently conflicting conditions: the teacher must convince his pupils of the importance he attaches to whatever it is that he wants them to learn (1980, p.27), yet he must not let his intentness overwhelm them and forestall their putting forward priorities of their own (1980, p.3). These conditions are not juxtaposed by Feuerstein himself; he treats them as steps in a sequence, wherein teaching from conviction precedes encouraging pupils to take learning initiatives (Feuerstein and Hoffman, 1982, p.61). The sequence starts with the teacher's eliciting particular behaviours by means of precise forms of intervention, and ends with children's feeling supported enough to burgeon intellectually in directions of their own choosing.

In reality, the Instrumental Enrichment teacher begins to nurture an autonomous state of susceptibility to intellectual growth in his pupils as soon as he takes control of their thinking skills curriculum. Cognitive modifiability is contingent on children's

having both the scope and the ability to initiate changes (Feuerstein, 1980, p.3). The teacher's intentionality lends direction to children's learning; communicating intentionality not only reveals a commitment to certain fixed objectives, but also transfers something of the volitive force which bears those objectives. Part of the explanation for this phenomenon might be that, by giving children insight into the purpose underlying a lesson, the teacher bestows some of his status on them. In so doing, the teacher gives his pupils a sign that it is legitimate for them to become active participants in the lesson rather than passive recipients. As Wall said in 1965 (see Hunter-Grundin, 1985, p.86), education should be marked by the attainment of such signs of "increasingly complex intellectual independences."

Negotiating Meaning

Intellectual independences reside in language, "experience expressed being experience possessed" (Creber, 1972, p.31). I use the term "language" to denote "a purely human and non-instinctive method of communicating ideas, emotions and desires, by means of a system of voluntarily produced symbols" (Sapir, 1921, in Wilkinson, 1971, p.14). If children frequently find it difficult to discern the message encoded in the language their teacher produces, they are likely to retreat from active participation in lessons. The teacher's intentionality is threatening unless children can trust that they have understood its meaning for them. Moreover,

> the damage caused by a teacher's incomprehensibility is to be measured not in terms of particular meaning lost, but of the cumulative effect of such experiences on the child's attitude to learning. The real danger is that we may so condition him that he learns to accept his incomprehension. (Creber, 1972, p.30)

Feuerstein's solution for ensuring that the language of intentionality is comprehensible is to instruct the teacher to make his pupils party to negotiating meanings (19th July 1985, lecture Nottingham University). The teacher's task, then, is to help pupils create a mediating system wherein meanings are mutual and trust is inherent; they do not have to start from scratch, yet their situation still bears some resemblance to that of fellow workers who had to create language in the ancient times referred to by Vygotsky:

> Rational, intentional conveying of experience and thought to others requires a mediating system, the prototype of which is human speech born of the need of intercourse during work. (1962, reprinted in De Cecco, 1969, p.59)

Feuerstein does not assume that negotiating meanings and creating a system of mediation are innate behaviours in children, but that they are natural social developments. The need for communication is cultivated by,

> the verbal community that says, "Why did you do that?" "What are you going to do next?" Consciousness is imposed on the unconscious, rather than the unconscious being produced by driving conscious material to the repressed depths. (Skinner, in Cohen, 1977, p.281)

Educationalists may worry "that not all pupils in schools would want or indeed be mature enough, to negotiate sensibly; that extensive negotiations and discussions could be time-consuming; that committee decisions were not always the best ones and that there was a distinction to be made between the knowledge and responsiblilities of the adult and those of the child or young person" (Schools Council seminar on Disruptive Pupils, September 1980, ed. Evans, 1981, p.24). Yet, in respect of classroom language development, the teacher may face a choice between negotiating meanings with pupils and reducing them "to silence or to a subversive retreat into their own language" (Creber, 1972, p.22).

The negotiation of meaning makes an obvious contribution to what Rosenshine called "a climate of involvement" in the classroom. Given such a climate, Rosenshine predicted that pupils would feel better adjusted and that their attitudes toward one another, toward the teacher and toward learning would be more conducive to the realisation of educational aims and objectives than would otherwise have been the case (1971, in Kellmer Pringle, 1975, p.39). I shall be describing how my evaluation of Instrumental Enrichment was based on a somewhat similar hypothesis in my next chapter; so I shall only make a brief note here of my inference from Rosenshine that pre-existent attitudes can be at least as powerful as the intentionality of the moment, in respect of their influence upon pupils' willingness to try and arrive at consensual meanings with their teacher.

Unlike emotions, which have an evanescent quality, attitudes can be formulated and stored. Socially or culturally acquired attitudes are generally formulated according to identifiable sets of values, whereas inborn attitudes are attributable to psychophysical constancies known collectively as "temperament." Acquired attitudes can persist indefinitely, just like inborn attitudes, once they have been stored in an individual's "affective memory" (Yarlott, 1972, p.59ff). Whenever the individual makes an intuitive appraisal of her circumstances, her view is coloured by a combination of acquired and inborn attitudes unknowingly brought forward from her affective memory.

If we conceive of pupils' disaffection in terms of the embitterment of their affective memories, then we will not want a teacher's attempts to dismantle mistrustful attitudes curtailed on the grounds that they are time-consuming. Time must be found because, so long as barriers to cognitive modifiability are left in place, we have stalemate in the classroom. By negotiating meanings, the teacher can at least minimise the risk of stirring his pupils' affective memories and reviving unpleasant feelings associated with experiences of incomprehension. Shared language is the social means of thought (Luria and Yudovich, 1959); and, unless the teacher ensures that pupils are provided with a clean set of verbal tools, the transfer of thinking skills will be in jeopardy.

Whilst Feuerstein's original paradigms for teaching concentrated on verbal tools for thinking, as was consistent with Vygotsky's

assertion that "human mental development has its source in the verbal communication between child and adult" (1962, in Creber, 1972, p.36), the pre-eminence of verbal components in mediated learning experience is less pronounced in the later theory of Instrumental Enrichment:

> Whenever such verbal tools are missing, they may be substituted for by intonation, mimicry, gestures, and metalinguistic types of communication. (1980, p.82)

Feuerstein even describes the first of his instruments, Organisation of Dots, as "nonverbal" (1980, p.126). This is virtually correct, insofar as only the most rudimentary level of literacy is required of pupils attempting the worksheets. But the most important phase of any Instrumental Enrichment lesson is the "discussion for insight," when pupils endeavour to recognise the strategies they employed during the paper and pencil phase, to name the cognitive operations involved, and to speculate about other possible applications of their strategies. Feuerstein does concede that when pupils are confronted with abstract and formal logical operations, "the lack of verbal tools makes the mastery of such tasks very difficult, and, in many cases, uneconomical to the point of being prohibitive" (1980, p.83). Indeed, the length and sophistication of his vocabulary list in the Teacher's Guide which accompanies Organisation of Dots is a concession to the need for verbal communication in itself. Feuerstein's list includes the following words for teachers to impart to their pupils:

systematic	hypothetical	projection	relevance
impulsivity	differentiate	discriminate	strategy
cognitive	priorities	elaboration	precision
principle	constancy	flexibility	evaluate
inference	implicit	internalize	explicit
ambiguous	scientific	particular	universal

Because some of these words are labels for cognitive operations and were singled out to lead pupils into thinking about their own thought processes," Instrumental Enrichment teachers are sometimes tempted to spend a lot of time explaining their meanings and to skimp on negotiations in which pupils play an active part. A substantial minority of pupils complained of teachers talking too much when asked by Schools Council evaluators to say what they did not like about Instrumental Enrichment lessons (Weller and Craft, 1983, p.50). Feuerstein's instruments elicit problem-solving behaviours from pupils, and his Teacher's Guides suggest to teachers how they might present sophisiticated language to focus pupils' attention on the strategies they use to solve problems; but Feuerstein has not yet operationalised the task of negotiating meanings in sufficient detail. More remains to be done in the development of teachers' sensitivity to strengths as well as weaknesses in pupils' existing vocabulary, since pupils' strengths provide a platform for intervention whereas weaknesses are a bottomless pit into which no end of explanations can be fruitlessly poured.

Meanwhile, let us return to Feuerstein's ideal classroom: by exploring the meanings of existing vocabulary and negotiating the meanings of fresh vocabulary, the teacher helps pupils create a mediating system. Thus, mutual words are available for when the

teacher wants to assign meaning to experiences which hitherto would have seemed beyond the intellectual grasp of pupils. Language with agreed and personally felt denotations, a living language, can carry children who previously had only an episodic grasp of reality into the realm where knowledge is obtained a priori. Conversely, "words dry and riderless," like those described in Sylvia Plath's poem entitled Words, have no instrinsic power to transcendentalise children's learning experience:

WORDS

Axes
After whose stroke the wood rings,
And the echoes!
Echoes travelling
Off from the centre like horses.

The sap
Wells like tears, like the
Water striving
To re-establish its mirror
Over the rock

That drops and turns,
A white skull,
Eaten by weedy greens.
Years later I
Encounter them on the road -

Words dry and riderless,
The indefatigable hoof-taps.
While
From the bottom of the pool, fixed stars
Govern a life.

(Sylvia Plath, 1965, from the Ariel collection)

Words may dislodge some of the "fixed stars" or the apparent immutableness in children's lives, and negotiating their meanings

is inextricably linked with fostering transcendence, another of the tasks Feuerstein sets for teachers.

Fostering Transcendence

Fostering transcendence involves extending pupils' need systems beyond what is here and now. It would be futile for me to try and say what this might mean for Feuerstein in his Jewish context. Instead, I shall interpret the task as one of enrichment and extension in the areas of experience identified by Her Majesty's Inspectors; those areas are, in alphabetical order: aesthetic and creative, ethical, linguistic, mathematical, physical, scientific, social and political, and spiritual (A View of the Curriculum, 1979).

Many areas of experience, although logically distinct, can not be divided up exclusively for presentation under subject headings at school. Furthermore, some areas of experience are interrelated in such a way that they can arise from the study of a single subject. The relationships between areas of experience, school subjects, pupils' skills and attitudes have therefore been illustrated in a great variety of holistic formulations. Wilson's framework is a helpfully simple formulation of pupils' curricular needs:

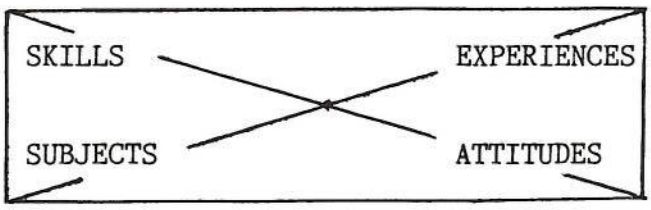


Figure from "The Curriculum in Special Schools," 1981, p.17.

Wilson also provides us with an example of how subject boundaries are crossed by areas of experience and how one subject can unfold into successive areas of experience; its span from the mundane to the spiritual is apt, since our present concern is with pupils' transcendence, albeit that Feuerstein sometimes debases the meaning of transcendence by using the word as a synonym for progression:

> Exploration of the social/political areas of experience can be seen as a developmental process, beginning with interpersonal relationships before proceeding to study the organisation of larger groups. Discussion of social and political issues raises questions of morality, and eventually the issue of absolute ethical standards, and the meaning and purpose of life. So awareness that there is a spiritual side to experience is not confined to religious education or morning assembly. As with aesthetic experiences this experience cannot be predicted. All that can be done is to devise situations in which their occurence is likely for some pupils. (Wilson, 1981, p.15)

At this point I shall rejoin Feuerstein in order to take issue with Wilson's conclusion that all that can be done, in view of the unpredictability of transcendent learning experiences, is to devise situations in which their occurrence is likely for some pupils. For pupils with learning difficulties, mere exposure to situations is not enough; before they can use direct experience as a springboard for taking imaginative leaps into a priori cognition, they must learn to identify the strategies gained from direct experience and thereby to hold them in readiness for future applications. Feuerstein argues that the teacher can intervene to support pupils in this process of generalising from what they know, by focusing attention on relevant aspects of their cognitive behaviour:

> Insight can be achieved by analyzing experiences and showing the child which functions play a role. Not only successes, but failures, too, should be analyzed in terms of their components. Each activity should be evaluated according to its relevance in achieving certain goals. The child's own experience should be utilized to generate his understanding of his past performance for its contribution to his future accomplishments. (1980, pp.300-301)

The teacher fosters transcendence by giving pupils practice at recognising their own cognitive operations, identifying their problem-solving strategies, and extracting general rules from numerous specific contexts; so that pupils become aware of having gained insight that is not task-bound but generalisable, and so that they feel confident about attempting to apply their skills in ways that are different from their previous experience. Grant sets out pupils' ascent through "the learning hierarchy" as a table (1986, in an unpublished paper, based on Haring et al, 1978), with each level of skill transfer characterised by a certain type of performance, and with pertinent teaching strategies opposite:

LEVEL	CHARACTERISATION	STRATEGIES
Acquisition	Accuracy	Demonstration, clues/prompts
Fluency	Appropriate speed, no delay in response	Drill and practice, rewards, feedback
Maintenance	Continued fluency without reward and after a period of time	Phasing out reward
Generalisation	Performance in different situations, selection of skill	Changing materials, changing location, discrimination

Adaptation	Changing the skill or combining skills in new, creative way	Problem-solving simulations

Without a teacher to expand pupils' experience in the areas described by Her Majesty's Inspectorate and to prompt introspective thinking, Feuerstein's instruments would just be a brain-teasing collection of mainly diagramatic puzzles. It is the mediating teacher who helps culturally deprived pupils inhibit impulsive behaviour and make "more organised, articulated and differentiated" responses when they encounter challenging situations (Feuerstein, 1980, p.117). As Feuerstein points out, because the culturally deprived child lacks mediated learning experience she constantly searches for extenal stimuli with very little investment in relating them to the conditions they produce in herself; she has learning difficulties because she is "addicted to acting-out behaviour" and she is a virtual stranger to introspection (1980, pp.116-117). The Instrumental Enrichment teacher's method for helping such pupils transcend their limited ambit is know as "bridging" (Feuerstein, 1980, p.295).

The teacher uses bridging to pave a way to transcendence for pupils; he selects "concepts, vocabulary and operations" (Feuerstein, 1980, p.295) to make key elements of pupils' past experience more accessible in classroom discussion and to initiate a new synthesis of those elements. For example, the teacher may point out to pupils working on the Organisation of Dots instrument that they have been looking for universal shapes in clouds of dots, that they have communicated concepts of shapes to

one another by using an agreed vocabulary to define shapes according to their attributes, that they have been engaged in operations such as comparison and differentiation, and that they have employed strategies such as systematically searching for relationships between the dots; he may then open up the far end of this bridging activity with a question about where else people search for patterns in a mass of information. If responding to such a question causes pupils to experience a sense of things falling into place, the teacher's bridging has been successful.

Successful bridging produces a chain of intellectual events which culminates in a newly synthesised experience being accommodated or, in other words, in a new mental schema being precipitated, and it is thereafter likely to be evidenced in pupils as a bent for assimilating further experiences comparable to the synthetic one which accrued from the teacher's intervention. I expect this bent for assimilating further experiences to be the outcome of successful bridging because to extend pupils' cognitive structures is surely to forecast an extension of their need systems? Feuerstein presumably had a similar argument in mind when he said that children's transcendence to a state of greater cognitive modifiability was characterised by a widening of their need systems (18th July 1985, lecture at Nottingham University).

Unfortunately, Feuerstein has not provided much guidance for the practice of bridging. The teacher is left to string together all the components of the curriculum pupils will need in order to realise the experience intended, rather like a lone sapper with

the task of building a pontoon-bridge from boats in turbulent water. Moreover, an Instrumental Enrichment bridge can never be secured at its far end, since there is no fixed point in the domain of generalisation; so, the teacher also has the task of instilling a feeling of competence in his pupils before he can expect them to break ground with a confident leap, to transcend of their own volition, and to venture forth from the bridge into the unknown. It is this latter task that I shall turn to next.

Instilling a Feeling of Competence.

The task of instilling a feeling of competence in children is about engendering self-confidence and self-respect in them. Parents begin the task by being deferential and attentive toward their helpless babies, so that they produce infants who, by about six months of age, appear to develop a sense of omnipotence. Ansubel and Sullivan infer this phenomenon from the imperious and possessive expressions which commonly feature on the faces of infants of six months and over. They suggest that the infant's self-respect hinges upon his misinterpretation of his parents' obedience to his will and needs, "as a result of which he exaggerates his volitional power and autonomy" (in Herbert, 1974, p.88).

The infant's exaggeration of his power is tolerated for a while and then gently eroded by parents who want to see their child learn to give as well as take. Being thus weaned has its compensations, because from about eighteen months to three years

old, the infant can normally enjoy the increased autonomy that comes with learning the skills of toddlerhood. If there are prolonged difficulties in mastering socially significant skills such as locomotion, enunciation, and bowel and bladder control, however, the infant may come to fear that he is inadequate. Parental support is crucial in these circumstances, although excessive attempts to motivate the infant can stifle his determination to deal with difficulties rather than restore his feeling of competence.

According to Erikson, children of three to five years old become increasingly vulnerable to both inadvertant and deliberate attacks on their initiative; for him, initiative is the manifestation of a child's feeling of competence. Erikson counsels parents to avoid undue restraint on their child's behaviour as well as avoiding intrusive attempts to motivate him, lest they jeopardise the child's prospects for active participation in educational or interpersonal exchanges by conditioning him to accept a passive role. Erikson suggests that the major hazard to the achievement of initiative is,

> overly strict discipline and the concomitant internalisation of rigid ethical attitudes which interfere with the child's spontaneity and reality testing, and lead to excessive guilt.
> (1965, in Herbert, 1974, p.189)

Unlike teachers, parents are in a position to mediate for the young persons in their charge with what Newson calls "unreasonable care" (1978, p.12). Instead of having to demand conformity to the

rules of a social institution at the same time as pursuing educational interests, parents can give their undivided attention to bolstering their child's self-esteem. They have the luxury of deciding for themselves alone what lattitude of acceptance they will afford to their child's eccentric behaviours; so, whilst teachers threaten to change the child, parents may wish to preserve the idiosyncrasies which contribute to the uniqueness of their offspring. As Newson reports:

> In many different ways, parents accept as valid, and worthy of their attention and respect, demands from the child which they might reasonably judge as irrational whims. (1978, p.12)

It would not be feasible for a teacher to cherish every child, warts and all, to an extent where he was pandering to their whims; indeed, many parents would insist on a more cautious approach from somebody who is not part of their family circle, quite apart from the obstacles presented by conflicting demands and interests in the classroom. Some children, who present as having been deprived of effective parental support, can be singled out for compensatory treatment; but the way for a teacher to instil feelings of worth and competence in all pupils is through rendering the curriculum accessible to them and, specifically, by setting them appropriate programmes of work.

When setting programmes of work, the teacher should take account of how much correspondence there is between each programme and each pupil's cognitive map. On some but not all of the seven parameters I defined in my chapter on Theory and Terminology, the

demands made by a programme should slightly exceed the recipient's current attainments; in other words, a programme should extend or enrich the pupil in some respects only, so that he is stretched but not defeated. Buckinghamshire County Council's Education Committee endorse the latter point in a policy document on Extension of the Technical and Vocational Education Initiative; the Committee states that all pupils "need to find themselves systematically challenged but not to find that the tasks set are beyond them" (16th October 1986).

Evans observes that it is particularly important to ensure that work is "programmed for success" when pupils are known to be intolerant of criticism or hypersensitive about the adequacy of their performance (1981, p.22). Nevertheless, in order to implement Buckinghamshire's policy of setting programmes at the right pitch for individual pupils, it is not just teachers of exceptionally vulnerable children but all teachers who will require a means of both analysing the curriculum and profiling their pupils on the same parameters. I have already suggested that Feuerstein's cognitive map might provide teachers with such a means, whereby they can check what they intend to teach against their pupils' strengths and weaknesses. But I have also noted earlier in this chapter that Feuerstein was soon disabused of the idea that teachers could spend their time and energy analysing the curriculum into programmes of work, then find more time and energy to systematically adapt those programmes into individualised responses to various profiles of pupils' needs, all without highly structured and constant support.

The Instrumental Enrichment programme is highly structured and constant; so much so that it would be in danger of becoming fossilised, were it not for offshoots such as the Somerset Thinking Skills Curriculum and the Oxfordshire Skills Programme (both published by their respective Local Education Authorities in 1986; although the Somerset materials are not available to any schools, except those participating in pilot studies, at the time of writing). It provides teachers and pupils with a steady nucleus in the ceaseless tide of curricular innovation. This might appear to be a dubious virtue if curricular innovations were better orchestrated, but it contrasts favourably with the School Curriculum Development Committee "evidence that much unsystematic planning, repetition and unplanned discontinuity exists in schools" (1986, Curriculum Issues No. 2, a leaflet prepared in collaboration with Derricott and Dunne). In the following extract from a seminar report, Evans describes what happens to secondary school pupils whose working conditions have been thrown into disarray by bungled re-structuring of the curriculum:

> It is also necessary not to overlook how difficult it is for pupils to make sense of what one contributor called "the shifting kaleidoscope of the curriculum". The totality of the provision is not readily grasped and it is only too easy, where routine and patterns of work tend to be fragmented, for pupils to lose their way and become detached from the school's main purpose. This situation needs to be forestalled and one of the ways of doing this is to ensure success early, certainly in the first two years. (1981, p.22)

Progress is far from a kaleidoscopic experience for pupils working on the Instrumental Enrichment programme. Indeed, colleagues

engaged in the development of the Oxfordshire Skills Programme have sought to present a greater variety of stimuli and to induce less "over-learning" through their instruments, as compared with Feuerstein, despite their desire to emulate his systematic approach. The tasks in Feuerstein's instruments have been meticulously sequenced to increase the complexity of pupils' mental activties gradually and, "in the best traditions of the spiral curriculum, learning is reinforced and concepts and skills are re-encountered in successively more demanding situations" (Weller and Craft, 1983, p. 18). "Mastery" pages, on which pupils can confirm their growing competence, have been interleaved at intervals in most of Feuerstein's instruments.

There are, of course, alternative methods of organising the mainstream curriculum to reduce pupils' confusion and alienation; for instance, modules or units provide an opportunity to re-structure two-year public examination courses into smaller learning packages. The modular approach offers pupils shorter-term goals and is flexible enough to make it possible for learning programmes and the needs of individual pupils to be closely matched (Schools Curriculum Development Committee, 1986, in Curriculum Issues No.1). But I have chosen to study Instrumental Enrichment because it purports to offer something which supervenes its structural merits and which no subject-based mainstream curriculum in my experience has offered to the same extent:

> That is to say, this type of training is concerned with enhancing conscious awareness of the general strategies which come under the executive control of the

> individual. It teaches "thinking about thinking" and "learning about learning" rather than specific subject matter.
>
> A knowledge of one's own cognition (metacognition) is a developmental ability but it can be trained in individuals who have not acquired it spontaneously (Flavell, 1976; Brown, 1978). According to Wiens (1983) developing control over one's own thought processes, and the pleasure derived from that control, creates the motivation to learn. Metacognitive training may therefore suit the needs of the passive learning disabled adolescent. (Shayer and Beasley, April 1986)

In the experiment I am about to describe in my next chapter, I shall be particularly interested in looking for evidence of pupils rating themselves higher in respect of their learning ability. If, after intervention using Feuerstein's instruments and methodology, pupils gain more than their peers as regards feeling competent as learners, irrespective of their gains on tests of academic ability and attainment, it might be reasonable to infer that Instrumental Enrichment has furnished the means for them to acquire a more powerful sense of executive control over their learning and thinking. I shall pursue this hypothesis later; there are still five more tasks for the teacher before this chapter is complete, albeit that they require a good deal less explanation than the previous four because they either amplify certain aspects of those four corner-stones to the practice of Instrumental Enrichment or they cover ground that has been well-trodden by educationalists with other concerns.

Interpreting Achievements

By interpreting a pupil's achievements, the teacher makes that pupil aware of how she measures up against whatever situation is

confronting her (Feuerstein, 19th July 1985, lecture at Nottingham University). The aim of this task is to help the pupil grasp the scale of the problem she has to solve in order to close the gap between her previously accumulated experience and her goal, and to give the teacher an inkling of the pupil's strengths and weaknesses "for the purpose of diagnosis, formative assessment and sensitive guidance" (Oxfordshire Skills Programme, Teacher's Notes, 1986). Execution of the task falls into two stages within a lesson, both of which are described succinctly in the following paragraphs from Oxfordshire's booklet outling the argument for a cognitive skills learning programme and suggesting classroom techniques:

> DEBRIEFING provides an opportunity to review the work done and consider the reason for any unexpected ease or difficulties experienced. It is important that students should often be asked to justify their judgements and solutions and indeed to modify them in the light of new evidence introduced within or after the task in question. "Arguing the point" is to be encouraged if it leads to consideration of what is a "reasonable" answer. Students should learn to recognise when an alternative solution is feasible.
>
> A valuable part of many lessons will be FEEDBACK, inviting, indeed expecting, individuals to comment on their own experience of the lesson. In a small group this may be done "round the circle" with everyone, including the teacher and any visitor, contributing. In large groups it may be feasible to involve only some of the number. Students may talk about "what I learned today", "what I enjoyed most and what I liked least in today's lesson" or "high and low points". This may in turn generate discussion and disagreement between students, but this phase should allow a negotiation between students and teacher on the conduct and direction of work.

Establishing Psychological Differentiation and Encouraging Sharing Behaviour and Reciprocity

These two tasks are obversely related; establishing psychological differentiation is about urging each pupil to re-constitute the culture he or she is exposed to, so that they develop a cultural identity of their own; whereas encouraging sharing and reciprocity is about engaging with pupils in what Feuerstein calls "a joint search for novelty" (19th July 1985, lecture at Nottingham University). A joint search suggests that interaction between the teacher and his pupils should be typified as "support between independents," and not merely as a one-sided attempt by the teacher to elicit novel outcomes from his pupils (Fletcher, in a letter dated 25th June 1986). Fletcher defines support between independents as a relationship wherein,

> the persons involved are both recognized to be capable of some things and complementary in others. Their ideas can be in partial or extensive conflict but there is not a power struggle because all of the task is not taken over and there is discussion of every stage. Both parties can expect to moderate their views and approaches. (25th June 1986)

This relationship has three inherent characteristics: "a concern for the quality of relationships (TRUST)"; "a recognition that support is a mutual expression and need (RESPECT AND REASSURANCE)"; and "a concern to monitor progress from everybody's point of view (EVALUATION)" (see Appendix 5 for Fletcher's table showing Stages of Support Between Independents). Before they can enter such a relationship, children have a hard

road to travel. According to Erikson, the development of reciprocative behaviour patterns involves a series of crises in roughly the same three areas of concern as those identified by Fletcher; Erikson names these crises as follows: "trust - mistrust", "confidence - doubt" and "initiative - guilt" (1965, in Herbert, 1974, p.4ff). When children resolve the bi-polar conflicts which cause the crises, their personal integrity increases and so does their inclination toward sharing and reciprocation.

Paradoxically, while psychological differentiation is allied to personal integrity, in that both are aspects of a child's individuation, the teacher's task of establishing differentiation is prone to interference from his task of encouraging sharing and vice versa. By the same token, it may be difficult for pupils to realise that responsibility for themselves implies responsibility towards others (Kierkegaard, 1843).

The two tasks revolve around the teacher and his pupils striving for a balance of interests; a balance subject to tensions between feelings and to tensions which stem from cognitive disequilibrium:

> "Play" and "imitation" are examples of cognitive behaviour marked by a lack of balance, in one direction or the other, between assimilatory and accommodatory processes. Danziger states that it is possible to understand Erikson's bi-poplar pairs as involving a similar lack of balance or conflict in the development of social reciprocity. (Herbert, 1974, p.5).

