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Mental retardation

- Children with mental retardation of ORGANIC origin tend to show greater intellectual impairment than those with a FAMILIAL AETIOLOGY, who are typically of lower social class or have experienced environmental deprivation.
- Mentally retarded children are often slow at learning because of a lack of experience at learning, because of inexperience with social rewards, and because of learned helplessness.
- Retarded children can often be helped by BEHAVIOUR MODIFICATION in which a problem is IDENTIFIED, a GOAL set, BASE-LINE BEHAVIOUR measured, a specific INTERVENTION is used to modify the behaviour and its CONSEQUENCES monitored.
- Beneficial behaviours can be increased in frequency by positive reinforcement, most successfully using either TOKENS as secondary reinforcers, or by means of SOCIAL REINFORCERS.
- Successful reinforcers are CONTINGENT, IMMEDIATE, CONSISTENT and CLEAR.
- Deleterious behaviours can be decreased in frequency by a careful use of PUNISHMENT, often in the form of TIME OUT, which should be administered in small, frequent amounts.

One in forty of the population is MENTALLY RETARDED (the preferred term, which has replaced mental subnormality or deficiency which have pejorative overtones). Definition is not easy, although that of the American Association on Mental Deficiency (AAMD) is probably satisfactory:

> 'Mental retardation refers to significantly sub-average intellectual functioning resulting in or associated with impairment in adaptive behaviour and manifested during the developmental period'.

Notice the separate emphases on *intellectual functioning*, social or *adaptive behaviour*, and on the *developmental period*. In practice, retardation is often defined solely in terms of an IQ of two or more standard deviations below the mean for age (i.e. less than 70). Although apparently arbitrary, the criterion is useful in practice, broadly separating those in need of care and attention from those able to live a normal life; nevertheless, it must be emphasized that half of the

retarded will marry, have jobs, and live in the community. Severity of retardation is classified as MILD (IQ 50–70), MODERATE (IQ 35–50), SEVERE (IQ 20–34) and PROFOUND (IQ less than 20). Retardation is also defined legally in many countries, and Figure 31.1 summarizes the terminology of successive Acts of Parliament in the UK. The MENTAL HEALTH ACT OF 1983 defined both 'MENTAL IMPAIRMENT' and 'SEVERE MENTAL IMPAIRMENT', the latter being:

> 'a state of arrested or incomplete development of mind which includes severe impairment of intelligence or social functioning *and is associated with abnormally aggressive or seriously irresponsible conduct on the part of the person concerned*' (my italics).

A key innovation of this Act is that retardation alone is not sufficient for compulsory detention in hospital, instead *impairment* is required, thereby restoring a number of civil rights to the majority of the mentally handicapped.

Mental retardation is also classified aetiologically into two major groups. Some 25 to 50% of retardates show ORGANIC aetiology, with over 200 causes being described, broadly grouped into PRENATAL (e.g. chromosomal problems, such as Down's syndrome and fragile-X syndrome, genetic defects, and teratogenic syndromes, such as intrauterine rubella infection), PERINATAL (e.g. intrapartum cerebral anoxia), and POSTNATAL (e.g. secondary to meningitis, encephalitis, or head injury). The remaining 50 to 75% of cases are described as FAMILIAL AETIOLOGY, mostly being the tail of the normal distribution of IQ (essentially a poor deal in the lottery of polygenic inheritance) or, more rarely, environmental deprivation. The two aetiologies differ in IQ, familial retardation mainly being mild, while organic retardation is often severe (Fig. 31.2); they also differ in many other features (Fig. 31.3), the most important being that organic aetiology comes from all social classes, whereas familial aetiology arises principally in social class IV and V, where mean intelligence is lower and environmental deprivation greater.

By definition, the mentally retarded are less able to carry out intellectual tasks. The reasons are complex, and two theoretical positions can be distinguished. DEVELOPMENTAL THEORIES say that intellectual growth is simply delayed, with slower progression through the same stages as the non-retarded child, and hence a lower final level. DIFFERENCE (or DEFICIT) THEORIES say the retarded are not just quantitatively different but differ qualitatively, having specific problems with some aspects of cognition, such as language, attention, or sensory processing, and developing differently to non-retarded children. Although controversial, current consensus sees familial retardation as developmental and organic retardation as due to deficit.

