Positive Deviance in Child Nutrition

With Emphasis on Psychosocial and Behavioural Aspects and Implications for Development

by Marian Zeitlin, Hossein Ghassemi, and Mohamed Mansour

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The major objectives of this study of positive deviance were to identify successful child-care and feeding behaviours and to determine effective aspects of social support systems as a basis for designing policies and programmes to reinforce and extend these adaptations to more mothers

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The authors are also grateful to the respondents to the mail survey, who are listed in Appendix 2. Since international postal systems are subject to irregularities, some respondents will not find their names in the list in Appendix 2 because their questionnaires arrived too late for computer processing (or possibly did not reach us). Late arrivals were added to the mailing lists for the state-of-the-art paper.

Executive Summary

The term "positive deviance" has been used to describe the performance (regarding health, growth, and development) of certain children vis-à-vis the performance of other children in the community and the family. It has been seen as a form of social, behavioural, and physiological adaptability to nutritional stress.

From the perspective of young-child nutrition, positive deviants are children who grow and develop adequately in low-income families living in impoverished environments, where a majority of children suffer from growth retardation and malnutrition. A number of observers of this phenomenon, like Wray and Greaves, have called for greater attention to be given to this process of apparent adaptation so that any common themes or principles occurring in different situations might be identified and described.

In searching for possible explanations, it is necessary to determine the critical factors that contribute to this positive deviance, and in particular to try to identify which factors are predominantly behavioural, which are biological and environmental, which are innate, and which are acquired.

The major purpose in studying positive deviance is to learn from adaptive child-care and feeding behaviours, as well as from the social networks that support them, in order to design policies and develop programmes that reinforce and transfer these adaptive mechanisms to the malnourished. While other works have concentrated on socio-demographic and physiological variables associated with good growth, this state-of-the-art paper focuses on psychosocial and behavioural considerations.

The paper places positive deviance in an evolutionary context as a form of adaptation and reviews theories linking infant development to nutrition, from pre-natal life to breast-feeding, the introduction of solids, and the transition to an adult diet, following the infant up to two or three years of age. The book consists of two parts

The first part documents the literature and its policy and programme implications. It defines positive deviance, presents an overview of what has already been written on the subject, gives overall conclusions, and makes policy recommendations It seeks to link psychosocial and behavioural characteristics to child growth, and analyses the most proximate caretaker–child interaction, associated individual temperaments, and

the social support systems in which such interaction is formed and nurtured. The section is designed to assist programme managers and policy-makers in the application of approaches that may be relevant to local socio-cultural and environmental conditions

The second part examines considerations for research in positive deviance, underlining assumptions for research and relating that research to epidemiological methods It presents a model for conducting programme-relevant research, a conceptual framework for this research, and an overview of important concepts and variables It goes on to review a series of methodological problems and ways of dealing with them Its purpose is to provide the type of methodological information needed to assist nutritionists and other social and biological scientists in developing research on positive deviance.

The emphasis placed on research considerations distinguishes this paper from other state-of-the-art papers prepared for the WHO/UNICEF Joint Nutrition Support Programme (JNSP), which are much more application-oriented The need to deal with research so extensively is predicated on the fact that the positive-deviance approach is relatively new to nutrition; as a result, little systematic research has hitherto been done in this area, and further study is needed in order to identify broadly applicable themes

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1
The Literature and Its Policy and Programme Implications

INTRODUCTION

The concept of "positive deviance" had already entered the nutrition literature by 1967, although serious field reseach in this area is more recent. Hegsted (1967), for example, advised that "we should pay a great deal more attention to those individuals who are apparently healthy while consuming diets which seem to us to be restricted. We should pay more attention to the reasons for nutritional success rather than nutrition failure." Wray (1972) advocated studying "successful mothers," while Greaves (1979) recommended that "another approach might be to identify in the village women who can cope: there are many who do manage to rear healthy and active children, and yet who belong to the same 'community' as some who cannot. How do they manage? Are they following some of the basic rules? What is their secret? Can it be shared with others? There would seem to be tremendous opportunity for research here."