Extrapolating from Danziger's curious link between Piaget's concepts and Erikson's, I wonder if the dynamic of mediated learning experience derives from a perpetual struggle between the teacher and his pupils to rectify the imbalances between them. Perhaps such a struggle is an inevitable consequence of interdependence.

Issuing Challenges and Setting Goals

Feuerstein instructs Instrumental Enrichment teachers to issue challenges in order to create cognitive disequilibrium in their pupils. Cognitive disequilibrium is a feeling of unease which obtains when an individual does not have the knowledge she needs to meet a challenge. If we accept that "thinkkng is what we do when we don't know" (Hansen, 1985, p.2), then cognitive disequilibrium is liable to provoke thinking. However, our reaction to not knowing what to do may be to panic rather than to engage in problem-solving thought processes, even though it may be more comfortable to calmly try and "restore the equilibrium between the perceived facts and those anticipated on the basis of previous experience" (Feuerstein, 1980, p.90).

Pupils baulk at problems when they do not feel competent to tackle them; as one can infer from combining Festinger's first and second findings in the Theory of Cognitive Dissonance, people tend to actively avoid situations which give rise to cognitive disequilibrium or "dissonance" unless they believe there is some prospect of their achieving equilibrium or "consonance" (1957, p.2).

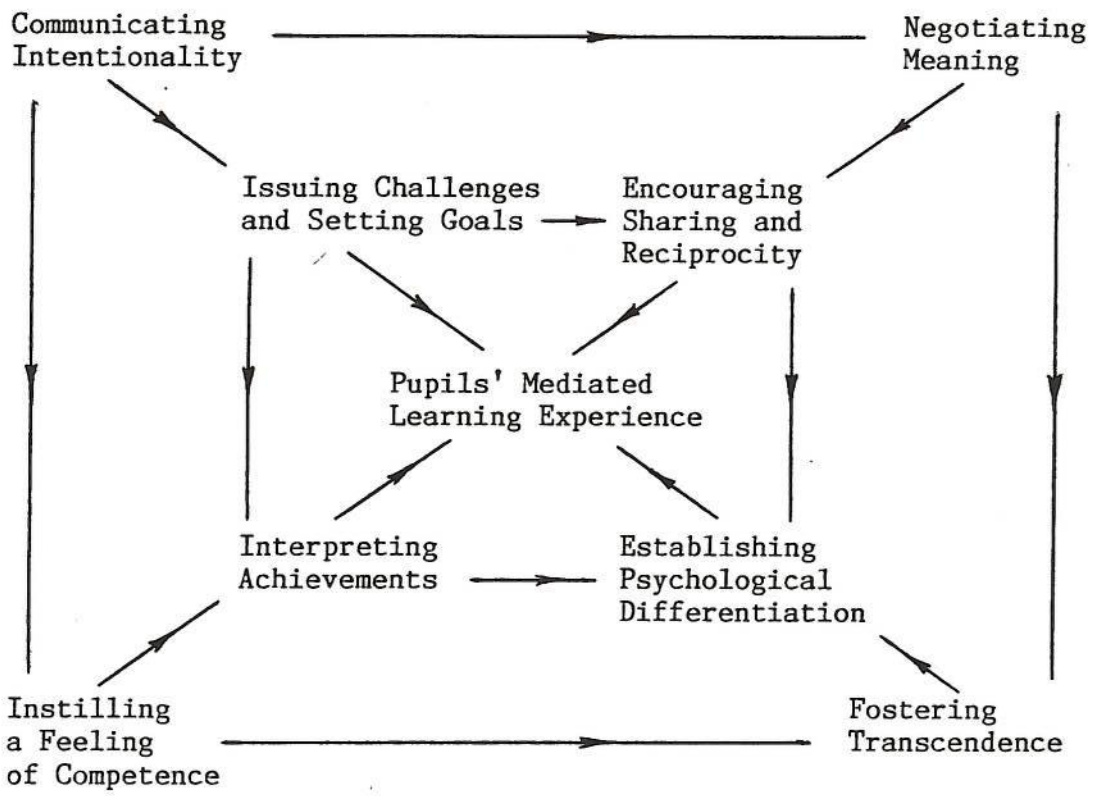
Setting goals makes the prospect of achieving equilibrium more tangible. The teacher's task is not only to set goals but also to demonstrate to pupils how he uses his interpretation of their past achievements, in conjunction with his assessment of their present needs, to inform his selection of goals. Hence, the teacher provides a model for how pupils might choose their own future priorities. Once again, as with the other eight tasks, the nature of the mediation is an integral part of its message.

Diagram to summarise ways in which the Teacher's Tasks contribute to Pupils' Mediated Learning Experience

Several of the nine tasks may be performed simultaneously by the teacher, rather than as a sequence in the order given by Feuerstein. It is therefore tempting to represent mediation as intervention which encapsulates pupils' learning experience in a permeable bubble, with the tasks comprising the interface of the bubble between teacher and pupils. Such an illustration of all conceivable permutations of task interaction serves no practical purpose, however.

I shall instead restrict myself to drawing just those lines of development from task to task for which I have provided an explanation in the course of this chapter. My diagram is more complicated than I should have wished but, if we start at the corner dedicated to "Communicating Intentionality" and work round in both directions to "Fostering Transcendence" at the same time as working inwards, it might at least remind us of how the tasks shift from teacher-dominated to pupil-centred initiatives in the

classrooom.



The arrow-heads in the diagram indicate that some tasks tend to be precursors of others; but we should not presume from this that simple cause and effect relationships exist, either as chain reactions within the teacher's performance of tasks or as predictable stimulus-response patterns from pupils in receipt of mediated learning experience. Predictions from particular tasks would overlap so much as to prove futile, in my case. For example, pupils' higher ratings of themselves as learners may result from their teacher's instilling a feeling of competence in them or, equally, higher ratings may occur in the light of the teacher giving a new interpretation of pupils' achievments. None of the tasks is entirely discrete in theory and, having teased out

the classroom practice of Instrumental Enrichment to a certain extent, we are not left with nine mutually exclusive variables to manipulate.

In my next chapter, I shall treat all nine tasks as combined elements of mediated learning experience; indeed, I shall treat the whole of Instrumental Enrichment, an intervention programme for cognitive modifiability, as a single independent variable in an experiment designed to yield insight into how much certain factors in pupils' adjustment to school might be influenced by one of their teachers using Feuerstein's methodology and materials.

OPERATIONAL DEFINITIONS

We know that the aim of Instrumental Enrichment is to produce in pupils a state of mind that Feuerstein calls cognitive modifiability. A state of mind is of course unobservable, an intervening variable that can not be measured directly because the rules for assigning numerals to it can not be ascertained by empirical tests. So, how can I find out about the efficacy of Instrumental Enrichment in respect of its potential for enhancing pupils' cognitive modifiability, given this stumbling-block in the way of an appeal to experiment? I shall have to infer variations in cognitive modifiability from relevant data on those constructs which I believe, in the light of the two chapters preceding this one, account for the qualities of cognitive modifiability that I am interested in. In order to be able to do so, I must first identify my criteria for determining the relevance of data or, more precisely, I must establish operational definitions of the constructs by specifying which activities or operations are appropriate for measuring them.

Adjustment To School

The construct "adjustment to school" is a useful means of focusing on behaviours which presumably relate to the attitudinal components of pupils' cognitive modifiability. "Adjustment," more so than "adaptability," has connotations which emphasise the affective and conative aspects of pupils' cognitive modifiability, as well as the purely cognitive aspect; and

"school" has the virtue of limiting my study of pupils' behaviour to a single microcosmic context and, moreover, to a type of context where I have vested interests.

"Adjustment to school" is open-ended conceptually in that it refers to the extent to which a pupil's behaviour conforms to the expectations of her school, without suggesting that the roots of such behaviour lie either with the pupil or with the school (Varlaam et al, October 1983, p.1). To be consistent with Feurstein's view of cultural deprivation, I should treat the roots of pupils' behaviour as properties of the pupils themselves. However, the extent to which pupils have sovereignty over their behaviour or, obversely, the extent to which pupils' behaviour is impulsive, is not solely attributable to how much they have learned from their cultural heritage or whether they suffer from the "inadequate cognitive development syndrome of cultural deprivation" (Feuerstein, 1980, p.18). Lawrence, Steed and Young (1984) argue that a lot of the responsibility for defining adjustment and maladjustment, and for precipitating disruptive behaviour, is attributable to teachers. I can not afford to enter into Lawerence, Steed and Young's "Disruptive Children - Disruptive Schools?" arguments here, but in preparing for my experiment I shall have to allow for the possibility that teachers sometimes violate pupils' sovereignty and prevent them from behaving as responsibly as they would wish to behave.

Measuring pupils' adjustment to school is full of snags, even if it is possible in theory for teachers or outside observers to

find objective means of recording the frequency and intensity of certain behaviours. There is the snag I have already mentioned: teachers sometimes thwart pupils' attempts to control their own behaviour and hence obscure pupils' readiness for change. This can happen if teachers forget that changes in their perceptions lag behind changes in pupils' attitudes; teachers may allow their old expectations to impinge on pupils and thus discourage new initiatives. There is also the snag that teachers' perceptions of pupils' adjustment to school may be distorted by a tendency to construe behaviours as if they reflected children's strengths and weaknesses more than adults' successes and failures as mediators. It is tempting to treat a pupil's weaknesses as developmental faults rather than acknowledge the constraints she is currently under, particularly when one is party to having fashioned those constraints. Snags, then, often arise from ignoring the context in which behaviours occur; yet allowing for different contexts would be so complicated and time-consuming as to be impracticable. Varlaam, Stoll, Sammons and Kysel describe how this deadlock can be broken:

> In practice, pupil behaviour is usually assessed by means of rating scales completed by teachers. The Bristol Social Adjustment Guides and the Rutter B(2) scale are perhaps two of the best known and most widely used in educational research. Ratings on such scales are, of course, essentially subjective but in one sense this subjectivity is an asset. Teachers tend to rate a pupil's behaviour in relation to the behaviour they expect of the class. In other words, they make an assessment of the pupil's adjustment to those norms of behaviour. (October, 1983, p.1).

The Child at School - a new behaviour schedule

I shall use the new rating scale devised by Varlaam and his colleagues (see Appendix 6 for Inner London Education Authority's Report on The Child at School - a new behaviour schedule) to generate data on teachers' perceptions of pupils' adjustment to school. It is more succinct than those in most observation schedules, yet it does not mutilate the concept of adjustment to school beyond recognition. Its short length, just nine pairs of statements with five scoring positions between each, means that class teachers can complete ratings of all their pupils at one sitting. The task is not too much to ask of colleagues who are otherwise uninvolved in my experiment and they should not become so tired that accuracy suffers.

Because "The Child at School - a new behaviour schedule," henceforward abbreviated to "the CAS schedule," is based on teachers' judgements about pupils' behaviour rather than direct measurement of pupils' behaviour, it is applicable to a wide age range. This means that I can use it with both of the age groups in my experiment: ten to twelve years old primary school pupils and twelve to fourteen years old secondary school pupils. The judgements required by the CAS schedule focus on aspects of pupils' behaviour with which teachers are likely to be familiar; teachers are asked to rely on their own knowledge of pupils in the school context, and they do not need to offer exceptionally deep pyschological insights or to make global interpretations. Furthermore, since I am seeking improvements in pupils' adjustment

to school as a result of experimental intervention, it is important that judgements about the nine CAS schedule items can yield positive as well as negative assessments of behaviour. The structure of the CAS schedule affords teachers the opportunity of recording high levels of adjustment in pupils, instead of restricting them to a scale whereon adjustment has a neutral rating and all gradations are dedicated to levels of maladjustment.

Notwithstanding all the advantages of the CAS schedule over other means of generating data on teachers' perceptions of pupils' behaviour in school, I have already argued that any measuring operation which only gathers teachers' perceptions ought to be complemented by another operation which generates data on the feelings or beliefs underlying pupils' behaviour. Why not ask pupils to complete CAS schedules on themsevles, instead of using a different measuring operation to go over the same ground? There are at least four reasons for rejecting this proposition. First, pupils would not necessarily take the whole of their class into consideration when rating themselves in relation to others; they would certainly not have anything like their teacher's experience of other classes of the same age. Secondly, modesty might forbid highly positive self-ratings, and T.S. Eliot's observation that "human kind cannot bear very much reality" (Four Quartets, Burnt Norton 1) is a warning which precludes our expecting children to rate themselves very negatively in response to bald statements. Thirdly, the CAS schedule is couched in teacher-oriented language

and is liable to induce a "social desirability response set" (as defined by Burroughs, 1971, p.80) in pupils, whereby they would tend to rate themselves either as they think their teacher would rate them or as they think their teacher would like to be able to rate them. Fourthly, not only the language but also the concepts which constitute the nine items on the CAS schedule are too teacher-oriented for some of the pupils involved in my experiment to grasp readily.

So, what sort of measuring operation would enable me to present the construct, "adjustment to school," in a manageable framework that corresponds to the CAS schedule but does not transgress pupils' experience? How could I keep the construct distinct and yet not so bald as to drive pupils into making middle-of-the-road responses? How could I extract data that have been contaminated as little as possible by an implied response set, given a construct that is liable to evoke pupils' awareness of what their school regards as conventional behaviour? What sort of measuring operation might engage pupils in actively deciding where they stand in terms of the construct, rather than leaving them to dither between the level of adjustment they aspire to and a genuine self-appraisal? The Repertory Grid Technique provides a comprehensive answer to all of these questions.

The Repertory Grid Technique is a measuring operation which is "nearer to conversation than it is to the standard psychological test" (Fransella and Bannister, 1977, p.112). It is a means of exploring pupils' personal construct systems or, in other words,

of construing pupils' attitudes to form an insight into their experience. Pupils are not likely to hand over a record of their experience of adjustment to school "intact across the desk" (Kelly, 1955, p.200), but a grid will help them to inform us about how their construct systems are evolving. As Fransella and Bannister point out (A Manual for Repertory Grid Technique, 1977, p.3), the results of the grid have often been looked on "as a map of the construct system of an individual, a sort of idiographic cartography as contrasted with, say, the nomothetic cartography of the semantic differential (Osgood et al., 1957)".

The Repertory Grid Technique

To ensure that the grid I use with pupils covers the same ground as the CAS schedule I use with teachers, albeit from a different perspective, I shall have to depart from two of the principles established by Kelly, the originator of the Repertory Grid Technique: I shall not let pupils supply their own bipolar scales and I shall limit what Osgood, the originator of the Semantic Differential technique, calls the "semantic space" (see Burroughs, 1971, p.138; Kerlinger, 1973, Ch.33). Rather than working within a semantic space defined by as many scales as pupils care to specify, I shall pre-determine just five scales.

Three of the five scales will be dedicated to constructs that appear to be the key subordinate factors in pupils'adjustment to school. When Varlaam and his colleagues used the CAS schedule to assess nearly eighteen thousand primary school pupils and

subjected the results to principal components analysis, they found that three factors between them accounted for eighty percent of the variance in the data:

> What principal components analysis appeared to show was that although all items were positively correlated, both with each other and with total score on the CAS and there was a tendency for pupils to be seen as generally well or poorly adjusted, the items fell into three clusters or subscales. Items 4, 5 and 6 formed one cluster or subscale, items 3, 7 and 9 another, and items 1, 2 and 8 a third. These subscales were taken to measure the dimensions of learning skills - learning problems, co-operative - aggressive behaviour, social/personal confidence - anxiety respectively. (October 1983, pp.7-8).

It should not be difficult to select appropriate pairs of adjectives to help pupils describe the extremes of these subscales. The bipolar pair, "best - worst," facilitates comparison when measuring achievements or performances on dimensions where competiton is involved: the "learning skills - learning problems" dimension is an obvious example for Buckinghamshire pupils who have to compete for selective school places; and perhaps the "social/personal confidence - anxiety" dimension is an equally obvious example for pupils competing to move up the playground pecking order or conscious of fluctuations in their popularity. The same blatantly evaluative adjectives would arguably serve the remaining dimension, "co-operative - aggressive behaviour," since pupils may compete to please or annoy their teacher. However, as I pointed out when I cited the questions raised by Lawrence, Steed and Young (authors of Disruptive Children - Disruptive Schools?, 1984), it is not

necessarily under pupils' control whether they please or annoy their teacher. Even if two pupils ostensibly set out with the opposite intentions of pleasing and annoying their teacher, they may have attention-seeking as their common motive and both could find that they are perceived as nuisances. With the co-operative - disruptive dimension of adjustment to school in particular, then, it is important to concentrate on the potency of pupils' behaviour rather than judging it in terms of success or failure. Consequently, for this dimension, I shall substitute "most - least" for "best - worst."

To avoid asking pupils directly to consider themselves in comparison with their classmates and to identify their positions on the subscales which measure the three dimensions of adjustment to school, I shall ask them to arrange just eight anonymous photographs, of boys or girls close to them in age, in rank order (The Salvation Army Public Relations Department has provided me with a collection of photographs, to which I have added a few, for this purpose). Pupils will be asked to put the photographs one-by-one into two piles, starting with "the best at making friends at school" and "the worst at making friends, perhaps the one who has most difficulty making friends, at school." When pupils have ranked all eight photographs in response to this interpretation of the "social/personal confidence - anxiety" dimension, they will be asked to repeat the process in response to interpretations of the other two dimensions: "which one annoys teachers most?" as opposed to "which one annoys teachers least, perhaps gets on well

with them?"; and, "which one is best at learning things at school?" as opposed to "which one is worst at learning things, perhaps has most difficulty learning things, at school?".

Given a relaxed one-to-one interview situation, pupils will hopefully become sufficiently absorbed in ranking the photographs to project imagined characteristics onto them. I shall prompt pupils to wonder about the boys or girls in the photographs, by suggesting that they look carefully at expressions on the faces. When pupils have had time to invest whatever abstract qualities they might imagine in the eight photographs, they will be asked to rank the photographs for a fourth and fifth time.

The fourth scale will range from "most like I should like to be," through six less and less preferable wishes to, "least like I should like to be." I shall introduce it by telling a joke version of a fairy story, at the end of which pupils will be invited to choose from among the photographs whose way of life they would swap for their own. The fairy story, which amounts to little more than the arrival of a fairy-godmother who regrets having missed her vocation as a witch and grants only a restricted wish, was originally developed as part of interview routine by a colleague (Mike Lake, an educational psycholgist working in Buckinghamshire) helping me to pilot Repertory Grid material; pupils of all ages recognised it as a signal that they had been given licence to vent their aspirations without fear of criticism.

The fifth scale, "really most like me" through to "really least like me," will have a more sober introduction than the fourth; I shall ask pupils to leave aside any pretence inspired by the fairy story, and to rank the photographs according to how much each one reflects their situation in "real life". Such a straightforward probe into pupils' perceptions of themselves might have seemed an unacceptably startling approach, were it not for the fact that the Repertory Grid Technique allows respondents to encode sensitive information in comfortably oblique ranks of numbers.

Once every pupil has ranked the eight photographs on all five scales, and I have recorded the order in which the photographs were ranked by entering ordinal numbers on a grid (see Appendix 7 for copies of the photographs used and an empty grid), the search can begin for evidence of "affective - cognitive consistency" in pupils' responses (Rosenberg and Abelson, 1960, wrote about Affective - Cognitive Consistency Theory in "Attitude Organisation and Change: An Analysis of Consistency Among Attitude Components"; Eiser, 1980, p.36, has identified the central issue of the theory as, "the question of consistency between an individual's evaluations of attitude objects or "elements" and his beliefs concerning the relations between them"). Such evidence, if it exists, will come in the form of substantial correlations between the order in which pupils rank the photographs on the fourth scale and the order in which they ranked them on the previous three scales.

Weak correlations, between the order in which pupils rank the photographs on the fourth scale and the order in which they ranked them on the previous three scales, will leave us uncertain about how much pupils have associated themselves with the photographic elements or the verbal descriptions of constructs. For example, in the case of a pupil who chooses both the photograph she identified as "best at learning" and the photograph she identified as "most annoying to teachers" to rank close together as first or second in the order of "most like I should like to be," it will be confusing if she has already indicated that being good at learning and annoying teachers are incompatible. The explanation might be that the pupil has interposed a construct of her own in selecting a photograph she wishes to be like. Isolated contradictions are not important, since the order of the remaining seven photographs will usually outweigh a rogue ranking. Lots of contradictions could indicate that a pupil has responded casually to my implementation of the Repertory Grid Technique. Alternatively, lots of contradictions could indicate that a pupil has conflicting aspirations. Hence, one experimental effect I shall look for is, whether intervention with Instrumental Enrichment has resulted in pupils becoming less equivocal about where they stand along the construct dimensions: are patterns of psychological integration emerging?

If we can identify where pupils wish to stand in relation to the three adjustment to school factors, then the fourth scale will provide us with a set of bench-marks for measuring progress on the fifth scale. Indeed, closing the gap between "like I should like

to be" and "really like me" is perhaps the most important experimental effect of all those I shall be looking for. Are pupils indicating that they feel their positions have improved on the personal construct dimensions for which I supplied labels? Our authority to make assertions about progress on the fifth scale would be questionable, without corroborative evidence from the fourth scale that pupils were adopting the labels for factors in adjustment to school as a basis for discriminating between the eight photographic elements presented to them. Kelly explains why it is important to measure change according to terms of reference that individuals have made their own:

> A psychology that participates in the human enterprise must perceive that the guidelines channelizing a person's processes are drawn by the person himself - that they are therefore personal constructs, and may be redrawn and revalidated by the user to structure anew his thought and his behaviour. They are not the residue of biographical incidents, nor are they projected facsimilies of reality. They are, instead, the axes of reference man contrives to put his psychological space in order and to plot his varying courses of action. (1969, p.36)

Now that scales, bench-marks, and the gap between pupils' self-assessment and their aspirations have been mentioned, it is time to establish a system for measuring the strength of relationship between constructs. For my next chapter, I shall convert inter-relationships between each pupil's rankings on the five scales into a correlation matrix; the resultant Spearman rank-order coefficients of correlation will then be extracted from the fourth and fifth rows of the matrix, in order for them to be tabulated as

"wished for" and "self-assessment" ratings of "personal/social confidence - anxiety," "co-operative - aggressive behaviour" and "learning skills - learning difficulties," alongside the CAS schedule ratings of the same factors (see tables of results in Appendix 8). There are many precedents for treating correlation coefficients as ratings or scores (for example, in Sawyer and Riding, 1979, pp. 151-156), so a measuring system which comprises Spearman rho ratings is not an innovation.

Once I have obtained teachers' ratings and pupils' ratings of themselves, I shall be curious to know how those ratings compare and how far they are borne out by objective tests of intellectual ability and attainments. What are the conditions necessary for pupils to rate themselves favourably in respect of their ability to learn? Shayer and Beasley define the purpose of Instrumental Enrichment as, "to restore the ability to learn from fresh experience, and the individual's belief in that ability" (April 1986, p.3). How interdependent are ability and belief? Do some pupils seem to achieve a feeling of executive control over their learning, the status of being sovereign over their thoughts and deeds, without manifesting a concomitant improvement in the reality-processing skills required for new learning? Is there a significant amount of covariance between pupils' self-assessment ratings and attainment scores or teachers' ratings, suggesting the influence of feedback from outside the Instrumental Enrichment classroom?

I shall attempt to answer the above questions when I have recorded and analysed the results of my experiment. There are other questions that will remain unaddressed, even though they too might have thrown light on my thesis. If I had prepared sociometric tests (as pioneered by Moreno, 1937-38, in Sociometry, Vol.1), I could have explored how pupils rate in the eyes of their peers as well as in their teachers' eyes and their own eyes; a sociogram (of which there are examples in the Sociometry Reader, ed. Moreno, 1960) would doubtless have been a particularly useful tool for setting ratings on the "personal/social confidence - anxiety" dimension into the context of group dynamics. Given that tests must not encroach too much on pupils' lesson time, however, I have had to make a choice between sociometric and psychometric tests: my reasons for choosing the latter will hopefully become clear in the course of the following brief discussion about two constructs I have mentioned and yet not defined operationally.

Intellectual Ability and Attainments

"Intellectual ability" is a highly complex construct which helps us account for the cognitive operations underlying pupils' intelligent behaviour. It is characterised by reality-processing skills rather than the "nonintellective factors of intelligence" (Wechsler, 1976, p.6), and IQ tests designed to assess those skills indicate that their presence in individuals remains at a relatively stable level. Feuerstein warns us against construing IQ scores as limits on intellectual growth, however, since IQ test designers make a deliberate effort to eliminate "those items that

address the characteristics of an individual's functioning that are subject to change and to retain only those questions directed toward characteristics that are most resistant to change" (1980, pp.6-7). Feuerstein does concede that "the IQ score reflects the product of a given quantum of ability," but he goes on to argue that placing too much emphasis on a product-oriented assessment of intellectual ability distorts our view of pupils' cognitive functioning and tells us nothing about "the processes responsible for an individual's performance or about the individual's capacity to improve it" (1980, p.7). Perhaps Feuerstein's main point about IQ is that while certain innate cognitive structures may be impervious to intervention for cognitive modifiability, they are fragments within a "composite or global" intelligence (Wechsler, 1976, p.6) and not a governing entity which predetermines the scope of pupils' performances on all the parameters of the cognitive map.

Having put IQ into perspective as regards intellectual ability, I shall nevertheless need to know whether it seems to be influenced by the independent variable, intervention with Instrumental Enrichment, in my experiment. If it is only an "attribute variable" which pupils bring to the experiment "ready-made" (Kerlinger, 1973, p.38), I shall need to know if it co-varies with the dependent variable, adjustment to school, and thus comes into the reckoning of presumed experimental effect. Two tests from the Wechsler Intelligence Scale for Children - Revised (WISC-R), "Similarities" and "Arithmetic," ought to generate sufficient data for me to find out what I need to know.

The "Similarities" and "Arithmetic" tests are both scored on Wechsler's Verbal Scale, although each relates to a different mode of communication and represents a different strand within the modality parameter of the cognitive map. Wechsler offers several other test modes so as to be "effective as well as fair, "acknowledging that pupils differ in which modes they find easy or hard (1976, p.5); but like the two tests I have selected, they are all typical modality-parameter tests concerned with the reception and production of modes of communication, and their relevance to the elaboration processes which operate between input and output on the phase parameter is a matter for conjecture.

Shayer and Beasley tried to test children's intellectual ability in ways that kept measures on the operations and phase parameters of the cognitive map distinct from measures on the modality parameter (reported in Does Instrumental Enrichment Work?, April 1986). In order to obtain measures on the operations parameter, Shayer turned to an individual interview battery of twelve Piagetian tasks originally designed for recipients who might not be literate. This interview battery comprised the following elements: one-to-one Correspondence; Classification; Seriation; Conservation of Mass, Weight, Internal Volume, Displacement Volume and Length; and, the spatial tasks of Water-Level, Perspective, Mountain and House (details in Shayer, Demetriou and Pervez, 1986). Beasley turned to a more interactive form of testing, based on part of Feuerstein's Learning Potential Assessment Device (LPAD), having been convinced by Feuerstein that "static forms of

psychometric assessment lead to underestimation of the capabilities of the retarded" (Shayer and Beasley, April 1986, p.13). Beasley wanted to test children on both the operations parameter and the phase parameter; her method involved,

> an initial use of Raven's Matrices as a base-line measure, but taken only to the point where the subject starts to fail the items. Attention is then switched to LPAD Variations, a set of problems based on Raven's sets A to D. The administrator makes it clear from the outset that she is interested in the subject's success, and proceeds to supply an explicit teaching component. But she does not teach solution algorithms.
> The intervention proceeds using exactly the same model as underlies Instrumental Enrichment; observations are recorded of the subject's deficient cognitive functions and suggestions are then made to the subject for improving his information-gathering, elaboration and output strategies.... Finally the subject is taken back to the items in Raven's which he originally failed, to see how many more he can now solve. Again, a record is made in terms of the phase parameter of the subject's performance as well as of the extra items solved. The difference between the scores of the two administrations of Raven's represents a modifiability estimate: it indicates the extent to which the subject is able to transfer the recently acquired learning to new problems. (Shayer and Beasley, April 1986, pp.13-14)

Shayer and Beasley found that six children who had followed an Instrumental Enrichment programme scored significantly higher than six comparable children who had not, on their Piagetian and LPAD tests; whereas the same experimental group of six pupils revealed no significant advantage on Thurstone's PMA, a static form of psychometric test which yields measures on the modality parameter (see Appendix 9 for table of Shayer and Beasley's results). The problem with such results is that their full meaning can only be understood by somebody engaged in forging a relationship between Instrumental Enrichment and the measures used to study its

effects. Despite this difficulty, it is still possible to accept that logically, Instrumental Enrichment, "with its emphasis on metacognitive training, should show its most immediate effects in changes on the phase parameter, on pupils' general problem-solving strategies. It should thus show as quickly on forms of psychological testing focussed on here-and-now reasoning and on general reality-processing such as studied by Piaget and co-workers" (Shayer and Beasley, April 1986, p.18). But do the immediate effects of Instrumental Enrichment, which register on Piagetian and LPAD tests, translate into durable skills that will enhance pupils' attainments in school?