Care must be taken to distinguish two possible reasons for slower

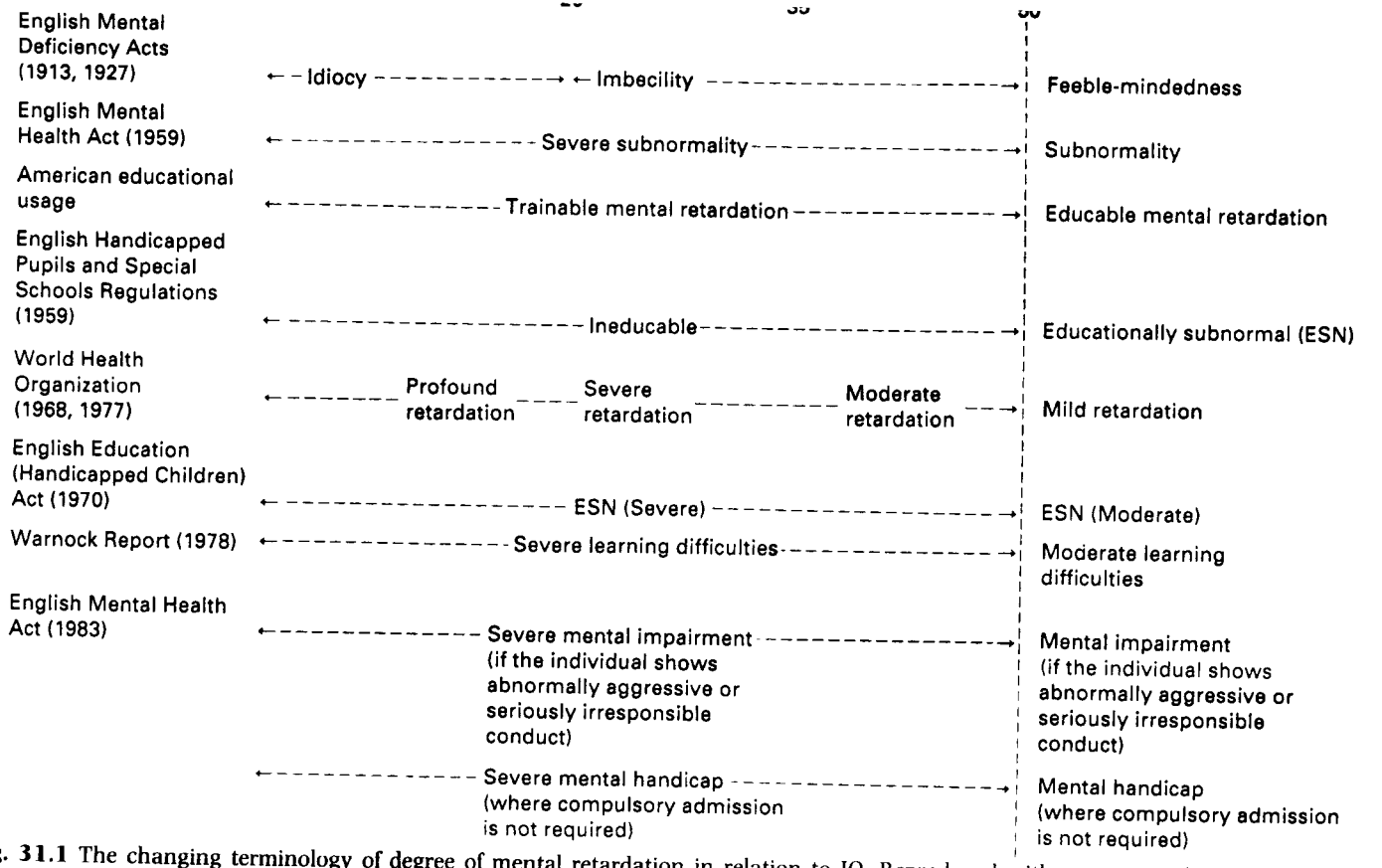

Fig. 31.1 The changing terminology of degree of mental retardation in relation to IQ. Reproduced with permission from Clarke A M, Clarke A D B and Berg J M (1985), *Mental deficiency: the changing outlook*, 4th edn, London, Methuen, 40.

