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# MULTIPLE LINEAR REGRESSION VIEWPOINTS

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# MULTIPLE LINEAR REGRESSION VIEWPOINTS



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# CHILD DEVELOPMENT AND THE WELFARE OF NATIONS

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# CHAPTER ONE
# INTRODUCTION

To speak of childhood and children as the Twentieth century draws to a close is to speak of the obvious. Childhood provides a major market for consumer goods, and generates a major demand for tax money in the form of schools. In the matter of values childhood is a complex which, historically if not currently, has tended to define major life commitments of women; it has also generated a great deal of law in the form of social legislation. In short, childhood is an obvious and inescapable element of both public and private life.

In this work we consider the role of childhood in nations around the world. For advanced societies this amounts to rediscovery, for it was only with great effort that the industrialized world purged childhood of industrial significance. For decades in the last century reformers strived to keep children out of factories. They counted it a sign of great progress that childhood might regain its former status. While not a matter of Blake-like innocence, childhood re-established a susceptibility to education and other benign influences. Today, industrialized nations take it for granted that childhood will be spent learning skills for living while also experiencing an opportunity for personal growth. Such is the complexity of life in developed countries that we believe only well-developed and skilled human beings can make a technological society run. Literacy, for example, is not a cultural grace, but a skill critical to employment and citizenship. We believe that attainment of national goals of collective and personal wealth, and maintenance of a high quality of life, require that society concentrate on its children, their schooling, and their acculturation.

In some developing but poor nations the instrumental value of childhood is not always so clear, and children may be cheap labor. Only boys have received an education traditionally, and not girls. The wages or work of children may be essential to the family budget, and the idea of childhood may be lost in the pressure of economic realities. And yet,

participation in the world economic order may hinge on the degree of preparation the young receive in their formative years. Put another way, we can say that the success of adults in joining the wave of technological change sweeping the world may depend on decisions made when today's adults were children. If this is true, the things we emphasize in our concept of childhood need to be viewed self-consciously; we need to know why we emphasize play, versus child labor, for example, as a way to develop a healthy work-force of adults. We need to see children as objects of positive valuation, rather than as resource-consumers and burdens on the family and the community.

For nearly two decades in the nations of the technologically advanced world childhood is a period in which youngsters are viewed in a permissive, largely developmental way. Today's parents view their children as inherently valuable and accept the burden they place on the family budget. Most parents are child- rather than self-centered; they choose a residence by its proximity to good schooling, whenever possible. They subordinate their needs to those of their children, and they put off their own satisfactions in favor of good experiences for their children. Parents consider themselves teaching parents, and fathers request a role in the case of very young children. The overall picture is one of adults living indulgently with their children. Their demands tend to focus on academic achievement, and the tolerance they show in other aspects of growth may be missing when schooling is the topic of attention.

In recent years this set of values about children has spread around the world. We can probably say with some certainty that the middle class, world-wide, share a set of common values which stress opportunities for self-exploration by the young, plus a pre-occupation with the skills needed for occupational success and entry into a job with a degree of prestige. However, support for middle class values about children presumes several things in any country. Among them are a degree of predictability and assurance about life, and a quantum of surplus wealth. Physical security and relief from high child mortality are situational variables which are also important. Unfortunately, many of the world's neigh-

borhoods lack these qualities. Political, military, and climatic violence reduce the perspective to the here-and-now. In that context, a people cannot look much beyond tomorrow, and collective planning may be impossible. Even in the West there are limitations; for example, the elected politician needs projects which can be finished and can be demonstrated as successful in the number of years between elections. Even so, people around the world try to plan constructively in the face of adversity.

When we consider a Nation's children we try to distinguish ways to achieve the collective good by means of generalized statements. Another term is to call them statements of policy. They set forth the values we try to express and the general goals we plan to pursue. There are other ways to describe policy statements; elsewhere (Jordan, 1982) the writer has set forth examples of what policy statements are, and are not. As an example, a policy statement may be a generally positive phrase such as "let's get rid of the slums." Another variant is to say, "let's reduce infant mortality by x percent in y years." In the first example we have a benign but vague statement. It is not clear what we plan to do, although our intentions are good. In the second case the policy has a quantitative element, and we can deduce bench-marks by which to assess our progress. In general, policy development is moving towards greater specificity, which allows us to make better plans, and also allows us to assess the worth of our policies. Curiously, the connection between resources and goals is not simple. There are pockets of social disorganization in the developed countries, which we call 'the Fourth World'. There, general social policy has not met its national goals. At the same time there are places such as Sri Lanka where the resources have not grown spectacularly, but the accomplishments in e.g. reducing child mortality, have been substantial.

These observations suggest that programs in child welfare and in pursuit of national goals are not quite rational, orderly, or linear. The world is replete with instances of planning in which the outcomes were not those envisaged at earlier stages. In matters of finance this is especially true when planes are more expensive to build than antici-

pated, when bridges experience unforeseen degrees of stress, and when commuters' plans contradict those on which rapid transit systems were built. All of these examples apply to childhood and policy formation. The best example is probably the outbreak of blindness in babies delivered prematurely and given oxygen ad libidum. The benign intent to help preemies breathe was confounded by damage to the retina of the eye caused by oxygen.

Accordingly, formation of policy for childhood should be slow and careful. It is best when it includes the expectation that it will be evaluated and then changed or fine-tuned as a consequence. Implicit is the idea of evidence or data of a measurable kind, for we need to know as precisely as possible what the elements of success and failure are. In this work we use statistics to see if there are elements of childhood which are followed in later years by related achievement of three social goals in a large number of nations. We hope to use quantitative evidence to see if there are elements of childhood which influence outcomes in later years. We assume that a country which is rich, that has a high gross national product expressed in money terms per person, or which has shown growth over time in the same $ GNP per capita, as we shall subsequently put it for brevity, is better than a poor country. We hope to identify elements of childhood which policy-makers in various zones of the world should consider.

We take one more step by assessing directly through interviews, in the form of questionnaires, what elements of childhood planning for improved welfare resident experts and people designated by governments consider important. In that inquiry, which we present in Chapter Seven, we seek to learn what the present sources of technical assistance are, and what forms of aid to help children are most needed. Finally, we seek to learn if urgency of need for specific types of assistance is predictable for countries with particular characteristics. If that were the case policy formation would be facilitated by the prior knowledge that countries of a certain type tend to need assistance of a certain type. The key is to go beyond the self-evident, since those most in need require

everything, and anything may be a help.

In our view, planning on a zonal or poly-national scale may be possible; however, planning on that scale requires that we have an unambiguous picture of the condition of children in many countries. One of our goals in this work is to see if zonal, poly-national planning has any basis in empirical data. If it has, international relief and aid organizations would be able to fine-tune their planning. Far too often international aid consists of throwing money and resources at problems without an empirical analysis of the state of things in developing countries and regions of the world. In many countries authoritarian regimes come to power by force of arms, and so have little competence in social policy. Accordingly, we cannot always rely on nations' statements of their needs on behalf of children. As a minority group their needs may not be seen as instrumental towards the ends of national policy, while military assistance is so construed. An external appraisal of the factors which relate characteristics of childhood to national development is more likely to produce good results, in such cases.

There arises the question of the empirical data from which we hope to glean significant elements for child-developing and nation-developing policies. In this volume we use data gathered and published by a variety of agencies, especially the World Bank and the Bureau of the Census. A third source is the writer's direct survey of experts in countries around the world by means of a questionnaire. The latter provides a statement of the needs of children which is current.

A major aspect of the data in this study is that it is longitudinal; that is, the specific variables are associated with given years, e.g. the gross national product in 1975. More than that, the analysis is prospectively longitudinal, meaning that the predictor variables, i.e. characteristics of childhood, come first in time, and the criterion variables or measures of national development are from years which come much later. In fact, we acquired both sets of statistics at the same time, and they are a portion of our over two hundred variables in the World Data Set of the St. Louis Baby Study. Both predictor and criterion variables were

assembled simultaneously, as opposed to taking predictor variables and then waiting ten years to gather criteria of national development. Accordingly, we could also describe the study as anterospective, archival, or non-current longitudinal study. An example of longitudinal study in which one waits for the years to pass literally is the writer's study of a birth cohort born in 1966-67 whose children have been studied on each birthday. In that data set we waited ten years for the tenth year criterion, and so forth. In the research of this volume we compress the time, but preserve the sequence of time between predictors and criteria. We point out that a necessary limitation of the economy of assembling the data set for analysis is that one can only assemble data elements from those which are extant, whereas in literally prospective research, such as that using a birth cohort, we can take virtually all the measures that we wish, subject to practical limitations.

Finally, this volume assesses the role of childhood predictors by using relatively complex statistics which take several variables into account simultaneously. This is important since relationships between predictors and criteria do not take place in isolation. In the real world relationships occur in a complex of other variables, and *ceteris paribus* never occurs. Here, we allow several relevant variables to fluctuate and pluck the significant relationships from the flashing loom of co-varying elements. By this multivariate process we preserve in our mathematical model a link to the real world of multiple forces and relationships.

# CHAPTER TWO

## CHILDHOOD

In this chapter we wish to provide an introduction to the condition of children around the world. Children are decreasing as a proportion of the population as birth rates decline. And yet, the number of children is very large as the baby booms of recent decades see those children reach child-bearing age. Around the world there is a great disparity in the conditions of life for children; as nations evolve economically so the status and welfare of children improves. Paradoxically, advancement of nations depends on the welfare and education of their youngest citizens. As they evolve so Society progresses.

We begin by offering some examples of the evolution of the status of children in family and community, itself a topic of only recent attention. Today, Historians inform us that the concept 'childhood' is relatively new. However, people have always known that some of their fellows are small and dependent, and that their social and legal accountability remained incomplete for many years. However, within those obvious perceptions people felt that children were, for the most part, incomplete adults, to be dressed, for example, in small versions of adult costumes. They could be betrothed, if not actually married, in ceremonies prefiguring the social act of adulthood. In contrast, our current view is much more sympathetic to childhood as a state of man with its own integrity, commanding our respect and attention on its own merits. To be sure there are exceptions to this, evident in child labor and child abuse, and in current themes of eroticization directed at children. However, it is a commonplace of life around the world that children are a distinct and important segment of society.

To emphasize the present and lately-arrived view of childhood in the world we turn in contrast to the condition of children in the early years of our present industrial age. We do so by examining the lives of children working in the industrial cities of the northern counties of England, the "dark, satanic mills" of the early 1800's, as the Poet Blake referred to them.

## CHILDHOOD IN THE INDUSTRIAL REVOLUTION

Much of the world is industrialized and countries which are not usually wish they were. For that reason we begin our observations on childhood within the economic order with the experience of children in the period when industrialization began. While the Industrial age may have begun with technology in the late Eighteenth century it is through the earliest years of the Nineteenth century that records permit us to see the situation of children. We consider the lives of children reported in extant documents from the first forty years of the last century, with particular attention to Great Britain, the forge of the Industrial Revolution, a society whose Northern regions endured an infamous connection between childhood and manufacturing.

Social Philosophy. By the time the Eighteenth century came to an end British workers had been protected from Republican violence across the Channel, but not from the violence of the factory system. In 1803, an act to regulate "...the health and morals of apprentices..." had been passed. However, passing laws in the Capital city did not materially affect habits in distant factory towns. Speaking of the matter later, Josiah Wedgwood said that the legislation passed thirteen years earlier, "...never had the slightest effect of any kind upon our manufactory." (Report...1816). That state of affairs improved, but Parliamentary inquiries in the 1830's and 1840's were still identifying gross abuses of children, despite laws which were formed at Westminster. Given the state of communication in the early Nineteenth century and the absence of bureaucracies to enforce laws, the indifference to legal protections for children is not surprising. The spirit of the times was Manchester liberalism, and the *Wealth of Nations* caught the mercantilism of the age. The spirit of these times is exemplified at its most progressive in the views of Robert Owen. Speaking in 1816 Owen said that,

> "Seventeen years ago, a number of individuals, with myself, purchased the new Lanark establishment from the late Mr. Dale, of Glasgow. At that period I found there were 500 children, who had been taken from poor-houses, chiefly in Edinburgh, and those children were generally from the age of five and six, to seven and eight...The hours of work at that time were

> thirteen, inclusive of meal times, and an hour and a half was allowed for meals. I very soon discovered that, although those children were extremely well fed, well clothed and well lodged ...their growth and their minds were materially injured... their limbs were deformed, their growth was stunted. (Q. Do you think ten and three quarter hours a day the proper time for children to be employed in manufactories?) I do not. (Q. What time would you recommend?) About ten hours of actual employment, or, at the most, ten hours and a half. (Report...: 1816, p. 20-21).

The economic significance of childhood is obvious, and even the horizons of the reformer, Robert Owen, were limited by the times.

Nutrition of Children. The early years of the Industrial Revolution in Europe constitute a period in which the food sector of national economies was continually inadequate. The French Historian Braudel (1975) has documented the central role of grains in the diet. Around the year 1800, he reports, a Mason in Berlin spent forty two percent of the weekly income on one item, bread, for his family of three children. Animal products (14.9%), drink (2.1%), and vegetable products (11.5%) raised the proportion of the budget spent on food to 72.7% of the Berlin Mason's weekly income. With regard to grains it is important to recall that we are not talking of rough but pure wheat grain bread alone. Actually, mixtures of grains were the typical pattern, and each had its own name. In Scotland *oat* cakes were favored, in England *muncorn* (barley plus oats), and *maslin* (wheat and rye), and in Wales *sipris* (barley plus oats). Collins (1975) estimates the consumption of wheat in England and Scotland in 1801 varying by region from ten to ninety seven percent. For Northern England, the site of the Industrial Revolution, the proportion was twenty five percent.

In this pattern of reliance on grain for nutrition price was an obvious factor; in turn, political facts played a part. Napoleon's successes led to blockade of the outlets of the Baltic and to prohibition of grain exports from the Low Countries. Ragsdale (1980) estimates the annual grain needs of the United Kingdom in 1801 as sixteen million bushels. Shortages led to attacks on food shops in Leeds and Manchester (Stevenson, 1979), as adults and children reacted to soaring prices.

Absence of war and passage of the Reform Laws gave early Victorian society some relief. However, nutrition was still a problem for workers and their children. Thomas Yates reported the budget of a family of two adults and two children in Bolton to the Parliamentary Factory Commission (Supplementary Report, 1834). In a weekly budget of £1.8, 5d. over half of the total £1.0, 11d., was spent on food. By weight, the family consumed thirty pounds of bread, twenty pounds of potatoes, and three pounds of flour. Kay (1832) reported that among cotton workers in Manchester the poorest ate mostly boiled potatoes with a little fat bacon, and very little meat. At that time, which was before the Great Famine, Irish immigrants were living twelve to a room, which was usually a damp cellar.

The Mayor of Manchester, William Neild (1789-1864), reported on the diets of local people for the years 1836 and 1841 in a paper to the Royal Statistical Society (1842). Among the poorer families the proportion of weekly income spent on bread reached the level of 39.1%. Analyzing Neild's excellent tables McKenzie (1962) reported an average intake of 2300 calories per day, with reduction of protein as the major deficiency.

For infants in Manchester, as elsewhere, the level of nutrition presupposes survival. During the 1840's one half of all deaths were children below the age of five (Children's Employment Commission, 1843). As high as that figure is, it represents a drop from the figure of seventy four percent given by Edmonds in 1836. There is an irony in the relationship between economic conditions and child nutrition in Manchester in the early 1860's. With the outbreak of the American Civil War in 1861 the Manchester mills and the cotton mills of other Lancashire towns worked only about half the time. Women were laid off, and infant mortality fell. The reason is that infant nutrition increased because women were available to breast-feed their new-borns. The same phenomenon was observed later during the siege of Paris in 1870-71, when infant mortality dropped by forty percent.

Physical Development. The picture of nutrition among workers and their families in the early decades of the Nineteenth century ranged from very poor to adequate. It was always accompanied by susceptibility to disease due to the pattern of nutrition in which vegetables played little part,

although fruit was a little more readily consumed, especially apples. Parallel to the pattern of dysnutrition was the effect on growth of children. By the 1840's thoughtful analysts perceived that the physique of people was deteriorating. It was not until the 1880's that the scare was thought to have ended. We illustrate the question of physique by studying heights of children using data gathered from 1833 to 1873 by Mr. Samuel Stanway (Factory Inquiries Commission, 1833), and others. The 1833 height data from 410 boys and 652 girls employed in factories, representing children from nine to eighteen years, with an average of forty one observations at each age, is the earliest set. For boys height is below the third percentile using norms from children in Denver in 1975 (Duncan, Lubchenko, and Hansman, 1975). Other children are also short, and the comparative height of American slave boys is superior to the height of European boys. This interesting observation is not an argument for slavery, but illustrates how badly off European boys were within the factory system and its urban environs. Repeatedly in the early nineteenth century reformers compared working conditions of British workers, adult and child, adversely with those of slaves in the West Indies. Indeed, a slave owner from the West Indies expressed amazement at the conditions in which children in Yorkshire mills worked. He asserted that he would never treat a slave as badly, according to Michael Oastler, in 1832.

These findings from early and middle decades of the Nineteenth Century accentuate the contrast between childhood in the early Nineteenth century and the present day. Today, misnutrition and obesity are problems; to our forebears survival, poor health, and an early death amidst terrible living conditions were the reality. Childhood was a brief period, one never entirely divorced from the adult world of work. Obviously, child labor was cheap, and in mines and some occupations their small size was a distinct advantage. In some instances, e.g. weaving, the worker needed the services of others to perform his tasks, and his children were an obvious source of help. For a typical working family the wages of children contributed to the family budget, and the length of the working day and working week created desirable sums of money. Accounts from the

1830's report that children were encouraged to work over-time. The incentive was that they were usually allowed to keep extra money, while surrendering the regular wages to the family. The picture, accordingly, is more than one of despotic factory managers enslaving children in inhuman circumstances; parents also conspired to ensure child labor for reasons that were not always for the larger good of the family. In the case of reforms which reduced or excluded child labor, opponents included parents who needed children as assistants, or who needed their wages to balance the family budget.

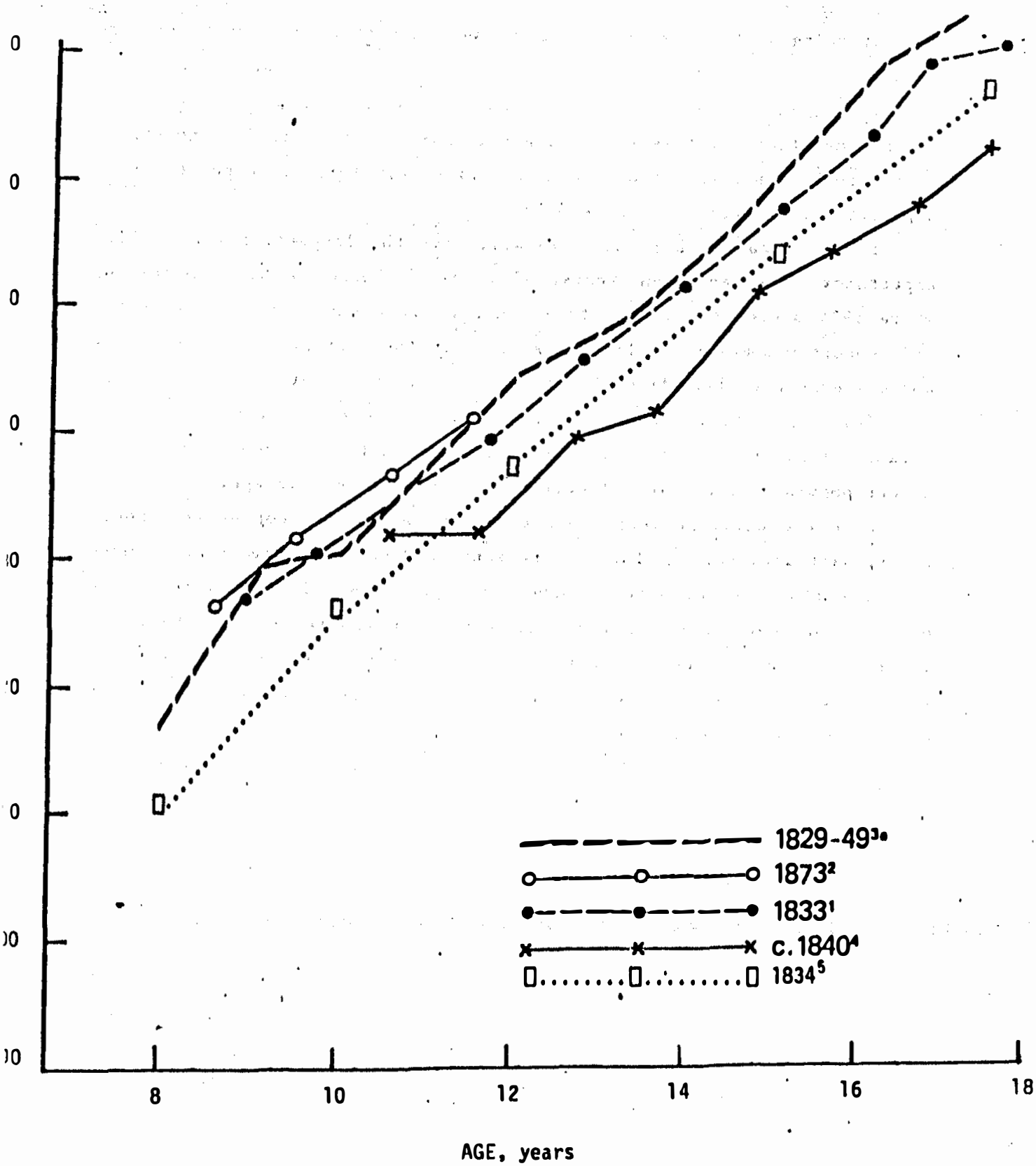
## CHILDHOOD TODAY

The abuse of children as adults in the early Nineteenth century was followed by gradual improvements although the scars on British society were evident in the early years of this century in Salford (Roberts, 1973) and in other British cities during the racial disturbances of 1981. Today, we recall the short-sightedness of earlier times and, generally speaking, people throughout the world see the merit of childhood as a period for development and not for exploitation. This enlightened period of view is evident in most parts of the world, and some nations, e.g. Sri Lanka, have made remarkable gains in child health despite their comparative economic under-development (Sewell, 1980).

Currently, the world's population of children under age fourteen years lies beween the figure of sixteen billions estimated for 1972 and twenty four billions estimated for the year 2000, according to the World Bank (1979). The state of these children quite accurately reflects their geography. The division of northern and southern hemispheres, with the less well-off in the south, is fairly accurate, with the exception of some Latin American cities, Australia, and New Zealand. Terms such as the Third World, Fourth World, and Less Developed Countries are euphemisms for zones where the poor and their children live. For the world as a whole Lorenz' curves of distribution show that wealth is not allocated proportionate to location of population (Taylor and Hudson, 1972). The obvious consequence is that there is a corresponding range of quality in the characteristics of the world's sub-populations of children.

FIGURE 2.1

HEIGHTS OF BOYS IN THE NINETEENTH CENTURY: LANCASHIRE FACTORY BOYS (1833), BELGIAN BOYS (1834), AMERICAN SLAVE BOYS (1829-49), AUSTRALIAN BOY FELONS (1840), AND LONDON BOYS (1876)




[1] Stanway (1833)
[2] Roberts (1876)
[3] Steckel (1979)
[a] 80% 1829-49 (Steckel, 1979)
[4] Gandevia (1972)
[5] Quetelet (1834)

Starting with the moment of birth we learn that European babies are born at a rate of about eighteen per year per one thousand population. For Latin America the rate is approximately double, at thirty six births per K population. Asia is still higher at thirty eight births, and Africa sees more babies born, at a rate of approximately forty five per thousand population each year (see Table 2.1).

European babies born in 1975 will live the longest, having a life expectancy of seventy one years. They are followed by Latin Americans where 1975 babies can expect to reach age sixty three, by Asians in the 1975 cohort who may reach fifty six years on the average, and by Africans who may expect to live from 1975 to the year 2020, after forty five years of life. Such life expectancies are, in part the consequence of reduced infant mortality, but they also express the reduction in adult mortality, as our populations are less likely to die in early middle age.

Once the earliest years pass children may or may not enter school, a step with implications for both personal and national development. Most of the world's children go to school today. Table 2.1 shows informative data on the enrollment of girls in various world sectors in 1970. The lowest rates are about two-thirds of the maximum possible; on the whole this is a negative picture, for two quite different reasons. First, it means there was one female not in elementary school for every two who were receiving an education. The second is of longer-range significance; research in advanced countries shows that the years of schooling achieved by mothers influences the attainment of their children. "The hand that rocks the cradle rules the World" is not too far off the mark. For the most part boys are more likely to be educated, with one in four in the less favored zones still excluded. In passing we note that occasional presence of percentage above one hundred represents early enrollments in grades by age and retention by age in grades.

Of course, schooling is the business of childhood, and it is useful to grasp the range of education around the world of childhood. In 1975 the percentages of African children in elementary and secondary schools were sixty two and eleven percent, respectively. For Asia the proportions

were ninety and eleven percent. For Europe the figures were one hundred and two and seventy percent, the former incorporating children over- and under-age in given grades. In North and Central America, including the United States and Canada, the figures were one hundred and seven and forty one percent. Finally, for South America, the proportion of children enrolled in elementary and secondary schools were one hundred and five and forty five percent. These figures are abstracted from the World Atlas of the Child (World Bank, 1979).

It seems likely that children not in school are working, including those under fourteen years of age. For the rich countries of the world the number is quite small, something less than one percent. The World Bank (1979) places the proportion in developing countries much higher. In the upper income group of the countries which are still developing the figure is between five and ten percent. For the poorest, least developed countries the proportion is twenty to thirty percent. This problem is sufficiently acute as a statistic to catch our attention. It takes no great imagination to perceive the discrete aspects of the problem; for example, it is obvious that working raises the question of the conditions in which children work; questions of safety and hours. Many of the topics in this question are those raised by Samuel Stanway and the British Parliamentary Commissioners one hundred and fifty years ago.