I shall ask the schools participating in my experiment to administer verbal, numerical and perceptual attainment tests (AH2 and AH3 by Hein et al., 1975); and I shall also arrange for tests of reading accuracy and comprehension (Neale Analysis of Reading Ability, 1966). Although Instrumental Enrichment can not actually alter pupils' learning history retrospectively, it might teach pupils to process the contents of previous learning more productively. If I had more time to investigate, what would interest me further is whether pupils who have received Instrumental Enrichment show better adjustment to school, better problem-solving strategies and better reality-processing skills than others do, when tested by fresh learning situations a few years after experiencing Feuerstein's method of intervention. Regretably, my schedule of measuring operations will not run to a

second post-test; it is outlined below.

Schedule of Measuring Operations

NOVEMBER 1984: pre-tests in four schools, each with a teacher trained to teach the first four instruments of the Instrumental Enrichment programme. One hundred and twenty four pupils were selected on the basis of their ages; they were just entering their last two years of primary schooling or just commencing their first two years of secondary schooling. They had all been known to their form teachers, who would be completing the CAS schedule on them, for two months. In addition to the CAS schedule, teachers administered the AH tests of verbal, numerical and perceptual attainments as group tests. An educational psychologist administered the WISC-R tests in one-to-one interviews. I used the Repertory Grid Technique and the Neale Analysis of Reading Ability in separate one-to-one interviews.

DECEMBER 1984: I had planned to either split pupils randomly within each school to create experimental and control groups, or to use pre-test scores to create matched experimental and control groups. Both of these options assumed that organisation within the schools would prove more pliable than it actually was. The primary schools split classes in half, understandably making sure that experimental groups would have a preponderance of the pupils with learning difficulties, disruptive behaviour or symptoms of anxiety. They were quite open about having used criteria borrowed

from the CAS schedule "in certain cases," but stressed that the experimental and control groups would nonetheless both contain their "normal range of pupils." The secondary modern school and the special secondary school for pupils with moderate learning difficulties each split their pupils by using parallel classes as experimental and control groups.

JANUARY 1985: Instrumental Enrichment teaching commenced, at a rate of two hours per week in each school.

APRIL 1985: I began visiting the four schools to observe Instrumental Enrichment lessons. It worried me that I might increase the likelihood of a Hawthorne effect by concentrating on the experimental groups and seldom observing the control groups. I soon discovered, however, that form teachers were making a conscious effort with pupils from the control groups to rival the Instrumental Enrichment teachers' intervention in the experimental groups. Shipman describes what happened to one experiment where compensation in favour of control pupils went to an extreme:

> the effect of the programme could not be compared with the control schools because these had reacted to the tests by drawing upon new schemes of work, employing extra teachers and concentrating on improving the performance of the children on the tests. This unintended consequence ..... was named by the authors the Bethnal Green effect, after the Hawthorne effect that was the first indication of distortion caused by involvement in an experiment rather than by any impact of the selected variables. (1981, pp.110-111)

It is hard to tell with any certainty, but Instrumental Enrichment seemed to be getting a fair trial in three out of the four schools I was visiting and neither the Hawthorne effect nor the Bethnal Green effect casts a noticeable shadow across my experiment. The fact that at least two of the Instrumental Enrichment teachers underwent profound changes in their professional practice as a result of adopting Feuerstein's methodology is not to be confused with unspecified or incidental effects.

JULY 1985: the Instrumental Enrichment teachers received another week of training together. The special school teacher reported that she could not maintain her commitment to teaching two hours of Instrumental Enrichment per week, and it was agreed that I should discount her pupils' results when post-testing was carried out. The loss of the special school experimental and control classes reduced the total number of pupils to ninety six.

SEPTEMBER 1985: each class of pupils joined a different form teacher, at the start of the new academic year. The fact that it would not be the same teachers completing the CAS schedule during post-testing as completed them during pre-testing was not a problem, because the inter-rater reliability of the CAS schedule is satisfactory (see Varlaam et al., October 1983, p.11).

JUNE 1986: post-tests in three schools, with nominal testing in the fourth. Various changes in individual pupils' domestic situations had reduced the number who had attended lessons

regularly and were available for testing to eighty three. Random evening up of experimental and control groups to contain equal numbers of primary and secondary pupils and equal numbers of boys and girls gave me a final total of seventy six pupils: nineteen each of primary experimental, primary control, secondary experimental and secondary control. The next chapter offers a record and analysis of the test results from these four categories of pupils, although in reality pupils belonged to six physical groups in three schools.

RECORD AND ANALYSIS OF TEST RESULTS

This chapter offers a summary of the results from my experiment rather than a collection of all the data. A complete record of individual pupils' ratings and scores appears in Appendix 8. The summary deals with primary and secondary pupils separately, partly in anticipation of age-related differences, and partly in recognition of organisational differences. Primary experimental and control groups were formed by splitting classes, whereas secondary experimental and control groups were formed from parallel classes. Hence, poorly-adjusted primary pupils who benefitted from intervention were possibly better placed to experience an immediate sense of "catching up" with their peers than poorly-adjusted secondary pupils whose classmates kept up a similar rate of progress to their own.

The primary pupils had a milieu of the whole gamut of progess among experimental and control group peers as a context for rating their adjustment to school, whilst neither half of the secondary pupils knew much about the progress of their counterparts. The situation could therefore have arisen, for instance, that one class of secondary pupils gained ground on the other in respect of learning skills, but remained unaware of any such reason for upgrading the range of their "self assessment" ratings. However, the effects of intervention should now be apparent whether or not this situation arose in the secondary school, given that one of the tasks of the Instrumental Enrichment teacher was to mediate on behalf of experimental pupils and interpret their achievements for

them (as explained in my chapter on A Practitioner's Perspective).

In fact, the presumed effects of Instrumental Enrichment teaching on secondary pupils' ratings of their adjustment to school do appear to have a lot in common with the effects of similar intervention where primary pupils are concerned. As the tables on the following pages show, there is a pervasive tendency for both the primary and the secondary experimental groups to either improve more or worsen less than their controls in respect of how their adjustment changed between 1984 and 1986. This tendency is strong enough for us to reject the null hypothesis, since the probability of its being explained away as a series of coincidences is very low (see footnote F5.1); although analysis of isolated sub-tests rarely yields an F-ratio which is above the 4.17 necessary to claim statistical significance at the five percent level.

F5.1 A two-tail sign test, of whether experimental or control groups' "self assessment" ratings improve more or worsen less between 1984 and 1986, shows six positive differences out of the six possible (three adjustment to school factors, presented both to primary and to secondary pupils) in favour of the experimental groups. The probability of this being a fluke is one chance in sixty-four for a one-tail test, so for a two-tail test $p = 0.032$ (still within the five percent level of significance, even when the probability has been doubled).

There was considerable within-groups error variance militating against sub-test results proving statistically significant, as the standard deviation figures which relate to the mean ratings from 1984 indicate (see tables with a "Total Scores" heading). Nevertheless, an important set of results did prove significant at the five percent level: the intercorrelation between what primary experimental pupils "wished for" and their "self assessment" leaps from 0.41 before intervention to 0.74 after intervention, whereas the intercorrelation between what primary control pupils "wished for" and their "self assessment" drops slightly from 0.59 to 0.56 during the same period.

Such significant differences between intercorrelation means are missing from the equivalent set of secondary results. With the inter-correlation between "wished for" and "self assessment" ratings already amounting to a group mean of 0.65 when the secondary experimental pupils were pre-tested, they appear to have felt that their aspirations had been realised to a large extent even before intervention began. The primary experimental pupils appear to have felt comparatively dissatisfied in 1984.

Perhaps longer experience of disappointments at school had taught the secondary pupils to set their sights lower than primary pupils' aspirations? Secondary experimental pupils' "wished for" identification with being good at learning was modestly rated at 0.49 before intervention; whilst primary experimental pupils gave learning skills a higher priority, rating their "wished for"

identification at 0.61. The explanation remains a matter for conjecture. From my experience of administering the Repertory Grid Technique, I can report that secondary pupils presented themselves as diffident rather than complacent about what they wished for; but the data I gathered afford only scant support for the view that secondary pupils with learning difficulties are liable to be more resigned to low attainments than primary pupils with learning difficulties. My experiment was not designed to resolve such matters.

Like all conventional experiments, mine was designed to control systematic extraneous variance as much as possible, so that unnecessary experimental error would not obscure any variance induced by intervention. However, Local Education Authority colleagues in Buckinghamshire's Advisory Service had asked me to study the effects of Instrumental Enrichment in diverse schools, and I could not eliminate age-related and organisational sources of error entireley. The obvious alternative to elimination was incorporation: I had to deliberately distinguish primary school sources of variance from secondary school sources of variance, and to use these sources as mutual checks and balances within my experiment, thereby allowing for any systematic strengthening or weakening of the effects of intervention to be properly attributed.

With results from the primary schools and the secondary school kept apart, the prospect of analysing them was not so daunting. I still needed to be vigilant, because the allocation of pupils to

experimental and control groups had not been done purely at random; this meant that the chances of unaccounted for variables cancelling one another out were reduced, and that the results were a little more vulnerable to contamination. Any contamination was likely to produce a bias against my hypothesis, since the exceptions to random allocation involved a few of the most intransigent pupils in my sample being selected for intervention. No amount of statistical manipultion will correct bias reliably if it remains unidentified, or course, but pre-testing had revealed the effects of schools' tinkering with the symmetry of my experimental design and Fisher's invention of the analysis of co-variance would enable me to purge post-test results of the contamination associated with known differences in groups' initial status. Analysis of covariance is,

> a form of analysis of variance that tests the significance of the differences between means of final experimental data by taking into account the correlation between the dependent variable and one or more covariates, and by adjusting initial mean differences in the experimental groups. That is, the analysis of covariance analyzes the differences between experimental groups of Y after taking into account initial differences in the Y measures (i.e., pre-test measures) or differences in some pertinent independent variable. The measure used for the control (pre-test measures or measures on a pertinent variable) is called the covariate. (Kerlinger, 1973, p.370)

Because the last column of figures in each of the following Tables of Means has been adjusted relative to the Instrumental Enrichment groups' and the control groups' initial status, in the way just mentioned, the difference between the figures in this column can

be said to represent and exptrapolation of experimental effect size. In other words, the "adjusted mean" figures provide a guide as to whether Instrumental Enrichment teaching changed pupils in operationally defined ways; although these figures must be read in conjunction with the F-ratios calculated to assess their statistical significance if they are to be cited piecemeal as evidence of specific changes.

So far in this chapter, I have concentrated on pupils' ratings of their adjustment to school. After the pages of tables, I shall highlight some of the ability and attainment scores as well. Once we have noted the direction and magnitude of changes in respect of every dependent variable, we shall be in a position to look for relationships between teachers' ratings, pupils' ratings and objective test scores. All ratings and scores have been subjected to analysis of covariance in the same way. To help the reader sort through them, ratings or scores from each sub-test are recorded, analysed and remarked upon in the space of a page; these pages are coded and an index is provided to establish their order (see overleaf).

5.0 INDEX OF RESULTS AND ANALYSES PAGES.

PRIMARY SCHOOLS		SECONDARY SCHOOL
Code	TESTS	Code
5.1	CAS schedule: Personal/Social Confidence.	5.11
5.2	CAS schedule: Co-operative Behaviour.	5.12
5.3	CAS schedule: Learning Skills.	5.13
5.4	Repertory Grid: wished for Pers/Soc Confidence.	5.14
5.5	Repertory Grid: wished for Co-op Behaviour.	5.15
5.6	Repertory Grid: wished for Learning Skills.	5.16
5.7	Repertory Grid: self assess Pers/Soc Confidence.	5.17
5.8	Repertory Grid: self assess Co-op Behaviour.	5.18
5.9	Repertory Grid: self assess Learning Skills.	5.19
5.10	Repertory Grid: wish/self inter-correlation.	5.20
5.21	WISC-R Similarities.	5.28
5.22	WISC-R Arithmetic.	5.29
5.23	Neale Analysis of Reading, Accuracy.	5.30
5.24	Neale Analysis of Reading, Comprehension.	5.31
5.25	AH 2/3, Verbal.	5.32
5.26	AH 2/3, Numerical.	5.33
5.27	AH 2/3, Perceptual.	5.34

5.1 CAS schedule: summary of teachers' ratings of Primary School pupils' PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	169	8.89	3.78
1986	171	9.0	2.61
Control 1984	121	6.37	2.1
1986	125	6.58	2.77

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	202.02	36	
Error	190.71	35	5.45
Treat.	11.31	1	11.31

F RATIO = 2.07

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	8.89	9.0	8.83
Control	6.37	6.58	7.2

REMARKS

The Instrumental Enrichment group contains pupils with more personal/social anxiety problems than the control group, according to teachers.

1984 ratings are wide-ranging within the I.E. group; the standard deviation is 3.78. Fewer experimental (I.E.) pupils stand out from the 1986 ratings as anxious members of their class.

The Table of Means shows experimental pupils' confidence to be holding relatively steady in teachers' eyes, compared to control pupils' increasing anxiety; although the F-ratio is not high enough for the difference between means to be regarded as statistically significant.

5.2 CAS schedule: summary of teachers' ratings of Primary School pupils' CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	123	6.47	2.43
1986	144	7.58	2.58
Control 1984	94	4.95	1.5
1986	126	6.63	2.9

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	280.86	36	
Error	278.06	35	7.94
Treat.	2.8	1	2.8

F RATIO = 0.3528

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	6.47	7.58	7.39
Control	4.95	6.63	6.81

REMARKS

Teachers find the Instrumental Enrichment pupils' behaviour to be more disturbing than that of the control pupils.

The Instrumental Enrichment pupils' behaviour deteriorates less than the control pupils' behaviour between 1984 and 1986, but the difference between means is not statistically significant.

5.3 CAS schedule: summary of teachers' ratings of Primary School pupils' LEARNING SKILLS.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	175	9.21	3.33
1986	172	9.05	2.52
Control 1984	120	6.31	2.29
1986	154	8.1	2.09

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	150.83	36	
Error	150.31	35	4.29
Treat.	0.52	1	0.52

F RATIO = 0.1219

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	9.21	9.05	8.45
Control	6.31	8.1	8.71

REMARKS

Teachers rate some experimental pupils as having extreme learning difficulties. 1984 ratings are wide-ranging; the standard deviation in the Instrumental Enrichment group is 3.33. By 1986 the standard deviation is reduced, and the Table of Means shows experimental pupils' learning skill to be going up in teachers' estimation while estimations of control pupils' learning skill are going down.

The difference between means is not statistically significant when variance within the whole primary sample is taken into account in the usual way. However, the difference between means in the larger of the primary classes alone is significant at the one percent level.

5.4 Repertory Grid Technique: summary of Primary School pupils' "wished for" identification with PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	10.15	0.53	0.41
1986	13.65	0.72	0.28
Control 1984	13.77	0.72	0.21
1986	13.14	0.69	0.3

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	2.83	36	
Error	2.75	35	7.85
Treat.	8.46	1	8.46

F RATIO = 1.078

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.53	0.72	0.75
Control	0.72	0.69	0.65

REMARKS

Several primary experimental pupils could barely identify themselves with the "Personal/Social Confidence" construct in 1984; their wished for ratings are wide-ranging, with a standard deviation of 0.41.

By 1986 the experimental pupils have come together as a group, as the reduced standard deviation indicates, and their mean rating is higher.

The difference between means is not statistically significant, but the trend toward greater adjustment to school is unmistakeable in the context of other results.

5.5 Repertory Grid Technique: summary of Primary School pupils' "wished for" identification with CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	9.89	0.52	0.38
1986	9.91	0.52	0.3
Control 1984	7.62	0.4	0.5
1986	9.39	0.49	0.45

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	4.54	36	
Error	4.53	35	0.13
Treat.	3.02	1	3.02

F RATIO = 2.33

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.52	0.52	0.49
Control	0.4	0.49	0.51

REMARKS

The whole primary sample, experimental pupils and control pupils, covers a wide range of wished for identification with "Co-operative Behaviour".

Group means stay at modest levels throughout the period of intervention, and the difference between means is not statistically significant.

Standard deviation from the means reduces in both groups.

5.6 Repertory Grid Technique: summary of Primary School pupils' "wished for" identification with LEARNING SKILLS.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	11.65	0.61	0.34
1986	11.82	0.62	0.3
Control 1984	9.5	0.5	0.44
1986	10.4	0.55	0.39

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	3.99	36	
Error	3.97	35	0.11
Treat.	1.21	1	1.21

F RATIO = 0.1066

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.61	0.62	0.6
Control	0.5	0.55	0.57

REMARKS

I.E. pupils wished for identification with the "Learning Skills" construct, more than the control pupils did, even before intervention began. Some of the pupils, whose self assessment indicates learning difficulties (see results in Appendix 8), are among those whose wished for ratings give learning a high priority.

There is no evidence of any experimental effect on the mean rating of the I.E. group. The difference between means is not statistically significant.

5.7 Repertory Grid Technique: summary of Primary School pupils' "self assessment" in respect of PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	5.46	0.29	0.47
1986	9.88	0.52	0.38
Control 1984	9.04	0.47	0.43
1986	10.03	0.53	0.37

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	4.48	36	
Error	4.4	35	0.13
Treat.	3.39	1	3.39

F RATIO = 0.27

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.29	0.52	0.55
Control	0.47	0.53	0.49

REMARKS

Pupils' self assessments in respect of "Personal/Social Confidence" are wide-ranging, as the high standard deviation figures show.

In 1984, experimental pupils were more anxious than control pupils about their personal or social standing. By 1986, the two groups are virtually neck-and-neck; the adjusted means are open to the interpretation that there is more impetus behind the experimental group's build-up of confidence, but the difference between means is not statistically significant.

5.8 Repertory Grid Technique: summary of Primary School pupils' "self assessment" in respect of CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	2.8	0.15	0.44
1986	6.96	0.37	0.33
Control 1984	7.29	0.38	0.43
1986	7.15	0.37	0.5

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	5.73	36	
Error	5.66	35	0.16
Treat.	7.44	1	7.44

F RATIO = 0.46

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.15	0.37	0.42
Control	0.38	0.37	0.32

REMARKS

Pupils' self assessments are spread out along the "gets on well with teachers - annoys teachers" dimension.

In 1984, experimental pupils were more depreciatory than control pupils about their record of co-operation with teachers. This is no longer the case in 1986.

The adjusted means indicate how much the experimental pupils have distanced themselves from disturbing behaviour, compared to the control pupils' standstill. Neither group has many pupils who rate themselves as highly co-operative, though, notwithstanding the I.E. group's progress. The difference between mean ratings is not statistically significant.

5.9 Repertory Grid Technique: summary of Primary School pupils' "self assessment" in respect of LEARNING SKILLS.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	3.55	0.19	0.48
1986	9.87	0.52	0.27
Control 1984	5.88	0.31	0.49
1986	7.2	0.38	0.52

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	5.6	36	
Error	5.27	35	0.15
Treat.	0.34	1	0.34

F RATIO = 2.23

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.19	0.52	0.54
Control	0.31	0.38	0.35

REMARKS

In 1984, both groups' ratings were wide-ranging. The experimental group associated themselves with learning difficulties nearly as much as they associated themselves with learning skills.

By 1986, the I.E. pupils have come together as a group, as the reduced standard deviation indicates, and their mean "Learning Skills" rating is much higher.

The adjusted means invite speculation about a substantial experimental effect, although the difference between means is not statistically significant.

5.10 Repertory Grid Technique: inter-correlation between what Primary pupils "wished for" and their "self assessments."

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	7.74	0.41	0.45
1986	13.99	0.74	0.25
Control 1984	11.21	0.59	0.35
1986	10.64	0.56	0.38

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	4.03	36	
Error	3.55	35	0.1
Treat.	0.48	1	0.48

F RATIO = 4.74 $p < .05$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.41	0.74	0.76
Control	0.59	0.56	0.53

REMARKS

By 1986, the experimental pupils have come together as a group, as the reduced standard deviation indicates, and they have come much closer than their control group peers to closing the gap between what they wish to be like and what they think they are really like.

The control group figures remain virtually unaltered throughout the period of intervention, whilst the I.E. group figures provide a record of progress. The difference between mean inter-correlations is statistically significant at the five percent level.

5.11 CAS schedule: summary of teachers' ratings of Secondary School pupils' PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	147	7.74	3.22
1986	144	7.58	3.04
Control 1984	140	7.37	2.94
1986	134	7.05	2.25

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	205.44	36	
Error	204.18	35	5.83
Treat.	1.26	1	1.26

F RATIO = 0.2162

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	7.74	7.58	7.49
Control	7.37	7.05	7.13

REMARKS

Teachers' mean ratings of the two secondary school groups start and finish very close together, where the "Personal/Social Confidence" factor in pupils' adjustment to school is concerned. The difference between means is not statistically significant.

5.12 CAS schedule: summary of teachers' ratings of Secondary School pupils' CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	106	5.58	2.97
1986	129	6.79	3.38
Control 1984	93	4.89	1.83
1986	110	5.79	1.98

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	223.28	36	
Error	219.72	35	6.28
Treat.	3.55	1	3.55

F RATIO = 0.5664

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	5.58	6.79	6.59
Control	4.89	5.79	5.98

REMARKS

In 1984, teachers perceived the experimental group as more diverse than the control group, as the standard deviation figures indicate. The behaviour of the experimental group was rated as more disturbing than that of the control group, due to there being a few more pupils in the experimental group who were regarded as troublesome (see individual results in Appendix 8).

By 1986, little has changed overall, except that both groups' behaviour has deteriorated slightly in their teachers' eyes. The difference between mean ratings is not statistically significant.

5.13 CAS schedule: summary of teachers' ratings of Secondary School pupils' LEARNING SKILLS.

TOTAL SCORES (lower ratings indicate fewer problems)

Cell	Total	Mean	St. Dev.
I.E. 1984	144	7.58	2.92
1986	183	9.63	3.16
Control 1984	137	7.21	2.3
1986	177	9.31	2.29

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	246.74	36	
Error	246.48	35	7.04
Treat.	0.26	1	0.26

F RATIO = 3.6656

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	7.58	9.63	9.56
Control	7.21	9.31	9.39

REMARKS

The I.E. group and the control group start and finish almost the same as one another. Both groups are perceived to be encountering more learning difficulties in 1986 than they were in 1984. The difference between mean ratings of the groups is not statistically significant.

5.14 Repertory Grid Technique: summary of Secondary School pupils' "wished for" identification with PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	10.5	0.55	0.41
1986	15.25	0.8	0.22
Control 1984	13.3	0.7	0.27
1986	13.95	0.73	0.13

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	1.2	36	
Error	1.12	35	3.21
Treat.	8.1	1	8.1

F RATIO = 2.5219

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.55	0.8	0.81
Control	0.7	0.73	0.72

REMARKS

In 1984, the experimental pupils endorsed their teacher's view of them as a diverse group; the standard deviation from the group mean was 0.41. They did not wish to become more closely identified with the "Personal/Social Confidence" construct as much as the control pupils did.

By 1986, the experimental pupils have come together as a group, as the reduced standard deviation indicates, and they have overtaken the control pupils in wishing for personal or social confidence.

The adjusted means alert us to the possibility of an experimental effect on pupils' aspirations, but the difference between means is not statistically significant.

5.15 Repertory Grid Technique: summary of Secondary School pupils' "wished for" identification with CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	8.57	0.45	0.46
1986	7.48	0.39	0.65
Control 1984	7.55	0.39	0.45
1986	5.6	0.29	0.48

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	10.41	36	
Error	10.36	35	0.29
Treat.	4.67	1	4.67

F RATIO = 0.1579

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.45	0.39	0.38
Control	0.39	0.29	0.31

REMARKS

In 1984, experimental pupils had a slightly more pronounced wish to co-operate with teachers than control pupils, despite the fact that their behaviour is rated as worse than that of their peers by teachers (see 5.12) and themselves (see 5.18).

By 1986, both groups have lost some of their already modest enthusiasm for co-operating with teachers. Responses from I.E. pupils vary a great deal; the standard deviation from the group mean is 0.65, which indicates that many ratings are near the extremes of the -1 to +1 range. The difference between mean ratings is not statistically significant.

5.16 Repertory Grid Technique: summary of Secondary School pupils' "wished for" identification with LEARNING SKILLS.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	9.49	0.49	0.46
1986	12.34	0.65	0.42
Control 1984	8.42	0.44	0.45
1986	10.62	0.56	0.27

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	2.78	36	
Error	2.74	35	7.83
Treat.	3.62	1	3.62

F RATIO = 0.4628

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.49	0.65	0.63
Control	0.44	0.56	0.57

REMARKS

By 1986, both groups wish for learning skills more emphatically than they did in 1984. The I.E. group maintains its lead over the control group, but the difference between mean ratings is not statistically significant.

5.17 Repertory Grid Technique: summary of Secondary School pupils' "self assessment" in respect of PERSONAL/SOCIAL CONFIDENCE.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	9.31	0.49	0.45
1986	12.55	0.66	0.36
Control 1984	12.17	0.64	0.25
1986	13.73	0.72	0.19

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	3.09	36	
Error	3.08	35	8.79
Treat.	1.23	1	1.23

F RATIO = 0.14

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.49	0.66	0.67
Control	0.64	0.72	0.71

REMARKS

Experimental pupils have become more confident during the course of intervention, but control pupils have also made a little progress in the same direction and the difference between mean ratings is not statistically significant.

5.18 Repertory Grid Technique: summary of Secondary School pupils' "self assessment" in respect of CO-OPERATIVE BEHAVIOUR.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	6.57	0.34	0.55
1986	6.97	0.37	0.55
Control 1984	8.48	0.45	0.39
1986	6.27	0.33	0.42

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	6.26	36	
Error	6.18	35	0.17
Treat.	8.67	1	8.67

F RATIO = 0.4912

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.34	0.37	0.39
Control	0.45	0.33	0.3

REMARKS

Both groups start and finish very close together, where self assessments in respect of "Co-operative Behaviour" are concerned. The adjusted means make the trend, for I.E. pupils to make progress relative to control pupils, more noticeable; however, the difference between means is not statistically significant in itself.