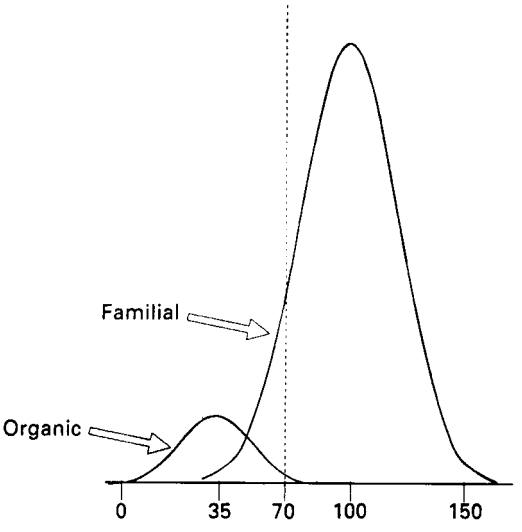

Fig. 31.2 Typical distributions of intelligence in organic and familial mental retardation, showing how the familial group forms the lower end of the population distribution, whereas the organic group forms a separate overlapping distribution. Adapted from Zigler E and Hodapp R M (1986), *Understanding mental retardation*, Cambridge, Cambridge University Press, 73.

learning. Averaged rates of learning in normal and retarded children may suggest that the retarded learn more slowly. That however is not necessarily the case. *When learning starts* it may be as fast as in controls, differences being in the time taken to start learning; if such results are plotted backwards in time from a criterion of success then rates of learning can be seen to be similar in the two groups.

Slowness in starting to learn is caused by several factors, not all cognitive. Retarded children are often surprisingly environmentally and socially deprived, partly due to institutionalization, but also occurring in those not in institutions. They are inexperienced at learning, and unused to social reinforcement, such that social reinforcement in an experimental situation often distracts attention, rather than assisting the task. Retarded children often also learn they are unable to succeed at tasks, this LEARNED HELPLESSNESS becoming greater with age as more failure is experienced.

The social deprivation experienced by retarded children itself partly reflects the child's influence upon its family. Parents of retarded children often mourn after the diagnosis is made, feeling guilt and a sense of failure for not producing a normal child, and being frustrated at the lack of educational progress. Compared with control groups the parents are more often depressed, are more preoccupied with their children, have diminished self-esteem, and greater problems in handling anger, the latter partly accounting for an increased risk of child abuse. Coping by families is improved if the parents are financially well off, if both parents are present, if the marriage was stable before the child's birth, and if there is a support network from family and friends. The material consequences of a retarded child should also not be forgotten, a retarded child typically needing seven hours care per

	IQ	Organic 0–70	Familial 50–70
CLASSIFICATORY PRINCIPLE		Demonstrable organic aetiology	No demostrable organic aetiology. Parents have this same type of retardation
CORRELATES		Found at all SES levels	More prevalent at lower SES levels
		IQs most often below 50	IQs rarely below 50
		Siblings usually of normal intelligence	Siblings often at lower levels of intelligence
		Often accompanied by severe health problems	Health within normal range
		Appearance often marred by physical stigmata	Normal appearance
		Mortality rate higher (More likely to die at a younger age than the general population)	Normal mortality rate
		Often dependent on care from others throughout life	With some support can lead an independent existence as adults
		Unlikely to marry and often infertile	Likely to marry and produce children of low intelligence
		Unlikely to experience neglect in their homes	More likely to experience neglect in their homes
		High prevalence of other physical handicaps (e.g., epilepsy, cerebral palsy)	Less likely to have other physical handicaps

Fig. 31.3 Differences between mental retardates with organic and familial aetiology. Some individuals cannot reliably be placed in either of the two groups and would therefore be classed as 'Undifferentiated'. Adapted from Zigler E and Hodapp R M (1986), *Understanding mental retardation*. Cambridge. Cambridge University Press. 53.

day, and considerable financial expenditure; families with retarded children fail to show the typical social and economic upward mobility seen in parents entering middle age.

Help for the retarded takes many forms, although in general there are unlikely to be 'miracle cures' (despite occasional claims in the popular press). Prophylaxis is successful in rare cases, such as a phenylalanine free diet in phenylketonuria. Physical treatments have little role. A controversial exception is partial glossectomy to reduce the bulky protruding tongue in Down's syndrome, thus allowing the mouth to close, improving speech and language, preventing dribbling, and producing a more normal appearance which diminishes stereotyping and discrimination by adults and children, and allows more normal social interactions.

Appropriate education for retarded children is required by law in the UK, and frequently this is a special education in institutions specializing in the needs of the retarded. Some carefully selected children (Figure 31.4) benefit from MAINSTREAMING, education in a normal school with ordinary children, a process that also benefits the normal children, by demonstrating the range of human variability, and reducing subsequent negative attitudes towards retardation.

