MEDICAL PRACTICE

Contemporary Themes

Which of you by taking thought can add one cubit unto his stature?

Psychosomatic Illness in Children: A Modern Synthesis*

JOHN APLEY

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My title, taken from the King James Bible, became rather more apt when I turned to the New English Bible of 1970. Here the word "thought" is more precisely translated as "anxious thought"; and it is the relation between anxious thought and stature, between emotional and bodily processes, that I am discussing.

This lecture commemorates Charles West, to whom children's hospitals and children owe so much. I cannot find that he used the word psychosomatic, though it was known in his time. Like Willis and Sydenham before him he did, however, describe patients with what today would be labelled psychosomatic disorders. When he did so, admittedly under the broad heading of Malingering, he logically ruled out organic disease. Since his time psychosomatics has turned from speculations to hard facts in this age of manicured medicine. It has a special appeal because it lends itself to the controls of biological science and to measurement. In Ryle's memorable phrase, we are learning to "measure the measurable, and make measurable the immeasurable."

If you are politely surprised to have listened so far without hearing a definition of psychosomatic illness, prepare yourselves for more. I do not propose to define the term.

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Bristol Royal Hospital for Sick Children, Bristol BS2 8BJ
JOHN APLEY, C.B.E., M.D., F.R.C.P., Consultant Paediatrician

Even though I use it I distrust it. It tends to perpetuate the illusory duality of mind and body associated with Descartes and his intellectual supermarket. There are no separate minds and separate bodies—only human beings. As children themselves might do, let me put this in a simple phrase: "The ill child is ill all over."

So "psychosomatic" will have to explain itself as we go along. But first I should like to savour with you a few words that describe the psychosomatic approach almost lyrically: "Listening to the child talking with his body." The poet? My friends and I thought it was Anna Freud, distinguished daughter of Sigmund Freud, himself (as Leo Rosten writes) "the Columbus of psychology, which still awaits its Euclid." Anna Freud, however, has charmingly denied the attribution, and I do not know the author's name.

Stature

By my definition the paediatrician is "a measuring doctor," and stature or height is undeniably his concern. Knowledge of the process of growth is still far from complete. Discussion used to turn on its "genetic inevitability" and its "inborn sequence"—such complacent phrases. But genes must enjoy the appropriate environment if they are to achieve their potential. It is now clear that many non-genetic factors can stunt growth. These factors may even be non-physical. Maternal deprivation¹ has now been linked with stunting of growth; what is called "deprivation dwarfism" occurs not only in institutions but in the home.

How could emotional factors check growth? In one or more of several ways, as by their effects on metabolism or on the hypothalamus, or by increasing cortisol secretion. It

has been reported that growth hormone production in the child can be depressed in a disordered family environment,² though at Bristol my colleagues D. Russell Davis, M. Hartog, and C. Grimaldi and I have been unable to confirm such abnormal growth hormone levels.

To our growth clinic at Bristol children are referred because their growth is stunted without any obvious cause. Most of the patients we see are short (below the third centile) and thin; they are charming miniatures with normal bodily proportions (fig. 1). Physical investigations (including growth hormone estimations in some) have proved negative in most cases,³ though in some a slight retardation of bone age occurs.

FIG. 1—Twelve-year-old girl under 3rd centile in height. Stunting becomes increasingly obvious with age.

There are abnormal findings, but they are not physical. They fall into two groups. Firstly, our studies confirm that a disturbed family environment¹ can retard growth. As I have written elsewhere, *"The child is a barometer of the family emotional climate."*

It is our second finding that was unexpected. In four-fifths of the cases there was no shortage of food but the child's eating was deficient and his diet often grossly abnormal. Bizarre feeding habits were almost the rule. Many of the children seem to exist largely on Coca-Cola and crisps, with a sprinkling of ice-cream or raspberry-flavoured Nesquik. Paediatricians might have known, remembering all those pink, plump children whose mothers complain sadly that "Hardly a morsel of food passes his lips." Some mothers' estimates of what their children eat obviously cannot be accepted, and we are going further with our dietary investigations. An American source⁴ rightly comments on an astonishing omission—that accurate dietary assessments are utterly lacking from previous reports on growth retardation. At long last, in the study of dwarfism, measurement is being applied—not only to the child's height but even to his diet.

