patient attendances over a period of 18 months. Only two further minor attacks of dysphasia have occurred, each clearing rapidly in a few minutes.

Comment

These cases are further examples of the steal syndrome. In Case 1 it seems probable that sufficient blood was diverted from the left hemisphere during the attacks of arm exercise to cause transient ischaemia. Removal of the block in the innominate artery effectively abolished the attacks of hemisphere and brain stem ischaemia, while leaving the attacks of right retinal ischaemia unchanged. In Case 2 transient cerebral ischaemia was associated with a vertebral arteriovenous fistula. It cannot be stated with certainty that the vertebral fistula was the only cause of the attacks, since the patient had evidence of widespread cerebral vascular disease, including stenosis of the carotid artery. Nevertheless, the symptoms appeared during the period of growth of the fistula and improved after the fistula closed.

The intermittency of symptoms suggests that the haemodynamic situation produced by the fistula is unstable. There was no evidence of reflux down the distal portion of the vertebral artery at the time of arteriography though the volume of forward flow was certainly much reduced. Possibly other factors, such as pressure from cervical osteophytes on the vertebral artery, vasodilatation in extracerebral tissue, and systemic hypotension, may have been the precipitating factors.

Though spontaneous cure of arteriovenous fistula is recorded (Shumacker and Wayson, 1950) the unexpected result of the second arteriogram is unexplained. The association of the two seems unlikely to be due to coincidence. The irritant effect of the injection medium (diatrizoic acid) on vascular endothelium causing thickening or on the muscularis causing temporary contraction of a degree sufficient to close a small fistula are possible explanations.

Reference

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Operant Therapy for an Abnormal Personality

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This report concerns a pilot operant experiment in which tokens were used to shape the behaviour of a patient with a severely abnormal personality. It was employed as a last resort before transferring her to a chronic institution. The patient was rehabilitated into the community within four months and was working one year later despite residual problems.

Case Report

The patient, a 12-year-old girl, was referred to the children's out-patient department at the Maudsley Hospital in 1961. She had always been shy and nervous, but immediately after her menarche a year earlier her personality changed. She became vegetarian, mute at school, and more aggressive to her mother and peers, especially girls. She ignored males, neglected her appearance, and swore excessively. After 15 months in the adolescent unit of the Bethlem Royal Hospital she was discharged to a school for maladjusted children. She returned to the care of her mother in 1963, but in 1964 again went to live at a school for maladjusted children. Depression, negativism, and a passive lesbian relationship with a teacher led to weekly analytic psychotherapy in the out-patient department in 1965-6 and in the Maudsley Day Hospital in 1967-8. She made little progress. Two applications for her admission to chronic mental hospitals were rejected. When transferred to the Bethlem Royal Hospital in February 1969 (aged 20) she complained of depression, fatigue, restlessness, screaming spells, and thoughts of killing her mother. She had not been out alone in

eight years, had never held a job or had friends, was lesbian, and dressed in masculine clothes.

For six months she had chlordiazepoxide, amitriptyline, and intensive supportive treatment. She became less tense and started to wear feminine clothing, but refused to do occupational therapy, eat with patients, or attend the consultant's rounds or patients' meetings. She never left the hospital, was quiet, sullen, depressed, and awkward, swore often, and complained of extreme fatigue. Intelligence was average. The diagnosis was a severely abnormal personality with complicating obsessions and agoraphobia.

Her mother, aged 50 in 1969, worked as a machine operator. Her father was an alcoholic drifter separated from his legal wife. As a child the patient lived in a series of deteriorating flats with various aunts and sitters while her mother worked.

TREATMENT AND RESULTS

On 12 August, 1969 an operant programme was begun. The patient was told that complete undisturbed bed rest was necessary as long as she felt tired. When she overcame her tiredness, as shown by talking to people and being helpful, she would earn tokens. With these she could buy time out of her room and do as she wished until all tokens were spent, when she returned to her room. She was alone, without books, radio, or visitors, and she ate her meals there. Initially a nurse visited two minutes every hour so that she could earn tokens by conversation. A psychiatrist or psychologist visited the patient daily for 15 minutes. Progress was reviewed each day and the reinforcement schedule adjusted if necessary. All ward staff met twice weekly with the therapists, who also telephoned the night staff nightly.

First conversation and constructive activities were reinforced systematically with tokens and praise. During the first week one token was earned for each second of conversation; one token bought three minutes outside the room. The second week one token was earned for 30 seconds' speech and one token for one minute of activities, such as helping with meals or working in occupational therapy; a bonus was added if tasks were initiated by the patient or done outside the ward. From the 15th day one token was earned for one minute's conversation. From the start of the programme reinforced behaviour (speech) increased steadily (Fig. 1).

Progress slowed in October when tokens were made contingent on walking increasing distances from the hospital. On 13 October discharge was threatened unless she did two walks daily. She then walked increasingly further from the hospital, though still frightened when out alone. This fear gradually decreased (Fig. 2). By the end of October she was speaking freely, so on 11 November (day 92 of the programme) reinforcement of speech was discontinued (see Fig. 1). Speech did not decrease after this.

In December increasingly longer bus rides were rewarded systematically, as was unpaid part-time work in a local store. A paid

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FIG. 1—Increase in conversation and constructive activity during token economy programme; (a)–(j) refer to changes in contingency schedules.

job was found at an electronics factory eight bus stops from the hospital. Despite regular bus rides, at the end of January she was still tachycardic during a fantasy of a bus ride. She was discharged to a hostel in mid-March.

One year after the end of the programme the patient remained improved in sociable conversation and activity. Her manner was much pleasanter and angry outbursts were rare, but she was still "wooden" and lacked spontaneity. She was working and travelling regularly. She initiated new behaviour, buying herself clothes, going out with friends, and visiting her ex-hospital. Her obsessive thoughts of harming her mother or herself receded (Fig. 2).

Comment

A patient with a severely abnormal personality who seemed destined for a chronic institution responded to operant shaping of her behaviour and became able to work and live outside hospital in a hostel. Nevertheless, at the end of the programme she still lacked initiative and required pressure to do anything new. Tokens were used to shape behaviour because they are convenient units of reward which can be finely graded and manipulated. In a "token economy" the therapists can systematically devalue "currency" and change "prices" to keep a patient improving in the desired direction.

A non-specific "Hawthorne effect" is unlikely to explain the results in this patient as she did not improve with consider-

FIG. 2—Course of treated and untreated phobia, obsessions, and depression.

able attention until the programme began. Improvement then occurred in behaviour which was selectively reinforced, while other behaviours remained unchanged. She did not go on buses until they were drawn into the programme, and she made no move to work until this, in turn, became a target behaviour. Sexual behaviour was never attended to and did not change. Graduated tasks within the patient's capabilities were the keynote at each stage, taking into account her interests and past behaviour.

Though operant treatment of this patient was time-consuming this was largely due to its novelty to nurses and doctors. A subsequent programme for another patient in the same ward was much easier to run successfully once the staff was trained. An operant approach deserves further exploration in other neurotic patients.

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