For moderate and severe retardation much benefit is attained through programmes of specific BEHAVIOUR MODIFICATION. Although far from confined to the treatment of mental retardation, this is a convenient place to describe these important techniques in detail.

The mentally retarded present many problems of practical management for carers, be they parents, teachers or nurses. Some absent behaviours could help the child, allowing more integration and benefit from society; examples are toilet training, ability to feed or dress, and improved language use. Other behaviours that are present are deleterious, such as temper tantrums, masturbation, or faeces smearing, and can be life-threatening, as with compulsive desires to climb or jump, head-banging or self-mutilation. Changing these behaviours is not easy in the absence of sufficient intellectual or linguistic skills for psychotherapy or reasoning, so that the only practical techniques are BEHAVIOUR MODIFICATION or BEHAVIOUR THERAPY, using the principles of learning theory, and especially of operant conditioning. Many techniques are now available and a few will be described here, emphasizing the principles of practical behaviour change.

Engineering human behaviour is similar to other forms of engineering, beginning with an objective description of the problem, and of the desired end product; a hypothesis is then proposed to explain the aberrant behaviour, and the hypothesis tested by implementing a process of change; and finally the outcome is evaluated to assess success or otherwise. Probably the key improvement over informal approaches to behaviour change (as practised by parents and teachers for generations) is the emphasis upon objective measurement of

A child should be mainstreamed	Caution should be used in considering mainstreaming
If the child is young and the problem has been identified rather early in the school year.	If the child is older and the problem has continued unimproved for some time in the regular class.
If the child's problem is mild and not readily apparent outside of the school context.	If the child's problem is severe and pervades other areas of the child's life.
If the child's problem is limited to a single area of functioning.	If the child's problems are multiple (e.g. mild retardation *and* a behaviour problem).
If remediation of the child's problem does not require complicated equipment or materials.	If the child's condition requires complicated remedial equipment or teaching methods.
If the child appears to have friends or the ability to develop supportive friendships with normal children.	If the child has had repeated difficulty in developing friendships with nonhandicapped children.
If the regular classroom contains less than 25 or 30 children.	If the regular classroom contains more than 30 or 35 children.
If the child's regular-class teacher appears knowledgeable and willing to deal with the child's problem.	If the child's teacher appears to be unwilling or grossly unable to continue working with the child.
If the child's family appear to be willing and able to deal effectively with his or her problem.	If the child's family appears to lack extensive support for dealing with his or her problem.

Fig. 31.4 Criteria for differentiating retarded children for whom mainstreaming is likely to be successful from those for whom it will probably be unsuccessful. Adapted from Forness S R (1979). *Psychology in the Schools*, **16**, 508–14.

behaviour, so that it can be seen directly whether a manipulation has worked, and if not, change it.

Programmes for behaviour modification must be tailored for each individual problem and person, there being no 'off-the-peg' solutions, although general techniques sometimes transfer, although not always successfully if applied uncritically.

The first, most important step is to IDENTIFY THE PROBLEM and SELECT A TARGET, which should be realistic, within the ability range of the child. Since problems do not exist in a vacuum but are part of a social world, the social situation may be a part or even the major cause of a problem, a behaviour occurring only in some places or with certain individuals. Identification of the problem requires MEASUREMENT, the child's behaviour being closely observed over an extended period of days or weeks, to establish a BASE-LINE level before intervention. Measurement uses many techniques, from simple checklists (e.g. Fig. 31.5), through observational methods derived from ETHOLOGY (the study of animal behaviour), assessing the timing and frequency of specific EVENTS in a SAMPLING PERIOD (e.g. the number of tantrums occurring each hour between 8 am and 6 pm), or the DURATION of behaviours (e.g. how long does the child take to get dressed?), through sophisticated methods of INTERVAL RECORDING by a trained observer who by using a pre-coded schema on a keyboard records all the behaviours occurring in each 15 second epoch.

After the base-line has been recorded a programme of intervention can be devised. Different techniques are used for initiating behaviours or preventing them, and they will be considered separately.