In 1979 the International Labour Organization (ILO) issued a report on child labor. In it the ILO re-asserted that children should not work before age fifteen, or before completing compulsory education when it extends beyond age fifteen. It is clear that many regions of the world have a long way to go in order to reach the ILO standards. In making this assertion we do not mean to suggest that the deficiency is in the underdeveloped world alone. The problem exists in developed, industrialized nations. It was discussed by the Council of Europe in 1979 (Brauser, 1979), which concluded that few nations absolutely forbid child labor, often condoning it as "practical" education. This idea recalls, once more, parallels with the early years of the nineteenth century. In 1842, Anthony Cooper, Lord Shaftesbury, introduced legislation to regulate

TABLE 2.1

CONDITIONS OF CHILDHOOD IN REGIONS OF THE WORLD[1]

| $\bar{N}$ Region | Population(K) Age 0-14 Yrs. | Crude Birth Rate Per K 1970-75 | Crude Birth Rate Per K 1995 | Life Expectancy 1975 | Infant Mortality Per K 1975 | Children Working Per K Popul. | % Females Elementary School 1970 | Primary School Enroll. % | Static Population Year | PQLI[2] | Per Capita Education Expend $ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| World | 9698 | 35.48 | 28.02 | 56.99 | 59.18 | 16.22 | 80.71 | 87.45 | 2098 | 62.13 | 94.65 |
| Rich Countries | 16238 | 25.66 | 20.80 | 67.11 | 27.97 | 5.72 | 104.22 | 106.55 | 2059 | 82.73 | 203.73 |
| Poor Countries | 10984 | 44.33 | 34.79 | 48.63 | 104.52 | 25.45 | 62.42 | 71.75 | 2126 | 43.88 | 17.88 |
| Africa | 3654 | 44.83 | 36.87 | 44.96 | 110.05 | 26.67 | 62.04 | 71.60 | 2140 | 35.53 | 24.97 |
| Asia | 26223 | 39.70 | 28.65 | 55.53 | 83.63 | 17.71 | 70.84 | 83.88 | 2102 | 60.03 | 70.86 |
| Latin America | 4938 | 35.89 | 27.01 | 62.96 | 52.79 | 8.98 | 102.04 | 101.54 | 2079 | 75.61 | 42.31 |
| Europe | 6526 | 17.83 | 15.66 | 70.96 | 19.78 | 3.31 | 101.58 | 103.07 | 2050 | 91.00 | 222.56 |

[1] From The World Data set of the St. Louis Baby Study.

[2] Physical Quality of Life Index (Morris, 1979).

employment of children in coal mines. Parliament was dissuaded from rigorous legislation and permitted ten year olds to work in the mines at the coal face. The influential argument, according to Kersen (1965) was the view of the coal owner, Lord Londenderry, that a "practical" education was superior to a "reading" education. In this respect it appears that the appeal against entrenched interests on behalf of children is not always successful or easy. Children are a power-less minority whose welfare tends to be subordinate to other interests.

The present state is that nations vary widely in their response to social needs. In the matter of health care, a complex vital to the welfare of children, there is a range of effort in various zones of the world. Israel, Argentina, and South Africa are all members of the advanced world, but they invest less than one percent of their GNP on public health services. Among the very poorest are Lesotho and Botswana which, according to Leichter (1979) spend 2 - 3.9 percent of their GNP on health services.

An excellent review of the health and related problems of children in the Third World has been given by Hasan (1982). In the aggregate, Hasan reports, twelve to thirteen million children in the Third World die each year, a number many times greater than the cataclysms of war which are so obvious. Disease among children spreads easily, and malnourished children are susceptible to infections which in privileged children are serious but transient. Malnourishment starts before birth and children of low birthweight have a mortality rate twenty times above that average. For children in the Third World who survive the neonatal period protein-caloric malnutrition is widespread, and Hasan cites the figure of ten million children experiencing this condition to a severe degree. Water pollution and sewage pose explicit threats to the health of children and adults. Particularly relevant to this volume is Hasan's reference to the high incidence in children of anemia, which he places at fifty percent in children living in developing countries.

The Third World of children has been affected by introduction of technology, and by the related process of urbanization. The loss of links

with the supportive contexts of tribe or village has weakened families and altered the roles of women. Accordingly, an unquestioned responsibility of women for the care of children has been replaced by uncertainty. Fathers absent in order to find work in cities are not available to assist and support women who become, by default, heads of one parent households.

## QUALITY OF LIFE

Finally, we conclude this overview of the social circumstances of childhood by considering the interesting task of developing indices of the circumstances of life for children and their families. Gross national product (GNP), changes in GNP, and GNP per capita are useful measures of the wealth of society and the implicit resources for children. However, there are goals for life which can remain unattained even when money is available. These are such things as reductions in infant mortality and increases in literacy. Conceptually, we are concerned about the quality of the lives children lead. However, the elements of living which sum to quality of life are both numerous and diverse. Gross national product (Land, 1975b) per capita summates the fiscal realities of life for nations and for individuals in aggregates. It is a static element (Bunge, 1981; Jordan, 1982b) and it misses the rhythms of living communities. Expressed in far greater detail we have the long list of elements generated by the Organization for Economic Cooperation and Development (1976 Progress Report..., 1977; Johnston, 1977). In between, are domains of living expressed, in the case of Bunge (1975) as eight areas, physical, political, economic, etc. In the work of Land (1975a) there are five themes from socio-economic welfare, which has eleven subtopics, to use of time and consumer behavior. In the work of Russ-Eft (1979), and of Ferris (1975) there are also sets of five domains, with Ferris' set drawn from studies in eleven countries. In some parts of the world there are unique social indicators such as the number of oxen one owns; in India (Vlassoff and Vlassoff, 1980), the proportion of non-U.K. immigrants in Australia (Stillwell and Hardwicke, 1973), and crowding in Japan, indexed quite neatly by counting tatami mats (Baillit, Niswander, and MacLean,

1968). The diversity of the human condition is the challenge to measurement.

The second problem is the failure to disaggregate social indicators by age segments. In Bubolz et alii's (1980) research 'Life Concerns' are clearly adult. Quality of life should mean something distinct for children, whose slot in the structure and processes of living is unique. It is true that young and the mature all breathe the same air, and so the physical component of the ambience of childhood is one shared with adults. On the other hand, childhood has a claim to its own ecology. It has its own diseases, it has its own culture which can be glimpsed in the mysterious transmission of children's games and it has its own demography. The young constitute an increasing proportion of the population in some countries, where they require more services such as schools and health care. In other countries they are a declining group with implication for an increase in the proportion of non-working, facilities-consuming older people. A population sub-group with such distinctive qualities has its own version of quality of life.

A third problem is measurement; the idea of quality in life is an abstraction, and our search for ways to quantify it is exemplified in Schneider's (1975), McCall's (1975) and Gillingham and Reece's (1980) comments about personal satisfaction as an element of quality and the choice of measurable and objective descriptors for obvious reasons of procedure. In the case of the world of childhood the geography of life imposes further restrictions since not every datum can be found in every society. Social realities make some social indicators too sensitive to gather; Carley (1981) points out that *race* was too touchy to be gathered in Britain's 1981 Census. The problem is sharpened by our need to monitor childrens' lives most closely where the needs are greatest (Jordan, 1981). Our choice of measures needs to respect the reality that some theoretically salient measures are not practicable for study of the quality of childrens' lives in many parts of the world. The attempt to study children's lives by using quantitative measures has always been closer to groups than to individuals. Aggregation and analysis of vital statis-

tics is a tradition going back to John Graunt's commentaries in 1662 on London's Bill of Mortality. Whatever attention has been paid to childhood has been as a sub-category of the total population.

A recent contribution to assessment of conditions of life, i.e. Morris' excellent Physical Quality of Life Index (1979), has dealt with the population without differentiation within the age structure. For our purposes in this work that situation is entirely satisfactory since we wish to use as dependent variables indices of a people's condition as a total population at a given time. Morris' Physical Quality of Life Index (1979), which we refer to in subsequent chapters as PQLI, measures "...how well societies satisfy certain specific life-serving social characteristics" (p. 4). Morris used six criteria in developing his scale attempting to:

1. respond to varied patterns of social development
2. incorporate the standards of more than one society
3. evaluate outcomes for people, rather than efforts
4. convey the range of outcomes in countries
5. develop a simple and understandable index
6. produce a measure applicable around the world.

The Physical Quality of Life Index weights three elements, literacy, life expectancy, and infant mortality. These elements can be used for countries and, as Morris points out, can be calculated for smaller units, such as states, provinces, and countries. Accordingly, we have employed Morris' PQLI as one of three criterion of national development in this investigation.

In passing we note for the reader our own efforts to develop a measure for children to be used when making cross-national comparisons on the welfare of children. The National Index of Children's Quality of Life ("NICQL Index") is described elsewhere (Jordan, 1983b). Briefly, it is a composite index which meets several criteria. They are: use of extant data, expression of current themes - feminism, discriminating power or spread, modest emphasis on deductions from theory, and comparability. We have calculated the NICQL Index for the nations of the world, and pro-

vided an index by continent as a geographical or zonal formulation for comparative purposes.

## TRENDS IN POPULATION

Our theme of children and the state of nations is an expression of the fact that childhood is brief and ends, generally speaking, when children enter the work force. The size of the work force is the cumulative effect of birth rate and the size of the population of children in preceding years. By studying the population traits of childhood we know, approximately, the predictable size of the work force in later years. Of course, the variables intervening between a rate of births in a given year and the subsequent size of the work force is modulated by things such as the death rate for children. The proportion of children diverted into secondary education helps define the total size of the work force, and may constitute a way to hold down the size of the unemployment problem, if only temporarily.

The World. Davis (1972) estimates that the world's population a half-million years ago was fifty thousand people and by 8,000 B.C. it had reached five millions; at the dawn of the Christian era it was approximately three hundred million. At the onset of the Industrial Revolution he puts the population of the world at 791 millions, followed by an explosion leading to the present population which is estimated at over 4.2 billions (Sewell, 1980).

In the broadest terms the population of the world will continue to grow. Davis (1972) saw the world's population doubling by the early years of the next century. Of course, not all of the growth is due to children, some growth is due to a decline in the mortality rate. The Nineteenth Century children reported earlier in this chapter did not live much beyond about age forty, after decades of working in factories. Today, a child can expect to live to age fifty seven years, as Table 2.1 shows. Reverting to our theme of childhood, however, we expect that the proportion of numbers increase. For the world as a whole a static population is possible, we calculate, in the year 2098, or at the beginning of the twenty second century. In the interim a birth rate of 28.02 children per

thousand population will prevail. That world-wide rate falls between a 1995 birth rate for Europe of 15.66 per thousand and a birth rate for Africa of 36.87 per thousand. One nation alone, China, with a current population of just over one billion is enough to affect the overall picture. At the moment a national policy discouraging more than one child per family seems to be effective. The U.S. Bureau of the Census places the growth rate for China in 1978 at 1.4 to 1.7 percent annually (Bureau of the Census, 1980). Thus the growth of children within the Chinese population seems likely to decline as a proportion of the one billion; however, given the total population the size of the population of children in China will always exceed the size of the total population of entire countries.

As health care continues to improve, and there is an example of how it has been done in the report from Nigeria by Ayeni and Oduntan (1980), we may reasonably expect to see even a stable birth rate yield more live children as diarrhea, a principal mechanism of infant deaths, is brought under control.

Rich Countries. To speak of rich countries is to consider the nations to which industrialization and its fruits came early. For the western hemisphere this means the establishment of manufacturing industries and of the benefits evident in public education, social welfare, and stability in government. However, the rich countries are not the masters of their fate, or the fate of others, as in years gone by. Today, an energy-hungry world sees the vulnerability of the historically rich nations to the economic initiatives of the oil-producing states. The next several decades suggest a pattern of economic decline in rich countries as increasing instability in the oil producing areas of the Middle-East sends its ripples abroad.

For the moment children in the rich countries fare well. Infant mortality is quite low comparatively and also historically. The mean rate of infant mortality for countries deemed rich by the World Bank was 27.91 deaths per one thousand live births. With a birth rate slightly in excess of deaths a degree of balance in the total population, which obviously includes the mortality rate for people beyond infancy, is in sight. For

the typical advanced nation population stability will be reached in the middle of the twenty first century, about the year 2059.

Poor Countries. The situation of children and adults in poor countries is bad both relatively and absolutely. That is, the poorest peoples have less than people in the developed countries, but they lack enough - of anything - by any standard. The World Bank (1980) estimated the world's number of desperately poor people at 780 millions. Forty percent of them were children under ten years of age, a staggering 312 millions. Of that number twenty percent of the newborns die in their first year, and another ten percent die by age five. Only fifty percent of the newborns will reach the eponymous age of forty.

The writer calculates the average life expectancy in the poor countries of the world at 48.63 years for those born in 1975. By the end of this century the birth rate will be about 35 per 1,000 population; this is above the world average (see Table 2.1) and will be far above the average for rich countries (M=20.80). A decline in the birth rate is evident, and it will drop about one-third in the last quarter of this century. A static population, however, is not expected until the second quarter of the twenty second century, A.D. 2126. Obviously, the growth of population between now and that date will create a parlous state of affairs for childhood. Given the decline in the world-wide economy created by the rise in oil prices there will be several developments affecting the world's poor children. Life will simply be harder for all around the world, with the children of the poor suffering most. Tensions between the third world and the developed countries will increase, although both the cause and resolution of the tensions will lay with those who control oil export prices. Finally, the pattern of aid for the third world from the advanced nations will be disrupted as surplus resources are needed at home. The latter state of affairs will be unfortunate; perhaps technical aid in the form of experts on childhood can substitute for the traditional pattern of credits, grants, and other fiscal assistance.

## HANDICAPPED CHILDREN

It should be recognized that not all children will play a conven-

tional role in the economy in their adult years. This may be due to conditions existing in childhood which interfere with responsiveness to schooling. Setting aside all but the trivial problems we can draw a conservative picture of childhood in which five percent have problems, which will interfere with work as adults. Viewed more closely this situation resolves into several forms. In undeveloped regions minor problems of childhood will go unperceived among the young, and when the young take up relatively unskilled tasks. On the other hand, minor problems are salient when life is complicated and when literacy may be an absolute requirement. The child who cannot become a worker automatically has several kinds of economic significance.

In the case of the seriously handicapped, with either physical or mental problems, provision of services is comparatively expensive; this is obviously a matter of significance since services tend to be provided from taxation of income and property. Once childhood is ended handicapped people do not lose their problems and persist as tax-dependent, rather than as wealth-generating, individuals in the economy. A policy issue arises in the trade-offs of costs incurred in order to make the young handicapped, when young, as self-sufficient as possible after the first two decades of life. The cost of failing to do so generates a double-cost, as dependent non-workers, and also as non-producers of revenue. For most societies there is a cost which is inevitable, and the choice of where in the life-span to incur it is a pragmatic act. Given proper structure many handicapped children can profit from special education. They can work as revenue-producers, rather than revenue-absorbers, in their working years. They can return to society funds they absorbed when enrolled in special education programs.

Lest this seem too optimistic a picture we point out that absorption of the handicapped into the work force depends on the complexity of given societies. Rising demand for technical sophistication plus the decline of cottage industries places non-handicapped young people at a disadvantage. And yet, the world-wide community continues to raise its expectations that each young person should grow toward economic efficiency and adequacy. Absorbing handicapped children into that proposition is a way

to return to society the cost of their care in the years of childhood from their labors in the decades of adult life. Failure to work towards marginal economic efficiency for handicapped persons is short-sighted. With increasing rescue of high-risk fetuses and new-borns the extent of disability states increases. The cost of expensive neonatal rescue needs to be evident in the trial balances of social accounting; investment in training becomes a way to balance the rising costs of social welfare. The problem for rich and poor countries is two-fold. First, there is the matter of finding and allocating the resources within a rational policy structure. Second, there is the summoning of what Hasan (1982) calls the political will to move society in a particular direction.

## CHILD STUDY AROUND THE WORLD

Recalling an opening statement of this chapter we assert commonplace of life in this century, namely that people around the world see the importance of childhood. It takes no effort to see that the health and skills evident at the end of childhood prefigure the traits of the work force, and the human resources which will constitute a vital dimension of national economic life. Around the world there are major studies of childhood contributing to our knowledge of how the juniors in society are growing and developing.

*Scandinavia.* Professor C. G. Janson (1965) directs Project Metropolitan in Stockholm. This inquiry is part of a Scandinavian program of studies which currently includes Copenhagen. Two other cities, Oslo and Helsinki, failed to participate due to lack of local interest. Project Metropolitan is broader than childhood; however, it includes the role of social background and education in the evolving lives of boys, but not girls, in school. Other Scandinavian studies of childhood include Arajarvi's (1980) study of perinatal influences on adult psychiatric status and Mednick et alii's (1980) study of transient neurological disturbances in newborns and the long term consequences.

*British Isles.* Newcastle has been the site of important studies of children and families (Miller et alii, 1960). The city of Aberdeen, long a fishing center and now the base for North Sea oil activity, has played

a unique role in the study of childhood because of its demographic stability and local university interests. Thompson (1980) has described studies of maternal and neonatal health, child development, and delinquency. The Isle of Wight work, described by Rutter, Tizard, and Whitmore (1970) studied children's growth in health, education, and behavior used London children for comparative purposes. The possibilities of delinquency, an obvious area for social policy studies, has been facilitated by Farrington and West's (1980) studies of boys in a London working class neighborhood.

Finally, we call attention to the 1946 cohort of British births studied by J.W.B. Douglas (1967), the 1958 (Plowden) cohort reported by Goldstein and Wedge (1975), known as the National Child Development Study and the 1972 cohort of Rona (Rona and Florey, 1980) known as the National Study of Health and Growth. The 1946 cohort is perhaps the best example of research on childhood which has produced changes in national social policies.

*North America.* In Montreal, a series of studies on children have been reported by Bouchard, Demirjian, and Mongeau (1980). This program particularly pays attention to physical growth. The writer's (Jordan, 1980, 1981) St. Louis Baby Study has followed several birth cohorts, especially a group of one thousand newborns delivered in 1966-67. The role of early biological and subsequent social factors has been stressed. Balow's group (Balow, Rubin, and Rosen, 1977) have studied children whose perinatal status was thoroughly studied at the Minneapolis site of the Collaborative Perinatal Study. Since the 1930's the California growth studies have reported the physical and psychological status of children born in Oakland and Berkeley (Eichorn, 1981).

*Pacific Basin.* In New Zealand, Silva (1982) has directed a study of one thousand new borns. This study is expected to provide guidance for public policy on a variety of aspects of child health for the national government. In Hawaii Werner and Smith (1977) have conducted studies on the growth of children on the island of Kauai. This study is distinguished by the span of human development considered and analyzed.

On the Island of Mauritius Mednick and associates (Mednick, Schulsinger, and Venables, 1980; Venables, 1977) have been studying the problem of schizophrenia in children, a complex whose long-term economic costs to society and to families is enormous. Chavalittamrong and associates (1980) have developed norms for understanding the course of development in height and weight of children in Thailand. This is particularly valuable for a Third World country: From India, Hauspie et alii (1980) reported a similar study. Both investigations of child development and health are in tune with the call by Tanner and Goldstein (1980) for less reliance on the norms of advanced countries to assess children's growth in developing countries.

We call particular attention to the studies of Professor Douglas and colleagues (Douglas, 1982), using the March 1946 cohort of five thousand births in Britain. This program of research, which maintains contact with eighty percent of the original subjects, has led to several innovations in policy affecting the lives of children. In 1946 better analgesia for women in labor was an outcome. In 1963, education in Britain benefited through changes in policy drawn from Professor Douglas' data base. The findings of research programs are not automatically acceptable to policy makers, but the probability is high that the welfare of people is more likely to advance when evidence rather than mere supposition can be drawn on. In that vein we analyze in Chapters Four to Seven evidence assembled from around the world with a view to identifying aspects of childhood which merit attention both as an end in themselves and as a means to acceleration of national development from which children can derive further benefits.

# CHAPTER THREE
# PURPOSE, METHOD, AND PROCEDURE
## PURPOSE

From the preceding Chapter it is apparent that childhood and the world are related; childhood suffered the impact of industrialization in the Industrial Revolution which, in a less malignant form is the hoped for solution to late twentieth century problems in the Third World. However, children were the cheap human fuel of the early and mid-nineteenth century, and became indispensable as machinery requiring little supervision supplanted adults' skills. Today, child labor, although in a largely manual form, remains a problem throughout the world.

*First Objective.* Our first goal in this work is to learn how critical childhood is in the subsequent economic and social development of nations around the world. We seek to learn if empirical, quantified traits of the population of children within nations, and the circumstances surrounding their lives, can be mathematically connected to the quality of people's lives and to the gross national product at two or more separated dates.

We seek to learn if key pieces of data we have arbitrarily but not irrationally grouped as Demographic, Health, and Environmental facts can be linked one by one to three quantified criteria of national development. Our predictor variables in three domains are:

DEMOGRAPHIC:
- 1965-70 Birth Rate
- 1960 N Births
- 1960 % Girls in Primary School
- 1975 Population CA 0-4 Years
- 1975 Population CA 5-9 Years

HEALTH:
- 1955-60 Birth Rate
- 1960 Population CA 0-14 Years
- 1970 People per Physician
- 1960 People per Hospital Bed
- 1970 % Needed Protein Calories

ENVIRONMENTAL: 1965-70 Birth Rate
1960 Life Expectancy
1970 Proportion of Children Working
1970 Primary Pupils/Teacher
1960 Radios per 000 Population

It will be clear that the three sets are not totally independent of each other, but are linked by, for example, the presence of a population element in each, but not the same one, in order to express a degree of continuity. Three criteria consist of a static measure of economic achievement, the gross national product in dollars per capita in 1975 and a less static, dynamic criterion, the increment between 1960 and 1978 in per capita $ GNP, which also defines nations economic development. The third, social criterion of nations' attainment is Morris' (1979) Physical Quality of Life Index. This last element is intended to express what societies have done with the resources available to them to raise the quality of life. The third element is needed since nations with comparable $ GNP's may have quite different patterns of distributed wealth. The third criterion comes closer to people than the first two.

We approach our task by asking how Demographic, Health, and Environmental factors affect our criteria around the world. We address our question to approximately one hundred countries ranging from rich to poor, large to small, and in all zones of the world. We then attempt to disaggregate the countries by repeating the question in an attempt to see if the patterns of the whole world community can be broken down into patterns unique to the poor countries of the world, as grouped by the World Bank (1979), and to the rich, as a contrast. Poor and rich countries are found around the world. We then ask if the question can be profitably broken down by geographic zone. That is, we ask the question looking at African countries, those in Asia, and the nations of Latin America.

Our answers have several attributes. Primarily, they are statements of mathematical-statistical significance. Beyond that, they are contingent on the particular sets of countries for which there are extant data. The answers are also data-specific. That is, the data are all identified by a given year or span of years. Of course, our exercise is

intended to generalize, as far as possible, but we do so conscious of the specificity in time for the variables gathered and analyzed. Also, our generalization is tempered by the size of data sub-sets some of which are unavoidably small. There are only so many Latin American countries, for example, and statistical analysis makes assumptions about size of samples which the real world may not permit.

However, the chief point is that we wish to identify within aggregates of countries the characteristics of childhood which seem to be important for attainment of nations' policy goals in fiscal, economic, and social terms. The essential element is that this is an empirical rather than speculative inquiry begun with the hope of finding childhood variables which can be key elements of effective policies to improve the wealth of nations in human terms. Further, we seek to learn if the relationship of childhood traits to each other and to criteria of national development are different in various zones of the world. We also ask this question for poor nations in all parts of the world.

*Second Objective.* Our second goal is to move from an appraisal of the statistical relationship in objective data between childhood and society to study of childhood in society today. Chapter Seven reports the priorities which developing countries, or more particularly, key informants in those countries, ascribe to various child services. We report in Chapter Seven analysis of a survey whose responses came to the writer in 1981 and 1982. We do two things with the survey; first, we offer a description of the findings supplied by our informants. Second, we have calculated a measure of need by scaling respondents' replies. Those scaled scores of need in various aspects of child welfare are analyzed by the technique of the preceding chapters; we hope to provide a clue to the national characteristics which correlate with degree of needs for children around the world. Here too, we are conscious of the limits of our data set, and offer findings with an awareness that there are limits to generalizing from specific countries to all countries. Even so, our material is empirical not speculative. It draws on the reasoned and reflective views of informed people. To that extent it may help us move toward the goal of policy formation for nations' children based on modest evidence rather

than on speculation.

In short, our goal in this work is to offer from data some clues by which the condition of children can be improved as a means to national goals, and as an end in itself. Children as a class are power-less; they are a minority whose claim to consideration may be advanced if it is seen as a means to a more pragmatic end, the good of the whole. Having examined the variables of childhood which relate to the greater good we then pursue the priorities for advancing child welfare as an end in itself which specialists around the world would like to carry out.

## METHOD

The data for the analyses in this work are drawn from the World Data Set of the St. Louis Baby Study. That data set comes from two sources and describe characteristics of up to one hundred and fifty six countries. Much of the data has been taken from publications of the World Bank, and other documents.

The second source is a survey of needs of childhood for purposes of policy formation conducted by the writer. A computer-friendly questionnaire was sent to 190 experts in 119 countries. Fifty seven replies were received, and fifty of them provided machine processable information. Questions were phrased about five topics, for a total of fifty items. The questionnaires were in English, French, or Spanish, according to the expressed wish of particular countries. At the time of writing the World Data Set contains two hundred and sixteen items of information on some portion of the countries of the world. The countries are classified as rich and poor by means of the World Bank's assessment in 1980. They were also grouped by continent, providing a geographic or zonal aggregation.