Most of our stunted children do not get enough calories or proteins, though, of course, we do not claim that there are no other contributory factors. Not surprisingly, two deprivations go together—emotional and nutritional. It seems likely that a pattern of disturbed family relationships influences

the child so that he eats less and he grows less. In these instances stunting of growth is psychosomatic.

My colleague Professor Russell Davis remarks that we have not yet found a way to alter the distorted family pattern; but because we know it can alter itself, with good effect on the child's appetite and growth, we have hopes that guidance and advice could help. Treatment with growth hormone is useless where it is not deficient, but we are trying the effects of stimulating the appetite with cyproheptadine⁵ (Periactin) in a controlled trial.

If what I have had to say about growth is confirmed it will show that by taking thought doctors could influence their own therapeutic stature; and they may then be able to increase their patients' physical stature, so long as their patients are children.

For orthopaedic surgeons matters are simpler. Fig. 2 shows a girl with scoliosis treated by pelvis-halo traction. Even she did not gain a whole cubit, but she did gain 5 in (12.7 cm) in height—and infinite happiness.

FIG. 2—Pelvis-halo traction for scoliosis. The patient's apparent height was increased by 5 in (12.7 cm).

Obesity

Another parameter of growth is obesity. It provides an interesting contrast. Just as chronic under-eating can retard growth in height and bone age, so chronic over-eating can accelerate growth in height and bone age. There is no one single cause for the over-eating which results in obesity, but the over-eating often reflects the individual's mental attitude and reaction to living. "Simple" obesity—it is never simple—is a psychosomatic or psychosocial disorder, with mental and physical changes interdependent. It may have started at a critical or sensitive period, when the infant was given too much carbohydrate. I constantly hear of mothers who added starch to the baby's milk as early as the second or even the first week of life; because of the mother's attitudes, which reflect those of the society in which they and we live, the child's physique may be blown out for the rest of his life. Overfeeding in the first year of life can permanently increase the body's total number of obese cells⁶ and so play a part in lifelong obesity. How the increased number of obese cells

is matched with the individual's increased appetite remains to be worked out.

The natural history of severe obesity is typical of many psychosomatic disorders in several respects: (a) it runs in the family, (b) the pattern is set early, (c) it is chronic (or recurrent), (d) it may shorten life.

Age Influences

Turning from growth, in stature or weight, I do not intend to press on you a glossy catalogue of so-called psychosomatic diseases. I prefer, as a new approach, to discuss the influence of age and development. Do you recall your childhood fears? Just as fears have a chronology of their own, so have psychosomatic disorders.

At different stages in development the child's responses to stress are not necessarily the same. The periodic syndrome in childhood includes vomiting, fever, headache, abdominal pain, and probably limb pains.⁷ As the patient grows up vomiting and fever recede, while the pains may migrate to the head.⁸ Hammond⁹ found that out of 12 children with cyclical vomiting 8 grew up with migraine. The complaints may change with age but a common denominator persists. The symptoms are expressions of a reaction pattern to stress, which is usually part of a family pattern too.

From infancy to adolescence not only may the responses alter but so may the effective stresses alter. Asthma illustrates both. Often in asthmatic children a reaction which was seen mainly in the skin moves and the target organ becomes the bronchi; allergic stimuli may later come to be reinforced or even superseded by emotional ones.

In all illness we must be mindful of underlying processes; among the chronological changes of psychosomatic disorders we must persistently seek out "*the pain beneath the pain.*"

The gut is the main target organ of children's psychosomatic disease. Its disorders tend to range in time from vomiting to "3-month colic," the "irritable bowel syndrome," recurrent abdominal pain, and occasionally peptic ulcer. And, with us at all ages, there is constipation, that obvious subject for "a time and motion study."

A few examples of the peak periods at which psychosomatic disorders commonly occur are given below. I shall comment on two.

Peak Periods of some Psychosomatic Disorders

Infancy to pre-school	..	..	..	..	Vomiting, breath-holding attacks
School age	..	..	..	..	Enuresis, recurrent pains, tics
Puberty	..	..	..	..	Anorexia nervosa

The infant's soma behaves as if it and the mother's psyche together form one unit. Children's doctors know that repeated vomiting in the young infant may result from handling by a mother who is tensely anxious; when a placid nurse takes over, or when the mother is taught to relax, the vomiting stops.

An explanation for *bedwetting* (primary nocturnal enuresis) is that a severe disruption in the family occurs when the child is about 3 or 4 years of age. This, which was a clinical impression,^{10,11} has been confirmed statistically.¹² The child is disturbed emotionally at the sensitive period of development when he should be learning the physical skill of bladder control.