Mentally retarded children need to know many skills, which they do not learn by imitation or modelling, examples being teeth cleaning, hair combing and use of knife and fork, the behaviours generally being completely absent, or else poorly formed and non-functional. The LAW OF EFFECT says behaviours change in response to their consequences, and hence behaviours are increased or improved by associating them with beneficial results; they are REINFORCED. Reinforcers are divided into three groups: PRIMARY REINFORCERS, such as food, drink, and warmth, which satisfy biological needs; SECONDARY REINFORCERS such as money or tokens without intrinsic effect, but which give access to primary reinforcers; and SOCIAL REINFORCERS, such as attention, praise, cuddling, hugging or smiling, which are perceived positively, but not because of their association with biological needs. Primary reinforcers are powerful but impractical, food, for instance, being messy and inconvenient, showing satiation, and requiring time out from training for its consumption. Sweets as reinforcers ('Smarties' being very popular) also cause obesity and dental problems if overused. In general, therefore, either social reinforcers or secondary reinforcers such as tokens are used. Most children rapidly learn that a token gives access to future rewards (be they sweets, television, games, or

A. Eating skills	Cannot	Can with help	Can by self but messy	Can by self neatly
Chews adequately				
Tries to feed self with fingers				
Eats with spoon				
Eats with spoon and fork				
Eats with fork alone				
Uses fork and knife				
Uses knife as pusher				
Cuts with knife				
Spreads with knife				
Drinks from cup				
B. Social training				
Finds own place and sits				
Sits still during meals				
Waits for others to finish				
Lays table				
Pours from jug				
Serves with spoon				
Carries plate				
Passes plates				
C. Behaviour problems	Often	Sometimes	Rarely	Never
Uses fingers unnecessarily				
Tips drink over				
Throws or tips food				
Grabs other people's food				
Regurgitates food				
Faddiness about food				
Bolts food				
Excessively slow				
Eats from plate with mouth				

Fig. 31.5 Example of an assessment form used in the monitoring of behaviour and self-care during feeding. Reproduced with permission from Carr J and Wilson B (1980), in Yule W and Carr J, Eds, *Behaviour modification for the mentally handicapped*, London, Croom Helm, 116–32.

swimming), and then behaviours may be reinforced by the tokens themselves, which are clean, easy to distribute, do not satiate, and require no time for consumption. TOKEN ECONOMIES also provide social training in handling those important tokens that motivate so much normal adult behaviour, money. Tokens may also reinforce group behaviour by rewarding individuals only if the entire group has acted in a particular way. Finding a reinforcer for a particular child is usually straightforward, since usually one can ask the child what they like, look at what they like doing, or present alternatives and observe preference. Occasionally no reinforcer is obvious and problems result. A solution uses the PREMACK PRINCIPLE, in which the child is left on its own and observed; any behaviour performed frequently, even if stereotyped, such as plaiting string or clapping hands, can be presumed to be intrinsically rewarding, and access to the behaviour will act as a reinforcer. Occasionally, observation reveals an undesirable behaviour such as masturbation or head-banging; that also can sometimes be used to gain behavioural control, and then itself phased out. All the reinforcers thus far have been positive; negative reinforcers, the removal of aversive events, find little practical use in behaviour modification.

If the desired behaviour occurs spontaneously then its frequency can be increased by reinforcement, successful reinforcement having the four features of being CONTINGENT, occurring only together with the target behaviour, being IMMEDIATE, as soon as the target behaviour has occurred, being CONSISTENT, and being CLEAR, so that there is no doubt about the relation between behaviour and reward. CONTINUOUS REINFORCEMENT, when each occurrence of the behaviour is reinforced, is more successful in the early stages of training than INTERMITTENT REINFORCEMENT, but gradually transfer is made to intermittent schedules, such as the variable rate schedule (see Chapter 3), which are more resistant to extinction, and correspond more closely to the vicissitudes of the real world.

Very often a behaviour is desirable but not even occasional reasonable efforts are made at performing it. SHAPING is used, so that at first crude approximations are rewarded, and then reinforcement gradually given only for the desired components; thus a child can be taught to use a spoon, firstly by rewarding for touching the spoon, then for holding or picking it up, then for holding it the right way up, followed by rewards only if the spoon is held near the mouth or put in it; and so on. In some sense this is how all children have learnt to use a spoon, using social reinforcers from parents, coupled with imitation. Some behaviours have the additional complication that the individual components are inherently simple, but the components must be assembled in the correct sequence; there is little point in brushing your teeth without firstly putting toothpaste on the brush. CHAINING is trained by rewarding for partial sequences, with reinforcers