5.19 Repertory Grid Technique: summary of Secondary School pupils' "self assessment" in respect of LEARNING SKILLS.

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	7.96	0.42	0.47
1986	10.05	0.53	0.44
Control 1984	8.49	0.45	0.46
1986	9	0.47	0.38

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	5.09	36	
Error	5.05	35	0.14
Treat.	4.32	1	4.32

F RATIO = 0.2994

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.42	0.53	0.53
Control	0.45	0.47	0.47

REMARKS

Experimental pupils start marginally behind control pupils and finish marginally ahead of them in their collective self assessment of "Learning Skills". The difference between the mean ratings of the two groups is not statistically significant by itself, but the trend for experimental pupils to gain more or lose less than control pupils is reinforced.

5.20 Repertory Grid Technique: inter-correlation between what Secondary pupils "wished for" and their "self assessments".

TOTAL SCORES (based on correlation coefficients from grids)

Cell	Total	Mean	St. Dev.
I.E. 1984	12.28	0.65	0.39
1986	13.69	0.72	0.34
Control 1984	14.97	0.79	0.16
1986	14.6	0.77	0.17

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	2.85	36	
Error	2.83	35	8.09
Treat.	1.95	1	1.95

F RATIO = 0.2407

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	0.65	0.72	0.72
Control	0.79	0.77	0.77

REMARKS

By 1986, pupils in the I.E. group have closed the gap between their aspirations and their perceptions of personal reality a little further than in 1984. Control pupils virtually maintain their high level of self-satisfaction, however, and the difference between mean ratings is not statistically significant.

5.21 WISC-R Similarities: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	168	8.84	2.25
1986	217	11.42	2.79
Control 1984	189	9.95	2.18
1986	234	12.31	2.65

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	141.78	36	
Error	141.75	35	4.05
Treat.	3.64	1	3.64

F RATIO = 8.9798 $p < .01$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	8.84	11.42	11.9
Control	9.95	12.31	11.83

REMARKS

The adjusted means show the Instrumental Enrichment group having made greater progress than the control group. The difference between mean scores is statistically significant at the one percent level.

5.22 WISC-R Arithmetic: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	164	8.63	2.2
1986	186	9.79	2.04
Control 1984	192	10.1	2.89
1986	217	11.42	3.37

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	248.7	36	
Error	240.88	35	6.88
Treat.	7.82	1	7.82

F RATIO = 1.1369

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	8.63	9.79	10.13
Control	10.1	11.42	11.08

REMARKS

The control group maintain their superiority in arithmetic.

5.23 Neale Analysis of Reading, Accuracy:
summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	2166	114.0	17.43
1986	2531	133.21	16.09
Control 1984	2390	125.79	18.28
1986	2675	140.79	15.26

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	2889.43	36	
Error	2880.35	35	82.29
Treat.	9.08	1	9.08

F RATIO = 0.1104

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	114.0 (9y 6m)	133.21 (11y 1m)	137.51
Control	125.79 (10y 6m)	140.79 (11y 9m)	136.48

REMARKS

The I.E. group draw closer to the control group's level of accuracy; their greater progress is reflected by the adjusted means, but the difference between mean scores is not statistically significant.

5.24 Neale Analysis of Reading, Comprehension: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	2103	110.68	16.11
1986	2540	133.68	15.31
Control 1984	2396	126.1	17.81
1986	2699	142.05	15.11

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	4783.46	36	
Error	4776.02	35	136.46
Treat.	7.44	1	7.44

F RATIO = 5.4543 $p < .05$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	110.68 (9y 3m)	133.68 (11y 2m)	138.35
Control	126.1 (10y 6m)	142.05 (11y 10m)	137.38

REMARKS

The I.E. group draw closer to the control group's level of comprehension; their greater progress is reflected by the adjusted means, and the difference between means is statistically significant at the five percent level.

5.25 AH 2/3, Verbal: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	195	10.26	5.57
1986	285	15.0	5.55
Control 1984	239	12.58	5.21
1986	368	19.37	6.2

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	1169.76	36	
Error	1072.05	35	30.63
Treat.	97.71	1	97.71

F RATIO = 3.1899

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	10.26	15.0	15.54
Control	12.58	19.37	18.82

REMARKS

The control group maintain their written verbal superiority.

5.26 AH 2/3, Numerical: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	103	5.42	3.13
1986	194	10.21	4.31
Control 1984	136	7.16	3.36
1986	236	12.42	5.1

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	605.07	36	
Error	598.79	35	17.11
Treat.	6.29	1	6.29

F RATIO = 0.3676

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	5.42	10.21	10.89
Control	7.16	12.42	11.74

REMARKS

The control group maintain their superiority in written numerical work.

5.27 AH 2/3, Perceptual: summary of Primary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	262	13.79	6.37
1986	357	18.79	5.29
Control 1984	289	15.21	5.21
1986	426	22.42	4.68

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	778.71	36	
Error	694.52	35	19.84
Treat.	84.19	1	84.19

F RATIO = 4.2427 $p < .05$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	13.79	18.79	19.1
Control	15.21	22.42	22.1

REMARKS

The control group continues to do better than the experimental group on this written test of perceptual ability. The difference between mean scores for the two groups is statistically significant at the five percent level.

5.28 WISC-R Similarities: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	188	9.89	1.88
1986	216	11.37	2.1
Control 1984	176	9.26	1.71
1986	210	11.05	2.35

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	121.81	36	
Error	121.6	35	3.47
Treat.	0.21	1	0.21

F RATIO = 6.1379 $p < .05$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	9.89	11.37	11.13
Control	9.26	11.o5	11.29

REMARKS

The two groups start and finish at almost the same level as one another. However, owing to the small amount of within-groups variance, the difference between mean scores emerges as statistically significant at the five percent level and our attention is drawn to the control group's slightly greater progress.

5.29 WISC-R Arithmetic: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	176	9.26	2.35
1986	216	11.37	3.18
Control 1984	178	9.37	2.63
1986	210	11.05	3.08

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	239.09	36	
Error	237.61	35	6.79
Treat.	1.48	1	1.48

F RATIO = 0.2185

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	9.26	11.37	11.41
Control	9.37	11.05	11.01

REMARKS

The two groups start and finish at almost the same level as one another. The difference between mean scores is not statistically significant.

5.30 Neale Analysis of Reading, Accuracy:
summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	2493	131.21	15.05
1986	2747	144.58	10.7
Control 1984	2559	134.68	17.25
1986	2742	144.31	10.6

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	1039.01	36	
Error	990.65	35	28.3
Treat.	48.36	1	48.36

F RATIO = 1.7086

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	131.21 (10y 11m)	144.58 (12y 1m)	145.58
Control	134.68 (11y 3m)	144.31 (12y 0m)	143.31

REMARKS

The Instrumental Enrichment group catch up with the control group in reading accuracy. The difference between mean scores is not statistically significant.

5.31 Neale Analysis of Reading, Comprehension: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	2540	133.68	10.76
1986	2782	146.42	5.16
Control 1984	2538	133.58	15.93
1986	2785	146.58	6.0

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	715.16	36	
Error	714.84	35	20.42
Treat.	0.33	1	0.33

F RATIO = 1.5973

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	133.68 (11y 2m)	146.42 (12y 2m)	146.41
Control	133.58 (11y 2m)	146.58 (12y 3m)	146.59

REMARKS

The two groups start and finish at virtually the same level as one another. The difference between mean scores is not statistically significant.

5.32 AH 2/3, Verbal: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	267	14.05	5.36
1986	362	19.05	3.36
Control 1984	260	13.68	4.41
1986	361	19.0	5.59

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	365.55	36	
Error	365.16	35	10.43
Treat.	0.39	1	0.39

F RATIO = 3.7714

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	14.05	19.05	18.92
Control	13.68	19	19.12

REMARKS

The two groups start and finish at almost the same level of written verbal ability as one another. The difference between mean scores is not statistically significant.

5.33 AH 2/3, Numerical: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	213	11.21	4.49
1986	307	16.16	6.69
Control 1984	226	11.89	4.77
1986	239	12.58	6.41

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	794.1	36	
Error	615.87	35	17.59
Treat.	178.23	1	178.23

F RATIO = 10.1289 $p < .01$

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	11.21	16.16	16.54
Control	11.89	12.58	12.19

REMARKS

In 1984, the two groups were close together in written numerical work.

By 1986, the I.E. pupils are much more advanced than their peers in the control group. The difference between mean scores is statistically significant at the one percent level.

5.34 AH 2/3, Perceptual: summary of Secondary School pupils' results.

TOTAL SCORES

Cell	Total	Mean	St. Dev.
I.E. 1984	333	17.53	3.6
1986	498	26.21	3.15
Control 1984	342	18.0	3.78
1986	478	25.16	3.46

ANALYSIS OF COVARIANCE

Source	SS	df	MS
Total	319.32	36	
Error	303.95	35	8.68
Treat.	15.37	1	15.37

F RATIO = 1.7694

TABLE OF MEANS

Group	1984 Mean	1986 Mean	Adjusted Mean
I.E.	17.53	26.21	26.32
Control	18.0	25.16	25.05

REMARKS

Pupils in the Instrumental Enrichment group come from behind to gain a slight advantage over the control pupils as regards perceptual ability, but the difference between mean scores is not statistically significant.

Results which appear to provide evidence of experimental effects on pupils' ability and attainment do not fall into an obvious pattern. They can only be properly understood in relation to the contexts in which they were achieved. Even then, they raise a number of questions.

In 1986, the primary experimental group's mean score on the WISC-R Similarities test shows these pupils well on the way to catching up with their control group peers, after starting out in 1984 more than a point behind on average. The diference between means is statistically significant at the one percent level. Is this result the fruit of work on Feuerstein's Comparisons instrument? Comparisons invites the sort of exercise that appears to be a useful preparation for answering WISC-R Similarities questions. However, the secondary experimental pupils also worked on Comparisons, and yet their WISC-R Similarities scores improve less than those of the secondary control pupils. Why is there no sign of secondary experimental pupils having developed superior ability in the area tested by WISC-R Similarities, despite their having practised the same specific skills as their successful primary counterparts in Instrumental Enrichment lessons? Perhaps other skills or factors were involved in the primary pupils' achievement; and perhaps the Comparisons instrument was too easy for the secondary pupils, so that it could not stretch them unless it was complemented by some sophisticated bridging. I shall explore these interpretations in my next chapter, when I look at what can be inferred from the results of my experiment.

Primary experimental pupils'enhanced ability to operate on verbal information, and to articulate their thoughts about it, is evidenced by other test scores besides the WISC-R Similarities scores. Neale Analysis of Reading Ability scores show experimental pupils to have made more progress than control pupils in respect of reading accuracy and comprehension; the difference between mean comprehension scores is statistically significant at the five percent level. But when primary experimental pupils were asked in 1986 to produce written evidence of their abiliy, they proved to be even less of a match for their control group peers than they had been in 1984. The control group, who had sometimes worked on written assignments while the experimental group were in mainly oral Instrumental Enrichment lessons, continued to be much the better of the two groups at responding in writing on the AH 2/3 tests.

Despite the primary experimental group's experience of learning to solve Feuerstein's diagramatically presented problems, their worst AH 2/3 test result, relative to the primary control group's results, is the one concerning their perceptual ability. The control group's advantage, measured at more than three points difference between means, is statistically significant at the five percent level. Frances Link has claimed (in the course of visiting two Buckinghamshire schools on 3rd April 1987) that this persistent disparity between the groups demonstrates a need for her "mediated writing" programme (a set of "work journals" entitled Reflections on Thinking and Problem Solving, pilot version published in 1986) to supplement Instrumental Enrichment,

since certain pupils' difficulties with written expression are not overcome by Feuerstein's instruments alone.

What Link may not have appreciated was that Buckinghamshire's Instrumental Enrichment teachers purposely neglect pupils' writing skills in the early stages of intervention, especially when they want pupils with learning difficulties to temporarily distance themselves from activities in which they have a history of conspicuous mistakes. There was never much hope of pupils doing justice to their cognitive development in the written mode of output, unless they had already acquired adequate skills from their English lessons.

That said, the secondary experimental pupils managed to transcend their previous level of performance on the written AH test of numerical ability, to an extent that routine progress in output skills would hardly have allowed. According to their results on the WISC-R Arithmetic test, their ability to process numerical data stayed level with that of their control group peers throughout my experiment; so, how is it that the secondary experimental pupils were so much more efficient at producing correct written answers on the AH test of numerical ability in 1986? The explanation could be that bridging prepared the way for success. Two teachers collaborated on teaching the secondary experimental group the skills measured by the AH test of numerical ability: their Instrumental Enrichment teacher arranged to facilitate the transfer of pertinent skills by involving their mathematics teacher in a series of lessons. The pupils for whom

this "bridge" was constructed started a little behind their control group peers, then pulled ahead nearly four points on average; the difference between means is statistically significant at the one percent level. Meanwhile, they stayed more or less level with their control group peers on the AH tests of verbal ability and perceptual ability. It clearly was not their written output per se that had undergone a dramatic improvement; perhaps they had negotiated improved work practices with their mathematics teacher, guided by mediation from their Instrumental Enrichment teacher?

Given that secondary pupils seem to have been able to utilise skills developed in Instrumental Enrichment lessons to improve their performance in written mathematics, just as primary pupils seem to have been able to utilise skills developed in Instrumental Enrichment lessons to improve their performance in spoken English, we may affirm that intervention with Feuerstein's programme for cognitive modifiability does not automatically enhance predictable skill areas or attainments in school subjects. Prediction is only possible when we know which direction a teacher's bridging will take.

Pupils' results would seem to reflect at least some of the mediating teacher's intentions and goals. Because of this phenomenon, I did not ask any of the Buckinghamshire Instrumental Enrichment teachers for their assessments of pupils' adjustment to school. I already knew from their reports of critical incidents in the classrooms that they perceived profound changes in some of

their pupils, and that their perceptions of change were inextricably linked with their own professional development as mediators. Their influence on pupils' thinking and learning during Instrumental Enrichment lessons was undoubted; but Instrumental Enrichment lessons only occupy a tiny fraction of the timetable. What influence was feedback from other teachers having? Did the CAS schedules completed by form teachers foreshadow pupils' "wished for" or "self assessment" ratings?

The relationship between form teachers' perceptions of pupils' adjustment to school and pupils' own perceptions seems to be a tenuous one, since teachers' ratings only coincide with pupils' ratings at an insignificant level (see Appendix 10 for cross-partitioned tables, showing instances of agreement and disagreement between teachers and pupils). Moreover, "co-operative behaviour" emerges as a factor in pupils' adjustment to school that is little changed by intervention. We can infer that experimental pupils have become confident that they are more like they wished to be without depending on their form teachers for a boost in self-esteem.

Part of the experimental pupils' confidence, particularly in respect of their learning skills, is likely to have arisen from satisfaction with the accomplishments revealed by objective test scores. It is impossibls to estimate how big a part: just as individuals are different in their sensitivity to praise or adverse criticism, they are also different in the amount of success they need before feelings of failure are outweighed by

feelings of prowess in the classroom. All we can say is that for most of the experimental pupils whose growth in confidence is above average, there is a corresponding above average increase somewhere among their personal objective test scores (see Appendix 8 for tables of individual pupils' results) and the score that increased by more than the average amount may represent an achievement that was important to them. We can not substantiate a causal relationship between pupils' abilities and attainments and their adjustment to school, wherein increments in the former lead to proportionate increments in the latter; indeed, such an assumption would ignore the tenet that adjustment to school is a precondition for pupils to realise their potential in ability and attainment.

Before my comments stray any further from a strict analysis of results into an overview of what can be inferred about the effects of Intrumental Enrichment on children's adjustment to school, I should acknowledge that I have reached the juncture at which to begin a new chapter. By themselves, neither mean ratings and scores nor speculation about interaction among the dependent variables measured can inform future classroom practice. It is no use for practitioners to know how much support there is for my hypothesis, unless they also know what conditions are necessary to realise that support. In the next chapter, I shall consider the implications of results from my experiment for colleagues planning the conditions under which future intervention for cognitive modifiability will take place.

INFERENCES AND IMPLICATIONS

In this chapter I shall consider some of the inferences that can be drawn from my study, and the implications for colleagues interested in using Instrumental Enrichment to promote pupils' adjustment to school, under four sub-headings: first, "Changes in Individual Pupils' Self-Assessments and the Trend toward Psychological Integration"; secondly, "Primary and Secondary School Differences Observed"; thirdly, "A Response to Feuerstein's Critics"; and fourthly, "The Outlook Now".

The results, after less than two years' intervention with Feuerstein's methodology and materials in the education of a sample of Buckinghamshire pupils, provide qualified support for my main hypothesis. It seems that Instrumental Enrichment can promote children's adjustment to school, at least insofar as it is conducive to their perceiving themselves as having made positive progress on one or more of the three dimensions which were held collectively to operationalise adjustment. Given a post-test situation in which class-teachers scarcely recognise that experimental pupils have made more progress or deteriorated less than their control group peers, however, how can we corroborate pupils' self-assessments? Objective test results were just as unhelpful toward this end as teachers' perceptions; ability and attainment scores only correlated patchily with pupils' "Learning Skills" ratings, and they can not be used as criteria for judging the validity of how individuals have measured themselves in

accordance with personal constructs.

What we need, if we are to corroborate pupils' self-assessments, is to discover that an internal logic governed their responses to the Repertory Grid Technique. Without such evidence of pupils' affective-cognitive consistency, we can not trust that their higher ratings reflect profound changes in their perceptions: pupils may simply have learned to disassociate their various feelings and beliefs rather than to resolve conflicts between them. I already have a considerable amount of evidence at my disposal, in the form of correlation matrices calculated from individual pupils' grids to show the strength of relationships between constructs; but so far, for the sake of economy in my attempts to communicate results, I have concentrated on whole groups' mean correlations and the statistical significance of differences between them.

Changes in Individual Pupils' Self-Assessments and the Trend toward Psychological Integration

What I want to do now is to make some of the evidence from individual pupils more accessible. This does not mean that I propose to undo my previous economy and to depart extensively or indiscriminately from the practice of analysing results on the basis of between-groups comparisions. I shall just use a few pupils' profiles to demonstrate, more vividly and more reliably than I could if I stuck to drawing from group trends alone, how "self-assessment" ratings can be construed as expressions of the way in which relationships between constructs have been developed.

The experimental group's apparent all-round progress could conceivably comprise a haphazard sprinkling of positive responses to Instrumental Enrichment, with few pupils having improved in respect of more than one factor in their adjustment to school, notwithstanding the higher inter-correlation of their aspirations and their view of reality; whereas individual profiles render personal growth toward psychological integration quite unmistakeable.

I shall use Hierarchical Linkage Analysis to display pupils' profiles graphically, in the manner adopted by Ravenette for his work on using grid techniques with children (1975, pp 79 to 83). This will allow us to see, at a glance, some examples of how pupils reconciled constructs and, particularly in cases where psychological integration was initially poor, what changes took place in the course of "like I'd like to be" and "like I really am" coming together in the same cluster. Solid lines indicate a cluster of constructs wherein none of the correlation coefficients are lower than 0.5, while broken lines indicate weaker relationships. Let us begin the display by juxtaposing the 1984 profile with the 1986 profile of Amanda, a pupil who received Instrumental Enrichment in the larger of the two primary school classes:

AMANDA, 1984

CONSTRUCTS (numbered as on repertory grid)

Personal/Social Confidence

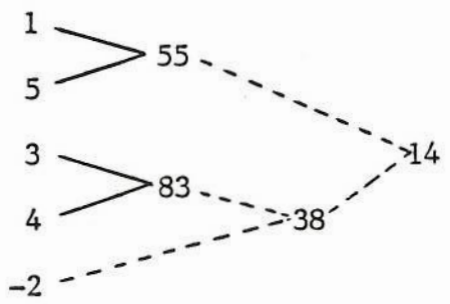
Like I really am

Learning Skills

Like I'd like to be

Co-operative Behaviour

HIERARCHICAL LINKAGE ANALYSIS



AMANDA, 1986

CONSTRUCTS (numbered as on repertory grid)

Personal/Social Confidence

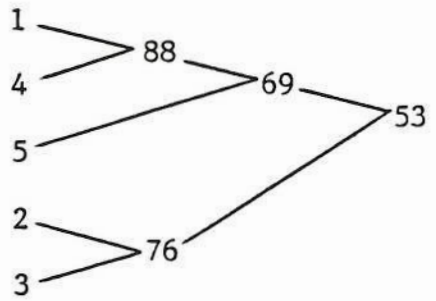
Like I'd like to be

Like I really am

Co-operative Behaviour

Learning Skills

HIERARCHICAL LINKAGE ANALYSIS

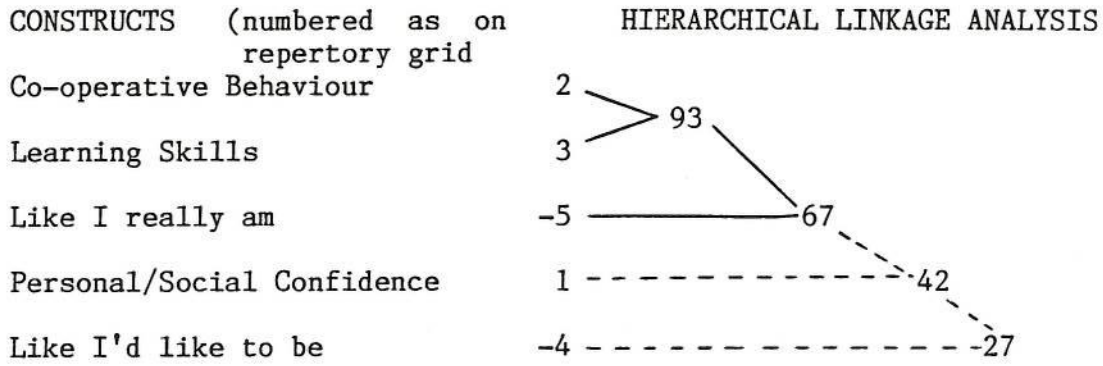


We can observe that Amanda considered herself to be fairly good at making friends in 1984, and that she wished to be good at learning. She identified with annoying teachers as opposed to co-operating with them, as the negative sign beside the construct number shows, but this construct was not perceived as very relevant to the previous two clusters. By 1986, Amanda has not only increased her self-assessment rating as regards making friends but she has also switched the main focus of her aspirations into the area of personal and social confidence. Meanwhile, she seems to have decided that annoying teachers is not compatible with her wish to learn; she links learning skills and

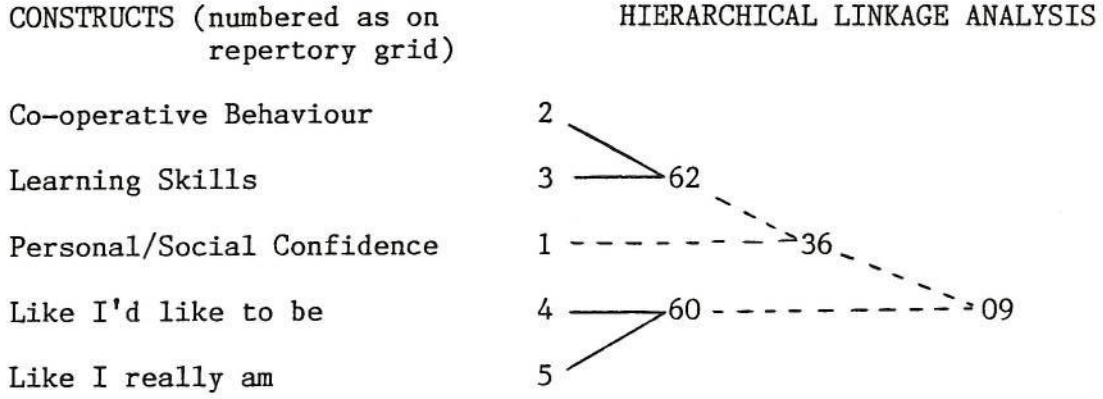
co-operative behaviour at a high level. Amanda is no longer in a situation where her position on one dimension of adjustment to school undermines her position on another dimension; she has realised that what she is really like in school is seminally related to who she would like to be, and she has become a more psychologically integrated person.

Amanda's classmate, James, was far worse orientated than she was in 1984 as regards his readiness to adjust to school. Even though he linked learning skills and co-operative behaviour from the outset, his identification with this wisdom was nonetheless strongly negative. Perhaps he felt he had burned his boats by alienating teachers with the frequent outbursts of anger or protest that had earned him a reputation for being refractory. He was certainly a lonely figure, like somebody stranded: he did not enjoy the benefit of kudos among his peers as a reward for disrupting lessons, and he rated himself as bad at making friends. He was defeatist about what he wished to change at school, and it would seem reasonable to interpret the remoteness of the fourth construct in his 1984 profile as a guide to how hopeless he felt his predicament to be. Indeed, James was one of the children deliberately selected by his class-teacher for Instrumental Enrichment, on the grounds that an intervention programme for cognitive modifiability was precisely what he needed if she was ever to "get through to him". Let us contrast how James came to present himself in 1986 with how he had presented himself in 1984:

JAMES, 1984



JAMES, 1986

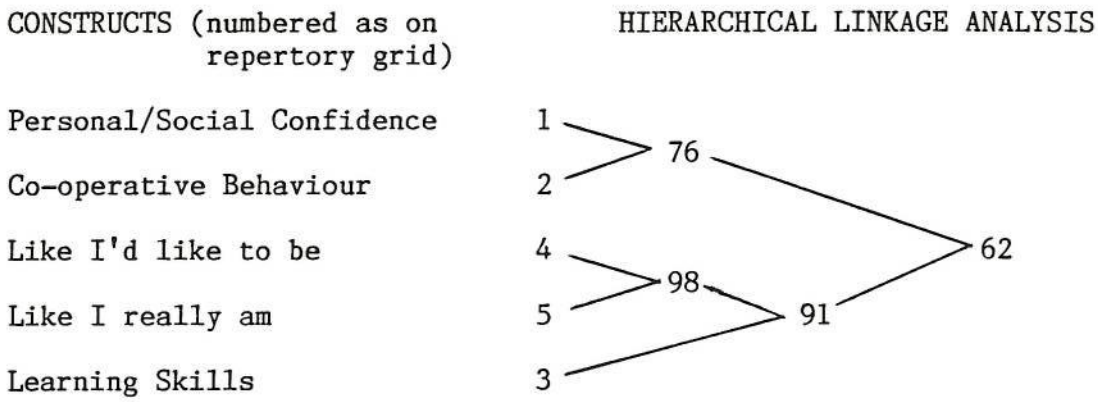


The most striking change in James's profile is the appearance of "like I really am" in the same cluster as "Like I'd like to be". Moreover, neither of these constructs remains negatively related to the adjustment to school constructs. These are signs of progress, even if they do not represent as much of a conversion as we might expect upon taking a step back from Hierarchical Linkage Analysis and looking at what happened to James's self-assessment ratings between 1984 and 1986 (see Appendix 8). James feels easier at school, as his class-teacher acknowledges on that part of the CAS schedule concerned with

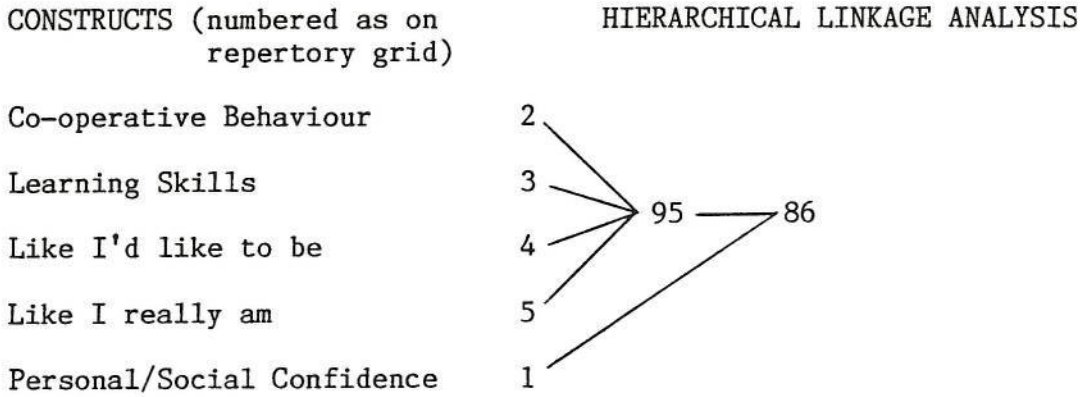
personal and social confidence; but we know from the teacher's other ratings of him that he still seems shy of help with the management of his learning and inter-personal difficulties (see Appendix 8). It would therefore be presumptuous to infer any substantial improvement in James's receptiveness to adult mediation from the evidence of changes in his profile. What I can support is an interpretation which suggests that he is now less inclined to blindly reject every opportunity offered to him, because his aspirations are no longer limited to the impulsive negation of every construct.