Mata (1980), writing on child malnutrition in Guatemala and Costa Rica, observed that "maternal technology" is a distinct determinant of the malnutrition complex: "Maternal technology pertains to practices, traditions and beliefs relating to food preparation, feeding techniques, child care during illness and convalescence, handling of drinking water and of feces, and personal hygiene. It is important to note that some mothers exhibit a high level of technology, independent of their upbringing or schooling. That is why some infants and young children in a community thrive well under village conditions."

In addition to practices relating exclusively to feeding, health care, and sanitation, other modes of mother–child interaction have also been consistently related to the nutritional status of infants and young children. The mother's affect – whether she smiles and enjoys the baby – and the frequency with which she interacts with her child, verbally and non-verbally, can be used as examples (Alvarez et al., 1982). Genetic factors governing energy metabolism, immune function, response to stress, and activity levels also play an underlying and as yet poorly understood role in determining nutritional status (Danforth, 1983).

RATIONALE FOR STUDYING POSITIVE DEVIANCE

It is widely acknowledged that socio-economic development will not alleviate poverty over wide areas of the developing world during the next few decades. Nutritional conditions have worsened between 1980 and 1985 and are continuing to deteriorate in most developing regions outside of South and East Asia (Cornia et al., 1987). With these disturbing trends in mind, international assistance agencies have supported the search for and implementation of feasible approaches to improve child survival. An important goal is the protection of the health and development of the next generation of young children in the world's poorest regions.

In presenting the rationale for seeking practicable solutions, it is also important to stress the importance of economic development and of equity of resource distribution, including access to health and other social services. Our focus on positive deviance should not divert attention and energy away from efforts to change the economic, social, and political conditions of the poor. Nevertheless, needless death and retardation of young children are among the most distressing manifestations of socio-economic inequity. This paper is concerned with the broadening of affordable methods that could be used in reducing these inequities.

At this point in time, primary health care (PHC) forms the programmatic basis for feasible interventions in health. The essential elements of PHC are: health education, promotion of food supply and proper nutrition, safe water and basic sanitation, maternal and child care, including family planning, immunization against communicable diseases, prevention and control of locally endemic diseases, appropriate treatment for common diseases and injuries, and, lastly, provision of essential drugs.

The knowledge base for the development of these activities as priority components was derived from a large number of epidemiological surveys focused on the causes of malnutrition, morbidity, and mortality of young children in developing countries. These epidemiological field studies were based on the need, first of all, to establish patterns of distribution of morbidity and to identify some of the broader associated factors. Given that this has been done, there is now an opportunity to promote more in-depth studies, in order better to identify and understand the group-specific characteristics associated with morbidity and mortality (Rogers, 1985; Griffiths et al., 1984).

A variety of social-science research methods are beginning to provide a greater depth of insight for the purposes of policy formation. Operational research and behavioural trial methods have begun to integrate the research process into the design of effective interventions.

Nutrition communications research and action projects have demonstrated that a blend of community development and commercial and social marketing techniques can achieve major changes in maternal behaviour. As found in Indonesia (Zeitlin et al., 1984), such changes may significantly improve the growth status of young children in low-income environments, even in the absence of major investments in health care or economic development. The JNSP in Haiti, as well as projects in Honduras and the Gambia, have used these methods to promote oral rehydration therapy (Smith et al., 1982).

To date, operational and behavioural research methods have not attempted to draw extensively upon the local adaptive wisdom of the mothers and families of the positive-deviant children in low-income communities. Very few studies in nutrition

have systematically examined the households whose children are at the top end of the growth performance curve in order to learn from successful adaptations.

From a purely scientific point of view, additional interest in positive deviance is motivated by the recognition that a focus on the malnourished only – the bottom tail of the distribution – lacks methodological rigour and fails to provide the basic information needed to understand the causes of malnutrition.