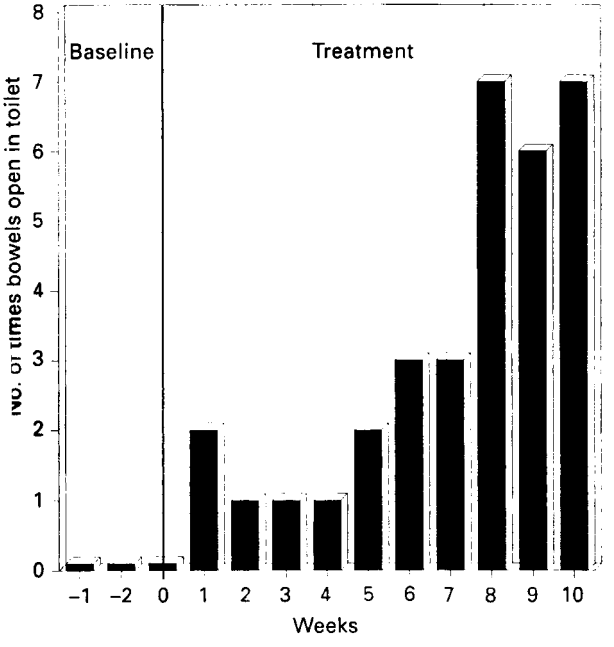

Fig. 31.6 The treatment of faecal soiling by the use of positive reinforcement with tokens in a five year old mildly mentally handicapped girl. Redrawn with permission from Wilson B (1980), in Yule W and Carr J, Eds, *Behaviour modification for the mentally handicapped*, London, Croom Helm, 135–50.

being given for longer and longer sequences. BACKWARD CHAINING, teaching the last item of the sequence first, is generally more effective than FORWARD CHAINING, when the steps are taught in their natural order. Sometimes children must be trained to GENERALIZE behaviour if, for example, toilet training is successful only at home but not at a nursery; alternatively they may need to learn DISCRIMINATION, that behaviours should only occur in response to specific stimuli, so that, for instance, food is only eaten at a dinner table at meal times, and not whenever it is seen, be it in the kitchen or the supermarket. Programmes of reinforcement usually provide such refinements with relative ease.

Figure 31.6 shows a successful behaviour modification programme for a five year old mentally retarded child who did not use a toilet for defecation (although she did use it for micturition), and instead soiled herself, ENCOPRESIS). Initially the mother taught her not to be afraid of the toilet by rewarding her with sweets whenever she sat on the toilet seat. However, she still did not defecate in the toilet, and after a baseline recording when the mother recorded where and when the child defecated (pants, floor, bed, toilet) a token system was instigated by the psychologist simply explaining to the child that each week they would visit the shops and buy an ice-cream or sweets if the child had collected enough 'stars', one star being given for each successful bowel opening. As Figure 31.6 shows, the programme was rapidly successul. However, encopresis can be particularly resistant to training, in part because the stimulus of rectal distention occurs infrequently each day;

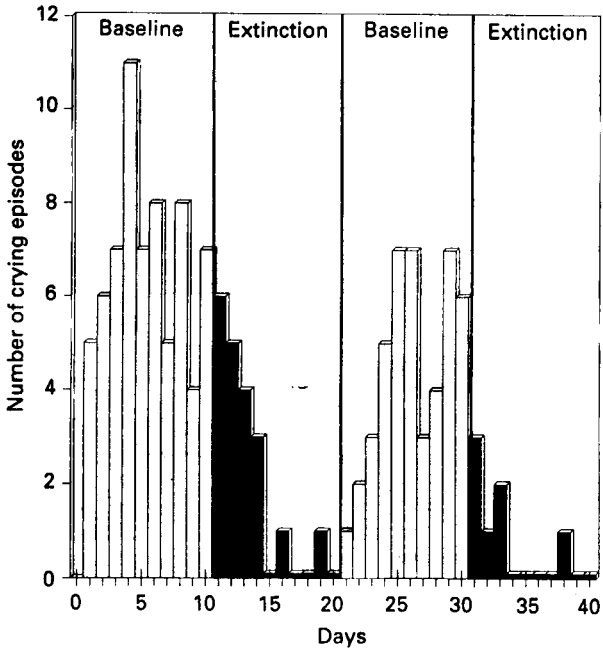

Fig. 31.7 The role of inadvertent social reinforcement in maintaining crying and tantrums in a four-year-old, and its extinction by ignoring of crying episodes. Redrawn with permission from Hart, Allen, Buell, Harris and Wolf (1964). Effects of social conditioning on operant crying. *J Exp Child Psychol.* **1**, 145–53.

that problem can be solved by administering a mild purgative. Similarly administration of oral fluids helps bladder control training by increasing the rate of bladder distention.