Tina, another pupil in the same class as James and Amanda, was already a well integrated person psychologically before she began to participate in Instrumental Enrichment lessons in 1984. What relevance could a methodology concerned with cognitive modifiability have for her, since she presented none of the problems which justified intervention in James's education? Was there anything that Feuerstein's methodology could add to the nature of her development and, if so, were his instruments necessary components in the process of making that addition? I shall respond to these questions further, when I review the notion of pupils having sovereignty over their adjustment to school and consider the curriculum issues that are raised when pupils are taught to exercise executive control over their own learning; meanwhile, I trust the changes in Tina's profile will provide something of an answer by themselves:

TINA, 1984

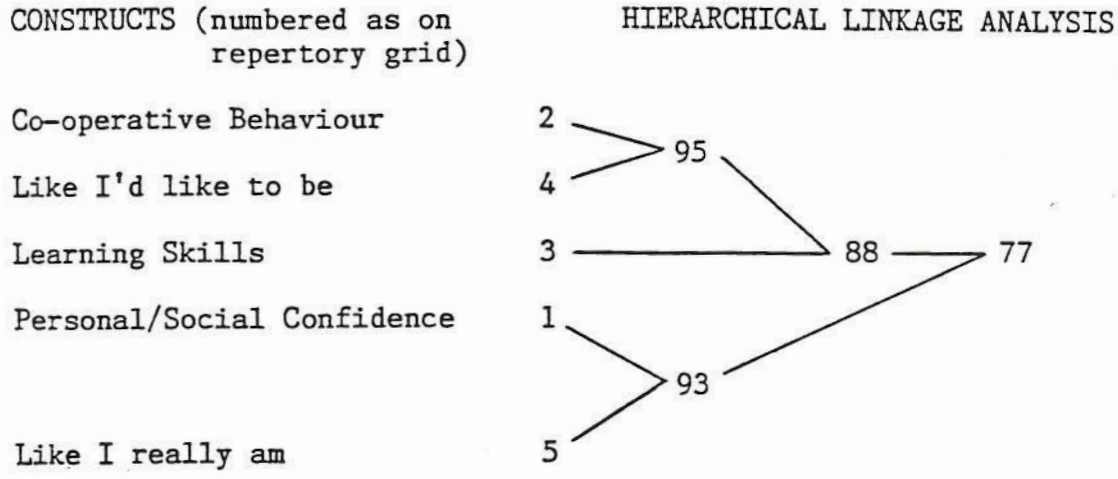


TINA, 1986

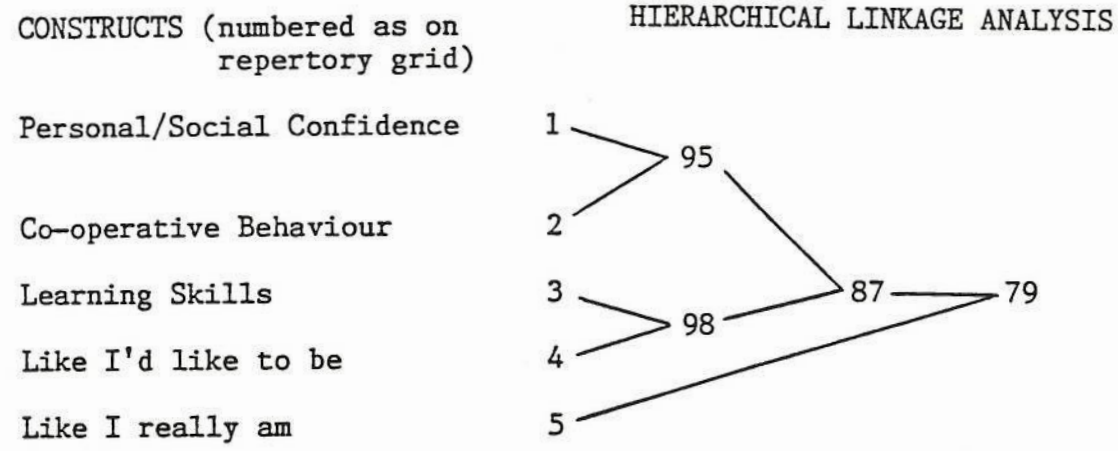


Taking Tina as an individual, we do not know whether any of the changes in her profile are wholly or partly attributable to Instrumental Enrichment. In order to make a worthwhile guess, we need to look at what happened to those of her control group peers who started out as psychologically integrated as she was in 1984. The fact that the control group's mean ratings for 1984 and 1986 do not differ much suggests that, in the absence of intervention, pupils tended to drift rather than to make coherent progress along the three dimensions of adjustment to school. Tessa is an example of this phenomenon:

TESSA, 1984



TESSA, 1986



Primary and Secondary School Differences Observed

The trend for experimental pupils to become more psychologically integrated in respect of their adjustment to school, while control pupils drift, is more pronounced in the primary groups. Embarrassment on the part of some pupils in the secondary experimental group, as well as the organisational factors mentioned in my previous chapter, might have contributed to this discrepancy in how pupils of different ages responded to

Instrumental Enrichment. It was the secondary school pupils who complained that Feuerstein's instruments looked deceptively "babyish," and the suspicion of an insult to their dignity is likely to have been counter-productive. Visually appealing artistry, such as that in the materials for Oxfordshire's and Somerset's thinking skills programmes, was sorely missed. It was also the secondary pupils who were embarrassed by the vocabulary associated with Instrumental Enrichment, although this time their complaint was not exactly about feeling belittled: they felt pretentious (Evaluative discussion lesson, conducted after post-testing in July 1986). Two anecdotes provide us with insights into how secondary pupils came to feel pretentious about using the vocabulary recommended in the Teachers' Guides (Feuerstein and Hoffman, 1980), whilst primary pupils relished using it.

I overheard the first anecdote in the secondary school staffroom. It was told by a subject teacher who had just finished a lesson with the class which comprised the experimental group of pupils. He wanted to share his sense of the ridiculous with colleagues, and he laughed awkwardly as he told them how the pupil who had provoked his ridicule had done so by volunteering to hypothesise about something. Nobody in the staffroom commented on the punchline: "A hypothesis?" the teacher had sneered, "You wouldn't know what a hypothesis was even if one were to come up and bite you!"

The second anecdote was told to an Instrumental Enrichment teacher by experimental pupils from the larger primary school class. On a

geography field trip, their class-teacher had jokingly rebuked one of them for using the word "hypothesis". "Don't you use those swear words with me," he said. Unlike the subject teacher in the secondary school, however, he quickly recovered his composure and seized the opportunity to capitalise on what had been offered: he asked the pupil to explain why a hypothesis was more appropriate than a definitive answer in the circumstances and then invited the rest of the class, half of whom were also experimental pupils and half of whom were control pupils, to suggest ways of testing the hypothesis.

I suspect that the personalities of the teachers in the two anecdotes were not the only factors which led to their different handling of pupils whose vocabulary struck them as uncharacteristic. The subject teacher in the secondary school had observed his union's temporary boycott of staff meetings, so he had only received a printed information sheet about Instrumental Enrichment; his lack of involvement no doubt put him in an invidious position. The class-teacher in the primary school did not depend on staff meetings for liaison, because his colleagues were so few in number that they could share information without being organised; an innovation affecting half of his class was hardly likely to have escaped his attention; and his role as the adult who set the tenor of lessons for most of each week was not immediately threatened when an experimental pupil showed initiative.

A teacher who makes pupils unsure about their right to negotiate meanings with him is bound to havoc his own purpose, if we assume that what he does in the classroom is intended to enrich or extend the capacities of everyone present. The intention to educate has no virtue unless it is accompanied by the recognition "that teaching is a shared enterprise and learning is a social activity" (Holt, 25th April 1987, p.10). Sharing amongst teachers is particularly important as a determinant of whether the effects of special educational intervention will be consolidated or dissipated, as I have inferred from the discrepant results obtained by primary and secondary school pupils in Buckinghamshire's Instrumental Enrichment groups. This is neither to imply that sharing is prohibitively complicated in secondary schools, nor that it is simple in primary schools. What I do want to say is that departmentalism in schools presents barriers to the implementation of a programme for cognitive modifiability, and secondary schools are more prone to departmentalism than primary schools. As Feuerstein's concept of bridging helped us to understand, cognitive development is contingent upon pupils being free to transcend departmentalised experience:

> It is therefore likely to receive support from curriculum models which encourage an integrated approach, and where appropriate curriculum design should foster the mutual support which enhances the achievement of generic aims across the curriculum as a whole. (Mays et al., March 1987, p.5)

A Response to Feuerstein's Critics

The practice of bridging, which demonstrates to pupils that the cognitive processes they were aware of in relation to specific circumstances can be marshalled together and applied to new circumstances of greater complexity, is dismissed by some of Feuerstein's critics as a futile attempt to distil thinking skills from the curriculum and to make them available in pure form: "the impossible dream of conferring a general capacity independent of context" (Holt, 25th April 1987, p.14). It is ironic that Feuerstein should have brought this criticism upon himself, since the object of bridging is for pupils to transcend their predictable ambit and to gain access to a cultural context that has hitherto been beyond them. Two of Feuerstein's claims have been criticised quite vehemently: the claim that it is "when cognitive processes become detached from specific tasks that cognitive structures are established" (1980, p.22), and the claim that his instruments are "content-free" (1980, p.119).

Much of the criticism that is meant to cast doubt on the first of these claims is, on close examination, wide of the mark. For instance, Holt questions whether "thinking can be dissociated from particular forms of inquiry and dispositions to act that take account of those forms" (25th April 1987, p.6). But Feuerstein does not dissociate thinking from forms of inquiry; for him, forms of inquiry are accommodated in cognitive structures, schemata, which are precipitated whenever the paradigmatic potential of a line of thought is realised:

> These structures are of a more general nature than the learning of specific tasks and, hence, result in more adaptive behaviour by the individual (Feuerstein, 1980, p.22).

Feuerstein's model of cognitive development is thus similar to Piaget's in outline; it assumes that,

> a child's cognitive structure develops under the influence of maturation and experience;
>
> this development occurs through a series of stages such that each stage builds on, and grows from, the previous stage but is characteristically different from it;
>
> the mechanism of development includes assimilation by the child of stimuli into existing cognitive structures where possible. When the experience cannot be assimilated, some cognitive dissonance occurs and there is an attempt to modify the cognitve structure so that it deals with experience more satisfactorily. The child is active in this procress (accommodation), and for cognitive development to occur must construct his or her own concepts from experiences. (Shayer and Adey, October 1986, pp.1-2)

Where Feuerstein's model of cognitive development differs from Piaget's is in the emphasis of the former on the effects of intervention for cognitve modifiability. Piaget takes relatively little account of mediation as a potential antidote against the constraints on concept formation imposed by an individual's existing cognitive structure, whereas Feuerstein sees the mediator's role as a pivot on which the transcendence of existing constraints depends.

If thought processes are to become detached from their immediate context, so that they will be more generally available, the thinker must be able to relate them to a wider context; otherwise we are left with the absurd notion of solutions floating about

randomly "in search of any sort of problem" (Holt, 25th April 1987, p.4). This is why the role of the mediator, who engages pupils in a cultural framework of reference, is such an imporant premise in Feuerstein's theory. Pupils who have not had adequate mediated learning experience are liable to find it difficult to transfer the cognitve strategies they used in a previous situation to process the content of a current situation because, without formative guidance, they will neither have all the structural mechanisms for recognising what is relevant to their situation nor the skills of transfer to exploit the capacity for assimilation inherent in those structural mechanisms.

What evidence is there that bridging can create a reserve of intellectual capacity in pupils, on top of their memories of how to tackle specific tasks such as those posed by Feuerstein's instruments? The results of my experiment suggest that bridges do project a sphere of influence which is greater than the sum of their components: mediation which focussed on redressing pupils' language deprivation appears to have produced higher scores on tests primarily concerned with linguistic ability, even though the content of the tests did not match the content of the lessons taught. Buckinghamshire's Instrumental Enrichment pupils had presumably learned to use the language in which they received mediation as a medium for the semantic elaboration of information from other contexts (Sugden and Newall, in Teaching Transfer Strategies to Children with Moderate Learning Difficulties, June 1987, p.63, define semantic elaboration as a strategy "by which information that is presented is actively transformed, overtly or

covertly, into one's own frame of reference"). According to Sugden and Newall, generalisation such as that achieved in Buckinghamshire is rare:

> In many experimental studies the task set was learned but, when the children were given a different task, closely related to the one on which they learned the rehearsal strategy, they failed to apply that strategy. It was demonstrated that they had definitely learned it, because when they were placed back in the original situation with the orginal task, they employed it again. It seemed as though the strategy was available only for a specific task in a particular setting. By failing to transfer across situations, the children showed that they did not have flexible access to the learned strategy of rehearsal.
>
> The concept of transfer can be broken down into two parts. The first is "maintenance," where the same materials and task are presented to a child at some later date. This is simply a strategy retention; it has proved to be very amenable to teaching. The second, "generalisation," what most people mean when they talk of transfer, is taking a strategy or informationm that has been previously learned and applying it in a new setting. Contrary to the experimental studies of maintenance, transfer has proved to be an elusive condition to researchers. It shows much resistance to teaching. (June 1987, p.63)

Feuerstein attributes the exceptional results achieved by users of his methodology to the triumph of metacognition over the learning difficulties which hitherto made generalisation appear resistant to teaching; he says Instrumental Enrichment makes children into cultural "messengers to themselves" (18th July 1985, lecture at Nottingham University), thereby overwhelming their isolative habit of confining their thoughts to what is "here and now". When he claims that his instruments are content-free, he is telling us that their value is extrinsic to their unique properties: each of

them is a resource for the exercise of metacognition, and "only a vehicle" (Feuerstein, 1980, p.119) for the conduct of pupils' cognitions. This downgrading of content in Feuerstein's instruments does not mean that he has forgotten that thinking skills can neither be acquired not exercised in a mental vacuum, even though he invites scepticism by dint of his failure to acknowledge "the importance accorded to domain-specific cognitive processes in current theory and reserach" (Boreham, 1987, p.86). His position might have been more defensible if he had conceived of his instruments as having a transparent quality, so that each item of content was not merely incidental but a window through which insight into cognition, the prerequisite for metacognition, could be gained.

The concept of metacognition implies a capacity for making decisions about what kind of thinking one chooses to employ for each problem encountered. If such a capacity has been developed in certain pupils, then we might expect those pupils to feel a greater sense of sovereignty over their thoughts than is commonly felt among their peers. New-found sovereignty would alter pupils' self-esteem. We can therefore deduce a logical explanation for why the Buckinghamshire pupils who received Instrumental Enrichment assessed themselves as having made statistically significant gains in respect of their adjustment to school: mediation gave them an awareness of and control over their cognitions, experience of metacognition produced a sense of sovereignty in them, and sovereignty exalted their status as learners and invested them with the power to determine their part

in inter-personal relationships.

The progress of Buckinghamshire's experimental pupils, towards cognitve modifiability and consequent readiness to adjust to school, was in reality much more complicated than my logical explanation suggests. The development of metacognition requires self-analysis on the part of the learner and diagnosis on the part of the teacher (Mays et al., March 1987, p.6), it requires a sharing of perceptions and respect for the feelings those preceptions engender. Feelings incite the will to learn and provide the motivating force which propels pupils' thoughts, whether those thoughts are confined to a single vehicle or spanning the contents of a pontoon-like mental bridge. We can not predict either the quantity or the quality of the feelings a perception will engender, because feelings are peculiarities of whole persons and not just peculiarities of the thoughts they accompany in persons' minds. As Gibson points out,

> the distribution of feeling is of quite a different order to the distribution of intelligence. That is, however sceptical we are of the notion of IQ, however much we resist the curve of normal distribution, it is evident that some people are naturally better at abstract thought than others. Indeed, on any scale of achievement the Gaussian curve has clear empirical backing. Learning difficulty is not simply a matter of social construction. But my claim is that the curve of normal distribution has very little application to feeling (1983, p.56)

It might have been the unmeasurable nature of feelings which deterred Feuerstein from openly pursuing a curriculum dedicated to the practices necessary to enrich and change culturally

deprived pupils. Practices of cultural exchange inevitably bring feelings into play, as do all human encounters, and they are therefore unlikely to appeal to a scientist who wishes to view the curriculum as technology. Feuerstein embodies both the educator seeking an interpretative curriculum and the technologically oriented scientist seeking a utilitarian one. How the theory of the former translates into practice is something of an arcanum, wrapped in a jargon typified by words such as "metacognition," "bridging" and "transcendence;" whereas the theory of the latter has a clear and precise translation into practice, which emerges as teaching techniques and learning skills.

Hence, the uninitiated could be forgiven for believing that Feuerstein stopped short of creating a programme which changes pupils and instead created a programme made up of instruments which are supposed to render pupils susceptible to change. The provision of mediated learning experience entails such a dynamic approach to curriculum, however, that we are obliged to dismiss any illusion of its delivery entirely by procedures that are "algorithmic rather than hermeneutic" (Pratt, 1987, p.149). So, why does Feuerstein present Instrumental Enrichment as a technological breakthrough instead of presenting it as a careful blend of tried and tested educational practices? The explanation has more to do with the view of skills Feuerstein wants to inculcate in pupils than with his own view of skills. Feuerstein himself is unlikely to challenge Holt's assertion that attempts to express education through skills "are both reductionist in their view of knowledge and restrictive in their view of persons" (25th

April 1987, p.5). But singling out pupils' skills may be a way of insisting on their separateness from personality:

> the "real me" is not put at risk by rebuff or failure if it is only my skills that are found wanting .... My skills do not testify to the kind of person I fundamentally am .... Our skills do not say much about who we are because they make no reference to our dispositions, our wantings and valuings, and it is by virtue of these that we are persons of one sort or another. (Richard Smith in Holt, 25th April 1987, p.6)

If Instrumental Enrichment convinces pupils that skills are part of their cultural heritage, and that the acquisition of skills is subject to a law of transfer which they can learn about, then those pupils will be less inclined to doubt their potential to adjust to school than peers who only have the limits of their personal capacity to blame for learning difficulties. Given that Instrumental Enrichment does make pupils aware of the existence of a property relation between a culture and the skills of its people, it must by the same token assure pupils that they retain custody of themselves. Obversely, "learning how to learn is fostered when pupils are expected to work independently, to raise questions that are meaningful to them, and be responsbile for their learing" (Eshel et al., 1987, p.166).

The Outlook Now

Johnson informs us that Jewish society has been organised to support the cognitive development of individuals, albeit an elite of intellectuals, for seventeen hundred years (15th March 1987, p.21). How far have we organised ourselves in this country to support congitive development in the way I have been describing?

Do our practices of working from the transmission of cultural structures toward pupils' enstructuration of themselves, and working from the promotion of adjusted behaviour in school toward pupils' sovereignty over their own adaptive behaviour anywhere, connect with the proposed national curriculum? Blagg fears that the practices generated by Instrumental Enrichment will not connect with the proposed national curriculum at all, because the authors of the latter project naively assume that,

> studying a broad and balanced range of subjects throughout compulsory schooling will help to develop pupil capacity to adapt and respond flexibly to a changing world.
>
> This is bound to pressurise teachers back into formal, rigid, old-fashioned teaching methods in their anxiety to meet the expected content goals. (18th September 1987, p.234).

Feuerstein's methodology was never likely to spread so fast that there was a prospect of its informing all subject teaching in the near future, and metacognition was "unlikely to prove memorable for teachers" (Entwistle, 1987, p.83) without special instruments to draw attention to it. Blagg's pessimism about the reviving emphasis on subject content at the expense of pupils' cognitive processes makes me wonder how much longer the schools which are currently finding space on the timetable for thinking skills lessons will continue to be able to do so. Besides, my experiment showed that isolating Instrumental Enrichment from subject teaching weakens its effect, and I expect the same goes for all thinking skills programmes. Is there a middle way between, on the one hand, submerging thinking skills so deeply into the curriculum that they pass out of sight and out of mind, and on the other hand, leaving them on the periphery of the curriculum until

such time as they are squeezed out altogether? Happily, I think there is. The Cognitive Acceleration through Science Education project provides us with a model, which Shayer and Adey describe as follows:

> a series of teaching activities have been devised which may be intervened into the regular science curriculum. Each of these "interventions" is concerned with one or more of the reasoning patterns of formal operational thinking (for instance control of variables, proportional reasoning, probability, equilibrium) and employs a methodology in which:
>
> The essential vocabulary needed to "get inside" the formal reasoning is introduced and used. Examples are "variable", "relationships," "correlation".
>
> The vocabulary and scope of the reasoning patterns are introduced using only concrete strategies.
>
> Only then, given the vocabulary and other mental tools necessary, do pupils come up against problems which they find that they cannot solve with concrete operations. They are put in the position where they need to reorganise their type of thinking, to accommodate their schema to reality.
>
> Pupils are made aware of their own thinking processes.
>
> The material of the intervention lessons is linked to the regular science curriculum, to "bridge" the reasoning patterns and guard against them being seen as confined to the "special" lessons. (October 1986, pp.3-4).

Shayer and Adey admit that the Cognitive Acceleration through Science Education materials make "some demands on teachers to become acquainted with their underlying theory" (October 1986, p.6). They are, of course, making a considerable understatement. Wolfe Mays and his team of colleagues identify two pre-conditions for the success of staff training: firstly, training programmes should be experience-based, "providing opportunities for the identification of individuals' own strengths and weaknesses and feedback for the development of understanding;" and secondly,

"they should take as their model the processes which the teachers are aiming to offer to the learners" (March 1987, p.7). Hypotheses about training deserve a study of their own, but I want to end this thesis with an observation pertaining to the second pre-condition.

Training based on the Instrumental Enrichment model will give teachers experience of tasks that demand personal resolutions of conflicts in the role of mediator, as well as experience in the implementation of classroom techniques. Experience of communicating intentionality, negotiating meanings and sharing (see my chapter on A Practitioner's Perspective for definitions of these tasks) is essential if teachers are to reconstruct the curriculum together with pupils in the way that Feuerstein advocates. Such experience ensures that teachers deal democratically with the tension between their own priorities for the curriculum and the priorities of others. Instrumental Enrichment methodology democratises teachers' interaction with one another and with pupils. Thus it may be that the limiting factor upon the future uptake of Instrumental Enrichment is neither scepticism about its potential for promoting pupils' adjustment to school nor competition from other curriculum components but rather the strength of democratic commitment within teachers, within schools and within our society. Despite Feuerstein's emphasis on the importance of cultural transmission, Instrumental Enrichment would seem to enhance the sovereignty of learners and to diminish the case for any external agency to maintain suzerainty over their learning.

REFERENCES TO AUTHORS

AINSCOW, M. & TWEDDLE, D., 1979. Preventing Classroom Failure. John Wiley & Sons.

BARRATT, E.B.C., 1987. Records of Achievement. Project Bulletin No.2. Essex County Council Education Department.

BEARD, R.M., 1969. An Outline of Piaget's Developmental Psychology for Students and Teachers. Routledge and Kegan Paul.

BLAGG, N., 18th September 1987. Study skills and the national curriculum. J. Educ. Admin., Management and Policy, Vol. 169, No.10, p.234.

BOLTON, E.J., September 1980. Seminar on "Disruptive Pupils", held at Stoke Rochford, reported by M. Evans, 1981. Schools Council.

BOREHAM, N.C., 1987. Review of the Teaching of Thinking by Nickerton, Perkins and Smith, 1985, in Brit. Educ. Research Journal, Vol.13, No.1.

BRENNAN, W.K., 1979. Curricular Needs of Slow Learners. Schools Coucil Working Paper 63.

BRUNER,J., 1983. "The Growth of Cognitive Psychology: Developmental Psychology", in States of Mind, ed. J. Miller. British Broadcasting Corporation.

BUCKINGHAMSHIRE EDUCATION COMMITTEE, 16th October 1986. Extension of the Technical and Vocational Education Initiative (TVEI): Aims and Criteria. Appendix to Minutes of Schools Sub-Committee Meeting.

BULLOCK, A., 1975. "A Language for Life". Report of the Committee of Inquiry appointed by the Secretary of State for Education and Science. HMSO.

BURKE, A., December 1985. G.C.S.E. Bulletin No. 5, Southern Examinations Group.

BURROUGHS,G.E.R., 1971. Design and Analysis in Educational Research. Educational Monograph No.8. School of Education. Univ. of Birmingham.

CREBER, J.W.P., 1972. Lost for Words - Language and Educational Failure. Penguin.

DE CECCO, J.P., 1969. The Psychology of Language, Thought and Instruction. Holt, Rinehart and Winston.

DOCKING, J.W., 1980. Control and Discipline in Schools. Penguin.

DUNLOP, F., 1984. The Education of Feeling and Emotion. George Allen & Unwin.

EISER, J.R., 1980. Cognitive Social Psychology. McGraw-Hill.

ENTWISTLE, N., 1987. Review of Learning Strategies by Nisbet and Shucksmith. Brit. Educ. Research Journal, Vol. 13, No.1.

ESHEL, Y., WAINRYB, C., and SHACHAR, H., 1987. Open Education and Reading Comprehension of High-Ability and Low-Ability Elementary School Pupils. Br. J. Educ. Psychol., 57, pp. 166-178.

EVANS, M., 1981. Disruptive Pupils. Schools Council Publications.

FESTINGER, L., 1957. A Theory of Cognitive Dissonance. Row, Peterson and Evanston.

FEUERSTEIN, R., 1979. The Dynamic Assessment of Retarded Performers. University Park Press.

FEUERSTEIN, R., 1980. Instrumental Enrichment, An Intervention Program for Cognitive Modifiability. University Park Press.

FEUERSTEIN, R., and JENSEN, M.R., May 1980. Instrumental Enrichment: Theoretical Basis, Goals and Instruments. Educational Forum Magazine, pp. 401-423.

FEUERSTEIN, R., and HOFFMAN, 1982. Intergenerational Conflict of Rights: Cultural Imposition and Self-Realisation. Journal of the School of Education, Indiana University. Vol. 58, No.1, pp. 44-63.

FEUERSTEIN, R., 16th-19th July 1985. "Progress and Practice", lectures to the International Congress on Special Education and the Instrumental Enrichment Teacher Training Course, Univ. of Nottingham.

FISH, J., 1985. "Educational Opportunities For All?" The Report of the Committee reviewing provision to meet special educational needs. Inner London Education Authority.

FLETCHER, C., 1985-1987. Thesis supervisor at Cranfield Institute of Technology.

FODOR, J., 1983. "Imagery and the Language of Thought", in States of Mind, ed. J. Miller. British Broadcasting Corporation.

FRANSELLA, F., and BANNISTER, D., 1977. A Manual for Repertory Grid Technique. Academic Press.

FURTHER EDUCATION CURRICULUM REVIEW AND DEVELOPMENT UNIT, January 1980. Developing Social and Life Skills - Strategies for Tutors. Dept. of Education & Science.

GALLOWAY, D.M., and GOODWIN, C., 1987. The education of disturbing children: pupils with learning and adjustment difficulties. Longman.