Procedurally, we ask if conditions of childhood and society in various groupings of countries are related to the stage of development reached in recent years. Thus, the design is anterospective or, as Sluss, Gruenberg, and Kramer put it, "a non-current prospective investigation" (Mortimer and Schumann, 1981); that is, from archival and survey sources predictor variables and criterion variables have been identified at

widely spaced intervals of time. This design is a sub-form of prospective inquiry; it is not retrospective because the sample is not defined solely via the dependent or criterion variable. The findings associated with pursuit of this objective are found in Chapters Four, Five and Six.

## STATISTICAL MODEL

In multiple linear regression (MacNeil, Kelley, and MacNeil, 1975), a regression equation is developed in order to predict a criterion. A critical element is deleted or collapsed, the resulting equation is designated as an alternate model, and an F-value is computed for the loss of predictive efficiency traceable to the deleted vector. The basic model may be illustrated as $y = a_0u + a_1x_1 + a_2x_2 \ldots a_nx_n + e$, where $y$ = a criterion of continuous or discrete data, u = a unit vector which when multiplied by the weight $a_0$ yields the regression constant; $a_1a_2 \ldots a_n$ = partial regression weights arrived at by multiple linear regression techniques and calculated to minimize the error sums of squares of prediction ($\Sigma e^2$); $x_1x_2 \ldots x_n$ = variables in continuous or discrete form, and e = error in predicting a criterion.

It is helpful to use a low variable-to-cases ratio in multiple linear regression analyses in order to avoid over-fitting regression lines from the data. In general, our analysis conform to this convention. However, there is an exception in the case of Latin America where we have data from about a dozen countries. We have applied the multiple regression model to the data from that region of the world and caution against applying the same degree of confidence we hold for other continental groupings to the data from Latin America. On the other hand, Latin America has some unique characteristics and problems as a zone, e.g. the common thread of Hispanic culture militated against pooling data from South America with that from other zones of the world. A second exception is the analysis of degree of need in Chapter Seven. The criterion measures were available in sufficient numbers; however, when the independent variables in three domains were assembled from over a number of years antecedent to the 1981-1982 criterion measures the size of the set of complete data declined.

## PROCEDURE

For each analysis a data set consisting of five predictor variables out of fifteen plus one criterion variable out of three were assembled. The full regression model was calculated and tested for significance against a model of zero information. The full model's $R^2$ value and its significance from a model of zero information were tested by the F-statistic, and the significance as a probability level is given. Next, five alternatives to the full regression model were devised; each alternative model was restricted by deleting one of the five variables. In the five restricted models the absence of the variable of interest was tested in the presence of the other four. Each restricted model was tested for significance against a model of zero information, and the probability level of the significance is reported in the tables. The critical test for each criterion was comparison of the full model against each of the five restricted models in order to test the hypothesis of significance for each variable in the presence of the other four predictor variables.

Accordingly, for each criterion there are five tests of hypotheses, and since there are three criteria for each predictor set tables report fifteen hypotheses. There are three predictor sets so there are three-by-fifteen hypotheses, forty five, for each aggregate of data. There are six aggregates of data - the countries of the world, rich and poor countries, and three continents - so there are six-by-fifteen hypotheses tested on the role of variables describing the population of children around the world; that is, there are ninety major hypothetical antecedents to nations' development tested and reported in Chapters Four to Six.

In part two of Chapter Seven we analyze World Survey data on degree of need for childrens' services in the same fashion, but on a smaller scale. For the criterion we apply a predictor model of five variables and report the outcome in tables employing the conventions of the preceding three chapters.

## SPECIFICATION OF VARIABLES FOR STUDY OF NATIONS' DEVELOPMENT

Predictor Domains. The range of variables describing childhood is wide

and so it is appropriate to formulate domains of information, groupings of traits which are similar. By that step individual and significant traits can be discriminated from comparable but non-significant traits. Similarly, sets of traits representing major vectors of influence can be defined, and also discriminated from other sets or domains. In this study we established for Chapters Four through Six three domains of predictor variables, and we label them in various tables as *Demographic*, *Health*, and *Environmental* models. All three models share a common span of years, 1960 to 1975, and so are antecedent to the criteria of national development to be described shortly. They also contain five variables for consistency. In addition, the three domains are linked through the presence in each of birth rate as a common child population factor of self-evident relevance to nations' development.

The *Demographic* model consists of data from each country in the data set on the number of births in 1960, the proportion of girls enrolled in primary education in 1960, the crude birth rate for the years, 1965-70, the population of children from birth to age four in 1975, and the population between the ages five and nine years in the same year, 1975. The last two variables are complementary, and permit assessment of the relative contribution of age segments of the child population.

The *Health* model consists of a basic fact about the load on health services - the population of children from birth to fourteen years, the birth rate for 1955-60, the population per physician in 1970, the population per hospital bed in 1960, and the percentage of needed calories per person in 1980.

The *Environmental* model contains the birth rate for 1965-70, life expectancy at birth in 1960, the proportion per one thousand children who are working, the proportion of elementary school children per teacher in 1970, and the number of radios per one thousand of the population in 1960. In total, we apply fifteen predictor variables in three aggregates to the criteria of national development.

Criterion Measures. The selection of a measure of national development which describes both the quality of living and the potentials for future

development of individual and collective aspirations is comparatively easy. By convention, custom, and usage the gross national product (GNP) per person expressed in United States dollars and in any given year - $ GNP per capita - is appropriate. Discussing $ GNP per capita Morris (1979) has said that GNP does not express patterns of welfare, abstract qualities important to people such as freedom or happiness, or imply that increments in GNP are felt by the poor, or improve daily life. GNP is an index of production and reallocation can improve lives without changing the level of GNP of a nation. However, GNP has a value as a convention, especially for econometric analyses.

A complication is that $ GNP in any given year gives a picture of a restricted span of time, and so is a static measure. In order to provide a broader picture of time we have selected a second, organic, criterion, the $ GNP per capita for countries over the span of years from 1960 to 1978. This is a period of nearly two decades; it describes a series of discrete changes in $ GNP by aggregating them, and it also provides a broad span of time within which the fifteen predictor variables could extend their influences on the processes of national life to a monetary index; but there is more to life than that. Accordingly, we have selected a third criterion, Morris' (1979) Physical Quality of Life (PQLI). It has the advantage for this analysis of criteria of nations' attainments of dealing with the full spectrum of age in the population, in contrast to the writer's NICQL Index (Jordan, 1983b) mentioned in Chapter Two. Morris' index is calculated from data on literacy, life expectancy and mortality, and is our third and non-fiscal criterion of nations' attainments.

In summary, we have selected fifteen variables, some of them purposefully redundant from model to model, and arrayed them in sets of five predictors. They have been tested by multiple linear regression against three criteria of national life, two of them fiscal and the third indicative of quality of life.

We now move to describe the application of this apparatus to data from countries in the World Data Set of the St. Louis Baby Study. The analyses we describe in the chapters which follow group countries of the world into two aggregates. First, we analyze all countries of the world

on which the requisite data exist. Second, we group together the countries of the World as rich, and as poor. Third, we group countries by continent, addressing Asia, Africa, and Latin America. The three analyses of the world's countries use the largest number of cases, ranging from eighty five to one hundred and twenty nine countries, according to the particular combination of predictor model and criterion.

## ASSESSMENT OF NEEDS

Predictor Variables. Part II of Chapter Seven is analysis of a portion of the preceding materials. That is, from the Survey items which were scaled for degree of response we constructed several scores expressing the degree of urgency associated with various groups of needs. Consistent with Chapters Four, Five, and Six we attempt to understand the generated need scores of the respondent countries by means of multiple linear regression analyses. The predictor variables used to create the models are not those employed in the analyses of Chapters Four to Six, since those were chosen expressly to be antecedent to the three criteria of development. In the case of the analyses reported in Chapter Seven, Part II, variables chosen as predictors for the multiple linear regression analyses were elements in the World Data Set from three domains; they were Demographic, Health, and Environmental domains. The domains are those used in the earlier chapters, for consistency of approach, but the variables themselves are more recent. They are combined into a single five-variable model which is applied to the criterion of aggregated needs of childhood.

The model employed in Part II of Chapter Seven consists of one Health variable, the amount in gm. of needed protein calories in daily diets in 1970. There are two Environmental predictors, 1978 $ GNP per capita, and consumption per capita of newsprint in 1970. This variable has been employed as an expression of the reading input in societies and as a measure of the literacy of a culture which surrounds children and adults. There are two demographic traits; the first is the number of persons per square kilometer in 1970, a measure of home density. The second is the growth rate between 1970 and 1980 in the urban proportion of

nations' populations. These five variables as a single composite model from three domains, and reflecting circumstances in the decade of the seventies generally speaking, are applied to the degree of need expressed in the World Survey in five areas.

Criterion Variables. In Chapter Seven we report responses to questions posed to experts in countries around the world in order to build a picture of needs for use in policy formation. Answers came from recognized experts, e.g. persons designated as in-country liaison figures for the International Year of the Child, for the most part. More particularly, the topics were grouped under the following six headings: Special Children, Facilities, Curricula for Children in two categories, Parent Education, and Technical Training. A need score based on scaled responses was calculated for each of the six topics, with a seventh score being the sum of urgency of all needs. Like the analyses of $ GNP and PQLI the country responses are treated as a single group, and so there is in Chapter Seven an analysis of aggregated need for all countries providing responses, up to a maximum of fifty cases, i.e. countries.

# CHAPTER FOUR

# COUNTRIES OF THE WORLD

## Introduction

In this chapter we report the first of several analyses of countries, all of which use the same methodology and the same format for reporting data. Here, we report the largest aggregate of data, and then proceed to repeat the analyses for countries grouped by level of economic development and by geography in subsequent chapters.

Our first data set is the aggregate of information on the one hundred twenty nine countries listed in Table 4.1. They are from all five continents and are drawn from the full range of rich and poor, large and small. Some have been recognized nation-states for centuries while others have acquired autonomy in recent years; this last step has been accompanied by changes of name in some instances and we report them. In other instances "countries" are not quite autonomous, and we have been guided by the idiom of the World Bank with regard to what are geo-political units worthy of analysis, subject to the availability of data. The fundamental element in this work is children, and we note that the absence of a nation from our analysis due to lack of extant data is not indicative of a lack of interest by governments in the welfare of children. Rather, it expresses the absence of data in a formal and collected set for the years covered in this inquiry.

*The World.* The maximum number of countries in the analyses reported in this chapter is 129. The data for this and subsequent chapters dealing with childhood cover the years prior to the criterion-measure years of 1975 and 1978, beginning with 1960. Our first data series in Table 4.2 applies five predictors described as the Demographic model to three criteria of national development. Within this data set are six descriptive variables present also in subsequent analyses using the Demographic predictor series in Tables 4.4 and 4.6. On the basis of the fifteen variables reported on the countries of the world the condition of childhood, generally speaking, has improved in the last two decades. On the average, one girl in three in 1960 was not enrolled in elementary school. Today,

the proportion of girls not in elementary school ranges from virtually zero in industrialized nations to just over half in developing countries with the lowest incomes. In 1960 the birth rate was 37.43 births per one thousand population. The most recent estimates of the World Bank put the birth rate in the poorest countries at 43.40 per thousand population, with the highest rate, that for Africa south of the Sahara, at 46.3. For industrialized countries the most recent estimate of the birth rate is 13.7 births annually per thousand population. These estimates are taken from data gathered by the World Bank. Over the last twenty years the age structure of populations has changed. The proportion of total populations fourteen years or younger was around forty percent in 1960, with a few exceptions. It has declined in the past twenty years, if only slightly, in developed countries, with industrialized countries having about four percent fewer of the population under fourteen years. The under-fourteen segment of populations has increased most in Africa (World Tables, 1980).

World-wide in 1960 in 129 countries literacy among adults was about fifty percent. Currently, it is seventy two percent among middle income countries (World Development Report, 1981). The typical person could expect to live to age fifty six years, a quota of years which has increased. At the time the subjects of the study were children, people generally lived outside of cities, and only about one in three dwelt in an urban center. The number of people per room was not excessive, historically speaking, at one and a half per room. About one home in ten had a radio before transitors came into general use. The volume of newsprint in kg. per capita annually was about 4.5 (=9.9 lb.). This item is used as an index of the reading emphasis in a society which encourages practice of literacy acquired in elementary school. In presenting these descriptive statistics we wish to convey the quality of living during the years of childhood. In the case of the criteria we see that the average size of gross national product ($ GNP) was only about $1560 per person. It is important to note that the standard deviation of this statistic is high reflecting the heterogeneity of the countries under scrutiny. The second criteria is the percentage of growth in $ GNP per capita over the period from 1960 to 1978. The average is not quite three percent and

indicates little real growth in the world's economy. In the case of the third criterion, the index of physical quality of life (PQLI), the typical country in our series is the Dominican Republic in Morris' (1979) ratings of countries from 1975 data.

The data for the preceding remarks are based on Table 4.2. In general, the complementary data in Tables 4.4 and 4.6 give comparable results. Accordingly, we refer the reader to them for technical purposes but leave the preceding presentation of descriptive materials in order to avoid repetition of data essentially comparable to that in Table 4.2.

## RESULTS

*Demographic Model.* Our first application of the demographic predictor series is to the criterion, *1975 per capita $ GNP*. The full model in Table 4.3 generated an $R^2$ of .36, which was highly significant. Of the five predictors, one, the 1965-70 birth rate, was significant. Its deletion from the full regression dropped the proportion of criterion variance accounted for from .36 to .29 ($F=14.24$, $p=.00002$). Thus, one fifth of the $R^2$ is associated with birth rate.

Applied to the second, dynamic criterion of percentage growth in $ GNP in the eighteen years between 1960 and 1978, the predictor series accounted for twenty one percent of the variance in a highly significant model ($p=.00009$). One predictor, crude birth rate 1965-70, was significant within the model, explaining about one quarter of the variance. The drop shown in Table 4.3 from $R^2=.21$ to .16 was highly significant ($F=7.81$, $p=.006$).

The $R^2$ generated by the five-factor regression model of demographic information produced an $R^2=.85$ ($p<.00001$) for the 1975 Physical Quality of Life Index criterion. Two predictor variables were significant, and their deletion from the full regression model produced restricted models with lower $R^2$. The percentage of girls in primary education in 1960 accounted for fifteen of the eighty five percent of the full model ($F=317.02$, $p<.00001$). 1965-70 birth rate accounted for four percent ($F=40.29$, $p<.00001$).

TABLE 4.1

COUNTRIES OF THE WORLD

| | | | | |
|---|---|---|---|---|
| Algeria | Mauritania | Iran | France | Honduras |
| Angola | Mauritius | Iraq | Germany, Fed. Rep. | Jamaica |
| Benin | Morocco | Israel | Greece | Mexico |
| Botswana | Mozambique | Japan | Hungary | Nicaragua |
| Burundi | Niger | Jordan | Iceland | Panama |
| Cameroon | Nigeria | Korea, Republic of | Ireland | Trinidad and Tobago |
| Cape Verde | Reunion | Kuwait | Italy | United States |
| Centr. African Empire | Rhodesia-Zimbabwe | Lao People's Dem. Rep. | Luxembourg | Argentina |
| Chad | Rwanda | Lebanon | Netherlands | Bolivia |
| Comoros | Senegal | Malaysia | Norway | Brazil |
| Congo, People's Rep. | Sierre Leone | Nepal | Poland | Chile |
| Egypt | Somalia | Pakistan | Portugal | Colombia |
| Equatorial Guinea | South Africa | Philippines | Romania | Ecuador |
| Ethiopia | Sudan | Saudi Arabia | Spain | Guyana |
| Gabon | Swaziland | Singapore | Sweden | Paraguay |
| Gambia | Tanzania | Sri Lanka | Switzerland | Peru |
| Ghana | Togo | Syrian Arab Republic | Turkey | Suriname |
| Guinea | Tunisia | Thailand | USSR | Uruguay |
| Guinea-Bisseau | Uganda | Yemen, P. Dem. Rep. | United Kingdom | Venezuela |
| Ivory Coast | Upper Volta | Albania | Yugoslavia | Australia |
| Kenya | Zaire | Austria | Barbados | Fiji |
| Lesotho | Zambia | Belgium | Canada | Indonesia |
| Liberia | Afghanistan | Bulgaria | Costa Rica | New Zealand |
| Libya | Bangladesh | Cyprus | Dominican Republic | Papua-New Guinea |
| Madagascar | Burma | Czechoslovakia | El Salvador | |
| Malawi | Hong Kong | Denmark | Guatemala | |
| Mali | India | Finland | Haiti | |

TABLE 4.2

DESCRIPTION OF THE SUBJECTS: ALL COUNTRIES-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 589.02 | 1815.77 | 129 | 692.22 | 1957.94 | 109 | 597.40 | 1828.84 | 127 |
| % Girls in Primary Education 1960 | 64.65 | 39.65 | 129 | 64.26 | 39.41 | 109 | 64.81 | 39.91 | 127 |
| Crude Birth Rate per 000 1965-70 | 37.43 | 12.05 | 129 | 37.30 | 12.49 | 109 | 37.45 | 12.14 | 127 |
| Population (000) CA 0-4 Years 1975 | 3060.08 | 9222.10 | 129 | 3594.09 | 9940.21 | 109 | 3102.54 | 9288.09 | 127 |
| Population (000) CA 5-9 Years 1975 | 2633.10 | 7875.33 | 129 | 3092.59 | 8487.36 | 109 | 2694.48 | 7931.64 | 127 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 55.81 | 29.47 | 48 | 55.25 | 29.11 | 43 | 56.78 | 29.00 | 47 |
| Life Expectancy 1960 | 56.09 | 12.78 | 68 | 56.10 | 13.06 | 60 | 56.09 | 12.78 | 68 |
| Urban % of Population 1960 | 33.92 | 22.71 | 95 | 33.93 | 22.30 | 83 | 34.15 | 27.71 | 94 |
| Rooms per Urban Person 1960 | 1.62 | .67 | 60 | 1.64 | .68 | 54 | 1.62 | .67 | 60 |
| N Radios per 000 Population 1960 | 86.96 | 101.10 | 102 | 88.17 | 103.64 | 89 | 87.77 | 101.77 | 101 |
| Newsprint Kg. per Person 1960 | 4.45 | 6.87 | 81 | 4.71 | 7.07 | 75 | 4.51 | 6.89 | 80 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1562.89 | 2225.90 | 129 | | | | | | |
| GNP Increment 1960-78 | | | | 2.80 | 2.17 | 109 | | | |
| PQLI 1975 | | | | | | | 60.00 | 26.83 | 127 |

TABLE 4.3

MULTIPLE LINEAR REGRESSION ANALYSIS OF DEMOGRAPHIC MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=129) 1975 $ GNP Per Capita $R^2$ | F | P | (N=109) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=127) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .36 | | <.00001* | .21 | | .00009* | .85 | | <.00001* |
| | | | .00 | 1.00 | | 1.00 | .31 | | <.01 | .97 |
| | Model 2 | .36 | | <.00001* | .21 | | .00005* | .85 | | <.00001* |
| % Girls in Primary | Full Model 1 | .36 | | <.00001* | .21 | | .00009* | .85 | | <.00001* |
| | | | .00 | .99 | | .32 | .56 | | 137.02 | <.00001 |
| Education 1960 | Model 3 | .36 | | <.00001* | .21 | | .00004* | .70 | | <.00001* |
| Crude Birth Rate | Full Model 1 | .36 | | <.00001* | .21 | | .00009* | .85 | | <.00001* |
| | | | 14.24 | .0002 | | 7.81 | .006 | | 40.49 | <.00001 |
| per 000 1965-70 | Model 4 | .29 | | <.00002* | .16 | | .00004* | .81 | | <.00001* |
| Population (000) | Full Model 1 | .36 | | <.00001* | .21 | | .00009* | .85 | | <.00001* |
| | | | 2.43 | .12 | | .21 | .64 | | .00 | 1.00 |
| CA 0-4 Years 1975 | Model 5 | .35 | | <.00001* | .21 | | .00003* | .85 | | <.00001* |
| Population (000) | Full Model 1 | .36 | | <.00001* | .21 | | .00009* | .85 | | <.00001* |
| | | | .00 | 1.00 | | .00 | 1.00 | | <.01 | .96 |
| CA 5-9 Years 1975 | Model 6 | .36 | | <.00001* | .21 | | .00003* | .85 | | <.00001* |

*Significance of the difference from zero.

Consideration of the results of applying the five demographic variables to the three criteria of national development shows the consistent significance for the countries of the world as a whole, as exemplified in our analyses, of the 1965-70 birth rate. This variable significantly influences the three criteria of development, and at statistical levels which are highly significant. The proportions of criterion variance, discretely, range from four to seven percent.

*Health Model.* This model of 1975 per capita $ GNP was more explanatory than the demographic model, in the sense that the generated $R^2$ was .60 ($p<.00001$) as Table 4.4 shows. Nearly one third of the model's variance was accounted for by the 1955-60 birth rate, whose omission from the full model, in the form of Table 4.4's model 3, dropped the $R^2$ from .60 to .42 ($F=42.18$, $p<.00001$).

The health predictor series also produced a fairly low but statistically significant account of variance ($p=.005$) for the criterion 1960-78 $ GNP per capita. The number of persons per physician within the predictor series accounted for about one-third of the variance ($F=5.74$, $p=.01$).

The Health model generated an account of seventy seven percent of the criterion variance for the variable PQLI. Three of the five predictors were statistically significant, as Table 4.4 shows. Birth rate, an element purposefully evident in all three models of childhood populations, although in varied form, was the most significant element. Its omission in restricted model three dropped the $R^2$ from .77 to .67 ($F=40.91$, $p<.00001$). The number of persons per physician was also important ($F=32.04$, $p<.00001$) and its omission dropped the $R^2$ from .77 to .69. A slight decline of one percent of variance was due to the variable, number of persons per hospital bed. Neither caloric requirements nor the size of the population under fourteen years was a significant variable.

For the three series of analyses 1955-60 birth rate was a highly significant influence exceeding somewhat in statistical power a second predictor, the number of persons per physician in 1960.

*Environmental Model.* This model of 1975 $ GNP is summarized in Table 4.7. The $R^2$ of this five-predictor model was .51, a highly significant model ($p<.00001$). As with the preceding models one predictor was significant,

TABLE 4.4

MULTIPLE LINEAR REGRESSION ANALYSIS OF HEALTH MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=99) 1975 $ GNP Per Capita $R^2$ | F | P | (N= ) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=98) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA | Full Model 1 | .60 | | <.00001* | .17 | | .005* | .77 | | <.00001* |
| | | | .52 | .47 | | 1.74 | .18 | | .79 | .37 |
| 0-14 Years 1960 | Model 2 | .60 | | <.00001* | .16 | | .004* | .77 | | <.00001* |
| Birth Rate per 000 | Full Model 1 | .60 | | <.00001* | .17 | | .005* | .77 | | <.00001* |
| | | | 42.18 | <.00001 | | .56 | .45 | | 40.91 | <.00001 |
| 1955-60 | Model 3 | .42 | | <.00001* | .17 | | .002 | .67 | | <.00001* |
| N Persons per Physician | Full Model 1 | .60 | | <.00001* | .17 | | .005* | .77 | | <.00001* |
| | | | .21 | .64 | | 5.74 | .01 | | 32.04 | <.00001 |
| 1960 | Model 4 | .60 | | <.00001* | .12 | | .02* | .69 | | <.00001* |
| N Persons per Hospital | Full Model 1 | .60 | | <.00001* | .17 | | .005* | .77 | | <.00001* |
| | | | .44 | .50 | | .25 | .61 | | 5.48 | .02 |
| Bed 1960 | Model 5 | .60 | | <.00001* | .17 | | .002 | .76 | | <.00001* |
| % Needed Calories per | Full Model 1 | .60 | | <.00001* | .17 | | .005* | .77 | | <.00001 |
| | | | .71 | .40 | | <.01 | .92 | | 2.14 | .14 |
| Capita 1970 | Model 6 | .59 | | <.00001* | .17 | | .002* | .76 | | <.00001* |

*Significance of the difference from zero.

TABLE 4.5

DESCRIPTION OF THE SUBJECTS: ALL COUNTRIES—HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 56072.00 | 8482.27 | 99 | 5820.28 | 8771.25 | 89 | 5300.73 | 8516.53 | 98 |
| Birth Rate 1955-60 | 38.76 | 11.98 | 99 | 39.01 | 12.32 | 89 | 38.75 | 12.04 | 98 |
| N Population per Physician 1970 | 10927.17 | 17995.34 | 99 | 11559.66 | 18758.82 | 89 | 10903.87 | 18085.44 | 98 |
| N Population per Hospital Bed 1960 | 766.11 | 1225.22 | 99 | 817.80 | 1280.21 | 89 | 755.66 | 1227.06 | 98 |
| % Needed Calories per Capita 1970 | 101.56 | 13.67 | 99 | 101.91 | 14.20 | 89 | 101.82 | 13.49 | 98 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 56.65 | 30.54 | 47 | 55.78 | 29.84 | 42 | 57.67 | 30.07 | 46 |
| Life Expectancy 1960 | 56.59 | 13.13 | 68 | 56.44 | 13.27 | 60 | 56.59 | 13.13 | 68 |
| Urban % of Population 1960 | 35.69 | 22.08 | 89 | 35.76 | 22.39 | 80 | 35.96 | 22.05 | 88 |
| Rooms per Urban Person 1960 | 1.59 | .68 | 61 | 1.61 | .70 | 55 | 1.59 | .68 | 61 |
| N Radios per 000 Population 1960 | 103.76 | 135.41 | 96 | 103.96 | 139.86 | 86 | 104.80 | 135.74 | 95 |
| Newsprint Kg. per Person 1960 | 5.19 | 7.81 | 81 | 5.43 | 8.09 | 74 | 5.25 | 7.84 | 80 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1781.52 | 2210.38 | 99 | | | | | | |
| GNP Increment 1960-78 | | | | 2.93 | 2.07 | 89 | | | |
| PQLI 1975 | | | | | | | 62.03 | 27.07 | 98 |

the number of radios in the population. Omission of this predictor dropped the $R^2$ significantly from .51 to .44 (F=12.82, p=.0005). Of the three significant predictors two represent the population elements in the model, and only in the environmental model does another element appear.