Similar research in psychology, looking at "invulnerability" or the reasons why some children develop into psychologically healthy adults despite poor nurturing or traumatic early circumstances, has been conducted for several decades (see Anthony and Cohler, 1987, for a review of this approach). In the epidemiology of diarrhoeal disease, a positive-deviance case-control approach is now popular for studying hygiene behaviours associated with greater and lesser diarrhoeal incidence in low-income communities (Clemens and Stanton, 1986).

Example from Burma

An example from a positive-deviance study conducted by the Burmese Department of Medical Research illustrates the value of this approach to nutritional research. It demonstrates that information gained from studying the top of the distribution curve may call into question the accuracy of previous conclusions based on study of the malnourished only. The Department of Medical Research in Burma collected socio-economic, anthropometric, dietary, and morbidity data from 3,298 households of children aged 0 to 3 years in representative regions of Burma. Two-day weighed food intake, including test-weighed breast-milk, was taken from an intensive study subsample of 874.

According to the accepted theory concerning growth failure at the weaning age in developing countries (based primarily on studies of the malnourished), the quantity of breast-milk becomes insufficient after 6 months, and malnutrition occurs in infants whose mothers do not start supplements soon enough or in large enough quantities. The Burmese study conducted by Dr. Cho Nwe Oo and colleagues (Nutrition Research Division, 1985) suggests that supplementary feeding patterns were not of primary importance in determining those who were well-nourished and those who were malnourished from 0 to 12 months. Rather, the quantity of test-weighed breast-milk consumed by the children differed significantly between positive-deviant, average, and malnourished infants between 0–3, 4–6, and 7–12 months.

From 0 to 6 months positive-deviant children receive fewer calories from supplementary foods than the other two groups. In fact early introduction of larger quantities of supplements was associated with poorer nutritional status in this breast-fed population (who did not practise formula feeding). From 7 to 12 months, the well-nourished received significantly more breast-milk but only slightly more calories from supplements than the average and malnourished groups. These findings are supported by research from Thailand (Van Aarsdale, 1983). In the Burmese case, a scientific test of positive-deviance hypotheses yielded findings with important implications for intervention.

The accepted theory concerning growth failure at the weaning age and the hypothesis based on the Burma study are contrasted in figures 1a and 1b.

The study raises the question of the degree to which the large quantity of breast-

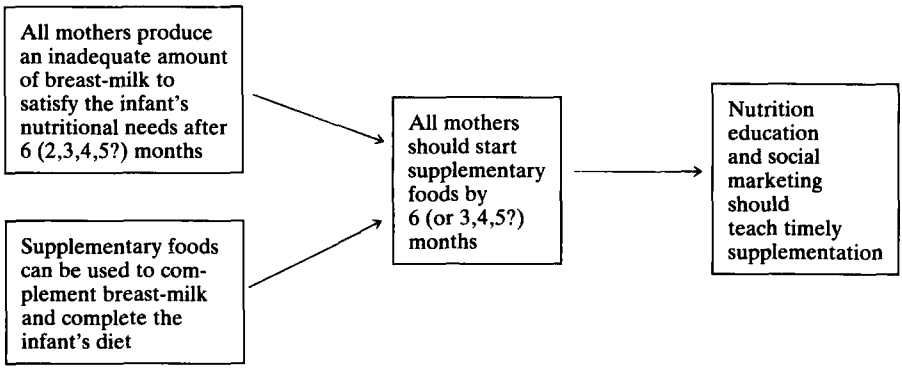

Fig. 1a. The logic of traditional weaning theory.