GARDNER, H., 1983. Frames of Mind, The Theory of Multiple Intelligences. Heinemann.

GEERTZ, C., 1983. "Notions of Primitive Thought", in States of Mind, ed. J. Miller. British Broadcasting Corporation.

GIBSON, R., June 1983. The Education of Feeling. Cambridge Inst. of Education.

GRANT, P., 1986. The Learning Hierarchy. Unpublished paper based on HARING, N.E., LOVITT, T.C., EATON, M.D., and HANSEN, C.L., 1978, The Fourth R - Research in the Classroom, publ. Charles E. Merrill.

GRIFFITHS, M., 1985. Review of The Education of Feeling and Emotion by F. Dunlop. J. of Phil. of Educ., Vol.19, No.2, pp.281-292.

HANSEN, J., 1985. Oxfordshire Skills Programme. Oxon. County Council.

HARLEN, W., 1986. Planning Scientific Investigations at Age 11. Assessment of Performance Unit. Dept. of Education and Science.

HARRE, R., 1983. "An Analysis of Social Activity" in States of Mind, ed. J. Miller. British Broadcasting Corporation.

HERBERT, M., 1974. Emotional Problems of Development in Children. Academic Press.

HER MAJESTY'S INSPECTORATE, 1979. A View of the Curriculum. HMSO.

HER MAJESTY'S INSPECTORATE, 1985. Draft copy of an extract of some of the advice concerning the revision of government Circular 4/73 relating to staffing for pupils with special educational needs on statements.

HOLT, M., 25th April 1987. Thinking Skills in the Curriculum, a paper presented to the Inaugural Meeting of the "Thinking Skills Network" at the Association for the Study of Curriculum Conference, Chester.

HUNTER-GRUNDIN, E., 1985. Teaching Thinking: An Evaluation of Edward de Bono's Materials. Schools Council Publications.

JACKSON, B., 1964. Streaming. Routledge & Kegan Paul.

JOHNSON, P., 15th March 1987. The Observer newspaper.

KELLMER PRINGLE, M., 1975. The Needs of Children. Hutchinson.

KELLY, G.A., 1969. "The role of classification in personality theory" in Clinical Psychology and Personality: the Selected Papers of George Kelly, ed. B. Mahler. Wiley.

KENDLER, T.S., 1963. "Development of Mediating Responses in Children" in The Psychology of Language, Thought and Instruction, ed. J.P. De Cecco, 1969. Holt, Rinehart and Winston.

KERLINGER, F.N., 1973. Foundations of Behavioural Research. Holt, Rinehart and Winston.

LAWRENCE, J., STEED, D., and YOUNG, P., 1984. Disruptive Children - Disruptive Schools? Routledge and Kegan Paul.

LINK, F.R., May 1981. "Instrumental Enrichment: the Classroom Perspective" in Educational Forum magazine, pp. 425-428.

LURIA, A.R, and YUDOVICH, F., 1959. Speech and the Development of Mental Processes in the Child. Staples Press.

MAYS, W., 1985. Thinking Skills Programmes: An Analysis. J. New Ideas Psychol., Vol. 3, No.2, pp. 149-163.

MAYS, W. et al., March 1987. Stretching the Mind: Support for Intellectual Development. Prospective Further Education Unit document for the Dept. of Education and Science.

MILLER, J., 1983. States of Mind. British Broadcasting Corporation.

MORENO, J.L., 1974. Various articles in Psychodrama, Theory and Therapy, ed. I.A. Greenberg. Souvenir Press.

NEWSON, E., May 1978. Unreasonable Care; the Establishment of Selfhood. The Dorothy Gardner Memorial Lecture, in Child Development Society Newsletter No.27.

NISBET, J., and SHUCKSMITH, J., 1986. Learning Strategies. Routledge and Kegan Paul.

PANORAMA, 17th February 1986. Television programme. British Broadcasting Corporation.

POLANYI, M., 1973. Personal Knowledge. Routledge and Kegan Paul.

PRATT, D., 1987. Curriculum design and humanistic technology. Journal of Curriculum Studies, Vol. 19, No.2, p.149.

RAVENETTE, A.T., 1975. Grid Techniques for Children. J. Child Psychol. Psychiat., Vol. 16, pp. 79-83.

ROSENBERG, M.J., and ABELSON, R.P., 1960. "An Analysis of cognitive balancing", in Attitude Organization and Change: An Analysis of Consistency Among Attitude Components, eds. M.J. Rosenberg et al., Yale University Press.

SAWYER, C., and RIDING R.J., 1979. Recall Order of Prose Details as a Cognitive Style in Children. J. Educational Studies, Vol. 5, No.2, pp. 151-156.

SCHOOL CURRICULUM DEVELOPMENT COMMITTEE, 1986. Curriculum Issues, Nos.1, 2 and 3.

SHARRON, H., 1987. Changing Children's Minds. Souvenir Press.

SHAYER, M. and ADEY, P.S., October 1986. Cognitive Acceleration through Science Education. Leaflet publ. by King's College.

SHAYER, M., and BEASLEY, F., April 1986. Does Instrumental Enrichment Work? Unpublished Article from the Centre for Educational Studies, King's College London.

SHIPMAN, M.D., 1981. Limitations of Social Research. 2nd. ed., Longman, first publ. 1973.

SKINNER, B.F., 1977. Interviewed in Psychologists on Psychology, ed. D. Cohen. Routledge and Kegan Paul.

SOUTH BANK SHOW, 20th April 1986. Television programme broadcast by London Weekend Television.

STRASSER, S., 1956, trans. R.E. Wood, 1977. Phenomenology of Feeling, Duquesne University Press, Pittsburgh.

SUGDEN, D., and NEWALL, M., June 1987. Teaching Transfer Strategies to Children with Moderate Learning Difficulties. Brit. J. of Special Education, Vol. 14, No.2, pp. 63-67.

SWANN, Lord, 1985. Education for All. Report of the Committee of Inquiry into the Education of Children from Ethnic Minority Groups. HMSO.

VARLAAM, A., STOLL, L., SAMMONS, P., and KYSEL, F., October 1983. The Child at School - a new behaviour schedule. Inner London Education Authority.

VURPILLOT, E., 1972, trans. W.E.C. Gilham, 1976. The Visual World of the Child. George Allen and Unwin.

VYGOTSKY, L.S., 1962. Thought and Language. Trans. E. Haufman and G Vakar. Massachusetts Institute of Technology Press.

WARNOCK, H.M., May 1978. Report of the Committee of Enquiry into the Education of Handicapped Children and Young People. HMSO.

WELLER, K., and CRAFT, A., December 1983. Making Up Our Minds, an exploratory study of Instrumental Enrichment. Schools Council.

WILKINSON, A., 1971. The Foundations of Language. Oxford Univ. Press.

WILSON, M.D., December 1980. The Curriculum in Special Schools. Schools Council.

WILLIAMS, A.A., 1970. Basic Subjects for the Slow Learner. Methuen.

YARLOTT, G., 1972. Education and Children's Emotions. Weidenfeld and Nicholson.

APPENDIX 1 : FEUERSTEIN'S CASE HISTORY OF "C".

A Case History

The history of C. was referred by a foreign governmental agency to the author for help in placing him in custodial care in Israel. His condition was that of a severely retarded individual who at the age of fourteen had only forty words and no orientation in time and space. He was devoid of the most elementary capacities of conceptualization and functioned without any apparent ability to reach a state of even minimal independence. Life placement in custodial care seemed to be his only option, and the urgency of his placement was complicated by the fact that the dying mother required placement in a Jewish setting available only in Israel.

C. is the second among three brothers born to an alcoholic, hemiplegic father and a mother who died in a mental hospital, partly due to the severe conditions of life to which she had been subjected. The father had physically abused the mother, especially during periods of pregnancy, and this determined the premature birth of all three children. C. was born at the limits of viability, with a weight of two and a half pounds. He was placed for a long period in an incubator and suffered from conditions of hyperoxia. He was separated from his mother because of his need for continuous medical care and her alleged incapacity to care for such a high-risk child. C. spent his early childhood in creches and homes for the retarded, and at school age was referred to homes for trainable and severely retarded children. At the time of his mother's death he was living in a home for severe retardates that had a very limited if any provision for their training or education.

Referred to us, we decided to examine him with the help of dynamic assessment, the LPAD.[3] Despite great difficulties encountered in conveying simple instructions to him (we used mainly an imitation/gestural modality of interaction), we were able to demonstrate a level of modifiability which, rather than causing us to accept his condition as immutable and unchangeable, warranted an attempt on our part to initiate an active modificational approach. Very minimal signs of learning detected during a long session of dynamic assessment enabled us to see, beyond the apparent and pervasive deficiencies, certain breakthroughs that could become sources of learning. Thus, after acting in a very passive way, C. began to demonstrate a certain amount of intrinsic curiosity and an orienting reflex toward certain stimuli with which he was becoming familiar and able to master to a certain degree. Having learned to recognize and even to construct a square, he started to look for a square within other more complex tasks, and succeeded in distinguishing it under conditions of embeddedness in a variety of tasks.

Thus he demonstrated a capacity to develop task-intrinsic motivation. Following this minimal and yet important evidence of modifiability, we decided against lifelong custodial care in favor of an active approach in a socially stimulating environment

among children in a foster home group care program.

Ten years of investment using focused intervention as well as enriched social interaction geared toward mediated learning experiences have affected in a most dramatic—albeit slow—way the cognitive structure of C. He is today an independent young man, economically self-sufficient, and open to further learning and development. Having mastered reading, writing, and spoken fluency in Hebrew, he became able to mobilize previous experiences and to make use of them for further learning and growth. After having learned to speak and read Hebrew, he suddenly displayed an efficient command of his mother tongue, French! By the same token, many of the things he had experienced that had been totally inaccessible to exploration became available through his increased capacity to retrieve them, to organize them, and to successfully communicate them.

The course of life of C. had seemed to be totally predictable in the direction of life placement in custodial care, considering the fourfold determinants of his condition: heredity, organicity, early maternal deprivation, and prolonged exposure to restrictive conditions of life. All this, coupled with the fact that developmentally C. was in full adolescence, made meaningful changes in his condition appear to be impossible. The fact that such changes have been evidenced in C., as well as in many hundreds and even thousands of children, albeit in less extreme conditions than that of C., points to the high plasticity of the human organism and the degree of openness to meaningful changes across etiological determinants of the condition, across the severity of the condition, and even across the developmental stage during which it is commonly considered that intervention may be instituted with significant effects. It is to this phenomenon that we refer when we discuss modifiability in general, and we consider the cognitive component of such drastic changes to be of greatest importance. It is the cognitive component that creates the prerequisites for adaptation, without which no meaningful progress in the integration of the individual within society can take place.

APPENDIX 2 : FEUERSTEIN'S INVENTORY OF COGNITIVE FUNCTIONS.

Instrumental Enrichment Cognitive Functions

I. Gathering all the information we need (Input)

1. Using our senses (listening, seeing, smelling, tasting, touching, feeling) to gather clear and complete information (clear perception).
2. Using a system or plan so that we do not skip or miss something important or repeat ourselves (systematic exploration).
3. Giving the thing we gather through our senses and our experience a name so that we can remember it more clearly and talk about it (labeling).
4. Describing things and events in terms of where and when they occur (temporal and spatial referents).
5. Deciding on the characteristics of a thing or event that always stay the same, even when changes take place (conservation, constancy, and object permanence).
6. Organizing the information we gather by considering more than one thing at a time (using two sources of information).
7. Being precise and accurate when it matters (need for precision).

II. Using the information we have gathered (Elaboration)

1. Defining what the problem is, what we are being asked to do, and what we must figure out (analyzing disequilibrium).
2. Using only that part of the information we have gathered that is relevant, that is, that applies, to the problem and ignoring the rest (relevance).
3. Having a good picture in our mind of what we are looking for, or what we must do (interiorization).
4. Making a plan that will include the steps we need to take to reach our goal (planning behavior).
5. Remembering and keeping in mind the various pieces of information we need (broadening our mental field).
6. Looking for the relationship by which separate objects, events, and experiences can be tied together (projecting relationships).
7. Comparing objects and experiences to others to see what is similar and what is different (comparative behavior).
8. Finding the class or set to which the new object or experience belongs (categorization).
9. Thinking about different possibilities and figuring out what would happen if you were to choose one or another (hypothetical thinking).
10. Using logic to prove things and to defend your opinion (logical evidence).

III. Expressing the solution to a problem (Output)

1. Being clear and precise in your language to be sure that there is no question as to what your answer is. Put yourself into the "shoes" of the listener to be sure that your answer will be understood (overcoming egocentric communication).
2. Think things through before you answer instead of immediately trying to answer and making a mistake, and then trying again (overcoming trial-and-error).
3. Count to ten (at least) so that you don't say or do something you will be sorry for later (restraining impulsive behavior).
4. If you can't answer a question for some reason even though you "know" the answer, don't fret or panic. Leave the question for a little while and then, when you return to it, use a strategy to help you find the answer (overcoming blocking).

APPENDIX 3 : DISTAL AND PROXIMAL ETIOLOGIES OF DIFFERENTIAL COGNITIVE DEVELOPMENT.

APPENDIX 4 : SAMPLES OF FEUERSTEIN'S INSTRUMENTAL ENRICHMENT MATERIALS.

הדסה ויצו קנדה — המכון למחקר — ירושלים
HADASSAH-WIZO-CANADA-RESEARCH INSTITUTE JERUSALEM

INSTRUMENTAL ENRICHMENT

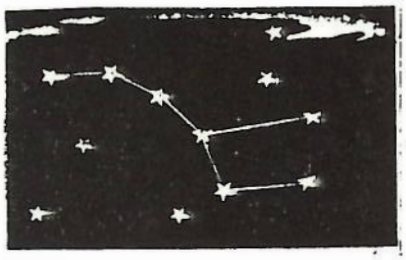
A SELECTED SAMPLE OF MATERIALS FOR REVIEW PURPOSES

Table of Contents

JUST A MINUTE ...
LET ME THINK !

FIGURE 1

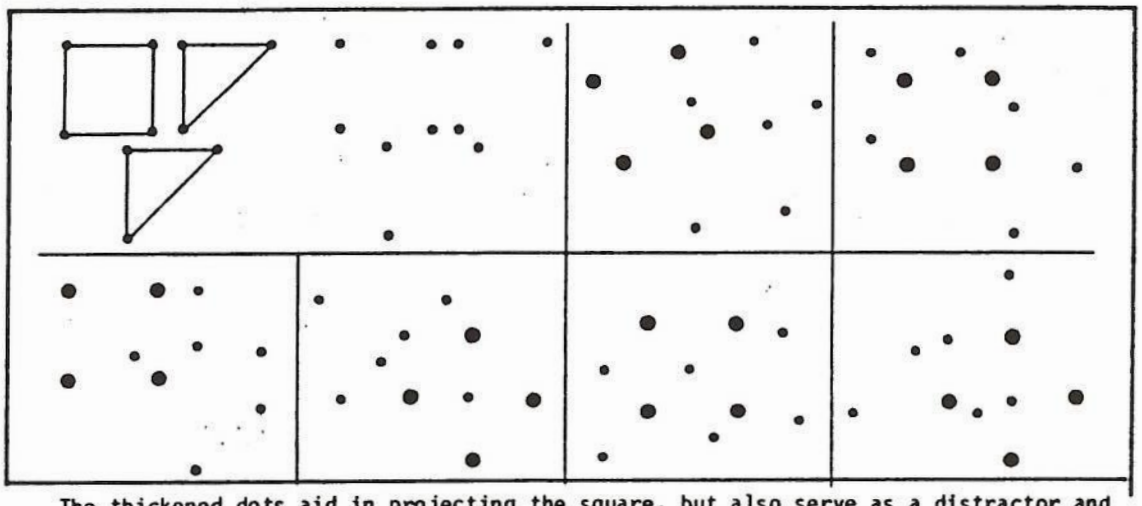
EXAMPLES FROM ORGANIZATION OF DOTS



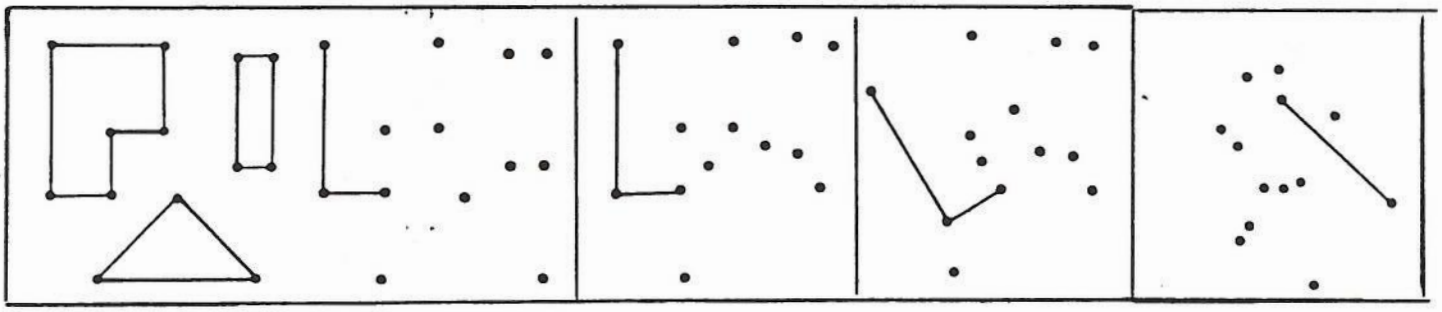
The student must perceive the dots in an amorphous, irregular cloud so as to project figures identical in form and size to those in the given models. The task becomes more complicated by density of the dots, overlapping, increasing complexity of the figures and changes in their orientation. Successful completion demands segregation and articulation of the field.

Among the cognitive functions involved are:

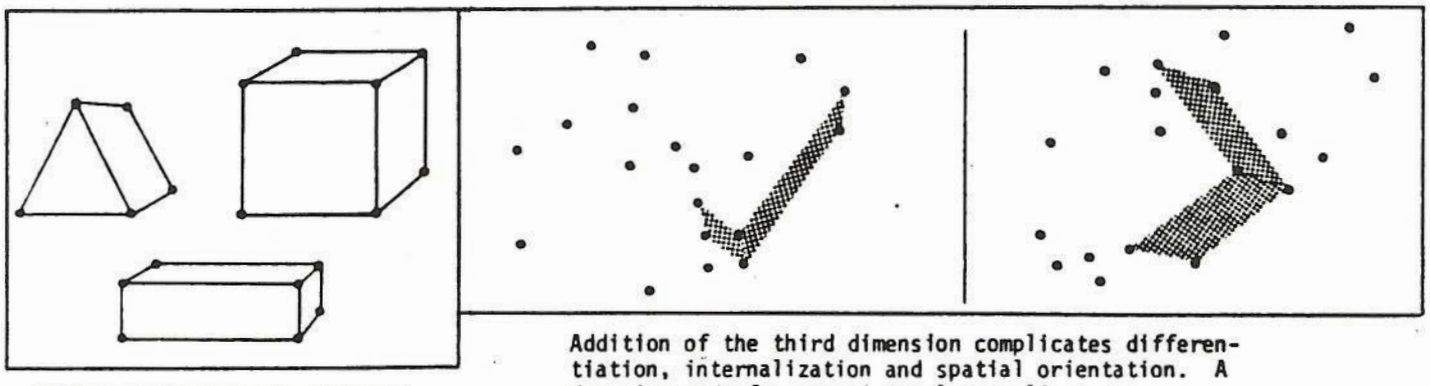
- Projection of virtual relationships
- Discrimination of form and size
- Constancy of form and size across changes in orientation
- Use of relevant information
- Discovery of strategies
- Perspective
- Restraint of impulsivity



The thickened dots aid in projecting the square, but also serve as a distractor and prevent the perception of similarities between frames. In addition to the functions and operations listed on the title page (left), the tasks involve labeling, precision and accuracy, planning, determination of starting point, systematic search and comparison to model. Successful completion aids in creation and maintenance of motivation.



An asymmetric figure in the model necessitates representational re-orientation in space. The provided cues are reduced until extinction so that an alternate starting point must be found. Scientific thought: hypothesis, investigation and confirmation, as well as logical evidence, are necessary.



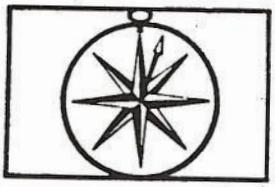
Addition of the third dimension complicates differentiation, internalization and spatial orientation. A dot, instead of connecting only two lines, serves as a nexus of 3 or more lines. The shaded cue is a synthesized whole, formed from parts separate in the model and each cue is relevant to a different form in the model.

1

ORIENTATION IN SPACE III

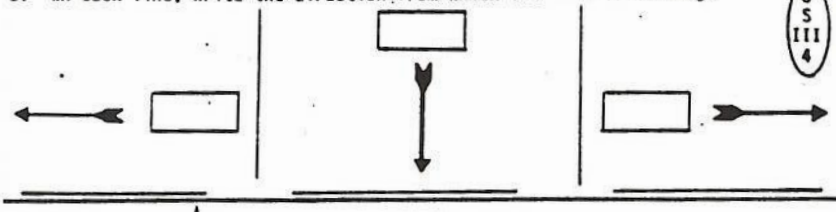
WEST WIND - WIND THAT COMES FROM THE WEST
EAST WIND - WIND THAT COMES FROM THE EAST
NORTH WIND - WIND THAT COMES FROM THE NORTH
SOUTH WIND - WIND THAT COMES FROM THE SOUTH

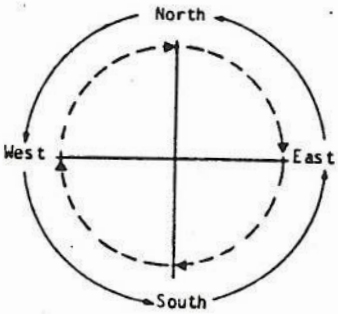
The arrow shows the direction of the wind.



A. Inside the rectangles, write the directions.
B. On each line, write the direction from which the wind is blowing.

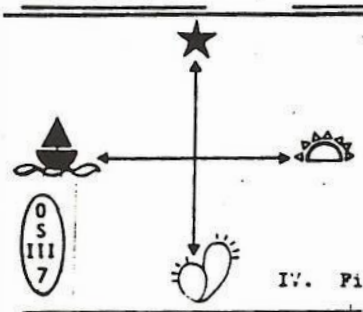
OS III 4



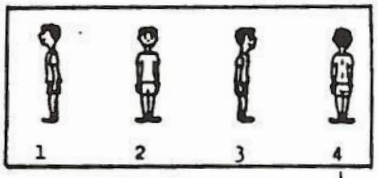


1 turn = 1/4 circle
2 turns = 1/2 circle
3 turns = ____circle
__ turns = full circle

OS III 10



OS III 7



Positions

IV. Fill in what is missing:

2	West	
3	North	
	East	Left
1		Back
4		

Look at the above and fill in the blanks below.

5. You are facing west.

Make 2 turns to the right, then 3 turns left, and 1 to the right. Where are you?_____.

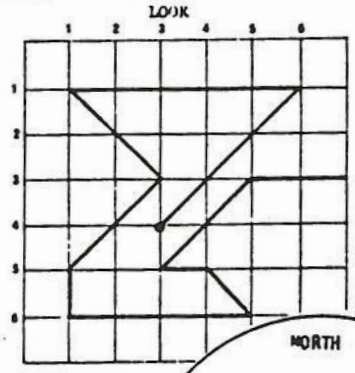
In order to reach the same point, one may proceed _____ circle to the left.

6. You are facing east.

Make 3 left turns, 3 right turns, and 2 turns to the left. Where are you? _____.

In order to reach the same point, one can proceed_____ circle to the right.

LOOK

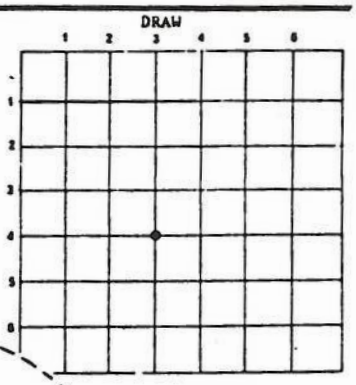


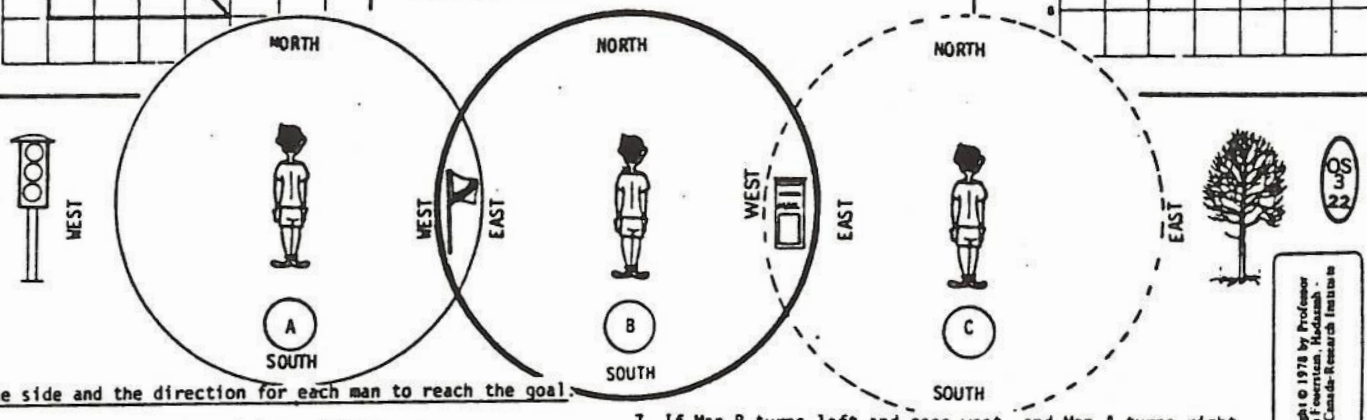
OS 3 20

LIST

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

DRAW





OS 3 22

Write the side and the direction for each man to reach the goal.

1. To reach the tree, Man A must turn right and go _____.
2. To reach the flag, Man C must turn _____ and go _____.
3. To reach the mailbox, Man A must turn _____ and go _____.
4. To reach the stop signal, Man B and Man C must turn _____ and go _____.
5. To reach the flag, Man ___ must turn _____ and go east and Man ___ must turn _____ and go _____.
6. Man C must turn left and go west, and Man B must turn right and go east to reach _____
7. If Man B turns left and goes west, and Man A turns right and goes east, they will meet next to _____.

Why, in order to reach the flag, is it necessary for one man to go eastward, and another westward? _____.

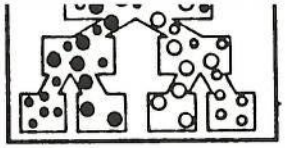
Choose a goal and list how Man A would reach it, and how Man B would reach it.

Goal: _____
Man A _____.
Man B _____.

3

Four of them belong to one group; one belongs to a different group. It is an exception.

Exception



CATEGORIZATION

1. Book, ball, girl, picture, chair

_____, _____, _____, _____ belong to the group of

_____.

_____ belongs to the group of _____. It is an exception.

4. Leaf, tree, grass, wheat, stone

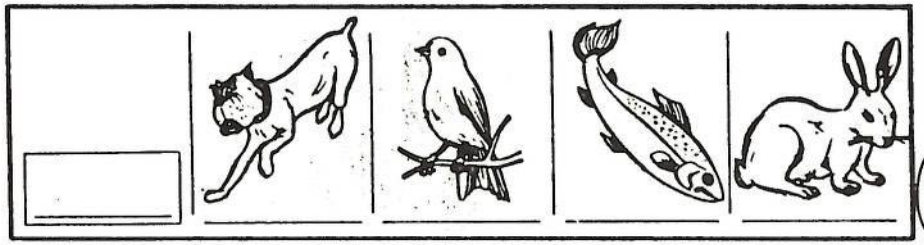
_____

_____

_____

C1 5

Label each picture. Choose a general name which describes the four pictures in each row and write it within the space provided at the beginning of each row.