Among the age factors, or chronological determinants, maturation of the nervous system must be important. I suggest that some part is played also by social and cultural influences. No, I shall not start here a discussion on what are called sociopsychosomatic diseases. They all are.

Some Current Contributions

Just as neurology is being rationalized by neurophysiology, so psychosomatic medicine is being rationalized by psychophysiology. Psychosomatic medicine has advanced a long way since the early attempts to relate so-called disease entities to specific situations, personalities, or emotions; they are either entities nor specific.

The emotion most thoroughly studied is anxiety.¹³ We know from experience what widespread changes can occur in healthy people who are anxious. The mouth becomes dry, the palms damp, the heart beats fast, the pupils may dilate, pain or "butterflies" may be felt, bladder or bowel may empty. These changes, which are more pronounced and longer lasting in patients who are ill with anxiety, are largely mediated by the autonomic system.

Many have been measured. Anxious patients, even when they are at rest, show abnormally high levels of physiological activity. From this can be seen to stem two important consequences. Firstly, because they are already responding at a high level, anxious patients react to stimuli *less* than normal people do. Secondly, and for the same reason, they show impaired adaptation to the environment.

This is not just speculation. Both statements are borne out by studies of the reactions of the pupils.¹⁴ The pupil is an obvious though neglected end-organ for the measurement of automatic function. At Bristol we have investigated two main groups of children with psychosomatic disorders, one group with asthma and the other with recurrent abdominal pain; as controls we compared them with unaffected children.^{15,16} The pupil reactions were measured in the light and the dark, at rest and under stress (a hand placed in cold water). In the patients (a) the pupils tended to be larger, both in the rest condition and under stress, and (b) the changes in pupil size provoked by stress were less (fig. 3). I draw attention to an interesting observation. We have found a few mothers who had noticed that the child's pupils became larger at the start of an attack of abdominal pain, or at other odd times. One was a 7-year-old boy. When he was sitting in my out-patient clinic his pupils were of normal size. As he went from there to the pupillometry laboratory his pupils were observed to become steadily larger. They were very large indeed by the time he saw the gadgetry (fig. 4). When he was comforted and reassured they became smaller.

If abnormal pupil reactions reflect autonomic dysfunction we ought to know whether the dysfunction is familial. Dr. J. Robinson is currently measuring pupil reactions in the parents of my patients with asthma or recurrent abdominal

FIG. 3—Pupil sizes at rest and after stress (a) in a group of normal children and (b) in children with recurrent abdominal pain (R.A.P.), (c) in normal adults and (d) in parents of R.A.P. children who themselves have symptoms. (Note: discrepancy in sizes at rest between (c) and (d) is due to the normal decrease in size of pupils with the age of the subjects, because the age of the normal adults was considerably lower than of the symptomatic parents.)

FIG. 4—Widely dilated pupils with anxiety in 7-year-old boy.

pain. About 20 have been studied so far. In many of the parents who themselves have symptoms it looks as if autonomic dysfunction does indeed run in the family (fig. 3).

If autonomic dysfunction is familial, as psychosomatic disorders certainly are, and if it is accompanied by symptoms, we should not expect too much from medical treatment using present-day methods. Experience of psychosomatic disorders suggests this caution to be necessary. Let me illustrate from the "little bellyachers," the children with recurrent abdominal pains. In this disorder the emotional factors which MacKeith and O'Neill¹⁷ indicated have repeatedly been confirmed. At Bristol we have shown that only about one case in 20 has an organic basis; in 19 out of every 20 the pains are psychosomatic.¹⁸

I once wrote "*Little bellyachers grow up to be big bellyachers.*" This gloomy conclusion was based on a study in which 30 children, virtually untreated, were followed into early adult life. Now at last we have been able to complete a similar long-term follow-up survey, again of 30 little bellyachers.¹⁹ But these had been treated by us with reassurance based on sympathetic listening, explanations, and discussions. For want of a better term this is what we call informal psychotherapy. A cynic might describe any form of psychotherapy not as the laying on of hands but as the laying back of ears; but informed listening does play a valuable part.