The five-factor model of 1970-78 $ GNP per capita explained a comparably small portion of variance by generating an $R^2$=.21 (p=.001). The number of radios in the population explained about one fourth of the variance. The difference in $R^2$ between the full model's .21 and model 6 (see Table 4.7) was statistically significant (F=5.32, p=.02).

In the case of the third criterion, Morris' Physical Quality of Life Index (PQLI), the five variable predictor model of the environment of childhood explained a high proportion of variance ($R^2$=.92, p<.00001). When the five predictors were deleted in five alternate or restricted models only one variable was significant. Model 3 omitted data on life expectancy at birth in 1960 and its $R^2$ was .80. The drop from an $R^2$ of .92 to .80 was highly significant (F=154.23, p<.00001).

*Commentary.* In the analyses just reported the number of countries around the world varied from eighty five to one hundred and twenty nine; these are numbers large enough to support regression analyses using five predictor variables. The $R^2$ values are quite high ranging from .17 to .92, with the majority at the top end of that range. For the most part, an empirical connection is made between the characteristics in the world of childhood and three indices of national growth approximately fifteen years later for countries in all regions of the world, taken as a group. The most predictable criterion, in the sense of highest $R^2$ from three models, is the 1975 $ GNP per capita, with a mean $R^2$=.49, the least predictable in the same sense is the increment in per capita $ GNP between 1960 and 1978 - $R^2$=.20.

Looking at the three models the most predictive of the three is the Environmental model in Table 4.7. However, its mean generated $R^2$ of .54 is only slightly above the mean $R^2$ of the Health model and is fairly close to the mean $R^2$ of .47 of the child data model. Generally speaking, the three aggregates of data from the world of childhood explain about

TABLE 4.6

DESCRIPTION OF THE SUBJECTS: ALL COUNTRIES-ENVIRONMENTAL PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 37.93 | 11.83 | 99 | 38.35 | 11.92 | 85 | 37.93 | 11.89 | 98 |
| Life Expectancy at Birth 1960 | 50.56 | 13.31 | 99 | 50.29 | 13.23 | 85 | 50.64 | 13.35 | 98 |
| N Working per 000 Children 1970 | 18.45 | 15.24 | 99 | 18.96 | 15.15 | 85 | 18.22 | 15.16 | 98 |
| Primary Pupil/Teacher Ratio 1970 | 34.94 | 10.49 | 99 | 35.55 | 10.82 | 85 | 34.84 | 10.50 | 98 |
| Radios per 000 Population 1960 | 90.41 | 129.13 | 99 | 89.94 | 133.96 | 85 | 91.28 | 129.50 | 98 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 58.38 | 30.59 | 67 | 57.05 | 30.04 | 41 | 59.43 | 30.06 | 46 |
| Life Expectancy 1960 | 55.85 | 12.69 | 64 | 55.51 | 12.89 | 55 | 55.85 | 12.69 | 64 |
| Urban % of Population 1960 | 33.73 | .70 | 88 | 33.56 | 21.50 | 75 | 33.98 | 21.98 | 87 |
| Rooms per Urban Person 1960 | 1.65 | .66 | 57 | 1.68 | .67 | 50 | 1.65 | .66 | 57 |
| N Radios per 000 Population 1960 | 90.41 | 179.79 | 99 | 89.94 | 134.76 | 85 | 91.28 | 130.17 | 98 |
| Newsprint Kg. per Person 1960 | 4.34 | 7.32 | 76 | 4.53 | 7.60 | 69 | 4.40 | 7.36 | 75 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1644.67 | 2405.40 | 99 | | | | | | |
| GNP Increment 1960-78 | | | | 2.82 | 2.16 | 85 | | | |
| PQLI 1975 | | | | | | | 60.51 | 26.29 | 98 |

MULTIPLE LINEAR REGRESSION ANALYSIS OF ENVIRONMENTAL MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=99) 1975 $ GNP Per Capita $R^2$ | F | P | (N=85) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=98) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .51 | | <.00001* | .21 | | .001* | .92 | | <.00001* |
| | | | .08 | .77 | | 3.69 | .06 | | .17 | .67 |
| 1965-70 | Model 2 | .51 | | <.00001* | .18 | | .002* | .92 | | <.00001* |
| Life Expectancy | Full Model 1 | .51 | | <.00001* | .21 | | .001* | .92 | | <.00001* |
| | | | .38 | .53 | | .006 | .93 | | 154.23 | <.00001 |
| at Birth 1960 | Model 3 | .51 | | <.00001* | .21 | | .0005* | .80 | | <.00001* |
| N Working per 000 | Full Model 1 | .51 | | <.00001* | .21 | | .001* | .92 | | <.00001* |
| | | | .69 | .40 | | 1.10 | .28 | | 4.41 | .03 |
| Children 1970 | Model 4 | .51 | | <.00001* | .21 | | .0009* | .92 | | <.00001* |
| Primary School Pupil/ | Full Model 1 | .51 | | <.00001* | .21 | | .001* | .92 | | <.00001* |
| | | | 5.03 | .02 | | .98 | .32 | | 2.96 | .08 |
| Teacher Ratio 1970 | Model 5 | .48 | | <.00001* | .20 | | .0008* | .92 | | <.00001* |
| Radios per 000 | Full Model 1 | .51 | | <.00001* | .21 | | .001* | .92 | | <.00001* |
| | | | 12.82 | .0005 | | 5.32 | .02 | | .12 | .72 |
| Population 1960 | Model 6 | .44 | | <.00001* | .16 | | .005* | .92 | | <.00001* |

*Significance of the difference from zero

one half of the variance of the three criteria of national development.

When we turn to the three models summarized in Tables 4.3, 4.5 and 4.7, it is evident that some variables are more relevant to understanding the relationship between childhood and national development. For all three criteria from the world group brith rate is a consistently significant element within the demographic predictor series. However, it is also an influential element within the Health model, recalling our attempt to link the three childhood models by a common domain, but not an identical variable, in the form of birth rate. In some respects the significant variable for all three predictors and all three criteria, nine sets of results, is the birth rate. The most varied predictors for all criteria is the environmental model with four variables achieving statistical significance. They are the student/teacher ratio, the number of radios and life expectancy. The significant predictors for the PQLI 1975 criterion are the most diverse of all, including birth rate (2), the ratios of people to doctors and to hospital beds, and life expectancy.

For the world-wide aggregate of 129 nations it is clear that there is a solid statistical relationship between characteristics of the world of childhood around 1960, and three criteria of national development approximately fifteen years later, a date by which children in many countries would be in the adult work force. When the three model's $R^2$ values for three criteria are averaged the Health data and Environmental data are the best predictor models. The Environmental model of PQLI is the single best model of all three criteria, ($R^2$=.58), and the most predictable criterion is also PQLI ($R^2$=.83). Having set forth statistical findings we now express them as a view of the world, within the limitations of the data. In so doing we have two purposes. First, we wish to educe an empirically-based view of the role of childhood in the economic and social development of the world-wide community. It is a heterogeneous group composed of rich and poor countries, those with centuries of development and already entering a post-expansionist phase of re-adjustment, and those seeking development through industrialization; it includes those with large and small populations, in temperate and harsh climates.

In that spirit we observe that the condition of childhood is an

important antecedent to subsequent development. Our data are from quite distinct time-points and this longitudinal element gives credence to the data.

Because of the eighteen year picture of growth we believe the second criterion of $ GNP per capita from 1960 to 1978 is particularly important. Obviously, it is influenced by more than the fifteen variables of our analysis; there are natural disasters and wars, and there is the indisputable fact of the slow down in the world's economy triggered by the oil crisis of 1973. In some respects that event affected every country; producers of oil found their earnings diluted by inflation, while major consumers found their national life styles inhibited. In so far as the world-wide economic decline of the Seventies was wide-spread it becomes an implicit co-variate in our analyses. Accordingly, the 1960-78 $ GNP increment is a sensitive criterion. When we look at the antecedent models they are not insignificant, and they are all about equally predictive. More analytically, the single most important antecedent to the criterion is birth rate in 1965-70. The number of persons per physician can be linked to it, and may well play a role in determining the size of populations. That is, population growth may be inhibited by health education, in the face of values which emphasize the importance of having many children. We summarize that population control may be the single most important fact in a world where growth remains excessive in places whose resources are low. The availability of radios, we speculate, may have two meanings. One is that the availability of radios is an indicator of the standard of living attained by 1960. However, we add a second meaning which reflects placement of this variable in the Environmental model. It is that radios indicate a mode of acculturation and informal education, and so may contribute to economic progress.

When we take a simple slice of the same fiscal criterion, but for 1975 only, antecedent birth rate remains important within child variables. Birth rate is the single most important influence in the world. It is followed by the level of economic attainment previously arrived at, represented here by radios owned by countries' peoples, a factor which sets the stage for related elements such as the quality of elemen-

tary schooling. It appears that childhood traits affect national growth, and we see that the process is best elucidated by knowing where a society is in the preceding years.

In the social domain of attainment around the world we need to keep in mind that the criterion of Physical Quality of Life (PQLI) is not unrelated to the predictor domains. The PQLI draws on infants' life expectancy, infant mortality, and literacy. Here too variables of life and death, birth rate and availability of physicians, and girls' schooling affect the way in which people live. The issue of child labor arises in the area of nations' development as a problem.

In general we see that there are specific characteristics of the world's population of children which influence nations' subsequent attainment. We draw the conclusion that attention to childhood is a necessary element in schemes to raise nations' level of living in later years.

Our second purpose in summarizing the findings on the world-wide group is to provide a background against which we can ask narrower questions for groups of nations. We use the findings of Chapter Four to appraise findings in the following three chapters. We can ask which variables are important in poor countries; however, an interest in developing policies suggests we need to know how common or unique particular influences are. Comparisons with the world-wide findings from one hundred and twenty nine countries can help answer the questions in an empirical way. In this regard, we point out that some elements are self-evidently important, e.g. birth rate; but our data puts the self-evident into sharper perspective by relating it to other elements which probably would not identify themselves. In addition, the fig-leaf of the self-evident is augmented by a relatively sophisticated statistical analysis.

In the Chapters which follow we shall use the world-wide picture we have just drawn to evaluate findings for five particular groupings of nations, rich and poor, African, Asian, and Latin American countries. We will ask how the pattern of findings in this chapter compares with that for the five subgroups. Obviously, the rich countries are not a

pressing matter; however, it is well to keep in mind the existence of a Fourth World, the pockets of poverty and unemployment which exist in the developed world. The rich countries provide a contrast for studying poor countries, of course.

# CHAPTER FIVE
# RICH AND POOR COUNTRIES
## I. RICH COUNTRIES

This chapter analyzes national development and its antecedents in childhood in countries aggregated by wealth and by the lack of it. For both data sets organized by wealth the assessment of the World Bank in 1979 is the source of grouping countries. For this chapter we use data from fifty rich countries all of which have a score of 4 or above on a scale of 1 to 5. In the second part of the chapter we report and analyze data from sixty two countries grouped as poor by the World Bank.

Inspection of Table 5.1 shows that most rich countries are industrialized nations of the West. There are exceptions, of course, and the data set includes Gabon, Kuwait, and Fiji. Tables 5.2, 5.4, and 5.6 give the principal characteristics of the countries to be analyzed.

Given that our overall objective is pursuit of information ultimately suggesting variables to promote development within countries not yet fully developed economically, it seems appropriate to explain our attention to rich countries. The reason for studying our questions among rich countries is to provide a backdrop against which findings from poor nations and poor zones of the world may stand in contrast. Accordingly, we present analyses among the World Bank's designated rich countries.

### RESULTS

*Demographic Model.* The five predictors were used to develop a linear regression model of per capita $ GNP in fifty seven rich countries. The model explained eleven percent of the criterion variance, as Table 5.3 indicates. None of the five predictors in the model discretely and significantly affected the value of $R^2$ by deletion in the regression models 2 to 6.

In the case of the second criterion, 1960-78 $ GNP increment per capita, a robust $R^2$ of .41 ($p=.001$) was generated by the five demographic variables. Two variables were significant sources of variance in the presence of the other four variables. Model 3 omitted the percentage of

## TABLE 5.1

## RICH COUNTRIES

| | | | |
|---|---|---|---|
| Gabon[1,2,3] | Cyprus[1,2,3] | Portugal[1,2,3] | Panama[1,2,3] |
| Libya[1,2] | Denmark[1,2,3] | Romania[1,2,3] | Trinidad and Tobago[1,2,3] |
| Zambia[1,2,3] | Finland[1,2,3] | Spain[1,2,3] | United States[2,3] |
| Iran[1,2,3] | France[1,2,3] | Sweden[1,2,3] | Argentina[1,2,3] |
| Israel[1,2,3] | Germany, Fed. Republic[1,2,3] | United Kingdom[1,2] | Brazil[1,2,3] |
| Japan[1,2,3] | Greece[1,2,3] | Yugoslavia[1,2,3] | Chile[1,2,3] |
| Kuwait[1,3] | Iceland[2,3] | Barbados[1,2,3] | Peru[1,2,3] |
| Lebanon[1,2,3] | Ireland[1,2,3] | Canada[1,2,3] | Uruguay[1,2,3] |
| Malaysia[1,2,3] | Italy[1,2,3] | Costa Rica[1,3] | Venezuela[1,2,3] |
| Saudi Arabia[1,2,3] | Luxembourg[1,3] | Jamaica[1,2,3] | Australia[1,2,3] |
| Singapore[1,2] | Malta[2] | Mexico[1,2,3] | Fiji[1,3] |
| Austria[1,2,3] | Netherlands[1,2,3] | Nicaragua[1,2,3] | New Zealand[1,2] |
| Belgium[1,2] | Norway[1,2] | | |

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[1] = Demographic, [2] = Health, [3] = Environmental predictor sets

TABLE 5.2

DESCRIPTION OF THE SUBJECTS: RICH COUNTRIES-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 2806.00 | 534.61 | 47 | 420.60 | 554.56 | 41 | 370.12 | 534.61 | 47 |
| % Girls in Primary Education 1960 | 95.29 | | 47 | 94.82 | 28.39 | 41 | 95.29 | 27.35 | 47 |
| Crude Birth Rate per 000 1965-70 | 27.88 | 11.24 | 47 | 27.91 | 11.64 | 41 | 27.88 | 11.24 | 47 |
| Population (000) CA 0-4 Years 1975 | 1995.95 | 3231.99 | 47 | 2273.65 | 3373.84 | 41 | 1995.95 | 3231.99 | 47 |
| Population (000) 5-9 Years 1975 | 1845.57 | 2812.04 | 47 | 2099.19 | 2925.38 | 41 | 1845.57 | 2812.04 | 47 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 69.30 | 24.30 | 30 | 70.03 | 22.52 | 27 | 69.30 | 24.30 | 30 |
| Life Expectancy 1960 | 63.31 | 9.86 | 39 | 64.53 | 8.67 | 34 | 63.31 | 9.86 | 39 |
| Urban % of Population 1960 | 50.19 | 19.21 | 41 | 52.08 | 18.68 | 36 | 50.19 | 19.21 | 41 |
| Rooms per Urban Person 1960 | 1.24 | .52 | 35 | 1.23 | .51 | 31 | 1.24 | .52 | 35 |
| N Radios per 000 Population 1960 | 162.77 | 108.74 | 45 | 167.64 | 110.31 | 39 | 162.77 | 108.74 | 45 |
| Newsprint Kg. per Person 1960 | 7.85 | 8.03 | 43 | 8.48 | 8.16 | 39 | 7.85 | 8.03 | 43 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 3368.93 | 2787.60 | 47 | | | | | | |
| GNP Increment 1960-78 | | | | 3.80 | 2.27 | 41 | | | |
| PQLI 1975 | | | | | | | 81.61 | 18.00 | 47 |

TABLE 5.3

MULTIPLE LINEAR REGRESSION ANALYSIS OF DEMOGRAPHIC MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=47) 1975 $ GNP Per Capita $R^2$ | F | P | (N=41) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=47) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .11 | | .37* | .41 | | .001* | .71 | | <.00001* |
| | | | .60 | .43 | | 3.10 | .08 | | .86 | .35 |
| | Model 2 | .10 | | .33* | .36 | | .002* | .70 | | <.00001* |
| % Girls in Primary | Full Model 1 | .11 | | .37* | .41 | | .001* | .71 | | <.00001* |
| | | | .27 | .60 | | 13.29 | .0008 | | 10.80 | .002 |
| Education 1960 | Model 3 | .11 | | .28* | .19 | | .08* | .63 | | <.00001* |
| Crude Birth Rate | Full Model 1 | .11 | | .37* | .41 | | .001* | .71 | | <.00001* |
| | | | .71 | .40 | | 9.30 | .004 | | 15.44 | .0003 |
| per 000 1965-70 | Model 4 | .10 | | .32* | .26 | | .02* | .60 | | <.00001* |
| Population (000) | Full Model 1 | .11 | | .37* | .41 | | .001* | .71 | | <.00001* |
| | | | .31 | .57 | | .03 | .85 | | -.23 | 1.00 |
| CA 0-4 Years 1975 | Model 5 | .11 | | .27* | .41 | | .0005* | .71 | | <.00001* |
| Population (000) | Full Model 1 | .11 | | .37* | .41 | | .001* | .71 | | <.00001* |
| | | | .74 | .39 | | 2.29 | .13 | | .00 | 1.00 |
| CA 5-9 Years 1975 | Model 6 | .10 | | .31* | .38 | | .001* | .71 | | <.00001* |

*Significance of the difference from zero

girls in primary education in 1960, and the $R^2$ dropped from .41 to .19 (F=13.29, p=.0008). The crude birth rate between 1965 and 1970 also significantly affected the criterion variance; it accounted for over one third of the variance (F=9.30, p=.004). Observable, but not statistically significant, influences were associated with the number of births in 1960 and with the population aged 5-9 years in 1975.

Use of the five demographic variables generated the highest $R^2$ when applied to the Physical Quality of Life (PQLI). The $R^2$ of .71 is quite high (p<.00001); it was affected by two variables, however. The greater influence was the 1965-70 crude birth rate of countries (F=15.46, p=.0003), and it accounted for eleven of the seventy one percent of the full model of five predictor variables. The 1960 proportion of girls in primary schools was the other influence, explaining eight percent of the variance in PQLI.

Of the five demographic variables two are consistently associated with the last two criteria in Table 5.3. They are the percentage of girls in primary schools in 1960, and the 1965-70 birth rate. The two criteria are quite different in nature, and so the significance of the predictors in a sample of rich countries increases.

*Health Model.* We turn next to application of the Health predictor set of five variables, in Table 5.5, to the three criteria of development in forty one to forty seven rich countries. The five variable predictor model accounted for one third of the criterion variance in a statistically significant regression model of 1975 $ GNP per capita. One variable, the 1955-60 birth rate, explained fourteen percent of the thirteen percent of the full regression model's criterion variance. The $R^2$ of model 1 dropped from .35 to .21 in model 3. The difference in $R^2$ values was highly significant (F=8.93, p=.004).

In the case of the second criterion of nations' attainment over a span of time, the rate of change in 1960-78 $ GNP per capita, a low $R^2$ of .27 was generated by the full model of five health predictors. Here too only one predictor was significant, and the number of hospital beds for the population was highly significant. When deleted from the regression model the $R^2$ values dropped from .27 to .03 (F=11.58, p=.001).

TABLE 5.4

DESCRIPTION OF THE SUBJECTS: RICH COUNTRIES-HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 5727.35 | 9903.14 | 47 | 6529.14 | 10362.30 | 41 | 5727.35 | 9903.14 | 47 |
| Birth Rate 1955-60 | 29.68 | 11.52 | 47 | 29.43 | 12.10 | 41 | 29.68 | 11.51 | 47 |
| N Population per Physician 1970 | 1763.62 | 2344.68 | 47 | 1743.41 | 2444.89 | 41 | 1763.61 | 2344.68 | 47 |
| N Population per Hospital Bed 1960 | 240.32 | 251.39 | 47 | 245.48 | 265.66 | 41 | 240.31 | 251.39 | 47 |
| % Needed Calories per Capita 1970 | 110.44 | 12.20 | 47 | 111.97 | 12.11 | 41 | 110.44 | 12.20 | 47 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 71.53 | 24.93 | 30 | 71.46 | 22.97 | 26 | 71.53 | 24.93 | 30 |
| Life Expectancy 1960 | 63.91 | 9.83 | 41 | 64.87 | 8.63 | 35 | 63.91 | 9.83 | 41 |
| Urban % of Population 1960 | 51.73 | 18.39 | 42 | 53.07 | 18.42 | 37 | 51.73 | 18.39 | 42 |
| Rooms per Urban Person 1960 | 1.21 | .51 | 37 | 1.19 | .52 | 32 | 1.21 | .51 | 37 |
| N Radios per 000 Population 1960 | 190.42 | 155.22 | 45 | 196.41 | 162.98 | 39 | 190.42 | 155.22 | 45 |
| Newsprint Kg. per Person 1960 | 8.86 | 8.93 | 45 | 9.51 | 9.21 | 40 | 8.86 | 8.93 | 45 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 3360.42 | 2340.18 | 47 | | | | | | |
| GNP Increment 1960-78 | | | | 3.89 | 2.08 | 41 | | | |
| PQLI 1975 | | | | | | | 82.55 | 18.29 | 47 |

TABLE 6.12

MULTIPLE LINEAR REGRESSION ANALYSIS OF HEALTH MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=18) 1975 $ GNP Per Capita $R^2$ | F | P | (N=16) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=18) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA | Full Model 1 | .50 | | .09* | .34 | | .43* | .79 | | .0007* |
| | | | .92 | .35 | | .16 | .69 | | .73 | .40 |
| 0-14 Years 1960 | Model 2 | .47 | | .06* | .33 | | .29* | .78 | | .0002* |
| Birth Rate per 000 | Full Model 1 | .50 | | .09* | .34 | | .43* | .79 | | .0007* |
| | | | 7.51 | .01 | | .61 | .44 | | 7.16 | .02 |
| 1955-60 | Model 3 | .20 | | .53* | .30 | | .35* | .67 | | .003* |
| N Persons per Physician | Full Model 1 | .50 | | .09* | .34 | | .43* | .79 | | .0007* |
| | | | .007 | .93 | | .07 | .79 | | .10 | .75 |
| 1960 | Model 4 | .50 | | .04* | .34 | | .28* | .79 | | .0002* |
| N Persons per Hospital | Full Model 1 | .50 | | .09* | .34 | | .43* | .79 | | .0007* |
| | | | .91 | .35 | | 1.38 | .26 | | 2.93 | .11 |
| Bed 1960 | Model 5 | .47 | | .06* | .25 | | .47* | .74 | | .0007* |
| % Needed Calories per | Full Model 1 | .50 | | .09* | .34 | | .43* | .79 | | .0007* |
| | | | 1.96 | .18 | | 1.30 | .27 | | .32 | .57 |
| Capita 1970 | Model 6 | .42 | | .10* | .26 | | .45* | .79 | | .0002* |

The five factor Health model of PQLI explained a substantial seventy three percent of the criterion variance. Two predictors influenced the model discretely. The major contributor came from the variable, persons per Physician in 1960. Eleven of the seventy three percent of the variance were contributed by this predictor ($F=16.00$, $p=.0002$). The lesser variable of interest was the 1955-1960 birth rate which accounted for six percent of the variance ($F=7.88$, $p=.009$).

Of the five predictors in the Health model two were quite insignificant, the level of nutrition and the size of the population of children. The 1955-60 birth rate was significant for two of the three criteria of development among the forty-plus rich nations. The degree of contribution of the 1955-60 birth rate ranged from six to fourteen percent, however, and within models varying from .35 to .73 in $R^2$.

*Commentary.* All things in our analyses considered it appears that the three models of the world data set are fairly similar as statistical predictors to those of the rich countries. The grand mean $R^2$ of the latter is a little lower, .45 and .52, but the mean model $R^2$ for three criteria are generally similar.

Variable by variable, we see that the antecedents to social development, our third criterion the PQLI, are about the same in the world and in rich countries. Birth rate, education of girls, life expectancy, and the extent of child labor are present in both sets for the social criteria. In the case of fiscal attainment of nations over eighteen years, in rich countries education of girls and birth rate are important. In the Health domain only availability of hospital beds is important in rich countries. A related variable, people per physician, is important in the world series. The environmental variables are also different. It is radios available to the population which counts in the world-wide context. For 1975 $ GNP per person none of our Demographic variables in rich countries are relevant, and three environmental variables are important. In general, the pattern of important antecedent variables is unique in the rich countries of the world, and quite unlike the world-wide pattern of influences.