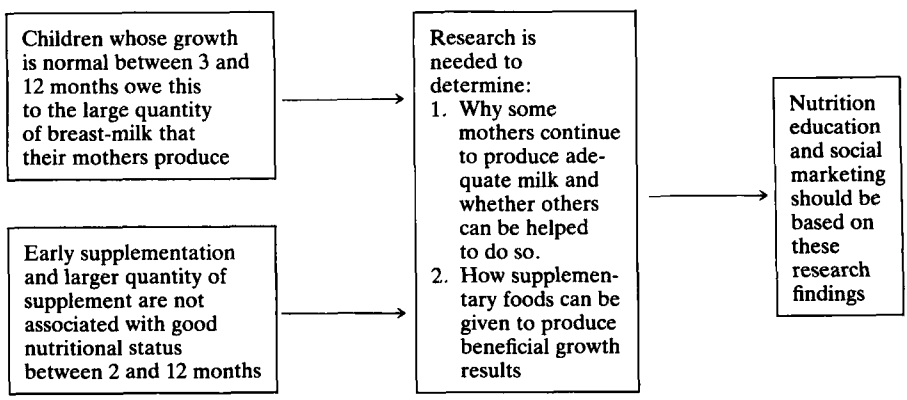

Fig. 1b. New implications based on Burma positive-deviance study.

milk the mothers produced was due to the fact that larger babies stimulated greater milk production by their more vigorous sucking and higher intake needs, as the proportion of low birth-weight ($\leq$ 2,500 g) was 4 per cent among the subsequently well-nourished, versus 17.5 and 36.7 per cent among the average and malnourished.

If early supplementation and a larger quantity of supplements are not associated with good nutritional status between 4 and 12 months, this may be due to quality of food given, its hygienic standard, and the possible reasons for starting supplementation.

CONCEPTUAL APPROACHES

Given the exploratory nature of positive-deviance research, this review will refer broadly to positive-deviance factors, behaviours, and hypotheses. These terms will generally characterize or pertain to the families of children whose growth falls in the

Table 1. Four types of adaptation to limited food availability

Type A	Level	Benefits
1. Increase in neo-natal and young child mortality	Across generations	1. Control of population size relative to food supply and ecological balance 2. Selective survival of genotypes, social structures, and behavioural models resistant to nutritional stress
2. Stunting in linear growth, other metabolic adaptations to limited or irregular supply of energy and other nutrients	Across and within generations	Modification of phenotypes (rarely genotypes) to reduce food nutrient requirements
3. Socialization of child to be efficient member of food production and distribution system	Across and within generations	Efficient exploitation of technology characterized by simple, monotonous agricultural labour
4. Positive deviance	Household and individual	1. Healthy nucleus maintained under adversity 2. Maintenance of vitality in social-class/leadership structure 3. Improved survival value across generations with development of more efficient behaviours, technologies, and social structures

upper third of the nutritional status distribution within a homogeneous low-income population.

Positive deviance can be viewed as one of several interrelated adaptations to limited food availability (table 1). This section will describe the types of adaptations that are known or presumed to occur in malnourished populations and will present a conceptual approach to research and programme design that takes confounding interactions between these adaptations into account. For a discussion of child development in the context of evolutionary theory, the reader is referred to chapter 1 of Chisholm's (1983) book on Navajo infancy.

It should be noted that, as Beaton (1984) pointed out, such adjustment to a limited food supply generally entails costs to the individual and to society.

Positive Deviance as Adaptation

The first form of adaptation occurs at the population level across generations. Limited food supply or agricultural carrying capacity of the land leads to increases in neo-natal and young child mortality. This mortality serves two main functions:

1. Control of population size relative to food supply and ecological balance.
2. Selective survival of genotypes, social structures, and behaviour patterns resistant to environment limitations in food availability.

Some of the mechanisms related to mortality are: decreased maternal nutrition, leading to premature births and intra-uterine growth retardation, hence to increased neo-natal and infant mortality; decreased breast-milk production and food availability for the weanling; infanticide and differential care (Scrimshaw, 1978, 1982). The term dif-

ferential care describes the fact that parents treat unwanted or less wanted children in ways that sometimes permit them to die without the parents taking conscious responsibility for infanticide. Cassidy (1980) explains and discusses at length the first three types of adaptation presented here using the term "benign neglect."