C1 9

CLASSIFICATION OF ANIMALS

How many animals are there in the table? _____ You want to build a zoo and display all these animals. You have to pay attention to the following rules:

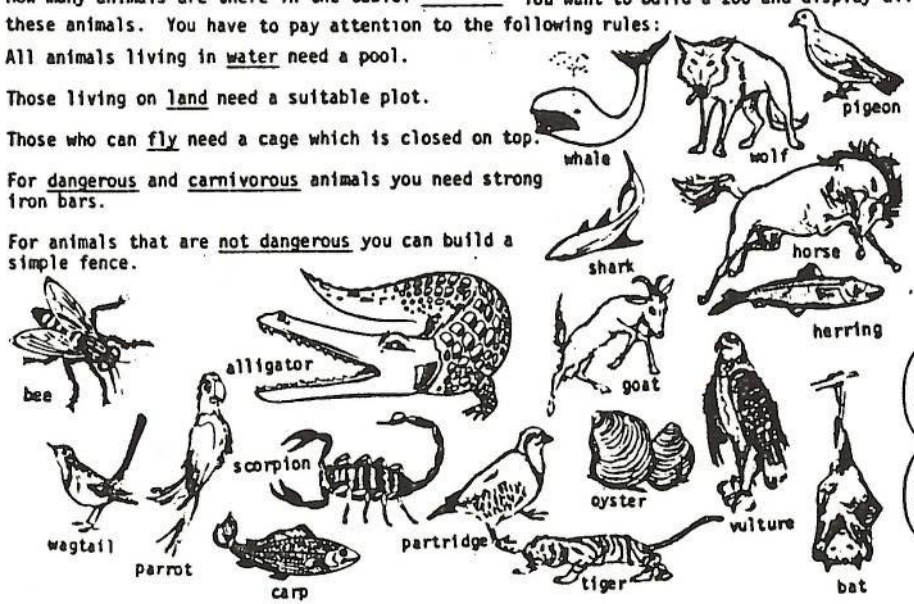
All animals living in water need a pool.

Those living on land need a suitable plot.

Those who can fly need a cage which is closed on top.

For dangerous and carnivorous animals you need strong iron bars.

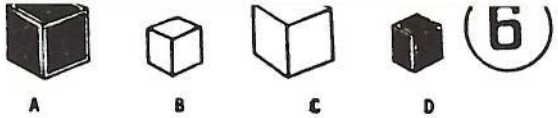
For animals that are not dangerous you can build a simple fence.



C1 19

C1 20

size			
small	large		
		white	color
		black	



4. Classify the cubes according to size and color. Fill in the headings and write the correct letter in each empty square.

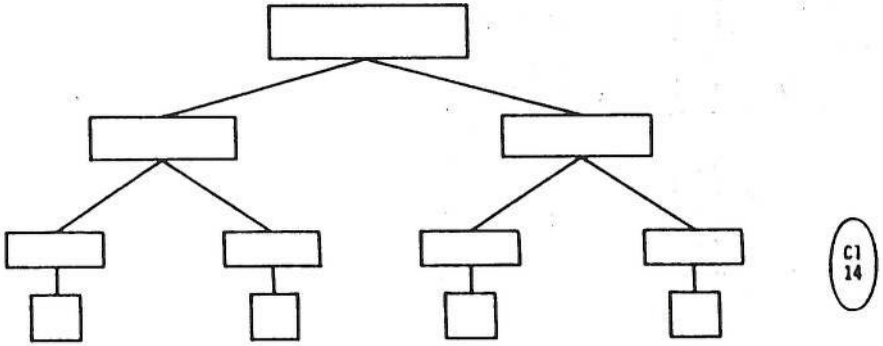
Subject of classification: _____

Principles of classification: _____: (1) _____

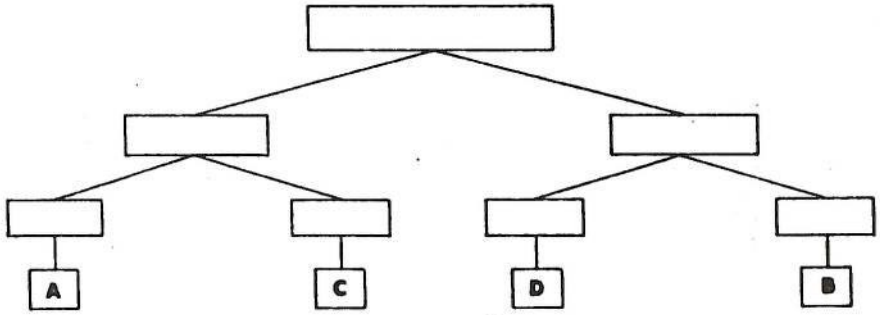
(2) _____

_____: (1) _____

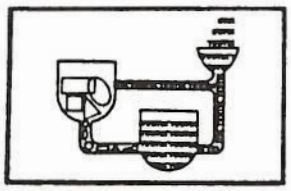
(2) _____



C1 14



C1 15



INSTRUCTIONS

In the frame, draw a triangle, a square and a circle.

Draw the square in the lower right side, below the triangle and to the right of the circle.

I 23

10

the line, draw a square, a rectangle nd a triangle in size order.

he square should be larger than the riangle, and the rectangle the largest f all.
he smallest figure should be on the ight side.

Draw three circles in size order on a diagonal line which begins at the upper left corner.

The smallest circle should be the top one.

I 12

the upper left of the frame, draw a rcle.

the circle, draw a square; and in the uare, a triangle.

In the lower left side of the frame draw a triangle inside of a square, and a circle around both of them.

I 22

LOOK

DESCRIBE

DRAW

I 24

CORRECT THE DRAWINGS ACCORDING TO THE INSTRUCTIONS		CORRECT THE INSTRUCTIONS ACCORDING TO THE DRAWINGS	
Draw a circle inside a rectangle in the lower right side of the frame. Mark an X in their common center.		Draw a square inside a hexagon in the center of the frame. To the left of the hexagon, draw a circle that intersects the hexagon.	
In the upper right side of the frame. draw a small circle and a big square so that they have a common center.		Draw a square in the center of the frame and put a circle inside of it. The square and the circle have a common center.	

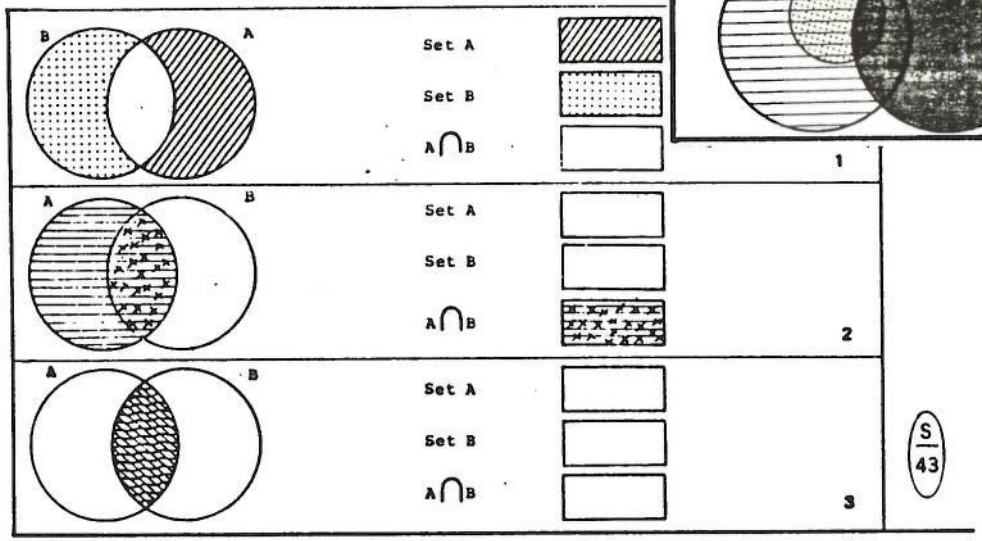
I 36

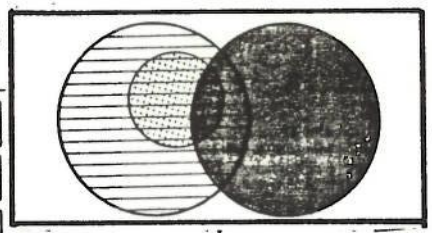
_____ line bisects the hexagon; beneath s another _____ line. From the _____ right corner is a _____ _____ the hexagon.		Darken the lines so that the smallest square will be underneath, and the largest square will be uppermost.	
ine begins at the lower _____ corner, allel to sides 0 _____ and _____ . There is ine that bisects the _____ and parallels is 0 ____ and ____. In the bottom of the gon is a line _____ to the sides ___ and ____.		Darken the lines so that the center square will seem on top of the other two squares.	

I 40

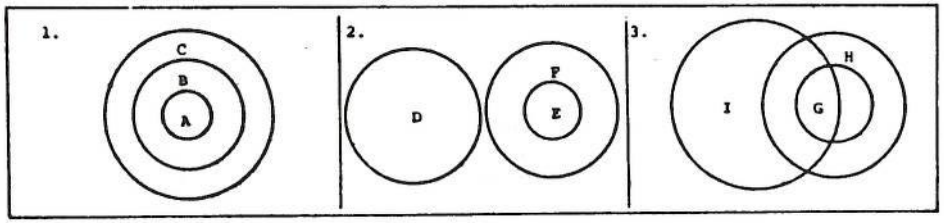
SYLLOGISMS

Fill in what is missing in the drawings.





S/43

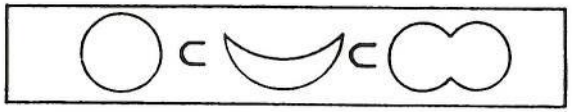


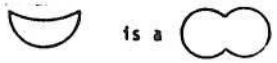
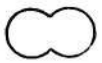
In the circle beside the conclusions, write the number of the drawing which illustrates each of the following exercises.
Fill in the blanks. In the parentheses write the appropriate letter for each set as illustrated by the drawing.

1. All letters (_) are postal matter (_).
   All postal matter (_) is stamped (_).
   ◯ Conclusion: _____
2. All flowers (_) are plants (_).
   Some flowers (_) are fragrant (_).
   ◯ Conclusion: _____
3. No liar (_) is honest.
   Every judge (_) is honest.
   ◯ Conclusion: _____
4. Some ◇ are □
   Every □ is ▭
   ◯ Conclusion: _____
   or: _____
5. No ⏢ is ◯
   All ⏢ is ◯
   ◯ Conclusion: _____
6. All △ is ⏢
   All ⏢ is ▽
   ◯ Conclusion: _____
7. Every _____ is a bird.
   Every bird lays eggs.
   ◯ Conclusion: _____ robins
8. No ovals _____
   All hexagons are polygons.
   ◯ Conclusion: No _____
   or: _____

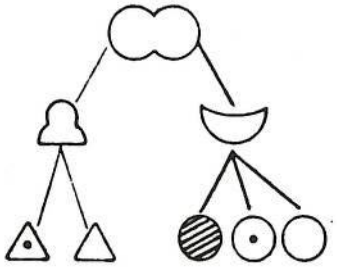
S/61

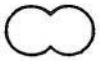
11



Every  is a 

 is a



Conclusion: _____ (draw) is a 

✕ is a 

Can we conclude that ✕ is a  ? ____

_____ (draw) ⊃  ⊂ _____ (draw)

Every △ is a _____ (draw)

✕ is a  Can we conclude that ✕ is a  ? _____

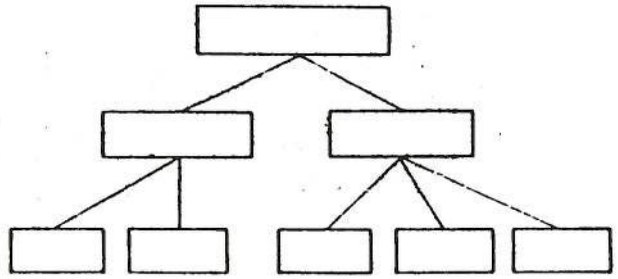
Each one of the above shapes represents a set. Every set has a name.

The names of the sets are: salt, spices, food, ice-cream, dessert, cake, pepper, vinegar.

Fill in the name of the set.

Shape	Name of Set
⬭	= food
◡	= _____
⏢	= dessert
⊙	= vinegar
◍	= pepper
○	= _____
△	= _____
⊙	= _____

Fill in the names of the sets in the correct places.



S/30

Fill in the missing.

REVIEW

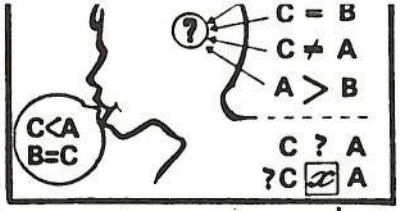
1.

A 2 [ ] B 10:5

B 10:5 [ ] C $\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}$

Conclusion: [ ] = [ ]

2.



Gary and Bill were born in the same year.
Bill was born a year before Steve.

Conclusion: _____

3. Samson is stronger than Len.
Len is as strong as Dennis.

Conclusion: _____

4. The bread is fresher than the meat.
The meat is fresher than the lettuce.

Conclusion: _____

TR. 5

2. In an apartment house, the tenants in apartments A, B and C each had a party one Saturday night. The noise coming from apartment A added to the noise from apartment B was more than twice the noise from apartment C. The tenant in apartment C called the police and claimed that the noise coming from apartment A was greater than the noise from his own apartment and was disturbing his party. The tenant of apartment A claimed that this was not so and argued that the noise from his apartment was less than that coming from apartment C.

Who was right:

A _____?

C _____?

What additional information would have helped the police and us to find the solution?

_____ [ ] _____ , _____ [ ] _____

When the only given is A + B [>] C + C, there is not enough information to find the relationship

A [≠] C B [≠] C

TR. 15

3. Each week a messenger brings two packages, identical in size and weight, to Mr. Smith's office. For each package Mr. Smith pays a service charge of one dollar. One day Mr. Smith received two packages whose total weight was greater than that of the total weight of the packages he had been previously receiving. The new packages differed from each other both in size and weight. Package A was lighter than the regular weekly package. The messenger argued that because of the difference in weight he was entitled to more money for the second package, because it was undoubtedly heavier than the regular weekly package. Was the messenger correct?

Set up the equation: _____ + _____ [ ] _____ + _____

Take into consideration all given information: _____ [ ] _____

and write the relationship between B [ ] C.

Draw the conclusion: If A + B [ ] C + C
And it is given that A [ ] C Then B [ ] C.

2. If the given is that

B [>] C
or
B [=] C
Then A [<] C

If the given is only that

A + B [<] C + C
A [≠] C
B [≠] C

If the given is that

A [>] C
or
A [=] C
Then B [<] C

TR-16

12

Read each of the given sentences carefully. In each of the columns, write 'correct,' if the relationship heading the column is appropriate for the given sentence. Write 'possible,' if the heading could be appropriate for the given sentence; and 'incorrect,' if it is inappropriate.

Given Sentence	A s. B	A n.l. B	A sm. B	A d. B	A l. B	A n.s. B	A n.d. B	A n.sm. B	Relations in signs	Contradic
Example: If A n.s. B and B l. A, then:	incorrect	correct	correct	incorrect	correct	incorrect	correct	incorrect	A < B	No
1 If A n.sm B and B s. A, then:									A = P	No
2. If A n.d. B and B s. A, then:										
3. If A n sm. B and B sm. A, then:										
4 If A n.l. B and B n.s. A, then:										
5. If A d. B and B n l. A, then:									A > B	
6. If A l. B and B n.l. A, then:										
7 If A s. B and B d. A, then:									Yes ↓ ↑	
8 If A n d. B and B l. A, then:										
9. If A l. B and B sm. A, then:										
10. If A l. B and B l. A, then:										
11. If A sm. B and B n.s. A, then:										
12. If A n l. B and B n.sm A, then:	possible									
13. If A n d B and B n.sm A, then:										
14 If A sm. B and B s. A, then:										
15. If A n.s. B and B d. A, then:		possible								
16. If A n.l. B and B n.l. A, then:										
17. If A n.sm B and B n.sm. A, then:										
18 If A n.sm. B and B l. A, then:										
19. If A l. B and B s. A, then:										
20 If A d. B and B sm. A, then:										

TR-G

from left to right. The number of the bottom stencil is listed first, on the left; the number of the upper stencil is listed on the right.)

6 5-14

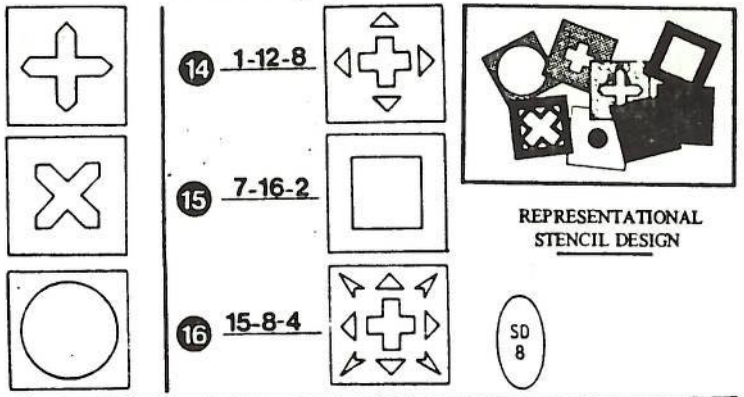
7 13-6

8 10-11

14 1-12-8

15 7-16-2

16 15-8-4



REPRESENTATIONAL STENCIL DESIGN

SD 8

ANSWER THE QUESTIONS

Card Number

A-20

A. Define and correct the two errors: 1 - 12 - 18 - 14 - 2

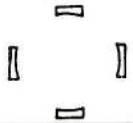
1. _____

2. _____

B. If we were to fill in the white parts in the design we would get a white cut-out in the form: _____

SD 16

C. Draw lines to connect the sections so as to complete the figure.



STENCIL NUMBERS From left to right _____

A-32

1. In this design, the color _____ appears twice. The numbers of the stencils of this color are _____ _____. The color _____ also appears twice. The numbers of the stencils of this color are _____ _____.
2. Which stencils of the same color blended? _____ _____

Correct and define the errors:

a. _____ 15 14 12 17 3 11

b. _____ 15 14 12 18 3 2 11

c. _____ 15 14 12 16 3 2 11

d. _____ 15 14 12 17 4 2 11

SD 19

STENCIL NUMBERS from left to right _____

A - 47

1. How many colors are in the design? ____
2. How many stencils are in the design? ____
3. In the design there is a _____ of white stencils whose numbers are _____
4. How do you know that the stencil closest to the center is stencil 4 and not 3? _____
5. Is there any importance to the sequence of appearance of white stencils 16 and 17? _____ Why? _____
6. Is there any importance to the sequence of the appearance of white stencils 15 and 18? _____ Why? _____
7. Write a similar sentence about stencils 3 and 4: _____

SD 25

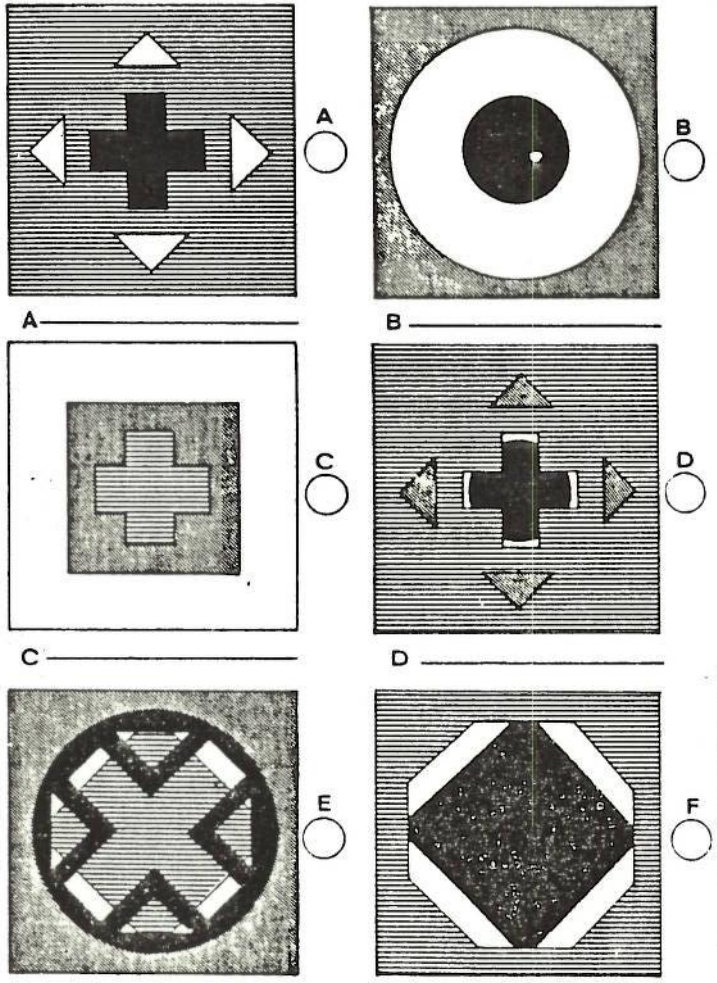
STENCIL NUMBERS From left to right _____

Fill in:

1. There is _____ importance to the order in which the stencil numbers are listed.
2. We always begin by listing the number of the stencil that appears _____.
3. Choose the appropriate word: It is _____ possible to know the sequence of the stencils if we proceed from the center outwards, exactly according to the colors in the design. (always, sometimes, never).

13

In which of the drawings is it possible to know the sequence of the stencils from the center outwards exactly according to the order of the colors from the center, outwards. List a + in the circle if one can proceed according to the colors; list a - in the circle if it is impossible to proceed according to the sequence of colors.



Cross out the incorrect word in each statement:

1. It is possible/impossible to know the sequence of the stencils from the center outwards when all the stencils in the design are cut-out only in the center. For example: A, B, C, D, E, F
2. It is possible/impossible to know the sequence of the stencils from the center outwards, when at least one of the stencils in the design is cut out in the center and also in the periphery. For example: A, B, C, D, E, F.

SD 13

APPENDIX 5 : FLETCHER'S TABLE OF THE STAGES OF SUPPORT BETWEEN INDEPENDENTS.

APPENDIX 6 : THE CHILD AT SCHOOL - A NEW BEHAVIOUR SCHEDULE.

Inner London Education Authority

Research and Statistics

Report

THE CHILD AT SCHOOL -
A NEW BEHAVIOUR SCHEDULE

RS 907/83

Prepared by Research and Statistics Branch

Director: Dr. Peter Mortimore
Assistant Director (Research): Andreas Varlaam

Research Team

Andreas Varlaam
Louise Stoll
Pamela Sammons
Florisse Kysel

Report written by

Florisse Kysel
Andreas Varlaam
Louise Stoll
Pamela Sammons

Copies and further information from: Hazel Pennell, Information Officer, Research and Statistics Branch, Addington Street Annexe, London, SE1 7UY. Tel: 633 2896

October 1983.

THE CHILD AT SCHOOL - A NEW BEHAVIOUR SCHEDULE

Introduction

Behaviour at school affects a pupil's opportunities for learning and development. Pupils whose behaviour is regarded as 'disturbed', 'disruptive' or 'maladjusted' have been shown to be at risk of poor educational attainment (1) and it was for this reason that the Plowden report (1967) recommended that 'disturbed' pupils should be one of the criteria used to identify educational priority schools and areas. In addition to the consequences for the individual, behaviour problems also diminish the educational opportunities for other pupils in the classroom and contribute to teacher stress. To prevent these adverse effects, early identification of poorly adjusted pupils is clearly of importance.

In this paper, we use the phrase 'adjustment to school' rather than 'disturbed' or 'disruptive' behaviour. A pupil's behaviour at school is the result of many influences; the teachers, the school as well as personality and home background factors. The concept of adjustment to school refers to the extent to which the pupil's behaviour conforms to the expectations of the school, without suggesting that the roots of such behaviour lie either with the pupil or with the school.

Measuring adjustment to school raises a number of problems. It is, in theory, possible to observe and measure the frequency and intensity of certain behaviours by objective means. Such an approach however, ignores the context in which behaviour takes place and the possibility that a given form of behaviour may be appropriate in certain settings but inappropriate in others. Furthermore, observation is time-consuming and not a practical option for screening large numbers of pupils.

In practice, pupil behaviour is usually assessed by means of rating scales completed by teachers. The Bristol Social Adjustment Guides and the Rutter B(2) scale are perhaps two of the best known and most widely used in educational research. Ratings on such scales are, of course, essentially subjective but in one sense this subjectivity is an asset. Teachers tend to rate a pupil's behaviour in relation to the behaviour they expect of the class. In other words, they make an assessment of the pupil's adjustment to these norms of behaviour.

This paper reports on the development of a new rating scale to measure pupils' adjustment to school: the 'Child at School' (CAS) schedule. This schedule was devised for the ILEA Junior School Project which is following a sample of pupils through their career at junior school. Subsequently it was also used to collect behavioural data from all ILEA schools for the Authority's Educational Priority (EP) Indices.

In view of the number of behaviour rating schedules which already exist, it may be asked why it was necessary to devise a new schedule. Most of the schedules we

(1) For example, Davie, Butler and Goldstein (1972) found an association between maladjustment and low reading attainment in children in the National Child Development Survey.

examined, however, were found to have disadvantages for large scale screening of pupils by teachers.

An obvious disadvantage of many schedules is their length. A schedule of thirty or more items with multiple response answers for each item (eg the Child in School schedule of the Bristol Social Adjustment Guides) takes considerable time to complete. Completing such a schedule for all the pupils in the class can be an arduous task and accuracy may suffer as a result.

A second disadvantage of many behaviour schedules is that they concentrate on negative aspects of behaviour. Teachers do not have the opportunity of identifying pupils who are particularly well adjusted. This was one of the main concerns raised by ILEA teachers about the Rutter B(2) scale when this was used as a measure of pupil behaviour in the Educational Priority Index.

For longitudinal studies investigating change in pupil behaviour over time, it is necessary to have a behaviour schedule which is applicable to a wide age range. Schedules which depend on the identification of behaviours appropriate or inappropriate for a particular age group are not suitable for this purpose.

Finally, in order to assess adjustment to school, it is important to have a schedule which relates to behaviour at school. Schedules which ask for global judgements about, or interpretations of the child's behaviour are not suitable for this purpose. Such schedules often demand a level of psychological knowledge which the ordinary classroom teacher cannot be expected to possess.

The CAS schedule was designed to overcome these disadvantages. It is short and simple to complete. The items allow for a positive as well as negative assessment of pupil adjustment. Because the schedule is based on judgements about behaviour rather than measurement of behaviour itself, it is applicable to a wide age range. The judgements which teachers are asked to make relate to the school context and cover aspects of behaviour with which teachers should be familiar.

Description of the Child at School (CAS) Schedule

The CAS schedule consists of nine items focussing on the pupil's temperament, approach to learning and social behaviour in a school context. Teachers are asked to make direct judgements of the child's behaviour based on their knowledge of the child and of other children of the same age.

The CAS schedule is reproduced below. In design and in the selection of some of the items, use was made of the Classroom Observation Procedure behaviour schedule (COP) developed by the ILEA Schools Psychological Service. Some of the items of the CAS are based directly on the COP, although these and other items were modified and revised in the light of comments from teachers participating in a pilot study.

The items are scored on a five-point scale with the scoring reversed for items 2,4 and 8 so that a low score on each item reflects good adjustment and a high score, poor adjustment.