TABLE 5.6

DESCRIPTION OF THE SUBJECTS: RICH COUNTRIES-ENVIRONMENTAL PREDICTORS

| Variable | M. | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 28.07 | 11.13 | 43 | 28.29 | 11.69 | 36 | 28.07 | 11.13 | 43 |
| Life Expectancy at Birth 1960 | 62.13 | 9.96 | 43 | 62.57 | 9.50 | 36 | 62.13 | 9.96 | 43 |
| N Working per 000 Children 1970 | 7.04 | 7.24 | 43 | 6.76 | 7.15 | 36 | 7.04 | 7.23 | 43 |
| Primary Pupil/Teacher Ratio 1970 | 28.97 | 8.16 | 43 | 28.94 | 8.08 | 36 | 28.97 | 8.16 | 43 |
| Radios per 000 Population 1960 | 173.06 | 158.66 | 43 | 176.37 | 167.34 | 36 | 173.06 | 158.66 | 43 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 73.50 | 23.30 | 30 | 73.73 | 20.89 | 26 | 73.50 | 23.30 | 30 |
| Life Expectancy 1960 | 62.95 | 10.01 | 37 | 63.91 | 8.84 | 31 | 62.95 | 10.01 | 37 |
| Urban % of Population 1960 | 49.48 | 18.43 | 37 | 51.70 | 18.01 | 31 | 49.48 | 18.43 | 37 |
| Rooms per Urban Person 1960 | 1.27 | .51 | 43 | 1.28 | .51 | 28 | 1.27 | .51 | 43 |
| N Radios per 000 Population 1960 | 173.06 | 1160.54 | 43 | 176.97 | 169.71 | 36 | 173.06 | 60.54 | 43 |
| Newsprint Kg. per Person 1960 | 7.90 | 8.88 | 39 | 8.58 | 9.24 | 34 | 7.90 | 8.88 | 39 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 3309.72 | 2890.38 | 43 | | | | | | |
| GNP Increment 1960-78 | | | | 3.69 | 2.27 | 36 | | | |
| PQLI 1975 | | | | | | | 81.74 | 17.97 | 43 |

TABLE 5.7

MULTIPLE LINEAR REGRESSION ANALYSIS OF ENVIRONMENTAL MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=43) 1975 $ GNP Per Capita $R^2$ | F | P | (N=36) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=43) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .43 | | .0005* | .37 | | .01* | .94 | | <.00001* |
| | | | .77 | .38 | | 8.36 | .007 | | .01 | .91 |
| 1965-70 | Model 2 | .42 | | .0002* | .20 | | .12* | .94 | | <.00001* |
| Life Expectancy | Full Model 1 | .43 | | .0005* | .37 | | .01* | .94 | | <.00001* |
| | | | .85 | .35 | | 2.46 | .12 | | 91.42 | <.00001* |
| at Birth 1960 | Model 3 | .41 | | .0002* | .32 | | .01* | .80 | | <.00001* |
| N Working per 000 | Full Model 1 | .43 | | .0005* | .37 | | .01* | .94 | | <.00001* |
| | | | 3.91 | .05 | | 2.00 | .16 | | 6.33 | .01 |
| Children 1970 | Model 4 | .37 | | .001* | .33 | | .01* | .93 | | <.00001* |
| Primary School Pupil/ | Full Model 1 | .43 | | .00005* | .37 | | .01* | .94 | | <.00001* |
| | | | 7.26 | .01 | | 2.76 | .10 | | .63 | .43 |
| Teacher Ratio 1970 | Model 5 | .32 | | .004* | .31 | | .01* | .94 | | <.00001* |
| Radios per 000 | Full Model 1 | .43 | | .0005* | .37 | | .01* | .94 | | <.00001* |
| | | | 4.44 | .04 | | 2.87 | .10 | | .02 | .88 |
| Population 1960 | Model 6 | .35 | | .001* | .31 | | .01* | .94 | | <.00001* |

*Significance of the difference from zero

TABLE 5.8

POOR COUNTRIES

Algeria[1,2,3]
Benin[1,2,3]
Botswana[1,2,3]
Burundi[1,2]
Cameroon[1,2,3]
Chad[1,2,3]
Congo, People's Repub.[1,2,3]
Egypt[1,2,3]
Ethiopia[1,2,3]
The Gambia[1,2,3]
Ghana[1,3]
Ivory Coast[1,2,3]
Kenya[1,2,3]
Lesotho[1,3]
Liberia[1,2,3]
Madagascar[1,2,3]
Malawi[1,2,3]
Mali[1,2,]
Mauritania[1,2,3]
Maritius[1,2,3]
Morocco[1,2,3]
Niger[1,2,3]
Nigeria[1,2,3]
Rwanda[1]
Senegal[1,2,3]
Sierra Leone[1,2,3]
Somalia[1,2,3]
South Africa
Sudan[1,2,3]
Swaziland[1,3]
Tanzania[1,2,3]
Togo[1,2,3]
Tunisia[1,2,3]
Upper Volta[1,2,3]
Zaire[1,2,3]
Afghanistan[1,2,3]
Bangladesh[1]
Burma[1,2,3]
India[1,2,3]
Iraq[1,2,3]
Jordan[1,2,3]
Korea, Republic of[1,2,3]
Nepal[1,2,3]
Pakistan[1,2,3]
Philippines[1,2,3]
Sri Lanka[1,2]
Syrian Arab Republic[1,2,3]
Thailand[1,3]
Yemen Arab Republic[1,3]
Turkey[1,2,3]
Dominican Republic[1,2,3]
El Salvador[1,2,3]
Guatemala[1,2,3]
Haiti[1,2,3]
Honduras[1,2,3]
Bolivia[1,2,3]
Colombia[1,2,3]
Ecuador[1,2,3]
Guyana[1,3]
Paraguay[1,2,3]
Indonesia[1,2,3]
Papua-New Guinea[1]

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[1] = Demographic, [2] = Health, [3] = Environmental predictor

*Environmental Model.* In Table 5.7 we see application of the five Environmental variables to the three indices of national attainment in about forty rich countries. In the case of the criterion, 1975 $ GNP per capita the full model of five Health predictors explained forty three percent of the variance; this is a statistically significant model (p=.0005).

Three variables were significant at the .05 level or below. Most important was the ratio of elementary school children to teachers in 1970. This aspect of the environment in which children grow explained one quarter of the variance in the full model (F=7.26, p=.01). The number of radios in the society was slightly less significant, explaining eight percent of the variance in the same model (F=4.44, p=.04). Six percent of the variance was explained by the number of working children (F=3.91, p=.05). Neither birth rate 1965-70 nor the life expectancy in 1960 explained more than one or two percent of the variance.

When the five environmental models were applied to the second criterion, 1960-78 increase in $ GNP per capita, a slightly smaller, but significant $R^2$ of .37 (p=.01) was generated. Only one predictor, the first in Table 5.7-the 1965-70 birth rate, was significant (F=8.36, p=.007). It accounted for .17 of the full model's $R^2$ of .37, and model two which deleted this variable explained only twenty percent of the criterion variance, a statistically insignificant amount.

The Environmental model of five predictors was a powerful model explaining ninety four percent of the variance. Life expectancy at birth in 1960 was the major influence (F=91.42, p<.00001). This variable explained fourteen percent of the total variance. A secondary influence was the proportion of working children in 1970; however, the statistical significance of this model (F=6.33, p=.01) needs to be balanced against a trivial reduction of one percent in the variance of the full model.

For the set of five environmental predictors and three criteria the relationships are spotty, and inconsistent, although occasionally quite substantial. In this regard we have in mind the contribution to our study of antecedents to development in rich nations of birth rate to the second criterion and of Life expectancy to the third criterion. Of the set of fifteen conceivable relationships in Table 5.7 most are non-

existent. Each variable, however, related once, to some degree, to a criterion. The proportion of children working related to two criteria, statistically speaking.

## II. POOR COUNTRIES

The preceding section of this chapter dealt with the circumstances of life for children and national attainment in the forty to fifty rich countries listed in Table 5.1. We now turn, more formally, to the same formulation in the more urgent case of sixty two of the countries designated as poor by the World Bank, and listed in Table 5.8. They are to be found in Africa, Asia, and Latin America, for the most part, although some are island nations and in remote parts of the world. They range from large to small in both size and population, and vary in their listing as independent nation states. Some have been the site of turmoil in recent years, a condition related to their poverty in some cases. Table 5.9, 5.11, and 5.13 summarize the characteristics of the countries in the analyses which follow.

*Demographic Model.* Our first analysis in Table 5.10, applies the Demographic predictors to the three criteria of national development. The $R^2$ values range from .19 to .26, with the second $R^2$ being .30. In the case of the model of 1975 $ GNP per capita the $R^2$ of the full Demographic model was reduced by deletion of only one variable. The second predictor in Table 5.10, when removed in restricted regression model three, reduced the $R^2$ from .19 to .09 ($F=6.57$, $p=.01$). The significant variable is the proportion of girls in primary education in 1960.

In the case of the second criterion, the 1960-78 increment per capita in $ GNP, the Demographic predictors accounted for .30 of the criterion variance. Once more, the second variable was the sole vector of influence. When omitted from the predictor model the value of regression model three declined from $R^2=.30$ to .18 ($F=7.93$, $p=.007$). None of the remaining variables played a significant role in understanding the criteria; only the proportion of girls in elementary schools was significant.

The third criterion of development among sixty poor countries was

TABLE 5.9

DESCRIPTION OF THE SUBJECTS: POOR COUNTRIES-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 810.96 | 2493.02 | 61 | 911.66 | 2632.95 | 54 | 822.09 | 2512.21 | 60 |
| % Girls in Primary Education 1960 | 41.72 | 31.21 | 61 | 40.38 | 30.53 | 54 | 41.71 | 31.47 | 60 |
| Crude Birth Rate per 000 1965-70 | 45.40 | 4.77 | 61 | 45.62 | 4.50 | 54 | 45.54 | 4.68 | 60 |
| Population (000) CA 0-4 Years 1975 | 4273.80 | 12729.02 | 61 | 4803.31 | 13438.21 | 54 | 4333.66 | 12826.14 | 60 |
| Population (000) 5-9 Years 1975 | 3570.42 | 10828.74 | 61 | 4012.59 | 11434.89 | 54 | 3619.18 | 10911.80 | 60 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 33.33 | 23.20 | 18 | 30.31 | 20.88 | 16 | 34.70 | 23.15 | 17 |
| Life Expectancy 1960 | 46.37 | 9.41 | 29 | 45.07 | 8.95 | 26 | 46.37 | 9.41 | 29 |
| Urban % of Population 1960 | 21.56 | 16.61 | 54 | 20.03 | 12.87 | 47 | 21.74 | 16.71 | 53 |
| Rooms per Urban Person 1960 | 2.16 | .47 | 25 | 2.19 | .47 | 23 | 2.16 | .47 | 56 |
| N Radios per 000 Population 1960 | 27.10 | 29.63 | 57 | 26.20 | 30.13 | 50 | 27.50 | 29.74 | 56 |
| Newsprint Kg. per Person 1960 | .61 | .59 | 38 | .62 | .61 | 36 | .62 | .60 | 37 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 351.90 | 240.99 | 61 | | | | | | |
| GNP Increment 1960-78 | | | | 2.14 | 1.78 | 54 | | | |
| PQLI 1975 | | | | | | | 43.88 | 18.78 | 60 |

TABLE 5.10

MULTIPLE LINEAR REGRESSION ANALYSIS OF DEMOGRAPHIC MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=61) 1975 $ GNP Per Capita $R^2$ | F | P | (N=54) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=60) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .19 | | .03* | .30 | | .003* | .76 | | <.00001* |
| | | | .003 | .95 | | .00 | 1.00 | | <.01 | .99 |
| | Model 2 | .19 | | .01* | .30 | | .001* | .76 | | <.00001* |
| % Girls in Primary | Full Model 1 | .19 | | .03* | .30 | | .003* | .76 | | <.00001* |
| | | | 6.57 | .01 | | 7.93 | .007 | | 52.14 | <.00001 |
| Education 1960 | Model 3 | .09 | | .22* | .18 | | .03* | .53 | | <.00001* |
| Crude Birth Rate | Full Model 1 | .19 | | .03* | .30 | | .003* | .76 | | <.00001* |
| | | | .20 | .65 | | .90 | .34 | | 6.16 | .01 |
| per 000 1965-70 | Model 4 | .18 | | .01* | .28 | | .001* | .73 | | <.00001* |
| Population (000) | Full Model 1 | .19 | | .03* | .30 | | .003* | .76 | | <.00001* |
| | | | .00 | 1.00 | | .0002 | .98 | | .00 | 1.00 |
| CA 0-4 Years 1975 | Model 5 | .19 | | .01* | .30 | | .001* | .76 | | <.00001* |
| Population (000) | Full Model 1 | .19 | | .03* | .30 | | .003* | .76 | | <.00001* |
| | | | .002 | .96 | | .001 | .97 | | <.01 | .94 |
| CA 5-9 Years 1975 | Model 6 | .19 | | .22* | .30 | | .001* | .76 | | <.00001* |

Morris' Physical Quality of Life Index. The Demographic model accounted for .76 of the variance in a highly significant regression model. Once more, the second variable, the proportion of girls in primary schools, was the variable of note; it explained .13 of the full model's $R^2$ of .26. Three percent of this model was explained by the 1955-60 birth rate ($F=6.16$, $p=.01$).

In these three analyses of Demographic predictors of criteria of national attainment the role of girls as a proportion of elementary school students in 1960 is clearly salient. Ten, twelve, and thirteen percent of the criterion variance are due to this demographic variable, although the $R^2$ of the full models are far more heterogeneous at .19, .30, and .76.

*Health Model.* The five variables in the Health model applied by multiple linear regression to the three criteria in forty eight, fifty one, and fifty two poor countries are presented in Table 5.12. One of the full models in this data set failed to achieve statistical significance ($R^2=.20$, $p>.05$), and it is the full model of 1960-78 increment in $ GNP.

The first model in Table 5.12, that for the Health variables and 1975 $ GNP per capita, developed an $R^2$ of .37 ($p=.0004$). The third variable, persons per physician in 1960, accounted for two thirds of the full model variance. When deleted in regression model four, the $R^2$ generated was .12, which failed to reach statistical significance. The drop in $R^2$ due to the contribution of the third predictor variable was highly significant ($F=18.35$, $p=.00009$).

The second column of data in Table 5.12 shows that the Health model explained twenty percent of the variance of the 1960-1978 increment per person in $ GNP between 1960 and 1978. The model was not statistically significant from a model of zero data ($p=.07$). While none of the variables reached statistical significance, the first variable, the size of the population of children, accounted for .07 of the .20 of the full model of variance. The ratio of people to Physicians also explained one third of the variance. In model four the $R^2$ dropped from .20 to .14, which empirically if not statistically is interesting.

In the case of the non-economic criterion, PQLI, the full model explained half the variance ($R^2$=.49, p=.00001). The third variable once more explains a good deal of variance - about one third in this instance (F=17.30, p=.00001). Persons per hospital bed in the fifty one poor countries explained four percent of the variance, but missed statistical significance.

As in the case of the previous analysis, in Table 5.10, there is one variable of interest. For the Health series it is the ratio of people to physicians. From one-third to two-thirds of the variance is associated with this Health variable. Some other variables lack statistical significance, although explaining interesting fractions of variance from the three criteria within poor countries.

*Environmental Model.* The final predictor series, the Environmental series of five variables listed in Table 5.14, was applied to the three criteria in the data set from the countries designated poor by the World Bank. The data set included forty nine, fifty five, and fifty six countries, as the availability of complete data for each criterion group fluctuated. The $R^2$ values of the models, which were all statistically significant from zero, ranged from .29 to .80. The first criterion group provided an $R^2$ of .45, (p=.00001). The number of children working in fifty six poor countries explained eight of the full model's forty five percent of the criterion variance for 1975 $ GNP per capita. This variable was statistically significant (F=6.68, p=.01), and was the only one in the set of five labelled Environmental.

The second criterion yielded an $R^2$ of .29, which was statistically significant (p=.007) from zero. Small amounts of variance were explained by several predictors, the largest being associated with life expectations at birth in 1960, but none reached statistical significance.

The full regression model of the third criterion in Table 5.14 explained eighty percent of the variance, itself a highly significant occurrence. One Environmental variable, life expectancy at birth in 1960, was significant. It accounted for one fourth of the full model's variance and for one fifth of the total variance (F=52.84, p=.00001). No other predictor was significant. For the three criteria in approximately fifty

TABLE 5.11

DESCRIPTION OF THE SUBJECTS: POOR COUNTRIES—HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 4840.60 | 6925.63 | 52 | 5214.80 | 7080.70 | 48 | 4907.56 | 6976.51 | 51 |
| Birth Rate 1955-60 | 46.96 | 3.40 | 52 | 47.19 | 3.37 | 48 | 47.11 | 3.27 | 51 |
| N Population per Physician 1970 | 19209.61 | 21611.67 | 52 | 19944.37 | 22243.09 | 48 | 19327.25 | 21806.02 | 51 |
| N Population per Hospital Bed 1960 | 1241.34 | 1524.84 | 52 | 1306.66 | 1568.38 | 48 | 1230.58 | 1537.76 | 51 |
| % Needed Calories per Capita 1970 | 93.53 | 9.24 | 52 | 93.31 | 9.40 | 48 | 93.88 | 8.99 | 51 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 30.41 | 20.22 | 17 | 30.31 | 20.88 | 16 | 31.68 | 20.16 | 16 |
| Life Expectancy 1960 | 45.48 | 9.09 | 27 | 44.64 | 8.85 | 25 | 45.48 | 9.09 | 27 |
| Urban % of Population 1960 | 21.36 | 13.65 | 47 | 20.93 | 12.86 | 43 | 21.56 | 13.73 | 46 |
| Rooms per Urban Person 1960 | 2.17 | .47 | 24 | 2.19 | .47 | 23 | 2.17 | .47 | 24 |
| N Radios per 000 Population 1960 | 27.29 | 30.23 | 51 | 27.25 | 30.77 | 47 | 27.74 | 30.37 | 50 |
| Newsprint Kg. per Person 1960 | .61 | .61 | 36 | .62 | .62 | 34 | .62 | .61 | 35 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 354.44 | 249.36 | 52 | | | | | | |
| GNP Increment 1960-78 | | | | 2.11 | 1.68 | 48 | | | |
| PQLI 1975 | | | | | | | 43.11 | 18.11 | 51 |

TABLE 5.12

MULTIPLE LINEAR REGRESSION ANALYSIS OF *HEALTH* MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=52) 1975 $ GNP Per Capita $R^2$ | F | P | (N=48) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=51) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA 0-14 Years 1960 | Full Model 1 | .37 | .80 | .0004* | .20 | 3.08 | .07* | .49 | 1.59 | .00001* |
| | | | | .37 | | | .06 | | | .21 |
| | Model 2 | .36 | | .0002* | .13 | | .18* | .47 | | <.00001* |
| Birth Rate per 000 1955-60 | Full Model 1 | .37 | 1.16 | .0004* | .20 | .02 | .07* | .49 | 2.96 | .00001* |
| | | | | .19 | | | .87 | | | .09 |
| | Model 3 | .35 | | .0003* | .20 | | .03* | .46 | | .00001* |
| N Persons per Physician 1960 | Full Model 1 | .37 | 18.35 | .0004* | .20 | 2.93 | .07* | .49 | 17.30 | .00001* |
| | | | | .00009 | | | .09 | | | .0001 |
| | Model 4 | .12 | | .17* | .14 | | .13* | .30 | | .002* |
| N Persons per Hospital Bed 1960 | Full Model 1 | .37 | 1.48 | .0004* | .20 | .48 | .07* | .49 | 3.55 | .00001* |
| | | | | .22 | | | .48 | | | .06 |
| | Model 5 | .35 | | .0003* | .19 | | .04* | .45 | | .00001* |
| % Needed Calories per Capita 1970 | Full Model 1 | .37 | .47 | .0004* | .20 | .40 | .07* | .49 | .36 | .00001* |
| | | | | .49 | | | .49 | | | .54 |
| | Model 6 | .36 | | .0002* | .19 | | .04* | .49 | | <.00001* |

poor countries around the world only two Environmental variables were significant, and they were the number of children working and life expectancy. Both gave substantial accounts of total variance, and of the full model's variance, for the first and third criteria in Table 5.14. The majority of the elements in the Environmental model of three criteria were not detectable influences on national development.

*Commentary*. We wish now to consider the implications of our findings concentrating on what the data tells us about development and its child antecedents in poor countries. We make two comparisons; the first is with rich countries; the set of fifty nations around the world and mostly western and industrialized. The second is with the full set of countries on which we have comparative data.

*Poor and Rich Countries*. Our first observation is that the three models, Demographic, Health, and Environmental, are equally effective when applied to rich and poor countries, this suggests an equal degree of confidence in deductions from either data set. The grand mean $R^2$ for nine analyses in poor countries is .42 and that for rich countries is .45. Poor countries share with rich countries some antecedents to development. For the social criterion of national development poor share with rich the importance of birth rate in earlier years, preceding levels of availability of physicians and life expectancy. For criteria of $ GNP growth per person from 1960 to 1978 there seem to be only a few antecedents shared with rich countries. This suggests that policy for national development of $ GNP is not the same in poor countries as in rich. The role of childhood variables is different, and so strategies involving childhood need to be developed expressly for poor countries; birth rate and medical facilities are prime candidates for economic strategies. For the static criterion of $ GNP per person in a recent year, 1975, the same uniqueness exists in the mechanism by which childhood's traits affect economic attainment. For poor countries and not for rich countries birth rate remains important, but schooling, and the role of radios as a medium of popular acculturation and informal education arises. Radios, like newspapers, television, and advertising, are a powerful form for educating people in an informal means. Of course, radios are more than a medium

TABLE 5.13

DESCRIPTION OF THE SUBJECTS: POOR COUNTRIES-ENVIRONMENTAL PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 45.4 | 4.50 | 56 | 45.75 | 4.15 | 49 | 45.65 | 4.40 | 55 |
| Life Expectancy at Birth 1960 | 41.68 | 7.44 | 56 | 41.31 | 6.85 | 49 | 41.66 | 7.50 | 55 |
| N Working per 000 Children 1970 | 27.21 | 13.91 | 56 | 27.92 | 13.08 | 49 | 26.98 | 13.93 | 55 |
| Primary Pupil/Teacher Ratio 1970 | 39.53 | 9.75 | 56 | 40.40 | 9.98 | 49 | 39.43 | 9.81 | 55 |
| Radios per 000 Population 1960 | 26.94 | 29.60 | 56 | 26.00 | 30.10 | 49 | 27.34 | 29.72 | 55 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 31.70 | 22.83 | 17 | 28.26 | 19.88 | 15 | 33.06 | 22.86 | 16 |
| Life Expectancy 1960 | 46.11 | 9.01 | 27 | 44.66 | 8.38 | 24 | 46.11 | 9.01 | 27 |
| Urban % of Population 1960 | 22.30 | 16.71 | 51 | 20.78 | 12.83 | 44 | 22.51 | 16.81 | 50 |
| Rooms per Urban Person 1960 | 2.16 | .48 | 24 | 2.20 | .48 | 22 | 2.16 | .48 | 24 |
| N Radios per 000 Population 1960 | 26.94 | 29.87 | 56 | 26.00 | 30.41 | 49 | 27.34 | 29.99 | 55 |
| Newsprint Kg. per Person 1960 | .59 | .59 | 37 | .61 | .61 | 35 | .61 | .60 | 36 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 366.16 | 242.85 | 56 | | | | | | |
| GNP Increment 1960-78 | | | | 2.18 | 1.82 | 49 | | | |
| PQLI 1975 | | | | | | | 43.90 | 18.73 | 55 |

TABLE 5.14

MULTIPLE LINEAR REGRESSION ANALYSIS OF ENVIRONMENTAL MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=56) 1975 $ GNP Per Capita $R^2$ | F | P | (N=49) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=55) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .45 | | .00001* | .29 | | .007* | .80 | | <.00001* |
| | | | 1.90 | .16 | | 1.81 | .18 | | .60 | .44 |
| 1965-70 | Model 2 | .42 | | .00001* | .26 | | .007* | .80 | | <.00001* |
| Life Expectancy | Full Model 1 | .45 | | .00001* | .29 | | .007* | .80 | | <.00001* |
| | | | 3.55 | .06 | | 3.66 | .06 | | 52.84 | <.00001 |
| at Birth 1960 | Model 3 | .41 | | .00002* | .23 | | .01* | .60 | | <.00001* |
| N Working per 000 | Full Model 1 | .45 | | .00001* | .29 | | .007* | .80 | | <.00001* |
| | | | 6.68 | .01 | | .69 | .40 | | .46 | .49 |
| Children 1970 | Model 4 | .37 | | .00006* | .28 | | .004* | .80 | | <.00001* |
| Primary School Pupil/ | Full Model 1 | .45 | | .00001* | .29 | | .007* | .80 | | <.00001* |
| | | | .01 | .89 | | .01 | .90 | | 1.48 | .22 |
| Teacher Ratio 1970 | Model 5 | .45 | | .00001* | .29 | | .003* | .80 | | <.00001* |
| Radios per 000 | Full Model 1 | .45 | | .00001* | .29 | | .007* | .80 | | <.00001* |
| | | | .61 | .43 | | .96 | .33 | | .29 | .59 |
| Population 1960 | Model 6 | .44 | | .00001* | .28 | | .005* | .80 | | <.00001* |

*Significance of the difference from zero

of education, and they are an indicator of a level of economic attainment in the form of the purchase price. In sixty one poor countries of the World Data Set the correlation of radios/K population with $ GNP per capita in 1975 is .50 ($p<.0001$).

*Poor Countries and the World-Wide Group*. Turning to the comparison with the set on countries around the world we see similarities and differences. For the third, social criterion poor countries resemble the world community in the shared importance of antecedent birth rate, availability of physicians, child labor, life expectancy and education of girls. In this respect poor countries resemble the rest of the world and policies aimed at reducing infant mortality, providing medical care, and reducing child labor will be fruitful. For the two $ GNP criteria there seems to be no pattern of antecedent variables which are common to the poor countries and the world-wide community, beyond availability of physicians. Accordingly, unique policies seem called for in poor countries, and generalization from a world-wide level to guide local policy seem irrelevant. Attention to the mechanisms suggested by the data from rich countries, that is those which have attained substantial levels of $ GNP per person, may be informative, but our thread of temporal sequence may be strained at that point. It seems safe to stress the role in poor countries as in rich of a low student/teacher ratio, availability of communication, e.g., radio, education for girls,and the birth rate.