Mortality rates typically increase in times of food scarcity. In many situations, there is now reason to believe that the modification of certain child-feeding and -rearing practices has enhanced child survival, even under the most stressful of conditions. In certain circumstances, on the other hand, current beliefs and practices may be actually exacerbating what are, for a variety of reasons, high-risk situations. Practices which are believed to protect the child, but which actually increase exposure to insult, may serve the purpose of permitting the child to die while the mother pursues highly apparent measures to save him. Withholding all fluids from infants with diarrhoea may be such a practice, as may be withholding key supplementary foods because "infants cannot digest them." These behaviours, which may not be consciously recognized as life-threatening to children, may have the effect of enhancing the survival of the group as a whole (Scrimshaw, 1978, 1982) by allowing the weakest childen to die. They may thus contribute to the first form of adaptation.

The second type of adaptation occurs both across and within generations. Malnutrition in early childhood leads to stunting in linear growth. This stunting produces child and adult phenotypes with reduced food requirements and lower likelihood of overt nutrient deficiency symptoms which may occur when growth is accelerated (Hepner and Maiden, 1971). Other metabolic adaptations to reduced energy availability also occur and are introduced below on page 29.

The third type of adaptation socializes young children not to expect favoured foods or special treatment because of their low position in the family. It also sacrifices individual well-being for the survival of the group. This adaptation is in response to the inefficient subsistence agricultural production and distribution system to which child labour must contribute, and to the high reproductive burden placed on mothers who must continue to bear children every two to three years.

In agrarian societies with high fertility and high mortality, parents are usually guided by cultural modes, the goal of which is to maximize the number of surviving offspring, but not to optimize the growth and development of each one. It can be pointed out that societies in which the concept of child-spacing has not been adopted simply may not have the time, knowledge, or motivation to deal with growth and development. These models for parental behaviour are themselves adaptations, culturally evolved over the centuries to conditions of (a) labour-intensive family agricultural production and (b) natural fertility. The first of these creates a demand for child labour in the home: the more children, the more land can be cultivated and the more work distributed.

The second condition, natural fertility, creates an expectable birth succession in which a mother concentrates her efforts for child survival on the initial risk period, namely the early period of breast-feeding, especially the first year of life when mortality rates are highest. The mother then turns her attention to the next baby once he is born. This postpones risks of malnutrition and neglect to the post-weaning period, but it probably resulted – during times of better ecological equilibrium than are often seen today – in favourable survival rates despite malnutrition, chronic morbidity, and lowered life expectancy. Given the need to enhance child survival or accommodate

high mortality through high fertility, it may well be that the importance of pre-weaning care of the child has failed to gain its merited significance.

In their study of the Gusii in Kenya, LeVine and colleagues (forthcoming, 1989) documented special parental care during the first year of life. They found that mothers hold and feed more frequently those six-month-olds whose actual heights and weights were less than others. This suggests that they may be monitoring the child's growth and using compensatory measures available from local cultural models to bring faltering infants up to a standard. Their time schedule for phasing out intensive attention and devoting themselves to agricultural work was also dependent on the infant's attainment of motor milestones (e.g. sitting without help, walking unassisted) at normal ages. They used physical growth and motor development (along with disease patterns), then, as individually varying infant characteristics to which they responded flexibly during the first year. Indirect evidence suggests that mothers improve with parity in this kind of sensitivity. This type of monitoring, however, did not prevent the growth failure and high morbidity rates in the second half of the first year, features that characterize developing-country populations.

The weaned child is enculturated to participate in subsistence agriculture in which the family is the production unit. He or she is being prepared for early induction into the family work force (LeVine, 1974). As pointed out by Caldwell (1981), such a child should be weaned cheaply. Parental goals are to produce an undemanding, compliant worker, starting work from 3 to 5 years of age. Once past the dangers of early infancy, the child must accept its lowly rank as the least productive and youngest member of the production team. As a symbol of his entry-level status, he may receive the poorest quality and the smallest portions of food, and must not question this.

Living in a Yoruba village in Nigeria in 1966, Zeitlin observed that children learned their rank starting from the age of two or three years. They were encouraged to apply a rule of conduct that permitted any older child to give orders to and exact obedience from any younger one. Cousins differing by a few weeks in age knew exactly which of them was senior. This "game" tended to give authority for food and play materials to older children. Its enforcement was a source of fascination for the children.