Comparing the two groups I have to report that the proportions in whom abdominal pains ceased were the same. It is true that the treated children who lost their pains did so more quickly than the untreated ones. It is true also that rather more of the treated children were free from other symptoms when they grew up. But the main difference was that nearly all those who had been treated, unlike those who had not been treated, were enjoying a normal life, even la douceur de vivre. I infer that while we cannot at present abolish the underlying disorder, we can help the patients to understand, to minimize their own reactions, and to adapt satisfactorily. I hope we shall be able to do better for the pains as such, and prevent the patients from becoming recidivists, when we learn to treat the underlying dysfunction.

Here I must digress to the fascinating part played by conditioning and the autonomic, involuntary nervous system in psychosomatic processes.

Conditioning

The word autonomic means "a law unto itself," while involuntary means "not under the influence of the cortex." And yet the autonomic system is capable of being taught. In

the past few years Neale Miller²⁰ has brilliantly illuminated the subject with his experimental work.

The method used is trial and error learning or *operant conditioning*. Unlike Pavlovian conditioning it is an active learning process. In this process the behaviour of the subject changes; it does so as a consequence of his own reactions. The changes may be built up step by step, using preferential reinforcement, even to a stage at which highly complex, even abstract behaviour can be introduced.

By operant is meant any behaviour that modifies the environment. Everyone who is a parent, even an uncle, knows that the infant who smiles or who begins to say Da-da modifies and operates on his environment. What is his reward? He may get ecstatic praise and a warm hug, which themselves act to reinforce his smile or his sounds. So there will be more and bigger smiles, more and bigger words—what we rather ponderously call the development of social behaviour or of linguistics.

Miller's early work was with animals, using food and other rewards. He showed that by preferential reinforcement various functions might be increased or, alternatively, decreased to order. Salivation, heart rate, blood pressure, blood flow could be altered. Such is the power of rewards to rats. Miller claims that humans are just as smart as rats. In humans successes have been claimed by other investigators in modifying the blood pressure or the heart rate, in improving cardiac arrhythmias or migraine.

I am intrigued by the rewards which induced such changes in our fellow humans. An obvious one was money; volunteers might leave the laboratory with both a lowered blood pressure and a raised bank balance. Some students acted as subjects. They were duly rewarded, perhaps with a slice of American cheesecake or a photograph of an American blonde from *Playboy*.

Something that may prove of great therapeutic importance seems to be emerging from experience of operant conditioning. It is not essential that the reward offered should be a tangible one; equally effective as a reward may be a symbol of success, such as a coloured light or a musical tone, or even the knowledge itself of success. What does all this mean? Psychosomatic disorders, largely dependent on the autonomic system, are learnt or conditioned. A learning process is always involved in the development and in the maintenance of the disorders. Since they have been learnt may they not be *unlearned*?—since conditioned why not *unconditioned*, by operant methods?

Operant conditioning in humans is still under trial and there may be unsuspected snarls or snags. Reports of control series unfortunately are rare and one cannot yet predict how lasting will prove any induced changes. None of the reports I have seen refer to children. Yet it seems reasonable to suggest that a learning process—or equally an unlearning process—should be easier to observe in childhood and easier to modify. What is an adult but an obsolete child?

I wonder if operant conditioning or preferential reinforcement may help to explain why psychosomatic disorders are so common in our present-day Western society? A hundred years ago if the child had a tummy-ache it would be unusual for him even to be seen by a doctor. Nowadays he will be seen and fussed. He used to be dosed with old-fashioned, nasty castor oil; now he is lured with new-fashioned medicine tasting like ice-cream. He will be kept away from school—is not this preferential conditioning to feel pain? He may be kept away yet again to see a specialist. Perhaps all this is not the best treatment if he is suffering from a passing anxiety state, or even a passing green apple?

What we need to find and exploit are effective rewards for *not* feeling pain or other psychosomatic symptoms. We should be able to make schooling not too stressful, even attractive. I am experimenting with deconditioning using intangible rewards, like telling a girl patient how much prettier

she is becoming now that the pains are less frequent—and what I say is accurate too.

Expectancy (E) Waves

My last digression is an analogy that is almost an animated cartoon. It comes from electroencephalography. Over a wide area of the cerebral cortex slow changes of electrical potential occur. Their importance lies in the fact that they are more than isolated physical phenomena; they are related to the person's mental state and to his involvement with the environment.