# CHAPTER SIX
# AFRICA, ASIA, AND LATIN AMERICA
## INTRODUCTION

Our preceding analysis formulated the countries of the world in functional terms. That is, they were aggregated by their level of gross national product per person; this grouping by wealth paid no attention to where on the globe they are, and so set aside important covariates of development such as geographic size, climate, natural resources, and stability of government. In this chapter we move in that direction by using geography as a way to group countries. The zones of the earth, while not totally satisfactory, have the value of convention. In the case of Africa and Latin America, there is also a physical sense projected by ocean boundaries. Within the physical boundaries of these two continents are the climatic relevant of the equator, and fairly recent emergence of nation-states. This meaning slips out of focus in the case of Asia, but the state of Asian countries as members of the Third World, for the most part and with obvious exceptions such as Japan, gives a degree of value to the continental grouping.

## I. AFRICA

Extending from the Cape of Good Hope and a sense of Polar waters to the South and the Spice Islands to the East, to the shores of the Mediterranean and a glimpse of Europe, Africa is a combination of extremes. The sleeping giant of a century ago, scarcely touched by the world culture and inhabited for the most part by sequestered, autochthonous people, is now awake. National aspirations are high, populations grow, and the process of political development is well under way. Diversity of culture, religion, climate and resources all serve to give distinctiveness to Africa's nations. Our analysis of the role of childhood in nations' development is well-addressed in Africa whose population continues to grow, and whose national resources are a link to the economy of the world. In Tables 6.2, 6.4, and 6.6 are facts about the aggregate of thirty to forty African nations we analyze first in this chapter. Com-

TABLE 6.1

AFRICAN COUNTRIES

Algeria[1,2,3]

Angola[1]

Benin[1,2,3]

Botswana[1,2,3]

Burundi[1,2,]

Cameroon[1,2,3]

Cape Verde[1]

Centr. African Empire[1]

Chad[1,2,3]

Comoros[1]

Congo, People's Repub.[1,2,3]

Egypt[1,2,3]

Equatorial Guinea[1]

Ethiopia[1,2,3]

Gabon[1,2,3]

The Gambia[1,2,3]

Ghana[1,3]

Guinea[1]

Guinea-Bissau[1]

Ivory Coast[1,2,3]

Kenya[1,2,3]

Lesotho[1,3]

Liberia[1,2,3]

Libya[1,2]

Madagascar[1,2,3]

Malawi[1,2]

Mali[1,2,3]

Mauritania[1,2,3]

Mauritius[1,2,3]

Morocco[1,2,3]

Mozambique[1]

Niger[1,2,3]

Nigeria[1,2,3]

Reunion[1]

Rhodesia-Zimbabwe[1]

Rwanda[1]

Senegal[1,2,3]

Sierra Leone[1,2,3]

Somalia[1,2,3]

South Africa[1]

Sudan[1,2,3]

Swaziland[1,3]

Tanzania[1,2,3]

Togo[1,2,3]

Tunisia[1,2,3]

Uganda[1]

Upper Volta[1,2,3]

Zaire[1,2,3]

Zambia[1,2,3]

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[1] = Demographic, [2] = Health, [3] = Environmental predictor sets

TABLE 6.2

DESCRIPTION OF THE SUBJECTS: AFRICA-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 276.40 | 416.02 | 49 | 343.10 | 442.32 | 39 | 281.97 | 418.52 | 48 |
| % Girls in Primary Education 1960 | 33.95 | 28.48 | 49 | 29.07 | 23.23 | 39 | 33.27 | 28.37 | 48 |
| Crude Birth Rate per 000 1965-70 | 45.74 | 4.61 | 49 | 47.04 | 3.13 | 39 | 45.96 | 4.39 | 48 |
| Population (000) CA 0-4 Years 1975 | 1506.91 | 2257.98 | 49 | 1873.89 | 2397.03 | 39 | 537.35 | 2271.41 | 48 |
| Population (000) 5-9 Years 1975 | 1181.08 | 1764.11 | 49 | 1465.30 | 1873.85 | 39 | 203.87 | 1224.59 | 48 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 18.71 | 11.05 | 7 | 19.66 | 11.79 | 6 | 18.71 | 11.05 | 7 |
| Life Expectancy 1960 | 39.94 | 7.45 | 17 | 39.13 | 5.43 | 15 | 39.94 | 7.45 | 17 |
| Urban % of Population 1960 | 15.60 | 11.81 | 31 | 15.21 | 10.92 | 26 | 15.60 | 11.81 | 31 |
| Rooms per Urban Person 1960 | 2.17 | .52 | 11 | 2.21 | .53 | 10 | 2.17 | .52 | 11 |
| N Radios per 000 Population 1960 | 18.17 | 21.35 | 34 | 16.89 | 20.57 | 29 | 18.17 | 21.35 | 34 |
| Newsprint Kg. per Person 1960 | .36 | .35 | 19 | .35 | .36 | 18 | .36 | .35 | 19 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 480.06 | 833.55 | 49 | | | | | | |
| GNP Increment 1960-78 | | | | 1.72 | 1.77 | 39 | | | |
| PQLI 1975 | | | | | | | 35.41 | 14.87 | 48 |

TABLE 5.3

MULTIPLE LINEAR REGRESSION ANALYSIS OF DEMOGRAPHIC MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=49) 1975 $ GNP Per Capita $R^2$ | F | P | (N=39) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=48) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .09 | .59 | .98* | .20 | .01 | .16* | .48 | 4.04 | .00002* |
| | | | | .44 | | | .89 | | | .05 |
| | Model 2 | .07 | | .98* | .20 | | .09* | .44 | | .00004* |
| % Girls in Primary Education 1960 | Full Model 1 | .09 | .73 | .98* | .20 | 1.59 | .16* | .48 | 17.33 | .00002* |
| | | | | .39 | | | .21 | | | .001 |
| | Model 3 | .07 | | .46* | .16 | | .18* | .27 | | .006* |
| Crude Birth Rate per 000 1965-70 | Full Model 1 | .09 | .90 | .98* | .20 | 1.64 | .16* | .48 | .05 | .00002* |
| | | | | .34 | | | .20 | | | .81 |
| | Model 4 | .07 | | .99* | .16 | | .18* | .48 | | .00001* |
| Population (000) CA 0-4 Years 1975 | Full Model 1 | .09 | .19 | .98* | .20 | .20 | .16* | .48 | .0004 | .00002* |
| | | | | .65 | | | .65 | | | .81 |
| | Model 5 | .08 | | .38* | .19 | | .10* | .48 | | .00001* |
| Population (000) CA 5-9 Years 1975 | Full Model 1 | .09 | .0003 | .98* | .20 | .25 | .16* | .48 | 2.45 | .00002* |
| | | | | .98 | | | .61 | | | .12 |
| | Model 6 | .09 | | .96* | .19 | | .10* | .45 | | .00002* |

plete data for regression analyses were available for thirty nine, forty eight, and forty nine African countries for which the requisite six items of information could be compiled. The countries are listed in Table 6.1.

*Demographic Model.* The first analysis, which is reported in Table 6.3, applied the Demographic model to the 1975 $ GNP criterion, but with no great outcome. The $R^2$ was only .09 for forty nine African nations (p=.98). None of the five Demographic variables when assessed in restricted regression models two through six, turned out to be influential when compared against the full model of five variables.

For the second criterion, 1960-78 $ GNP increment, the Demographic predictor model was twice as good as for the first criterion; however, the $R^2$ of .20 failed to reach statistical significance from a model of zero information (p=.16). None of the five predictor variables were significant, statistically speaking. The proportion of girls in primary education explained four of the sixteen percent of the full model of the second criterion, but failed to reach statistical significance (p=.16).

The third, non-fiscal criterion, Morris' PQLI was quite well explained by the Demographic model and the $R^2$ was substantial ($R^2$=.48, p=.00002). The second demographic variable, proportion of girls in elementary school, accounted for twenty one percent of the total variance, and for fifty six percent of the model's variance (F=17.33, p=.001). The 1960 number of births in African countries provided four percent of the variance in the .48 $R^2$ of the model. This drop in $R^2$ from .48 to .44 was barely significant, however (F=4.04, p=.05).

In reviewing the outcomes of the analyses in Table 6.3 it is evident that the Demographic model did not have much relation to the two fiscal criteria, the $ GNP for 1975 and for the 1960-78 increment. On the other hand, when applied to the PQLI criterion the Demographic model was robust, and it was influenced statistically by the second predictor, the proportion of girls enrolled in primary schools in 1960. In general, the five demographic predictors have no real connection to the criterion.

*Health Model.* For the Health predictors and criteria, in Table 6.5, using African data the outcome is about the same as the Demographic analyses. The two fiscal criteria yield significant $R^2$ values while the PQLI is

TABLE 6.4

DESCRIPTION OF THE SUBJECTS: AFRICA-HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 2994.85 | 4363.19 | 33 | 3380.41 | 4520.66 | 29 | 2944.84 | 4363.19 | 33 |
| Birth Rate 1955-60 | 47.24 | 3.92 | 33 | 48.15 | 2.70 | 29 | 47.24 | 3.92 | 33 |
| N Population per Physician 1970 | 25496.05 | 23406.16 | 33 | 27495.85 | 24178.15 | 29 | 25496.05 | 23406.16 | 33 |
| N Population per Hospital Bed 1960 | 889.69 | 841.04 | 33 | 967.24 | 866.19 | 29 | 889.69 | 841.04 | 33 |
| % Needed Calories per Capita 1970 | 93.24 | 8.05 | 33 | 92.82 | 8.17 | 29 | 93.24 | 8.05 | 33 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 18.71 | 11.05 | 7 | 19.66 | 11.79 | 6 | 18.71 | 11.05 | 7 |
| Life Expectancy 1960 | 39.94 | 7.45 | 17 | 39.19 | 5.43 | 15 | 39.94 | 7.45 | 17 |
| Urban % of Population 1960 | 16.07 | 11.97 | 28 | 15.50 | 10.85 | 24 | 16.07 | 11.97 | 28 |
| Rooms per Urban Person 1960 | 2.17 | .52 | 11 | 2.21 | .53 | 10 | 2.17 | .52 | 11 |
| N Radios per 000 Population 1960 | 18.96 | 22.17 | 31 | 17.79 | 21.24 | 27 | 18.96 | 22.17 | 31 |
| Newsprint Kg. per Person 1960 | .35 | .36 | 18 | .34 | .36 | 17 | .35 | .36 | 18 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 520.54 | 984.10 | 33 | | | | | | |
| GNP Increment 1960-78 | | | | 1.83 | 1.79 | 29 | | | |
| PQLI 1975 | | | | | | | 33.84 | 13.60 | 33 |

TABLE 6.5

MULTIPLE LINEAR REGRESSION ANALYSIS OF *HEALTH* MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=33) 1975 $ GNP Per Capita $R^2$ | F | P | (N=29) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=33) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA | Full Model 1 | .19 | | .29* | .11 | | .69* | .36 | | .02* |
| | | | .30 | .58 | | .54 | .44 | | .21 | .64 |
| 0-14 Years 1960 | Model 2 | .18 | | .20* | .09 | | .64* | .36 | | .01* |
| Birth Rate per 000 | Full Model 1 | .19 | | .29* | .11 | | .69* | .36 | | .02* |
| | | | .16 | .68 | | .09 | .75 | | .46 | .50 |
| 1955-60 | Model 3 | .18 | | .19* | .11 | | .55* | .35 | | .01* |
| N Persons per Physician | Full Model 1 | .19 | | .29* | .11 | | .69* | .36 | | .02* |
| | | | 1.09 | .30 | | 1.09 | .30 | | 6.15 | .01 |
| 1960 | Model 4 | .15 | | .28* | .07 | | .74* | .22 | | .11* |
| N Persons per Hospital | Full Model 1 | .19 | | .29* | .11 | | .69* | .36 | | .02* |
| | | | .13 | .71 | | .04 | .84 | | 2.73 | .10 |
| Bed 1960 | Model 5 | .19 | | .19 | .11 | | .54* | .30 | | .03* |
| % Needed Calories per | Full Model 1 | .19 | | .29* | .11 | | .69* | .36 | | .02* |
| | | | 1.70 | .20 | | .23 | .59 | | .01 | .91 |
| Capita 1970 | Model 6 | .14 | | .35* | .10 | | .59* | .36 | | .01* |

*Significance of the difference from zero

TABLE 6.6

DESCRIPTION OF THE SUBJECTS: AFRICA-ENVIRONMENTAL PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 46.32 | 4.69 | 34 | 47.25 | 3.37 | 29 | 46.32 | 4.69 | 34 |
| Life Expectancy at Birth 1960 | 37.82 | 5.38 | 34 | 37.38 | 3.91 | 29 | 37.82 | 5.38 | 34 |
| N Working per 000 Children 1970 | 31.42 | 13.44 | 34 | 31.53 | 12.94 | 29 | 31.42 | 13.44 | 34 |
| Primary Pupil/Teacher Ratio 1970 | 42.14 | 9.70 | 34 | 43.17 | 9.79 | 29 | 42.14 | 9.70 | 34 |
| Radios per 000 Population 1960 | 18.17 | 21.03 | 34 | 16.89 | 20.21 | 29 | 18.17 | 21.03 | 34 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 18.16 | 12.00 | 6 | 19.20 | 13.12 | 5 | 18.16 | 12.00 | 6 |
| Life Expectancy 1960 | 40.12 | 7.65 | 16 | 39.28 | 5.60 | 14 | 40.12 | 7.65 | 16 |
| Urban % of Population 1960 | 15.74 | 11.82 | 29 | 15.36 | 10.85 | 24 | 15.74 | 11.82 | 29 |
| Rooms per Urban Person 1960 | 2.17 | .52 | 11 | 2.21 | .53 | 10 | 2.17 | .52 | 11 |
| N Radios per 000 Population 1960 | 18.17 | 21.35 | 34 | 10.89 | 20.57 | 29 | 18.17 | 21.35 | 34 |
| Newsprint Kg. per Person 1960 | .37 | .35 | 18 | .37 | .36 | 17 | .37 | .35 | 18 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 374.35 | 422.88 | 34 | | | | | | |
| GNP Increment 1960-78 | | | | 1.73 | 1.82 | 29 | | | |
| PQLI 1975 | | | | | | | 34.52 | 13.62 | 34 |

more promising. In the case of the 1975 $ GNP criterion the Health model explains one third of the criterion variance ($R^2$=.18, p=.29). None of the five Health variables when deleted to form the five restricted models were able to drop the $R^2$ to a statistically significant degree; however, a drop from .19 to .14 was evident, even though it failed to reach significance (F=1.70).

A less robust model with an $R^2$ of .11 was created by applying the Health predictors to the 1960-78 $ GNP increment. Here, too, no variable was statistically significant, although the ratio of people to Physicians when omitted in restricted regression model four dropped the $R^2$ from .11 to .07 (p=.30).

As with the Demographic predictor analyses the third criterion, the PQLI, yielded the best $R^2$, one which was significant (p=.02) at .36. The third variable was important, and model four differed from the full model to an important degree. The $R^2$ of that dropped to .22 from .36. The F-value of 6.15 was statistically significant (p=.01). Six percent of the variance was associated, to an insignificant extent, with the fifth predictor, protein calorie supply.

Overall, the Health data had little to say about the three criteria of attainment in African countries. Only the ratio of people to Physicians was statistically significant.

*Environmental Model.* When we turn to the Environmental model, in Table 6.7, the picture improves. That is, the data provide two, rather than one, models which are significant. For thirty four African countries the Environmental model explains half the variance ($R^2$=.45, p=.003). One Environmental predictor just reached statistical significance - 1960 Life Expectancy (F=4.07, p=.05). The number of radios, the fifth variable came close, and explained seven percent of the total variance.

The Environmental model when applied to the 1960-78 increment in $ GNP was not effective ($R^2$=.22, p=.27). Within that less than robust model the 1965-70 birth rate explained most of the variance; model 2, which omitted the 1965-70 birth rate, dropped the $R^2$ from .22 to .08 (F=4.33, p=.04). No other Environmental variable was important.

In the case of the third criterion the $R^2$ of the five Environmental factors was a vigorous .63 (p=.00002). 1960 Life Expectancy explained almost half of that variance. When 1960 Life Expectancy was omitted, in restricted regression model 3, the $R^2$ dropped the .63 to .38 (F=18.64, p=.0001). This variable explained sixty percent of the full model's variance.

Within this African data set no consistency is found among predictors as significant influences, and there are not many significant influences. The 1965-70 birth rate affects the first two criteria, but not the third criterion, which is social. The majority of the variables in the fifteen possible relationships are not relevant to the criteria of attainment in African nations.

*Commentary.* We now evaluate the effects of childhood variables in Africa some years before our criterion measures were calculated. We begin by pointing out that Africa is heterogeneous; the name of the continent is a Geographer's convenience, and some of our countries are islands near the African land mass. Africa is cold and hot, dry and wet, and has a comparable range of conditions of population, national resources, political stability, and religion. Even so, some degree of aggregation is called for, and most African states choose to associate with each other on the basis of perceived need and proximity.

When we compare the criterion of social attainment in Africa and in the rest of the world the statistical model of African childhood data work less well. The mean $R^2$ of nine models is .30, and only the Environmental model with an $R^2$ of .43 approaches the $R^2$ of .55 in the world data set. The other two are about half the size of the world data model. Accordingly, our comments about Africa in relation to the world as a norm are to be approached cautiously. Africa shares with the world group an important role attached to antecedent birth rates and life expectancy at birth. For $ GNP birth rate is the unique variable of interest in our sample of forty nine countries on the continental land mass or close to it. In this regard, one variable may be so powerful in a regression analysis that other variables are of little interest. 1965-70 birth rate,

TABLE 6.7

MULTIPLE LINEAR REGRESSION ANALYSIS OF ENVIRONMENTAL MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=34) 1975 $ GNP Per Capita $R^2$ | F | P | (N=29) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=34) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .45 | 6.88 | .003* | .22 | 4.33 | .27* | .63 | .06 | .00002* |
| 1965-70 | Model 2 | .31 | | .02* | .08 | | .70* | .62 | | .00001* |
| Life Expectancy at Birth 1960 | Full Model 1 | .45 | 4.07 | .003* | .22 | 1.58 | .27* | .63 | 18.64 | .00002* |
| | Model 3 | .37 | | .007* | .17 | | .30* | .38 | | .005* |
| N Working per 000 Children 1970 | Full Model 1 | .45 | 1.47 | .003* | .22 | .42 | .27* | .63 | .86 | .00002* |
| | Model 4 | .42 | | .002* | .21 | | .19* | .61 | | .00001* |
| Primary School Pupil/ Teacher Ratio 1970 | Full Model 1 | .45 | .26 | .003* | .22 | .14 | .27* | .63 | 2.10 | .00002* |
| | Model 5 | .44 | | .001* | .22 | | .17* | .60 | | .00001* |
| Radios per 000 Population 1960 | Full Model 1 | .45 | 3.79 | .003* | .22 | .12 | .27* | .63 | .44 | .00002* |
| | Model 6 | .38 | | .006* | .22 | | .17* | .62 | | .00001* |

in Table 6.7 is an example of a variable explaining substantially more criterion variance than other variables in the same model. We conclude that birth rate is probably the antecedent child trait of prime significance.

## II. ASIA

As an introduction to the data we have assembled on Asia it is necessary to point out that geographers use the word Asia in a particular way. Thus, we have in our data set Iran, Iraq, Israel, Jordan, Lebanon, Syria, and Saudi Arabia, in addition to Burma and Korea. This aggregate of nations extends from the eastern shore of the Mediterranean to the northern islands of Japan, in accordance with the World Bank categories we have drawn upon. The twenty four countries which have extant data need to be understood as an aggregate which is broader than the concept of the Far East as the sole meaning of Asia. Traditionally, Asia has begun for Westerners on the far-eastern shore of the Bosphorous in Turkey. We suggest that the reader consider Tables 6.8 and 6.9, in view of the configuration of countries we report in this section.

We add a further note, namely, that our data come from twenty to twenty four countries. Generally, we seek a larger number when using a predictor model of five variables. However, in this case the reality is that data exist on twenty to twenty four countries; the reality of the data takes precedence, and we continue our regression analyses with the advice that, *caveat lector*, in view of the low subject to variable ratio. The hazard is to avoid placing undue confidence in the findings when the sample is smaller than desirable.

*Demographic Model.* Neither fiscal criterion in Table 6.10 is well explained by the predictor model and the first two $R^2$ values do not reach statistical significance. In only one case, that of the second criterion, the 1960-78 $ GNP increment per capita, does a predictor appear to be informative. The 1965-70 birth rate accounts for .23 of the .29 $R^2$ ($F= 4.44$, $p=.05$).

In contrast, the PQLI criterion is well explained by the predictor series, although we repeat our caveat in view of the low sample size.

TABLE 6.8

ASIAN COUNTRIES

| | | | |
|---|---|---|---|
| Afghanistan[1,2,3] | Iraq[1,2,3] | Lao People's Dem. Republic[1] | Saudi Arabia[1,2,3] |
| Bangladesh[1] | Israel[1,2,3] | Lebanon[1,3] | Singapore[1,2] |
| Burma[1,2,3] | Japan[1,2,3] | Malaysia[1,2,3] | Sri Lanka[1,2] |
| Hong Kong[1] | Jordan[1,2,3] | Nepal[1,2,3] | Syrian Arab Republic[1,2,3] |
| India[1,2,3] | Korea, Republic of[1,2,3] | Pakistan[1,2,3] | Thailand[1,3] |
| Iran[1,2,3] | Kuwait[1,3] | Philippines[1,2,3] | |

[1] = Demographic, [2] = Health, [3] = Environmental predictor sets

TABLE 6.9

DESCRIPTION OF THE SUBJECTS: ASIA-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 1433.20 | 3767.99 | 24 | 1703.59 | 4074.13 | 20 | 1433.20 | 3767.99 | 24 |
| % Girls in Primary Education 1960 | 57.95 | 40.47 | 24 | 60.30 | 40.39 | 20 | 57.95 | 40.47 | 24 |
| Crude Birth Rate per 000 1965-70 | 40.68 | 9.43 | 24 | 39.72 | 9.90 | 20 | 40.68 | 9.43 | 24 |
| Population (000) CA 0-4 Years 1975 | 7601.78 | 19220.81 | 24 | 9028.19 | 20763.39 | 20 | 7601.78 | 19220.81 | 24 |
| Population (000) 5-9 Years 1975 | 6443.78 | 16370.00 | 24 | 7656.29 | 17685.49 | 20 | 6443.78 | 16370.67 | 24 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 42.42 | 26.68 | 14 | 43.23 | 27.59 | 13 | 42.42 | 26.68 | 14 |
| Life Expectancy 1960 | 53.58 | 10.31 | 12 | 54.10 | 11.31 | 10 | 53.58 | 10.31 | 12 |
| Urban % of Population 1960 | 37.88 | 24.90 | 18 | 33.06 | 21.13 | 15 | 37.88 | 24.00 | 18 |
| Rooms per Urban Person 1960 | 2.26 | .58 | 8 | 2.27 | .62 | 7 | 2.26 | .58 | 8 |
| N Radios per 000 Population 1960 | 39.25 | 47.57 | 20 | 37.29 | 51.42 | 17 | 39.25 | 47.57 | 20 |
| Newsprint Kg. per Person 1960 | 1.89 | 2.82 | 16 | 2.06 | 2.98 | 14 | 1.89 | 2.82 | 16 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1660.29 | 3090.26 | 24 | | | | | | |
| GNP Increment 1960-78 | | | | 3.74 | 3.09 | 20 | | | |
| POLI 1975 | | | | | | | 58.50 | 23.93 | 24 |

However, after noting that caution we observe that two variables are related to the criterion. They are the percentage of girls in primary schools in 1960, and the 1965-70 birth rate. In the case of the first Demographic variable about one third of the variance is accounted for ($F=68.96$, $p<.00001$). For the second variable a much smaller tenth of the variance is associated ($F=22.66$, $p=.0001$).

We cautiously observe that the data do not lead one to rash conclusions of influence about the first two criteria built on $ GNP in our Asian countries. We can avoid the error of accepting over-stated findings of influence. On the other hand, the primary education of girls seems a highly probable influence on the PQLI criterion, with the 1965-70 birth rate a suggestive finding.

*Health Model.* Aggregation of the Health predictor group of variables and the three criteria from the World Data Set produced quite small samples each of which had less than twenty countries. Insignificant $R^2$ values were generated for the two fiscal criteria in Table 6.12. In the case of the 1975 $ GNP data set the full model $R^2$ of .50 was in marked contrast to the $R^2$ of restricted model three, in Table 6.12, which was .20. Birth rate in 1955-60 explained .30 of the criterion variance, which was sixty percent of the full model variance ($F=7.51$, $p=.01$). No other variable within the statistically non-significant model was influential.

Application of the Health series to the 1960-78 $ GNP criterion of attainment in sixteen Asian countries produced an $R^2$ of .34 ($p=4$). None of the variables in this weak model were related statistically to the criterion variance.

In contrast the social criterion, the Physical Quality of Life Index developed by Morris (1979) is more explicable. Among the five Health predictors, the 1955-60 birth rate, was a source of influence. It explained .22 of the .79, or about one quarter of the variance in this admittedly small sample of eighteen Asian countries.

Worthy of note is that the 1955-60 birth rate was influential with two quite different criteria, the 1975 $ GNP per capita, and the PQLI in 1979. No other predictor was relevant to any of the three criteria.