Dr. E. P. Y. Muhondwa (personal communication, 1984), discussing the same ranking system in Tanzania, has pointed out its benefits. In the absence of adults, each older child is held officially responsible for the welfare of the younger ones. Older children are taught that although they have the right to exact services or food from their juniors, it is their duty to see that the younger ones get their share to eat. These rules facilitate orderly child care and child labour in situations where adults are too busy to supervise the children closely.

Harkness and Super (1977) wrote that the Kipsigis of Kenya needed children who responded to adult speech with obedient action, rather than reciprocal speech. Mothers increased their commands and insults to the child after the age of two and the child spoke less frequently.

The highly active play, assertiveness, and curiosity of well-nourished pre-schoolers may be unwelcome and difficult to handle for busy caretakers in subsistence agricultural settings. Where agriculture is particularly demanding and food supply most limited, compliant submission to leadership becomes increasingly necessary. Non-demanding toddlers who sit quietly in one spot may be most valued, even though this behaviour may in fact be indicative of chronic infection or debilitation.

Whereas in some countries children appear to demand more attention during the second year than during the first year of life, Gusii mothers in Kenya expressed fears that if an infant's demands were allowed to escalate, he would be difficult to manage when the next child was born. Those children and toddlers left in the care of a grandmother were considered to be spoiled.

The values that enculturate the young child to accept its low rank under conditions of food scarcity may be elevated to the status of moral principles. The mother may feed her child less well in order to teach the child not to be selfish. In Java, Indonesia, self-restraint in eating is an important moral virtue. The pregnant mother may already deny herself food in order to train the infant in her womb in the virtues of self-denial. Similarly, the mother of the toddler may feel that she is spoiling her child if she feeds him full meals that include generous portions of fish and other attractive nourishing foods (Dr. R. Sobekti, personal communication, 1982). In Senegal and the Gambia children are trained "not to sacrifice themselves to their stomachs" (N'Doya, 1980). Chavez and Martinez (1982) described the ways in which the practices that induced malnutrition among the Indians in Mexico also prepared the children to live placidly as adults under impoverished and monotonous conditions.

A study in Nigeria of Yoruba students' memories of childhood found that many students' strongest single memory was the punishment they received when caught by their parents "stealing" meat from the cooking pot (LeVine, 1974).

By limiting the quality and quantity of food offered to young children, this third type of adaptation also contributes to the detrimental weaning practices that increase the mortality and stunt the growth of children in traditional low-income communities. These negative weaning practices are the primary target of nutrition education and growth-monitoring interventions in almost all developing countries.

We may then ask ourselves: First, do we not wish to continue to reform the negative food beliefs and practices as part of an overall strategy of socio-economic development? – to replace the old methods of population control with family planning? – to provide sufficient food to make stunting an unnecessary price to pay for group survival? – and to promote production technologies and social systems that encourage parents to stimulate and educate their children? Second, given that we owe the good health and nutrition of our children to the most scientifically advanced adaptation on the planet, shouldn't our goal be to enable all to share its benefits? Finally, is it not paradoxical under these circumstances to start searching for positive behaviours that enhance growth overlaid against a backdrop of negative behaviours that retard it?

The answers to these questions are not simple:

1. Yes, we do wish to keep on replacing formerly adaptive practices leading to high mortality, stunted growth, and impoverished lives.
2. No, it is not strategically possible at this time to bring the full benefits of modern technology, i.e. the high standard of living of the developed world, to the majority of the world's poor. Therefore, we are looking for interim solutions.
3. No, it is not contradictory to look for factors that foster good growth and health overlaid against cultural practices that diminish survival, growth, and vitality. It is not contradictory because these factors are known to operate in both human populations and other species as a fourth type or level of adaptation.

This fourth and last positive-deviant type provides the dynamic for cultural (and/or physiological) evolution within the micro-environment. This form of adaptation occurs at the individual, household, or, in our present case, the caretaker–child dyad level. It