What has become the best studied of these remarkable phenomena was discovered by Grey Walter and his colleagues.²¹ It can be called the expectancy wave or E wave (contingent negative variation or C.N.V.) (fig. 5). What happens? Two stimuli are applied. First comes a warning stimulus, then comes the second or imperative stimulus. The subject knows that he must respond as quickly as he can to the second stimulus. He has to take a decision to do something (like pushing a button). The E wave appears in *anticipation* of the second stimulus.

FIG. 5—Expectancy (E) wave. First stimulus by clicking sound, second stimulus by flashes of light. When subject is warned the E wave (shaded area) appears before second stimulus.

The E wave is associated with psychological constructs, such as attention or motivation. It is modified if the subject is distracted (fig. 6) or highly anxious. It is related to measures of autonomic function, such as the heart rate.²² Here, then, is a physical variable—and it can be measured in highly respectable millivolts—which reflects subjective mental states. I suggest that the E wave offers not merely an analogy but possibly an approach to further understanding of psychosomatic reactions.

Psychopathology of Psychosomatic Disorder

Before ending I shall try to outline a model of the psycho-

FIG. 6—Expectancy (E) wave (shaded area) modified by distracting the subject (see text).

pathology of psychosomatic disorder. I am happy to acknowledge my indebtedness to Lader,²³ who has collated experimental evidence from many studies of anxiety.

Perhaps words are spoken and sound waves enter the ear. A stimulus reaches the person and so to it he reacts.

How he reacts depends on inborn and acquired factors. These include his genetic make-up, his previous experiences, and what I have called the chronological determinants. We have to remember that psychosomatic reactions are like immunological responses in two fundamental respects: the subject is sensitive to something (an emotional stress or a foreign protein), and his reactions are influenced by what has happened to him before.

The stimulus, having been transmuted into nervous impulses, makes its impact (figs. 7 and 7a). First, there is a stage of arousal, which may be consciously perceived as an emotional change but may not. At the same time bodily (physiological) changes occur. Both may subside and return to a state of rest when the normal individual adjusts healthily.

FIG. 7—Psychophysiological basis for psychosomatic disorders. Composite model (see text).

FIG. 7a—Psychosomatic reactions. Normal sequence.

He may not adjust healthily (fig. 7b and 7c). It might be that the stimulus was too intense or too often repeated. It might be that anxiety has exaggerated the reaction. It might be that the patient or the target organ is particularly vulnerable. It has been said that vulnerability is always inborn, but as a clinician it appears to me that it is sometimes conditioned or learnt.

FIG. 7b—Psychosomatic disorders. Vulnerability and conditioning.

FIG. 7c—Psychosomatic illness. Recurrent or chronic.

Vulnerability and conditioning—these are the two major factors in building up chronic or recurrent psychosomatic illness. There are various mechanisms which can make the disorder self-reinforcing: one is a loss of adaptation that goes with anxiety; another is the awareness of symptoms, like pain, which itself acts as a feedback and so increases anxiety. Together with autonomic conditioning or preferential reinforcement these make psychosomatic disease characteristically self-perpetuating.

After a variable period anatomical damage may follow, as occurs in the lungs of asthmatics. Death may result from

psychosomatic disease. Much more often the older patient comes to terms with what is virtually a life sentence. Gropingly he may attempt to build his own model of events and reactions to indicate how and where he believes he can protect himself. Medical models such as I have drawn, indicate to us how and where we think we can intervene on his behalf. At the same time models expose the many areas of our ignorance. Yet, admitting these, a rational approach to psychosomatic disorders is now becoming feasible, and in childhood above all it must find its greatest opportunities.

Epilogue

Many details have had to be omitted from this presentation. Some philosophy has crept in, though I know that, like Montaigne, most doctors are "unpremeditated philosophers." Yet what is medicine if it is not a personal philosophy tempered by science and experience and put into practice?

We have been concerned here with psychosomatic medicine and "Philosophy asks the simple question 'What is it all about?'" (Whitehead). Mine is one paediatrician's answer. The child's world is small in time and space; it is small, too, in population and in concepts. Surely, then, it lends itself to exploration and so to comprehension? We have to comprehend because every child is a child and so in need of help. We have to comprehend also because the child's experiences and conditioning act as a template, patterning the whole of his life and, in turn, his child's life. None of the factors that influence wellbeing and illness can be ignored, call them physical, psychological, social, or what we will. At last this is being realized, and comprehension comes increasingly within our reach. And so, increasingly, we may hope to bring every child nearer the full measure of his true stature.

I am indebted to Dr. W. C. McCallum for helpful advice and material on E waves.

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