Decreasing a deviant or undesirable behaviour is more problematic than increasing the rate of a behaviour. Occasionally behaviours can be removed by altering the environment, by changing stimuli associated with the behaviour, or by gradually removing the reward associated with the behaviour. A child was excessively attached to a blanket that it would drag around all day, having tantrums whenever it was removed, and not taking part in more constructive educational activities; the mother was advised to cut a small portion from the blanket each night so that after a few weeks the child carried round only a tattered bundle of threads, in which it then lost interest.

Some behaviours can be removed by EXTINCTION. Behaviours must be maintained by being rewarded, so that if the reward is found and removed then the behaviour will decrease. Rewards are often social reinforcers, since behaviours attract attention or care from parents and carers. Figure 31.7 is an example of a four-year-old boy crying continuously at nursery school, as is seen in the base-line observations. Careful study showed crying to be rewarded by extra care and attention from staff, so that during extinction, staff were instructed to ignore the child, when the behaviour rapidly disappeared. In a test period, care and attention were reintroduced in response to crying and rapidly produced increased crying, after which a second extinction

period eliminated the behaviour even more quickly than before. Although often successful, extinction has the problem of being slow (especially when compared with punishment), particularly when previous reinforcement has been on an intermittent schedule; there is also often an EXTINCTION BURST, which is very unpleasant for carers, and sometimes dangerous for the child with behaviours such as head-banging. It also fails if reward is intrinsic, and so cannot be dissociated from behaviour, as in masturbation. Finally, it is practically difficult to ensure all carers produce the appropriate behaviour, such as ignoring *all* tantrums; a single failure will result in continuation of the behaviour, perhaps directed specifically at the most vulnerable member of staff.

Much more successful at removing unwanted behaviours is PUNISHMENT (used in the technical sense of an action that decreases the frequency of a behaviour, rather than simply as a coercive, moral or physical force, or threats of such behaviour). Corporal punishment is actually rarely used, partly because it is not very effective (being associated with positive reinforcers unbeknown to the administrator, such as elevation of status in the eyes of peers), partly because it degrades the carers, distracting them from their role of *caring*, and partly because of ethical problems within institutions. The most used punishment is TIME OUT (strictly, 'time out from positive reinforcement'), in which a pleasant stimulus is removed. A child misbehaving at dinner table is removed for several minutes, after which they are allowed to return. Similarly, televisions or gramophones are turned off, usually for a few minutes for each transgression, small repeated applications of punishment being more successful than a single large punishment. The events removed must genuinely be positive reinforcers; a child who is frightened of other children and misbehaves to attract teacher's attention will be *rewarded* by being placed outside the classroom, and the behaviour will increase in frequency. Occasionally, restraint is used as a punishment, such as a child's arms being pinioned to its side for 20 seconds or so, by an attendant or, very rarely, by a chair with straps. The latter is counter-productive in self-mutilating children since the restraint is a positive reinforcer to such children and hence increases the rate of the behaviour. In exceptional cases which involve life-threatening self-destructive behaviours electric shocks are used with effect. The crucial thing about punishment in behaviour modification is that it is *not* being used as a moral instrument, as a form of retribution or of 'just desserts', and there is no intention of making the punishment be proportional to or seem to atone for any supposed 'crime'. Punishments are small and mild but used frequently, in ways directly contingent upon behaviour, with the express intention of decreasing those behaviours. A final method of removing undesirable behaviours is DIFFERENTIAL REINFORCEMENT OF OTHER BEHAVIOURS (DRO). Since a child can

carry out only one task at a time, if more desirable behaviours are reinforced and increase in rate then it is a necessary consequence that undesirable behaviours will decrease in frequency.

Behaviour modification can dramatically improve the life-style and social skills of mentally handicapped children (and many other groups of individuals), and make life more pleasant for them and their carers; nevertheless it must be carried out systematically, and with careful monitoring by the team of carers, as an integral part of caring. Common sense and intuition are no substitutes in psychology, or elsewhere, for the careful and systematic analysis of problems and the consequences of actions.