TABLE 6.10

MULTIPLE LINEAR REGRESSION ANALYSIS OF DEMOGRAPHIC MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=24) 1975 $ GNP Per Capita $R^2$ | F | P | (N=20) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=24) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .15 | | .68* | .29 | | .38* | .93 | | <.00001* |
| | | | .00 | 1.00 | | .67 | .42 | | <.01 | .92 |
| | Model 2 | .15 | | .68* | .25 | | .31* | .93 | | <.00001* |
| % Girls in Primary | Full Model 1 | .15 | | .68* | .29 | | .38* | .93 | | <.00001* |
| | | | 2.53 | .12 | | 1.21 | .28 | | 68.96 | <.00001* |
| Education 1960 | Model 3 | .02 | | .97* | .22 | | .38* | .67 | | .0001* |
| Crude Birth Rate | Full Model 1 | .15 | | .68* | .29 | | .38* | .93 | | <.00001* |
| | | | .51 | .48 | | 4.44 | .05 | | 22.66 | .0001 |
| per 000 1965-70 | Model 4 | .12 | | .62* | .06 | | .89* | .84 | | <.00001* |
| Population (000) | Full Model 1 | .15 | | .68* | .29 | | .38* | .93 | | <.00001* |
| | | | .0004 | .98 | | .63 | .44 | | .00 | 1.00 |
| CA 0-4 Years 1975 | Model 5 | .15 | | .53* | .25 | | .31* | .93 | | <.00001* |
| Population (000) | Full Model 1 | .15 | | .68* | .29 | | .38* | .93 | | <.00001* |
| | | | .00 | 1.00 | | <.01 | .99 | | .00 | 1.00 |
| CA 5-9 Years 1975 | Model 6 | .15 | | .53* | .29 | | .24* | .93 | | <.00001* |

TABLE 6.11

DESCRIPTION OF THE SUBJECTS: ASIA-HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 7430.16 | 7593.95 | 18 | 8258.11 | 7662.03 | 16 | 7430.15 | 7593.95 | 18 |
| Birth Rate 1955-60 | 42.9 | 7.89 | 18 | 42.64 | 8.31 | 16 | 42.91 | 7.89 | 18 |
| N Population per Physician 1970 | 7448.33 | 112.56 | 18 | 8120.00 | 11766.23 | 16 | 7448.33 | 11256.60 | 18 |
| N Population per Hospital Bed 1960 | 1775.55 | 2252.05 | 18 | 1928.12 | 2343.98 | 16 | 1775.55 | 2252.05 | 18 |
| % Needed Calories per Capita 1970 | 96.61 | 8.87 | 18 | 96.61 | 9.38 | 16 | 96.61 | 8.87 | 18 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 42.07 | 27.74 | 13 | 42.91 | 28.80 | 12 | 42.07 | 27.74 | 13 |
| Life Expectancy 1960 | 53.36 | 10.79 | 11 | 53.88 | 11.98 | 9 | 53.36 | 10.79 | 11 |
| Urban % of Population 1960 | 36.06 | 20.06 | 16 | 34.57 | 21.07 | 14 | 36.06 | 20.06 | 16 |
| Rooms per Urban Person 1960 | 2.26 | 1.20 | 8 | 2.27 | .62 | 7 | 2.26 | .58 | 8 |
| N Radios per 000 Population 1960 | 41.17 | 50.94 | 17 | 40.06 | 54.18 | 15 | 41.17 | 50.94 | 17 |
| Newsprint Kg. per Person 1960 | 1.97 | 2.90 | 15 | 2.16 | 3.07 | 13 | 1.97 | 2.90 | 15 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1228.33 | 1376.22 | 18 | | | | | | |
| GNP Increment 1960-78 | | | | 4.15 | 2.81 | 16 | | | |
| PQLI 1975 | | | | | | | 59.50 | 23.09 | 18 |

TABLE 5.5

MULTIPLE LINEAR REGRESSION ANALYSIS OF WEALTH MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=47) 1975 $ GNP Per Capita $R^2$ | F | P | (N=41) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=47) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA | Full Model 1 | .35 | | .002* | .27 | | .03* | .73 | | <.00001* |
| | | | .41 | .52 | | .17 | .68 | | .03 | .84 |
| 0-14 Years 1960 | Model 2 | .35 | | .009* | .27 | | .01* | .73 | | <.00001* |
| Birth Rate per 000 | Full Model 1 | .35 | | .002* | .27 | | .03* | .73 | | <.00001* |
| | | | 8.93 | .004 | | 2.39 | .13 | | 7.88 | .009 |
| 1955-60 | Model 3 | .21 | | .03* | .22 | | .04* | .67 | | <.00001* |
| N Persons per Physician | Full Model 1 | .35 | | .002* | .27 | | .03* | .73 | | <.00001* |
| | | | .12 | .72 | | .64 | .42 | | 16.00 | .0002 |
| 1960 | Model 4 | .35 | | .008* | .26 | | .02* | .62 | | <.00001* |
| N Persons per Hospital | Full Model 1 | .35 | | .002* | .27 | | .03* | .73 | | <.00001* |
| | | | .41 | .52 | | 11.58 | .001 | | 1.93 | .17 |
| Bed 1960 | Model 5 | .35 | | .0009* | .03 | | .83* | .71 | | <.00001* |
| % Needed Calories per | Full Model 1 | .35 | | .002* | .27 | | .03* | .73 | | <.00001* |
| | | | .41 | .52 | | .05 | .82 | | .01 | .91 |
| Capita 1970 | Model 6 | .35 | | .0009* | .27 | | .01* | .73 | | <.00001* |

Keeping in mind the inordinately small sample of countries we tentatively construe the 1955-60 birth rate as a variable of interest and potential significance for national development for nations in Asia.

*Environmental Model.* The size of the sample of Asian countries remains under twenty when the five Environmental predictors and each of the three criteria of national attainment are combined; see Table 6.14. The full model of 1975 $ GNP came close to statistical significance with an $R^2$ of .51 (p=.06). None of the five Environmental variables were related to the criteria in the regression analyses. In the case of the second criterion, the 1960-78 increment in $ GNP per capita, the model was even less predictive, explaining only one quarter of the variance ($R^2$=.26, p=.61). None of the predictors was significant.

In contrast, the Environmental full model explained a great deal of the variance associated with the 1979 PQLI criterion ($R^2$=.94, p<.00001). One predictor, life expectancy at birth in 1960, accounted for one quarter of that variance. When deleted in model three the $R^2$ dropped from .94 to .67, a discrepancy of .27 (F=60.64, p<.00001).

As with the previous analyses of the Asian data we are conscious of the small samples. Life expectancy at birth in 1960 is an important variable for the PQLI criterion.

*Commentary.* The vastness of Asia and the size of its population stand in contrast to the propinquity of African Nations. Asia, like Africa, is diverse, but to a greater degree, and we note this as a preface to our observation. A second note is that we include one very large nation, India, but do not include the People's Republic of China whose population and corresponding traits would distort analyses. The People's Republic of China would merit analysis alone, since it is so large and so diverse. Our Asian states begin at the end of Europe going south to Singapore and northeast to Japan. High, cool, mountain-girt Nepal contrasts with the equatorial archipelago of the southwest Pacific ocean.

Our statistical models, on the average, compare very well with our models of the whole world. For both data sets the nine regression models have a grand mean $R^2$ of .52. As with Africa the Environmental model is

TABLE 6.13

DESCRIPTION OF THE SUBJECTS: ASIA-ENVIRONMENTAL PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 42.19 | 8.47 | 19 | 41.56 | 8.72 | 16 | 42.19 | 8.47 | 19 |
| Life Expectancy at Birth 1960 | 48.00 | 9.93 | 19 | 48.29 | 10.24 | 16 | 48.00 | 9.93 | 19 |
| N Working per 000 Children 1970 | 18.20 | 13.27 | 19 | 19.63 | 13.86 | 16 | 18.20 | 13.22 | 19 |
| Primary Pupil/Teacher Ratio 1970 | 32.26 | 9.91 | 19 | 32.50 | 10.41 | 16 | 32.26 | 9.91 | 19 |
| Radios per 000 Population 1960 | 39.42 | 47.57 | 19 | 37.37 | 51.42 | 16 | 39.42 | 47.57 | 19 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 40.25 | 28.28 | 12 | 41.00 | 29.53 | 11 | 40.25 | 28.28 | 12 |
| Life Expectancy 1960 | 52.72 | 10.36 | 11 | 53.11 | 11.53 | 9 | 52.72 | 10.36 | 11 |
| Urban % of Population 1960 | 37.50 | 24.23 | 16 | 31.84 | 20.69 | 13 | 37.50 | 24.23 | 16 |
| Rooms per Urban Person 1960 | 2.28 | .62 | 7 | 2.30 | .68 | 6 | 2.28 | .62 | 7 |
| N Radios per 000 Population 1960 | 39.42 | 48.87 | 19 | 37.37 | 53.10 | 16 | 39.42 | 48.87 | 19 |
| Newsprint Kg. per Person 1960 | 1.67 | 2.83 | 14 | 1.84 | 3.04 | 12 | 1.67 | 2.83 | 14 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 1856.05 | 3408.63 | 19 | | | | | | |
| GNP Increment 1960-78 | | | | 3.71 | 3.06 | 16 | | | |
| PQLI 1975 | | | | | | | 57.26 | 22.53 | 19 |

TABLE 6.14

MULTIPLE LINEAR REGRESSION ANALYSIS OF *ENVIRONMENTAL* MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=19) 1975 $ GNP Per Capita $R^2$ | F | P | (N=16) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=19) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .51 | .59 | .06* | .26 | 1.03 | .61* | .94 | .81 | <.00001* |
| | | | | .45 | | | .32 | | | .38 |
| 1965-70 | Model 2 | .49 | | .03* | .19 | | .63* | .93 | | <.00001* |
| Life Expectancy | Full Model 1 | .51 | .25 | .06* | .26 | 1.94 | .61* | .94 | 60.64 | <.00001* |
| | | | | .13 | | | .13 | | | <.00001* |
| at Birth 1960 | Model 3 | .42 | | .08* | .12 | | .80* | .67 | | .002* |
| N Working per 000 | Full Model 1 | .51 | .70 | .06* | .26 | 1.47 | .61* | .94 | 1.76 | <.00001* |
| | | | | .41 | | | .25 | | | .20 |
| Children 1970 | Model 4 | .49 | | .03* | .16 | | .71* | .93 | | <.00001* |
| Primary School Pupil/ | Full Model 1 | .51 | 2.66 | .06* | .26 | <.01 | .61* | .94 | 2.45 | <.00001* |
| | | | | .12 | | | .95 | | | .14 |
| Teacher Ratio 1970 | Model 5 | .42 | | .08 | .26 | | .44* | .93 | | <.00001* |
| Radios per 000 | Full Model 1 | .51 | 1.40 | .06* | .26 | .24 | .61* | .94 | 1.39 | <.00001* |
| | | | | .25 | | | .62 | | | .25 |
| Population 1960 | Model 6 | .45 | | .05* | .25 | | .49* | .93 | | <.00001* |

*Significance of the difference from zero

the best replication of the predictive power of the model. For the social criterion we see that antecedent birth rate, education of girls, and level of health care are important in Asia and in the whole world. There seem to be few other cases in the Asian context. For $ GNP birth rate remains important, but little else seems sensitive among our fifteen variables except the antecedent birth rate and life expectancy. The overall pattern of antecedents in Asian countries is quite unlike the worldwide pattern. It may be that the situation in Asia is that childhood's traits have a significance in the aggregate. Only exceptionally are they significant in the presence of the other variables as covariates as it were. As a hint for policy formation the Asian data are not particularly helpful with regard to antecedents to two formulations of $ GNP. In the case of our social criteria there are four items which may be considered, three of which deal with survival rates for children.

## III. LATIN AMERICA

We now turn attention from Asia to Latin America, a continent unlike Asia, as Part I of this Chapter has shown. The number of cases in the Latin American subset of our data is not large; the number of cases in the three tables reporting regression analyses which follow ranging from nineteen to twenty three.

*Demographic Model.* For the criterion $ GNP per capita in 1975 in twenty countries the five predictors in Table 6.17 explained about one half of the variance in a model which did not reach statistical significance ($R^2$=.42, p=.13). We note however, that the proportion of girls in elementary school, the second predictor examined in restricted model three, explained one quarter of the variance in the full model. This is a substantial portion, within a non-significant full model, however.

When the model was applied to the second criterion the same $R^2$ was generated, and it too was not statistically significant. The third predictor, 1965-70 birth rate, accounted for fourteen percent of the model's variance, but did not quite reach statistical significance. No other predictor was relevant.

The third criterion, Morris' PQLI in twenty two countries, was

TABLE 6.15

LATIN AMERICAN COUNTRIES

| | | | |
|---|---|---|---|
| Costa Rica[1,3] | Jamaica[1,2,3] | Bolivia[1,2,3] | Paraguay[1,2,3] |
| Dominican Republic[1,2,3] | Mexico[1,2,3] | Brazil[1,2,3] | Peru[1,2,3] |
| El Salvador[1,2,3] | Nicaragua[1,2,3] | Chile[1,2,3] | Surinam[1] |
| Guatemala[1,2,3] | Panama[1,2,3] | Colombia[1,2,3] | Uruguay[1,2,3] |
| Haiti[1,2,3] | Trinidad and Tobago[1,2,3] | Ecuador[1,2,3] | Venezuela[1,2,3] |
| Honduras[1,2,3] | Argentina[1,2,3] | Guyana[1,3] | |

---

[1] = Demographic, [2] = Health, [3] = Environmental predictor sets

TABLE 6.16

DESCRIPTION OF THE SUBJECTS: LATIN AMERICA-DEMOGRAPHIC PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Demographic Predictors) | | | | | | | | | |
| N Births (000) 1960 | 359.17 | 623.92 | 23 | 391.61 | 643.61 | 21 | 369.00 | 636.20 | 22 |
| % Girls in Primary Education 1960 | 84.26 | 20.57 | 23 | 82.19 | 20.34 | 21 | 86.18 | 18.91 | 22 |
| Crude Birth Rate per 000 1965-70 | 39.32 | 7.51 | 23 | 39.25 | 7.78 | 21 | 39.42 | 7.66 | 22 |
| Population (000) CA 0-4 Years 1975 | 2128.47 | 3910.10 | 23 | 2322.57 | 4038.78 | 21 | 2194.22 | 3985.53 | 22 |
| Population (000) 5-9 Years 1975 | 1838.60 | 3324.96 | 23 | 2005.28 | 3433.46 | 21 | 1894.50 | 3389.10 | 22 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 69.68 | 21.21 | 16 | 68.80 | 21.64 | 15 | 73.66 | 14.51 | 15 |
| Life Expectancy 1960 | 58.21 | 6.33 | 14 | 58.00 | 6.54 | 13 | 58.21 | 6.33 | 14 |
| Urban % of Population 1960 | 41.28 | 17.86 | 21 | 42.55 | 17.33 | 20 | 42.75 | 16.98 | 20 |
| Rooms per Urban Person 1960 | 1.82 | .39 | 17 | 1.83 | .40 | 16 | 1.82 | .39 | 17 |
| N Radios per 000 Population 1960 | 95.36 | 60.88 | 22 | 96.80 | 61.99 | 21 | 99.66 | 58.85 | 21 |
| Newsprint Kg. per Person 1960 | 2.56 | 1.99 | 21 | 2.56 | 1.99 | 21 | 2.69 | 1.96 | 20 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 929.56 | 512.40 | 23 | | | | | | |
| GNP Increment 1960-78 | | | | 2.43 | 1.10 | 21 | | | |
| PQLI 1975 | | | | | | | 73.31 | 11.84 | 22 |

TABLE 6.17

MULTIPLE LINEAR REGRESSION ANALYSIS OF *DEMOGRAPHIC* MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=20) 1975 $ GNP Per Capita $R^2$ | F | P | (N=21) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=22) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | Full Model 1 | .42 | | .13* | .42 | | .10* | .77 | | .0001* |
| | | | .00 | 1.00 | | .00 | 1.00 | | 3.43 | .08 |
| | Model 2 | .42 | | .06* | .42 | | .05* | .72 | | .0001* |
| % Girls in Primary | Full Model 1 | .42 | | .13* | .42 | | .10* | .77 | | .0001* |
| | | | 2.26 | .15 | | .72 | .40 | | 12.55 | .002 |
| Education 1960 | Model 3 | .33 | | .16 | .39 | | .07* | .59 | | .002* |
| Crude Birth Rate | Full Model 1 | .42 | | .13* | .42 | | .10* | .77 | | .0001* |
| | | | .02 | .87 | | 3.59 | .07 | | 5.21 | .03 |
| per 000 1965-70 | Model 4 | .42 | | .06* | .28 | | .21* | .69 | | .0002* |
| Population (000) | Full Model 1 | .42 | | .13* | .42 | | .10* | .77 | | .0001* |
| | | | .40 | .53 | | .08 | .77 | | -4.25 | 1.00 |
| CA 0-4 Years 1975 | Model 5 | .40 | | .07* | .42 | | .05* | .83 | | <.00001* |
| Population (000) | Full Model 1 | .42 | | .13* | .42 | | .10* | .77 | | .0001* |
| | | | .05 | .82 | | .13 | .71 | | .03 | .85 |
| CA 5-9 Years 1975 | Model 6 | .42 | | .06* | .42 | | .05* | .77 | | .00003* |

better explained by the Demographic model ($R^2$=.77, p=.0001). The second predictor, girls receiving primary education in 1960, accounted for eighteen percent of the criterion variance. The $R^2$ of restricted regression model three dropped from .77 to .59 (F=12.55, p=.002). A second predictor, the 1965-70 birth rate, was a statistically significant predictor (F=5.21, p=.03), whose omission in model four dropped the $R^2$ from .77 to .69. We note in passing that when N's are small the degrees of freedom may adversely affect statistical significance of drops in $R^2$.

Of the five variables the 1965-70 birth rate is noteworthy because it accounts for variance in two analyses, although only one is statistically significant. The 1965-70 birth rate is comparable in its effects in Table 6.17. We reiterate our cautious approach due to the small samples and indicate the role of the two predictors just mentioned, but with care.

*Health Model.* The Health model explains all three criteria in Table 6.19 to about the same extent, which is also statistically significant. In the case of the criterion 1975 $ GNP per capita the five predictors generated an account of sixty one percent of the criterion variance, which is significant (p=.005). The 1955-60 birth rate, via restricted regression model three, accounted for eight of the model's sixty one percent of the variance. However, this interesting drop in $R^2$ did not reach statistical significance. Other predictors in the model of 1975 $ GNP were quite uninfluential.

When applied to the second criterion of change in $ GNP per capita in the period 1960-78 the five-factor Health model explained half of the variance ($R^2$=.53, p=.03). The first predictor, the number of children under fourteen years of age, explained twenty four percent of the variance, which is nearly half of the full model's account (F=7.08, p=.03). The 1965-70 birth rate explained ten percent, but was not statistically significant (p=.09). The other three predictors played no role.

In the case of the third criterion, PQLI in nineteen countries, the $R^2$ was the largest of the three; this is a finding evident in several preceding tables. The $R^2$ of .64 was statistically significant (p=.01).

TABLE 6.18

DESCRIPTION OF THE SUBJECTS: LATIN AMERICA-HEALTH PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Health Predictors) | | | | | | | | | |
| N Children CA 0-14 Years 1960 | 4250.69 | 7005.49 | 20 | 4250.69 | 7005.49 | 20 | 4398.36 | 7156.66 | 19 |
| Birth Rate 1955-60 | 42.75 | 7.73 | 20 | 42.75 | 7.73 | 20 | 42.93 | 7.93 | 19 |
| N Population per Physician 1970 | 2742.50 | 2554.75 | 20 | 2742.50 | 2554.75 | 20 | 2191.57 | 894.44 | 19 |
| N Population per Hospital Bed 1960 | 464.25 | 332.57 | 20 | 464.25 | 332.57 | 20 | 394.47 | 138.03 | 19 |
| % Needed Calories per Capita 1970 | 99.25 | 11.88 | 20 | 99.25 | 11.88 | 20 | 100.47 | 10.89 | 19 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 67.71 | 22.03 | 14 | 67.71 | 22.03 | 14 | 72.15 | 15.07 | 13 |
| Life Expectancy 1960 | 57.58 | 6.65 | 12 | 57.58 | 6.65 | 12 | 57.58 | 6.65 | 12 |
| Urban % of Population 1960 | 42.94 | 17.71 | 19 | 42.94 | 17.71 | 19 | 44.66 | 16.51 | 18 |
| Rooms per Urban Person 1960 | 1.87 | .38 | 15 | 1.87 | .38 | 15 | 1.87 | .38 | 15 |
| N Radios per 000 Population 1960 | 98.35 | 63.19 | 20 | 98.35 | 63.19 | 20 | 103.26 | 60.87 | 19 |
| Newsprint Kg. per Person 1960 | 2.54 | 2.04 | 20 | 2.54 | 2.04 | 20 | 2.66 | 2.01 | 19 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 923.50 | 534.94 | 20 | | | | | | |
| GNP Increment 1960-78 | | | | 2.38 | 1.10 | 20 | | | |
| PQLI 1975 | | | | | | | 71.36 | 11.59 | 19 |

TABLE 5.19

MULTIPLE LINEAR REGRESSION ANALYSIS OF HEALTH MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=22) 1975 $ GNP Per Capita $R^2$ | F | P | (N=20) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=19) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| N Children CA | Full Model 1 | .61 | | .005* | .53 | | .03* | .64 | | .01* |
| | | | .03 | .85 | | 7.08 | .01 | | .25 | .62 |
| 0-14 Years 1960 | Model 2 | .61 | | .001* | .29 | | .22* | .63 | | .004* |
| Birth Rate per 000 | Full Model 1 | .61 | | .005* | .53 | | .03* | .64 | | .01* |
| | | | 3.47 | .08 | | 3.10 | .09 | | 1.56 | .23 |
| 1955-60 | Model 3 | .53 | | .008* | .43 | | .06* | .59 | | .008* |
| N Persons per Physician | Full Model 1 | .61 | | .005* | .53 | | .03* | .64 | | .01* |
| | | | .34 | .56 | | .11 | .73 | | .005 | .94 |
| 1960 | Model 4 | .60 | | .002* | .53 | | .01* | .64 | | .004* |
| N Persons per Hospital | Full Model 1 | .61 | | .005* | .53 | | .03* | .64 | | .01* |
| | | | .01 | .90 | | .24 | .62 | | 1.63 | .22 |
| Bed 1960 | Model 5 | .61 | | .001* | .52 | | .01* | .59 | | .008* |
| % Needed Calories per | Full Model 1 | .61 | | .005* | .53 | | .03* | .64 | | .01* |
| | | | .39 | .53 | | <.01 | .93 | | 1.26 | .28 |
| Capita 1970 | Model 6 | .60 | | .002* | .53 | | .01* | .60 | | .007* |

*Significance of the difference from zero

None of the five Health predictors influenced the criterion through the restricted regression models.

Overall, only one predictor, the number of children under fourteen years of age, is significant in Table 6.19. However, we note in passing that several variables, when deleted from the model, produced an interesting drop in predictors of criterion variance.

*Environmental Model.* In the final applications of predictor models to the development of twenty one to twenty three Latin American nations statistically significant amounts of variance are generated. The $R^2$ values of the two fiscal criteria are both .47, while the third criterion had an $R^2$ of .90, which is highly significant ($p<.00001$). Table 6.21 shows that in the case of the 1975 $ GNP criterion the second predictor, 1960 Life Expectancy, explained ten percent of the criterion variance, but fell short of statistical significance ($F=3.15$, $p=.09$). No other predictor was influential, as Table 6.21 shows.

Within the second model of 1960-78 increment in $ GNP per capita three variables, when omitted, each reduced the $R^2$ considerably. The prime influence among the three is the 1965-70 birth rate, which accounted for twenty two percent of the variance ($F=6.37$, $p=.02$). Eighteen percent of the criterion variance were contributed by the ratio of pupils to teachers in 1970 ($F=5.18$, $p=.03$). Slightly less effective was the fifth predictor, radios per thousand of the population, which explained seventeen percent of the variance ($F=4.93$, $p=.04$).

When applied to the third criterion the five Environmental variables produced a high $R^2$ once more ($R^2=.90$, $p<.00001$). The second predictor, 1960 Life Expectancy, explained fifteen percent of the variance ($F=23.16$, $p=.0002$). No other predictor was significant.

The overall picture of the role of discrete variables as influences is poor. There are three statistically significant variables in Table 6.21, but there is not homogeneity among them.