This observation schedule consists of pairs of statements. Each pair covers a particular aspect of the child's temperament and disposition, learning skills, or social behaviour.

It is important, before filling in the schedule, to read ALL the statements carefully. It is, however, also necessary, when rating a child's behaviour, to consider each pair of statements SEPARATELY AND INDEPENDENTLY of all the others.

Judgements should be made on the basis of your personal knowledge and experience of children of this age - not just in the context of this particular class. You should also attempt to base judgements on your own knowledge of the child, not on what other teachers say.

For each pair of statements:

Tick 1 if Statement A is true of the child ALL OR MOST OF THE TIME

Tick 2 if Statement A is USUALLY TRUE of the child.

Tick 3 if the child's behaviour can be best described as falling exactly between the two statements, or if he/she is sometimes one and sometimes the other.

Tick 4 if Statement B is USUALLY TRUE of the child.

Tick 5 if Statement B is true of the child ALL OR MOST OF THE TIME.

	Statement A	1	2	3	4	5	Statement B	cc
1	A happy and contented child.						An unhappy, anxious or worried child.	31
2	Has difficulties in coping with new situations or people.						Copes easily with new situations or people.	32
3	Even-tempered, easy-going child.						Irritable or quarrelsome.	33
4	Cannot concentrate on any particular task. Easily distracted.						Can concentrate on any task. Not easily distracted.	34
5	Eager to learn; curious and inquiring child.						Shows little interest, curiosity or motivation in learning.	35
6	Perseveres in the face of difficult or challenging work						Lacks perseverance. Is impatient with difficult or challenging work.	36
7	Helpful and considerate towards other children.						Bullies or is spiteful towards other children.	37
8	Solitary, withdrawn child.						A sociable, friendly child.	38
9	Readily accepts limits, discipline and control						Is generally disruptive, unco-operative, or disobedient.	39

Scoring the CAS

How the CAS should be scored depends on the purpose for which the schedule is to be used. For diagnostic purposes, the scores on the individual items are of interest and the schedule can be seen as a profile of the child's adjustment in different areas. For research and survey work, however, a profile is cumbersome and a summary score of the individual items may be required.

Two approaches to scoring the schedule have been investigated. The first approach is norm-based. Scores on the individual items were added together to give a total out of 45. A table of percentile equivalents to the distribution of total scores was drawn up. By reference to this table, it is possible to discover for example whether a pupil's score places him/her in the top 'best' 10% or bottom 'worst' 10% on the schedule. Such an approach to scoring assumes that the a single dimension underlies the ratings assigned to pupils.

The second approach to scoring was developed after principal components analysis of the scores on the individual items had revealed that the items could be grouped into three clusters or subscales. A high score on one of these subscales was taken to indicate poor adjustment in a particular area.

Sample

The CAS was completed for all first year junior pupils (aged 7-8) and all first year secondary pupils (aged 11-12) in November 1981, as part of the data collection for the construction of the Authority's Educational Priority Indices. This provided a data base of 17,780 junior pupils and 19,763 secondary pupils when all pupils with incompletely filled in CAS schedules had been excluded. Analysis of the CAS scores was based on these groups.

Scoring on the individual CAS items

Table 1 shows the mean scores and standard deviations obtained by the junior and secondary pupils on each of the CAS items (1)

(1) Items are scored out of 5 with a minimum score of 1 (not 0). A high score indicates poor adjustment and vice versa.

Table 1 - Means and standard deviations of CAS items

Item	Junior Pupils		Secondary Pupils	
	Mean	SD	Mean	SD
1	2.13	1.09	2.03	1.05
2	2.54	1.23	2.42	1.20
3	2.09	1.09	1.99	1.05
4	2.73	1.29	2.52	1.22
5	2.31	1.13	2.21	1.07
6	2.66	1.21	2.45	1.13
7	2.11	1.01	2.01	0.96
8	2.14	1.05	2.17	1.08
9	1.85	1.05	1.79	1.01
N	17780		19763	

(Scoring on items 2,4,8 has been reversed.)

The distributions of scores on all items were skewed towards the lower end of the rating scale ie. to 'good adjustment'. The mean scores lie mainly in the range 2-3 and indicate that good adjustment in the area measured by the item was 'usually true' of the average child. In contrast, a rating of 4 or 5 on an item is equivalent to scoring two standard deviations above the mean ie. is highly 'a-typical', thus supporting the interpretation that such ratings indicate comparatively poor adjustment.

Correlations between items

The inter-item correlation matrix showed significant positive associations between all items in the schedule and between individual items and total score (all items added together) on the schedule. Table 2 shows the correlations for junior pupils. Those for secondary pupils were similar.

Table 2 - Correlations between items and total score - junior pupils

	Item								
	1	2	3	4	5	6	7	8	9
Total score	0.77	0.74	0.78	0.78	0.78	0.82	0.78	0.70	0.72
Item									
1		0.63	0.61	0.45	0.48	0.51	0.52	0.65	0.44
2			0.47	0.52	0.51	0.53	0.43	0.59	0.38
3				0.48	0.45	0.52	0.75	0.47	0.69
4					0.67	0.76	0.50	0.39	0.50
5						0.75	0.50	0.49	0.46
6							0.56	0.44	0.53
7								0.48	0.70
8									0.34

As all items correlate positively with total score on the scale, the total score can reasonably be used as an indicator of general adjustment.

Distribution of total scores

Figure 1 shows the percentile equivalents of total scores for the junior and secondary pupils respectively. The possible range of scores is 9-45.

Figure 1 - Percentile equivalents of CAS scores

Score	Junior Pupils	Secondary Pupils
45	100	100
44	100	100
43	100	100
42	100	100
41	99	100
40	99	99
39	99	99
38	98	99
37	98	98
36	97	98
35	96	97
34	95	97
33	94	96
32	92	94
31	91	93
30	89	91
29	86	89
28	83	87
27	81	85
26	77	81
25	73	78
24	70	74
23	65	71
22	61	67
21	57	62
20	52	58
19	48	53
18	43	48
17	38	43
16	34	38
15	30	34
14	26	30
13	22	25
12	18	21
11	14	16
10	11	12
9	8	9

The mean score for juniors was 20.58 with a standard deviation of 7.78. For secondary pupils the mean score was 19.60 with a standard deviation of 7.48. Both the junior and secondary distributions were positively skewed (Co-efficients of skewness were 0.415 for juniors and 0.532 for secondary pupils.)

For some purposes, it may be necessary to determine cut-off points to distinguish pupils who are 'well adjusted' or 'poorly adjusted' from the rest of the pupils. The ILEA educational priority indices include a measure of the proportion of pupils whose behaviour at school can be classified as 'poorly adjusted'. Another example where cut-off points might be useful is if the schedule is used for initial screening of pupils to identify any who may need extra attention or help.

The cut-off points are, of course, arbitrary and depend on how the information is to be used. In the educational priority exercise, it was necessary to identify pupils who were poorly adjusted. In the past, the Rutter B(2) scale had been used as a measure of adjustment and on this scale roughly 20% of junior pupils were found to have abnormal scores, using the scoring criteria for the B(2) scale. Our initial plan was therefore to use 20% cut-off points on the CAS schedule. A 20% cut-off point on the percentile distribution of CAS scores is equivalent to a score of 28 or above for juniors and a score of 27 or above for secondary pupils. This, however, presented a conceptual problem. A score of 27 on the CAS could be composed of nine ratings of 3. However 3 is the mid-point of the rating scale for each item. Is it valid to designate a pupil who is given '3' ratings on all the items as 'poorly adjusted'? It was this problem that led to the search for an alternative method of scoring the CAS.

An alternative scoring system

Principal components analysis revealed that three factors between them accounted for 80% of the variance in the data. Table 3 shows the varimax rotated factor matrix for the junior data.

Table 3 - Factor loadings of CAS items

Item	Factor 1	Factor 2	Factor 3
1	0.2167	0.3608	0.7828
2	0.4003	0.1411	0.7355
3	0.1954	0.8147	0.3655
4	0.8302	0.2804	0.2055
5	0.8028	0.2124	0.3147
6	0.8273	0.3202	0.2554
7	0.2808	0.8128	0.2794
8	0.1947	0.2061	0.8351
9	0.3162	0.8367	0.1061

It can be seen that items 4,5 and 6 have a high loading on factor 1. These are all items which refer to the pupil's approach to learning. Factor 1 was therefore labelled 'learning problems'. Items 3,7 and 9 had high loadings on factor 2, which, after inspection of the items was called 'aggressive behaviour'. Items 1,2 and 8 had high loading on factor 3 which was called '(social) anxiety'.

What principal components analysis appeared to show was that although all items were positively correlated, both with each other and with total score on the CAS and there was a tendency for pupils to be seen as generally well or poorly adjusted, the items fell into three clusters or subscales. Items 4,5 and 6

formed one cluster or subscale, items 3,7 and 9 another, and items 1,2 and 8 a third. These subscales were taken to measure the dimensions of learning skills-learning problems, co-operative-aggressive behaviour, social/personal confidence-anxiety respectively.

Scoring the subscales

Scores on the items comprising the three subscales were totalled. A score of 12 or more (out of a possible score of 15) was taken to indicate poor adjustment in the area measured by the subscale in question. The reason for using 12 as a cut-off point was based on the rationale of the rating scale, rather than on statistical criteria. A score of 12 means that the pupil has to have ratings of '4' or '5' (ie the negative pole of the item is 'usually' true or true 'all or most of the time' of the child) on at least two of the three items comprising the subscale.

A similar method of scoring is used on the Rutter B(2) scale where items relate either to the neurotic or anti-social subscales and pupils are regarded as showing some disorder if they score above the cut-off points on either or both subscales.

Table 4 shows the percentage of pupils who were identified as poorly adjusted on each of the three subscales.

Table 4 - Percentage of pupils scoring above cut-off points on subscales of the CAS.

CAS Subscale	Junior Pupils %	Secondary Pupils %
Anxiety only	2.7	3.4
Aggression only	1.7	1.3
Learning Problems only	8.8	5.2
Anxiety & Aggression	0.4	0.2
Anxiety & Learning	2.5	1.9
Aggression & Learning	1.8	1.6
Anxiety, Aggression & Learning	1.5	1.0
None	80.7	85.3
All Anxiety	7.0	6.5
All Aggression	5.3	4.2
All Learning Problems	14.5	9.7

Using the subscales of the CAS, 19.3% of junior pupils and 14.7% of secondary pupils were classified as 'poorly adjusted' in one or more areas. Learning problems were the most prevalent type of difficulty in both groups

Relationship between the two methods of scoring the CAS

Table 5 - Correlations between subscale scores and total score (Juniors)

	Total Score	Anxiety	Aggression
Anxiety	0.85	*	*
Aggression	0.85	0.59	*
Learning	0.88	0.62	0.62

One question of interest was whether the use of total scores as an index of poor adjustment identified the same pupils as the use of the three subscales, or whether the former failed to identify pupils with adjustment problems in particular areas.

On the percentile distribution, 19% of junior pupils scored 28 or more. Similarly 19.3% of junior pupils had scores of 12 or above on one or more of the CAS subscales. Table 6 shows the extent to which the pupils identified by the two scoring systems were the same.

Table 6 - Comparison between two methods of scoring the CAS

CAS subscale	Total CAS Score 28-45		9-27	
Score of 12+ on ...	N	%	N	%
None of subscales	818	5.7	13528	94.3
Anxiety only	300	61.6	187	38.4
Aggression only	253	84.1	48	15.9
Learning only	1018	65.2	544	34.8
Anxiety & Aggression	65	100.0	0	0.0
Anxiety & Learning	436	99.8	1	0.2
Aggression & Learning	324	100.0	0	0.0
Anx,Agg,Learning	258	100.0	0	0.0
Total Pupils	3472	19.5	14308	80.5

The results show considerable agreement between the methods of scoring; 91% of junior pupils would have been classified in the same way by either method. In particular, all except one of the pupils who scored 12 or above on two or more of the subscales had total CAS scores of 28 or more. A high percentage (84%) of the pupils who scored 12 or more on the aggression subscale only also had total CAS scores of 28 or more. The main discrepancy between the scoring methods was with pupils who scored 12 or more only on the anxiety subscale or on the learning subscale. More than a third of these had total CAS scores of less than 28.

This analysis suggests that pupils seen as manifesting aggressive behaviour also tend to be rated relatively negatively in other areas giving them a high total score. Many of the pupils manifesting learning problems or social anxiety are relatively well adjusted in other areas, however, and are not identified if total scores are used as an index of poor adjustment.

The results of secondary pupils are not presented here but were broadly similar to those of the junior pupils.

Differences between junior and secondary pupils

Although the pattern of results for junior and secondary pupils was similar, indicating that the schedule could be used successfully with both groups, there were statistically significant differences in the mean scores obtained on the individual items and in the mean total scores. With the exception of item 8, secondary pupils were rated more positively (ie as better adjusted) than junior pupils. The mean total score for secondary pupils (19.60) was significantly lower than that for junior pupils (20.58). Fewer secondary pupils (14.7%) than junior pupils (19.3%) were identified as poorly adjusted on the CAS subscales. In particular there was a large difference (4.8%) between the percentage of secondary and junior pupils seen as having learning problems.

These findings are open to various interpretations. It is possible that adjustment to school improves with age or with length of schooling. Another possibility is that the most poorly adjusted pupils are referred to special education and are no longer part of the cohort when it reaches secondary school. It is also possible that secondary teachers use a different frame of reference from junior teachers when assessing pupils . Further investigation is needed to establish which of these explanations is the most plausible. The ILEA junior school project which is following a sample of pupils through junior school may be able to provide some answers; pupils in the sample are reassessed on the CAS in the Autumn and Summer term of each year.

Validity and reliability of the CAS

The items in the CAS are judgements made about pupils by the teacher, rather than descriptions of specific measurable behaviours. Because of this, it is difficult to find external criteria against which to assess the validity of the ratings. The schedule is best seen as a measure of teacher perception of pupil adjustment. It is, after all, how the pupil is perceived by teachers that influences the way s/he is treated by those teachers at school. Behaviour schedules relying on teacher perception of pupil adjustment have been used successfully by Thompson (1975) to assess whether adjustment to school was affected by prior attendance at nursery school or class and by Hughes, Pinkerton and Plewis (1979) to study children's difficulties on starting infant school. The CAS is similar in concept to the schedules used in these studies.

Of course it is important to establish that the items on the CAS are meaningful, not ambiguous and are interpreted consistently and in the same way by all teachers. In other words, that the inter-rater and test-retest reliability of the schedule is satisfactory.

It was not possible to calculate reliability from the EP data as each pupil was only rated once by one teacher. However, before the CAS was used in the EP survey, a preliminary study involving eight teachers and 130 first year junior pupils was carried out.

To calculate inter-rater reliability, 84 of these pupils were each rated by two different teachers. Test-retest reliability was based on 214 ratings (1) of pupils repeated after an interval of 4-5 weeks.

Table 7 - Reliability of the CAS

	r	A	N
Inter-rater reliability	0.71	0.83	84
Test-retest reliability	0.84	0.91	214

r= Pearson correlation coefficient
A= Co-efficient of agreement

Two measures were used to calculate the reliability of the scale: the Pearson product-moment correlation coefficient which is the usual measure employed for this purpose and the Coefficient of Agreement (A) (2). The latter appeared more appropriate to us as it reflects directly the degree of agreement between ratings, whereas the product-moment coefficient reflects the extent to which the two sets of ratings are linearly related. The coefficient of agreement varies from 0 (when the scores given by each pair of ratings differ maximally) to 1 (when the scores given by each pair of ratings are identical). Both the inter-rater and the test-retest reliabilities of the scale, as measured by the two coefficients, were satisfactory.

Uses of the CAS

The CAS was developed because there was felt to be a need for a short behaviour schedule which would assess some of the more important aspects of children's adjustment to school and could be used with a wide age range by ordinary classroom teachers. The analyses performed on the data obtained from the EP survey suggested that the CAS can be used both as a measure of general adjustment to school and, by the use of subscales, as a measure of adjustment in different areas. Teachers did not experience any difficulty in completing the schedule and many found the CAS simpler and more relevant than other behaviour schedules they had used in the past.

In the ILEA, the CAS now forms part of the information collected on pupils for the construction of educational priority indices. It is also being used in an ILEA research project following a sample of pupils through their career at junior school (the ILEA Junior School Project). This project should provide valuable information on the stability of the behaviour measured by the CAS schedule and on the feasibility of using the CAS for a large scale screening programme aimed at the early identification of pupils with adjustment difficulties.

So far, the practical use of the CAS in the ILEA has been limited to identifying pupils with poor adjustment. It is, however, equally possible to use the

(1) 84 pupils each rated by two teachers plus 46 pupils rated by one teacher
(2) Mathematically, the coefficient of agreement A is derived from $A = (r1 + 1)/2$, where r1 is the inter-class correlation coefficient. See 'The statistical measurement of Agreement', W.S. Robinson, A.S.Review, Feb 1957.

schedule to identify well adjusted pupils in order, for example, to see how good adjustment affects school progress.

Summary

The 'Child at School' is a new observation schedule for teachers which gives information on children's adjustment to school. There are three subscales assessing learning difficulties, anxiety and aggressive behaviour respectively. The schedule consists of nine items and has been used successfully by teachers with junior and with first year secondary pupils.

Acknowledgements

We wish to record our thanks to the many teachers whose judgements form the basis of our data. We would also like to thank Arno Rabinowitz and the members of ILEA's Schools' Psychological Service for permission to draw on their Classroom Observation Procedure (COP).

References

Central Advisory Council for Education (1967). Children and their primary schools (Plowden report). Volume 1. HMSO.

Davie R., Butler N. and Goldstein H. (1972). From birth to seven. Longman.

Hughes M., Pinkerton G. and Plewis I. (1979). Children's difficulties in starting infant school. J. Child Psychol. Psychiat., Vol.20, pp. 187 to 196.

Rabinowitz A.I. (1981). The ILEA classroom observation project. Education Today, Vol.31(1), pp. 10 to 18.

Rutter M. (1967). A children's behaviour questionnaire for completion by teachers. J. Child Psychol. Psychiat., Vol.8, pp. 1 to 11.

Stott D.H. (1963). The social adjustment of children: Manual to the Bristol Social Adjustment Guides, University of London Press.

Thompson B. (1975). Adjustment to school. Educ. Res., Vol.17, pp. 128 to 136.

APPENDIX 7 : THE PHOTOGRAPHS AND GRID USED FOR THE REPERTORY GRID TECHNIQUE.

REPERTORY GRID TECHNIQUE

Name:.....Age:.....Examiner:.....

Date Tested:.....

Given and elicited constructs:

1. Which one do you think makes friends most easily?
2. Which one annoys teachers most?
3. Which one is best at learning things at school?
4. Which one is most like you'd like to be?
5. Which one is really most like you?

RANKED ORDER GRID:

INTERCORRELATIONS:

ELEMENTS

CONSTRUCTS

CONSTRUCTS		A	B	C	D	E	F	G	H		1	2	3	4	5	CONSTRUCTS
1	Friends									1						
2	Annoys									2						
3	Learning									3						
4	Wish									4						
5	"Like me"									5						

WORK SPACE:

APPENDIX 8 : TABLES OF RESULTS.

ABILITY AND ATTAINMENT SCORES : PRIMARY EXPERIMENTAL GROUP "B"

PUPILS' NAMES	Date of Birth	Age when tested in 1984	WISC - R				NEALE ANALYSIS OF READING				A.H. 2/3					
			Similarities		Arithmetic		Accuracy		Comprehension		Verbal		Numerical		Perceptual	
			1984	1986	1984	1986	1984	1986	1984	1986	1984	1986	1984	1986	1984	1986
Abigail	27.09.73	11.00	08	13	05	14	07.10	11.00	08.02	10.01	17	15	05	06	20	13
Nathan	09.07.74	10.03	09	11	08	09	09.06	11.08	08.07	11.08	13	11	03	08	23	23
Gordon	23.01.74	10.10	11	12	09	08	08.11	10.01	08.07	11.06	10	17	10	18	17	24
Kirsty	09.02.74	10.08	06	10	07	10	08.06	09.03	07.10	09.10	13	21	06	13	17	21
Amelia	25.09.73	11.01	05	05	06	06	08.04	09.05	07.10	08.07	05	07	05	05	06	07
Simon	03.04.74	10.07	12	13	10	12	11.01	13.00	12.02	12.07	29	19	08	18	20	20
Douglas	31.10.73	11.00	11	12	11	09	08.00	09.11	08.11	11.06	06	16	11	14	22	20

APPENDIX 9 : SHAYER AND BEASLEY'S RESULTS.

TABLE 4

PRE AND POST-TEST MEANS AND MEAN DIFFERENCES FOR EXPERIMENTAL AND CONTROL GROUPS

	Experimental		Control		Pre to Post-Test differences				
	[mental age,years; mean (S.D.)]				[$(E_2 - C_2) - (E_1 - C_1)$]				
Test	pre	post	pre	post	't'value	significance level	Effect size (S.D.s)	Mental age differences (months)	Class of Test
Piagetian battery	11.7(1.6)	13.4(1.2)	13.1(1.1)	13.1(1.3)	4.69	.001	1.22	20.1	Fluid Intelligence
Raven's Matrices	7.7(0.7)	9.6(2.5)	8.3(0.4)	9.3(2.0)	4.47	.01	1.07	11.6	
Thurstone's PMA:									Crystallised Intelligence
Verbal (w)	10.7(0.5)	11.6(0.9)	10.6(0.5)	11.8(1.1)	-2.95	.02	0.37	-3.8	
Verbal (p)	11.4(0.6)	11.6(1.3)	12.0(1.2)	12.2(1.4)	0	n.s.	0	0	
Spatial	9.7(2.6)	10.6(2.2)	8.9(2.0)	9.2(2.3)	1.85	.1	0.23	8.2	
Reasoning(w)	9.4(2.6)	10.1(0.7)	9.9(1.1)	9.8(1.6)	6.79	.001	0.98	9.6	
Reasoning(p)	10.6(1.7)	11.3(0.8)	9.7(2.0)	10.9(2.7)	-0.84	n.s.	-0.26	- 6.0	
Perception	13.0(1.6)	12.1(2.5)	11.6(1.9)	11.8(1.5)	-1.90	.1	-0.35	-13.6	
Numbers	9.5(0.9)	9.8(0.6)	9.5(0.8)	9.9(0.7)	0.33	n.s.	0.07	- 0.6	
Neale Reading									Achievement
Accuracy	7.8(0.6)	8.3(0.7)	8.1(0.6)	8.4(0.5)	1.71	.2	0.36	1.8	
Comprehension	8.7(0.5)	9.5(1.1)	9.1(1.0)	9.9(0.8)	0.73	n.s.	0.26	0.4	
Rate	7.7(0.6)	8.9(0.7)	7.5((0.7)	8.4(0.8)	1.58	.2	0.47	3.5	
NFER Maths Attainment	8.6(0.4)	9.6(0.9)	8.4(0.8)	9.3(1.4)	1.45	.2	0.21	1.4	
Richmond Basic Skills									
Map Reading	-	-	-	-	1.71	.1	0.57	-	
Graphs and Tables	-	-	-	-	1.54	.1	0.46	-	
Mean age of subjects	12/4	14/0	12/5	14/1					

APPENDIX 10 : CROSS PARTITIONED TABLES.

PRIMARY PUPILS' "WISHED FOR" RATINGS vs. TEACHERS' RATINGS

Frequencies with which teachers' ratings on the CAS schedule went up/stayed the same or went down between 1984 and 1986, and frequencies with which pupils' Repertory Grid ratings went up/stayed the same or went down between 1984 and 1986, cross-partitioned to display instances of agreement and disagreement.

I.E. (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxxx xxxx (9)	xxx xxx (6)
down	xx (2)	xx (2)

CO-OPERATIVE BEHAVIOUR

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx xx (5)	xxx xxx (6)
down	xxx (3)	xxx xx (5)

LEARNING SKILLS

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx xxxx (8)	xxx xx (5)
down	xxx (3)	xxx (3)

Control (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx (4)	xxx (3)
down	xxxx xxx (7)	xxx xx (5)

CO-OPERATIVE BEHAVIOUR

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xx (2)	xxxx xxxx (8)
down	xxx xx (5)	xxxx (4)

LEARNING SKILLS

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx (3)	xxx xxx (6)
down	xx (2)	xxxx xxxx (8)

PRIMARY PUPILS' "SELF ASSESSMENT" RATINGS vs. TEACHERS' RATINGS

Frequencies with which teachers' ratings on the CAS schedule went up/stayed the same or went down between 1984 and 1986, and frequencies with which pupils' Repertory Grid ratings went up/stayed the same or went down between 1984 and 1986, cross-partitioned to display instances of agreement and disagreement.

I.E. (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxxx xxxxx (10)	xxx xxx (6)
down	x (1)	xx (2)

CO-OPERATIVE BEHAVIOUR

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx xxx (6)	xxxx xxxx (8)
down	xx (2)	xxx (3)

LEARNING SKILLS

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx xxxx (8)	xxx xx (5)
down	xxx (3)	xxx (3)

Control (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx xxx (7)	xxxx (4)
down	xxxx (4)	xxxx (4)

CO-OPERATIVE BEHAVIOUR

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx (3)	xxxx xxx (7)
down	xxxx (4)	xxx xx (5)

LEARNING SKILLS

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx (3)	xxx xxx (6)
down	xx (2)	xxxx xxxx (8)

SECONDARY PUPILS' "WISHED FOR" RATINGS vs. TEACHERS' RATINGS

Frequencies with which teachers' ratings on the CAS schedule went up/stayed the same or went down between 1984 and 1986, and frequencies with which pupils' Repertory Grid ratings went up/stayed the same or went down between 1984 and 1986, cross-partitioned to display instances of agreement and disagreement.

I.E. (N = 19)	Control (N = 19)

SOCIAL CONFIDENCE

I.E. (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx xxxx xxxx (12)	xxx xx (5)
down	(0)	xx (2)

Control (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxxx (4)	xxxx (4)
down	xxxxx xxxx (9)	xx (2)

CO-OPERATIVE BEHAVIOUR

I.E. (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx xx (5)	xxx xx (5)
down	xxx (3)	xxx xxx (6)

Control (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx (3)	xxxx (4)
down	xxx xxx (6)	xxx xxx (6)

LEARNING SKILLS

I.E. (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx xx (5)	xxxxx xxxx (9)
down	xx (2)	xxx (3)

Control (N = 19)

Pupils' ratings	Teachers' ratings: up/same	Teachers' ratings: down
up/same	xxx (3)	xxxxx xxxx (9)
down	xx (2)	xxx xx (5)

SECONDARY PUPILS' "SELF ASSESSMENT" RATINGS vs. TEACHERS' RATINGS

Frequencies with which teachers' ratings on the CAS schedule went up/stayed the same or went down between 1984 and 1986, and frequencies with which pupils' Repertory Grid ratings went up/stayed the same or went down between 1984 and 1986, cross-partitioned to display instances of agreement and disagreement.

I.E. (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxxxx xxxx (9)	xxxx xxx (7)
down	xxx (3)	

CO-OPERATIVE BEHAVIOUR

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxxx (4)	xxx xxx (6)
down	xxxx (4)	xxx xx (5)

LEARNING SKILLS

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxxx (4)	xxxx xxxx (8)
down	xxx (3)	xxxx (4)

Control (N = 19)

SOCIAL CONFIDENCE

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxxxx xxxxx (10)	xxx xx (5)
down	xxx (3)	x (1)

CO-OPERATIVE BEHAVIOUR

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxx xx (5)	xxxx (4)
down	xxxx (4)	xxx xxx (6)

LEARNING SKILLS

Pupils' ratings \ Teachers' ratings	up/same	down
up/same	xxx (3)	xxxxx xxxx (9)
down	xx (2)	xxx xx (5)