*Commentary.* The status of Latin American nations is slightly more predictable than that of the full set of countries around the world, on the average. More particularly, the Health and Environmental models are at

TABLE 6.20

DESCRIPTION OF THE SUBJECTS: LATIN AMERICA-ENVIRONMENTAL PREDICTORS

| Variable | M | σ | N | M | σ | N | M | σ | N |
|---|---|---|---|---|---|---|---|---|---|
| (Child Environmental Predictors) | | | | | | | | | |
| Birth Rate 1965-70 | 39.12 | 7.62 | 22 | 39.25 | 7.78 | 21 | 39.22 | 7.78 | 21 |
| Life Expectancy at Birth 1960 | 55.04 | 8.20 | 22 | 54.83 | 8.34 | 21 | 55.60 | 7.96 | 21 |
| N Working per 000 Children 1970 | 12.63 | 8.83 | 22 | 13.06 | 8.82 | 21 | 11.32 | 6.65 | 21 |
| Primary Pupil/Teacher Ratio 1970 | 35.50 | 7.97 | 22 | 35.80 | 8.02 | 21 | 35.04 | 7.87 | 21 |
| Radios per 000 Population 1960 | 95.36 | 59.48 | 22 | 96.80 | 60.50 | 21 | 99.66 | 57.43 | 21 |
| (Descriptors) | | | | | | | | | |
| % Adult Literacy 1960 | 69.68 | 21.21 | 16 | 68.80 | 21.64 | 15 | 73.66 | 14.51 | 15 |
| Life Expectancy 1960 | 58.21 | 6.33 | 14 | 58.00 | 6.54 | 13 | 58.21 | 6.33 | 14 |
| Urban % of Population 1960 | 41.28 | 17.86 | 21 | 42.55 | 17.33 | 20 | 42.75 | 16.98 | 20 |
| Rooms per Urban Person 1960 | 1.82 | .39 | 17 | 1.83 | .40 | 16 | 1.82 | .39 | 17 |
| N Radios per 000 Population 1960 | 95.36 | 60.88 | 22 | 96.80 | 61.99 | 21 | 99.66 | 58.85 | 21 |
| Newsprint Kg. per Person 1960 | 2.56 | 1.99 | 21 | 2.56 | 1.99 | 21 | 2.69 | 1.96 | 20 |
| (Criterion) | | | | | | | | | |
| GNP in $U.S. 1975 | 909.59 | 515.08 | 22 | | | | | | |
| GNP Increment 1960-78 | | | | 2.43 | 1.10 | 21 | | | |
| PQLI 1975 | | | | | | | 72.66 | 11.73 | 21 |

TABLE 6.21

MULTIPLE LINEAR REGRESSION ANALYSIS OF *ENVIRONMENTAL* MODELS OF THREE CRITERIA OF NATIONAL DEVELOPMENT

| Predictor Variable | Models Compared | (N=23) 1975 $ GNP Per Capita $R^2$ | F | P | (N=21) 1960-78 $ GNP Increment Per Capita $R^2$ | F | P | (N=21) PQLI $R^2$ | F | P |
|---|---|---|---|---|---|---|---|---|---|---|
| Birth Rate | Full Model 1 | .47 | | .03* | .47 | | .05* | .90 | | <.00001* |
| | | | <.01 | .98 | | 6.37 | .02 | | .31 | .58 |
| 1965-70 | Model 2 | .47 | | .01* | .25 | | .28* | .90 | | <.00001* |
| Life Expectancy | Full Model 1 | .47 | | .03* | .47 | | .05* | .90 | | <.00001* |
| | | | 3.15 | .09 | | 3.67 | .07 | | 23.16 | .0002 |
| at Birth 1960 | Model 3 | .37 | | .06* | .34 | | .12* | .75 | | .0001* |
| N Working per 000 | Full Model 1 | .47 | | .03* | .47 | | .05* | .90 | | <.00001* |
| | | | 1.41 | .24 | | 1.06 | .31 | | 3.66 | .07 |
| Children 1970 | Model 4 | .43 | | .03* | .44 | | .04* | .87 | | <.00001* |
| Primary School Pupil/ | Full Model 1 | .47 | | .03* | .47 | | .05* | .90 | | <.00001* |
| | | | .00 | 1.00 | | 5.18 | .03 | | .17 | .68 |
| Teacher Ratio 1970 | Model 5 | .47 | | .01* | .29 | | .20* | .90 | | <.00001* |
| Radios per 000 | Full Model 1 | .47 | | .03* | .47 | | .05* | .90 | | <.00001* |
| | | | <.00 | .53 | | 4.93 | .04 | | 2.37 | .14 |
| Population 1960 | Model 6 | .47 | | .01* | .30 | | .18* | .88 | | <.00001 |

*Significance of the difference from zero

least as effective in Latin America, although the Demographic information is slightly below the world-wide norm. The social criterion is influenced by the variables representing the education of girls, the birth rate, and child labor as in the world data. For the $ GNP criteria there are fewer similarities and availability of radios and pupil/teacher ratios are the childhood Environmental traits found world-wide in Latin America. The distinctive antecedents in Latin America are the size of the population of children up to age fourteen years.

# CHAPTER SEVEN

# NEEDS OF CHILDREN: A SURVEY AND ANALYSIS

In the preceding chapters we have established that the status of children, their welfare in a broad sense, is related to nations' development. Accordingly, it is helpful to turn to the question of what nations wish to do for children. Their welfare in the years of dependency anticipates their health and vigor as adults and their proportionate contribution to the common good. When we attempt to remedy deficiencies in the world of childhood the scope of the problems requires that we move expeditiously, making plans which will be effective in pursuit of goals. The objectives of our zeal vary from place to place as social and physical elements shape both the local way of life and define the problems faced by children in specific countries. To some extent problems may be shared by adjoining societies and so aggregation of information may lead to zonal as well as national planning.

In this chapter we report data obtained from fifty two countries around the world, most of which are poor by the objective standard of annual $ gross national product per capita. Our goal has been to compile the views of experts who are informed about the condition of childhood in their countries; in most cases they had been in liaison with UNICEF for the International Year of the Child. The data from our survey was received and analyzed in 1981-82. The questionnaire elicits forty three responses; the brevity of this number flows from two considerations. First, we have in the World Data Set two hundred items of information on each country. Second, the length of a questionnaire balances endless need for information against the probability of respondents' willingness to complete questionnaires.

## METHOD

I. The purpose of the inquiry has been to generate a picture of the aggregated needs which planning for childhood should incorporate in various parts of the world. A review of the literature indicated that the

TABLE 7.1

COUNTRIES PROVIDING DETAILED RESPONSES (48-52/57 COUNTRIES)

| | | |
|---|---|---|
| Botswana | Bangladesh | Jamaica |
| Burundi | Hong Kong | Mexico |
| Ethiopia | India | Brazil |
| Ghana | Jordan | Chile |
| Guinea-Bisseau | Nepal | Colombia |
| Ivory Coast | Pakistan | Ecuador |
| Liberia | Philippines | Guyana |
| Madagascar | Singapore | Peru |
| Mali | Sri Lanka | Fiji |
| Mauritius | Syria | Indonesia |
| Morocco | Yemen Arab Republic | Qatar |
| Niger | Portugal | Bahrain |
| Senegal | Turkey | Turks & Caicos |
| Sierre Leone | Barbados | Tuvalu |
| Somalia | Dominican Republic | Monserrat |
| Tanzania | El Salvador | Seychelles |
| Tunisia | Guatamala | |
| Uganda | Honduras | |

following topics in the world of children should be raised: types of children with special needs, facilities in which care might be provided, curricula, the child-centered needs of parents, and types of technical assistance supplied and needed. On the basis of these categories fifty questions were framed, and are provided in the text. The questionnaire was translated from English into French and Spanish by Professors of those languages who were essentially native speakers. The language chosen previously by various countries to facilitate communication during the International Year of the Child was selected. The questionnaire in one of three languages was sent to countries' representatives for the International Year or to comparably informed persons in 119 countries. Follow-up correspondence was undertaken when possible through similar persons in-country, or in diplomatic posts providing access to home governments. Respondents ranged from child development specialists to representatives of Heads of State. Seventy four replies were received and responses from fifty two countries adequate for computer processing were analyzed in 1981-82. In this regard, responses not processed ranged from unuseable due to the absence of detail to sets of planning documents which were highly informative but not suitable for data processing, our mode of analysis. In this regard, we note that one of our objectives had been to augment the World Data Set on childhood with current survey data. It is on magnetic tape and is a computer-based set of over two hundred pieces of data on over one hundred and fifty countries. Results were tabulated for all countries, for poor countries, and for three continents, Africa, Asia, and Latin America.

II. Following the descriptive presentation of findings from various aggregates of responses from individual countries we move on, towards the end of the chapter, to analysis of the data in terms of the degree of need evident in the aggregated data. We employ a multiple linear regression analysis to understand countries' population characteristics as antecedent to the aggregated degree of need for six services to children and their parents.

TABLE 7.2

MEAN CHARACTERISTICS OF POPULATIONS IN AGGREGATES OF NATIONS

| VARIABLE | AGGREGATES | | | | | |
|---|---|---|---|---|---|---|
| | All Countries (N=52) | Poor Countries (N=33) | Rich Countries (N=9) | Africa (N=18) | Asia (N=11) | Latin America (N=12) |
| 1. Population CA 0-4 (000) 1975 | 5100.10 | 5984.66 | 3702.55 | 1327.00 | 12733.09 | 3411.91 |
| 2. Population CA 0-14 (000) 1975 | 13193.00 | 15448.48 | 9716.33 | 3259.66 | 33123.45 | 8872.58 |
| 3. Life Expectancy at Birth 1975 | 53.26 | 50.39 | 65.74 | 44.68 | 54.58 | 61.05 |
| 4. Infant Mortality 000 live births 1975 | 81.27 | 97.10 | 34.42 | 104.80 | 102.54 | 61.00 |
| 5. ♀ Enrollment in Primary Schools % 1975 | 70.32 | 62.21 | 107.00 | 47.00 | 65.00 | 98.75 |
| 6. Total enrollment in Primary Schools % 1975 | 78.08 | 70.24 | 110.88 | 57.38 | 76.27 | 99.25 |
| 7. Pupil:Teacher Primary Schools 1975 | 37.11 | 38.09 | 34.00 | 40.50 | 35.36 | 36.27 |
| 8. Urban % of Population 1970 | 30.53 | 26.74 | 44.25 | 21.42 | 25.16 | 45.75 |
| 9. People per Physician 1970 | 13004.76 | 16048.18 | 1845.55 | 24473.12 | 9645.55 | 2734.16 |
| 10. % Daily Calorie Needs 1970 | 96.12 | 94.03 | 104.50 | 93.31 | 97.00 | 97.08 |
| 11. Per Capita Newsprint per year (kg.) 1970 | 1.72 | .86 | 4.12 | .22 | 2.04 | 2.59 |
| 12. Poulation in millions 1978 | 34.47 | 37.66 | 32.37 | 9.48 | 82.09 | 24.30 |
| 13. Date of Stable Population | 2114.12 | 2122.00 | 2077.14 | 2143.00 | 2122.72 | 2070.27 |
| 14. Quality of Childrens' Lives | 80.41 | 89.47 | 43.07 | 103.70 | 79.72 | 54.63 |

Sources of Data: Variables 1-7, World Atlas of the Child, 1979; 8-11, World Tables, 1976; 12-13, World Development Report 1980, 1980; 14, MICQL Index, Jordan, 1981.

The criterion series consists of the summation of six *need* scores calculated from the 1981-82 survey data. They are the scaled scores for degree of urgency of the need for: ten types of children with special needs, physical facilities for clinics, schools, and day-care centers, literacy and vocational training, aesthetics and non-native languages, parent education, and technical education for child care specialists. These six scores for need are combined into a single, composite need score, and analyzed for all cases. Analysis for the six subscores was not possible due to the low number of cases with all needed pieces of information. Countries were used in order to maximize the subjects-to-variables ratio.

The predictors are elements from the three domains drawn in Chapters Four to Six, however, they are different, being drawn from more recent years, usually from 1970. The *Demographic* predictors are the rate of growth of the urban population between 1970 and 1980, and 1978 population. *Health* is represented by the proportional consumption of needed protein calories in 1970. The *Environmental* domain is represented by per capita consumption of newsprint in 1970. For the analysis the countries involved are treated as a single group; we report one regression analysis using a predictor model of five variables from three domains against one composite criterion score. This approach replaces an earlier plan to use each of six criterion measures of need; the N dropped to an unacceptable number when sets of six variables were aggregated.

We begin with attention to the survey data in descriptive form, and consider first the world-wide aggregation of responses from the fifty two countries listed in Table 7.1.

## ALL COUNTRIES

The fifty two sets of responses analyzed as a single group represent virtually all regions of the world, and countries ranging from large to tiny. Apart from geographical grouping by continent we have aggregated data from developed and poor countries using annual GNP in dollars per capita. The countries for whom data are reported in this study are listed in Table 7.1 which omits several countries whose responses were not

TABLE 7.3

GROUP OF COUNTRIES: All Respondents[1]

(N-52)

| ITEM | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| I. How urgent in your country is programming for children who are: | | | | |
| A. physically handicapped | 50 | 6 | 15 | 29 |
| B. talented | 46 | 17 | 15 | 14 |
| C. delinquent | 48 | 6 | 18 | 24 |
| D. abandoned | 46 | 16 | 9 | 21 |
| E. starving | 45 | 12 | 7 | 26 |
| F. mentally retarded | 48 | 4 | 22 | 22 |
| G. visually handicapped | 50 | 6 | 22 | 22 |
| H. hearing impaired | 49 | 7 | 20 | 22 |
| I. minorities | 41 | 27 | 5 | 9 |
| J. refugees | 39 | 24 | 5 | 10 |
| II. How urgent is the need to build: | | | | |
| A. schools and clinics | 52 | 6 | 9 | 37 |
| B. day care facilities | 51 | 6 | 25 | 20 |
| III. How urgent is the need for curricula in: | | | | |
| A. literacy | 49 | 9 | 12 | 28 |
| B. vocational training | 52 | 1 | 17 | 34 |
| C. aesthetics | 48 | 22 | 18 | 8 |
| D. non-local languages | 50 | 27 | 17 | 6 |
| IV. How urgent is parents' need to improve: | | | | |
| A. nutrition | 41 | 3 | 7 | 31 |
| B. family life | 52 | 5 | 15 | 32 |
| C. child health and safety | 52 | 2 | 12 | 38 |
| D. prenatal care | 52 | 4 | 14 | 34 |
| V. How urgent is the need for technical assistance in developing: | | | | |
| A. teachers | 49 | 9 | 15 | 25 |
| B. physicians | 49 | 9 | 16 | 24 |
| C. nurses | 48 | 12 | 15 | 21 |
| D. social workers | 51 | 6 | 21 | 24 |
| E. others | 37 | 3 | 13 | 21 |

TABLE 7.3 (Cont.)

| ITEM | N | Yes | No | Don't Know |
|---|---|---|---|---|
| F. Are you currently receiving technical assistance from other countries: | 50 | 36 | 9 | 5 |
| If the answer is yes, list the countries by size of their assistance. | | | | |
| G. first | | UNICEF | | N = 12 |
| H. second | | United States | | N = 5 |
| I. third | | West Germany | | N = 3 |
| J. fourth | | -- | | |
| K. In your country do you receive assistance from Church groups? | 47 | 27 | 11 | 9 |
| L. Do you seek technical assistance from other countries: | 49 | 42 | 2 | 5 |
| If the answer is yes, specify | | | | |
| M. type of aid (1st choice) and N. the preferred country | | Technical Training<br>United States | | N = 8<br>N = 8 |
| O. type of aid (2nd choice) and P. the preferred country | | Social Services<br>United Kingdom | | N = 7<br>N = 5 |
| Q. type of aid (3rd choice) and R. the preferred country | | Money<br>United States | | N = 5<br>N = 7 |

| How urgent is your need for: | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| S. Surveys | 45 | 7 | 20 | 18 |
| T. Research Planning | 47 | 4 | 16 | 27 |

| | | |
|---|---|---|
| VI. Please name your country's most important | | |
| A. problem in child development | Nutrition | N = 17 |
| B. second most important problem | Education | N = 18 |
| VII. What agency in your country conducts research on Childhood? | Various | N = 42 |

amenable to our methods of analysis. In Table 7.2 we present fourteen demographic traits of the seven aggregations of countries. It can be seen that the various sub-groups vary widely; the first seven variables in Table 7.2 describe children's lives, and the next six present characteristics of showing the circumstances of life. For example, per capita consumption of newsprint is generally used as an index of the milieu in which childrens' reading skills are put to use by the informal curriculum of life. The last variable in Table 7.2 is the author's (1983) measure of the quality of childrens' lives, based on three elements, children in the labor force, females in elementary school, and infant mortality. These variables are drawn in part from reviewing the literature on social indicators exemplified in the studies of Stilwell and Hardwicke (1973), Bunge (1975), Land (1975), Johnston (1977), Gilmartin, Rossi, and Lutomski (1979), and Morris (1979).

The range of life expectancy at birth is lowest in Africa, which is also the continent whose enrollment of females in primary schools is lowest, forty seven percent. Generally speaking, people around the world tend to come close to their daily caloric needs, 96.12 percent. Given the range of dates for populations achieving replacement levels, and no more, the supply of food may not keep up with rates of growth. Only developed countries will reach stability within the lifetimes of today's young children. In the face of the range of conditions the first section of this report gives an overview for the world-wide community of children. It is a preface to regional summaries, and we use the world-wide data as a norm to evaluate the four aggregates of data which follow.

Turning to the reports of informed persons around the world, given in Table 7.3, we describe the needs for childhood. The data indicate that needs of major groups of exceptional children are unmet, with physically handicapped and malnourished children in greatest need. Children belonging to various social minorities, world-wide, and refugee children are seen to be least evidently at a disadvantage.

Schools and other facilities for giving care to children are clearly needed, according to Table 7.3.

With regard to specialized curricula, world-wide, it is evident that the most basic form of instruction, literacy, commands attention. In contrast, education for aesthetics is quite lacking in urgency, although its value does not go unrecognized among our world-wide respondents. In the matter of non-local languages over half of the respondents thought it a low priority; this makes sense when compared to literacy and vocational training, but is not without its complications. Non-local, world-wide languages are a link to sources of technical assistance, once literacy has been achieved, in poor countries of the world.

Virtually all aspects of education for family life are considered urgent by fifty two of our correspondents; only four to six percent think they are not. It may be well to recall the existence of a 'Fourth World'-pockets of undevelopment in countries generally considered well favored in resources.

Technical assistance to produce teachers, physicians, nurses, social workers and others is an urgent matter to people in all parts of the world. Three quarters of our respondents report some form of technical assistance from other countries. UNICEF and the churches are major resources in the world of childhood. Given the opportunity, several countries would like assistance with technical training and with social services. Aggregation of responses in this category is not very efficient, however, beyond the generalization that assistance with methods of inquiry into childhood's problems is a broadly expressed need. We note that nutrition and education remain major problems, and that most resident experts could identify a domestic agency doing research on childrens' problems.

When we turn to the question of the most intense problem around the world the need for schools and clinics is the item most frequently considered urgent. One-third of the respondents indicate that nutrition and education are paramount, and in equal amounts, as the prime and secondary challenges. A single, distinct category of highest need is children who are starving. This appalling problem is followed by two problems, literacy and the care of physically handicapped children. In this regard, we

point out that prevalence of urgent problems rises and falls around the world as natural disasters, wars, and other large scale afflictions fall on specific countries. We add that our list of forty three items for childhood is frequently responded to by an entry in the 'very urgent' category. This is evident in categories I. A-J in Table 7.3. "Moderate urgency" applies to about one third of the items in Table 7.3's categories I - VI.

We conclude that our fifty two responses from around the world show that childhood's needs persist, and are acute in many places. We now turn to four aggregations of country responses, thirty three poor countries, and those in eighteen African, eleven Asian, and twelve Latin American countries. We use the world data in Table 7.3 as the normative background for the four comparisons. In so doing, we advise that our comparisons with the four sub-groups are discriminations, rather than large differences, within a world where grave needs for childhood are the norm. Where we identify above or below average urgency it is necessary to keep in mind the over-riding fact of urgency in general.

## POOR COUNTRIES

For thirty three poor countries around the world most aspects of childhood present needs for programming. Very few topics are marked less than Urgent, with physical facilities and curricula for literacy and job training being in greatest demand. When compared with the total, world-wide set of responses the degree of urgency is greater.

Needs of parents for child nurturing are above the world-wide average in poor countries, with nutrition and prenatal care heading the list. Recalling from Table 7.2 a rate of infant mortality nearly three times that of advanced countries this attitude seems entirely appropriate. Clearly, the prime problem of childhood in the world's poor countries is survival, followed by maintenance of health under adverse conditions.

A lesser degree of urgency describes the challenge to provide professional personnel to develop and maintain the welfare of children. Compared to the world-wide community the urgency is greater. Developing

TABLE 7.4

GROUP OF COUNTRIES: Poor Countries[1]

(N= 33)

| ITEM | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| I. How urgent in your country is programming for children who are: | | | | |
| A. physically handicapped | 32 | 1 | 8 | 23 |
| B. talented | 30 | 11 | 11 | 8 |
| C. delinquent | 31 | 4 | 12 | 15 |
| D. abandoned | 31 | 8 | 8 | 15 |
| E. starving | 32 | 7 | 5 | 20 |
| F. mentally retarded | 32 | 3 | 16 | 13 |
| G. visually handicapped | 32 | 1 | 15 | 16 |
| H. hearing impaired | 31 | 2 | 14 | 15 |
| I. minorities | 27 | 19 | 3 | 5 |
| J. refugees | 28 | 15 | 4 | 9 |
| II. How urgent is the need to build: | | | | |
| A. schools and clinics | 33 | 1 | 5 | 27 |
| B. day care facilities | 32 | 2 | 12 | 18 |
| III. How urgent is the need for curricula in: | | | | |
| A. literacy | 32 | 4 | 6 | 22 |
| B. vocational training | 33 | 0 | 10 | 23 |
| C. aesthetics | 30 | 14 | 12 | 4 |
| D. non-local languages | 31 | 16 | 11 | 4 |
| IV. How urgent is parents' need to improve: | | | | |
| A. nutrition | 32 | 1 | 3 | 28 |
| B. family life | 33 | 4 | 9 | 20 |
| C. child health and safety | 33 | 0 | 3 | 30 |
| D. prenatal care | 33 | 2 | 6 | 25 |
| V. How urgent is the need for technical assistance in developing: | | | | |
| A. teachers | 30 | 3 | 9 | 18 |
| B. physicians | 30 | 2 | 10 | 18 |
| C. nurses | 30 | 6 | 6 | 18 |
| D. social workers | 32 | 5 | 9 | 18 |
| E. others | 25 | 2 | 9 | 14 |

TABLE 7.4 (Cont.)

| ITEM | N | Yes | No | Don't Know | |
|---|---|---|---|---|---|
| F. Are you currently receiving technical assistance from other countries: | 32 | 25 | 6 | 1 | |
| If the answer is yes, list the countries by size of their assistance. | | | | | |
| G. first | | United States | | | N = 4 |
| H. second | | West Germany | | | N = 4 |
| I. third | | Various | | | N = 10 |
| J. fourth | | Various | | | N = 18 |
| K. In your country do you receive assistance from Church groups? | 30 | 17 | 8 | 5 | |
| L. Do you seek technical assistance from other countries: | 31 | 30 | 1 | 0 | |
| If the answer is yes, specify | | | | | |
| M. type of aid and N. the preferred country | | Technical Training<br>United States | | | N = 6<br>N = 7 |
| O. type of aid and P. the preferred country | | Education<br>United Kingdom | | | N = 5<br>N = 3 |
| Q. type of aid and R. the preferred country | | Nutrtion<br>United States | | | N = 4<br>N = 6 |

| How urgent is your need for: | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| S. Surveys | 27 | 4 | 10 | 13 |
| T. Research Planning | 29 | 2 | 7 | 20 |

| | | |
|---|---|---|
| VI. Please name your country's most important | | |
| A. problem in child development | Nutrition | N = 15 |
| B. second most important problem | Education | N = 15 |
| VII. What agency in your country conducts research on Childhood? | Various | N = 25 |

nations have a keen grasp of the value of priming the pump of human resources through the helping professions. This same perception extends to the value of assistance from abroad. Behind the summary of technical assistance from other nations on page two of Table 7.2 is a broad array of nations giving assistance. The extent to which such initiatives may persist depends in part on the economic health of advanced countries. Nations small in population but large in natural resources may well play a larger role as energy supplies render the industrial world less capable of determining its effectiveness. Even so, the poor countries of the world uniformly desire assistance from others. We close by noting that the churches seem to render assistance in the same proportion to poor and developed nations.

When we look for specific guides to the sought-for help the list is long and resists summarizing since it expresses priorities of specific human countries and contexts. The list of possible donors is also broad. In both instances first choices of needed aid and hoped-for donors were similar in only a handful of countries. Assistance with planning and research is urgent in the thirty three countries, and to about the same extent as in the total sample. Nutrition and Education remain the most important problems, but with a higher degree of urgency than in the world wide sample. Finally, we note that twenty five of thirty three countries were able to name an in-country agency capable of conducting research on behalf of children.

When we evaluate the types and degrees of need of thirty three poor countries against the data from the full set of fifty two the size of the subgroup tends to influence the outcome in the direction of minimizing differences. Even so the comparison is informative, and the size of the poor country group, slightly more than half the total, makes the results useful. In the case of groups of children with special problems the differences in proportion of moderately urgent and urgent problems is towards greater urgency in the poor countries. For example, the combination of moderately urgent and urgent responses in poor countries as a description of the plight of physically handicapped children is ninety

seven percent in poor countries, versus about ten percent less for all respondents around the world. Slightly greater urgency in this domain for poor countries is evident in the case of children who are hungry, visually handicapped, hearing impaired, belong to social minorities and as refugees. Substantially more urgent in poor countries is the need for schools and hospitals. In the case of curricula, those advancing literacy and vocational training are in greater demand in poor countries. Interestingly, poor countries placed a greater degree of need than the whole sample on the urgency of need for aesthetics curricula. In a fairly relaxed approach to education in non-local languages the poor countries resembled the world-wide sample. In parent education the urgency in poor countries was the same or slightly greater for training in nutrition, family life, child health and safety, and prenatal care. No great differences between poor countries and the sample as a whole are evident in the need for trained teachers, physicians, nurses, and social workers. Technical help from UNICEF is especially evident in the poor countries.

## AFRICA

Our 1981 data set includes responses from eighteen comparatively small African countries, which are named in Table 7.1. In general, the quality of children's lives in the African countries is the lowest of the aggregates in Table 7.2. Life expectancy at birth is less than forty five years, and infant mortality is 105 per 1,000 live births. The enrollment of females in elementary schools is lowest, as is the total proportion of both sexes, and there is a low ratio of teachers to pupils. Daily calorie requirements are least met in Africa, compared to the other regions described in Table 7.2. The African countries in question have small populations, on the average, and they will be last to reduce their population growth to a replacement level in the year 2143.

Turning to the survey data in Table 7.3 we see that all kinds of special children urgently need attention, with the exception of minorities and of particular refugees, in the view of respondents. Facilities are clearly an important item. As in poor countries in the previous section, a number of which are African, curricula for literacy and job

TABLE 7.5

GROUP OF COUNTRIES: Africa[1]

(N=18)

| ITEM | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| I. How urgent in your country is programming for children who are: | | | | |
| A. physically handicapped | 17 | 1 | 4 | 12 |
| B. talented | 15 | 6 | 5 | 4 |
| C. delinquent | 17 | 0 | 5 | 12 |
| D. abandoned | 15 | 3 | 4 | 8 |
| E. starving | 16 | 3 | 2 | 11 |
| F. mentally retarded | 16 | 1 | 9 | 6 |
| G. visually handicapped | 17 | 0 | 4 | 13 |
| H. hearing impaired | 17 | 1 | 4 | 12 |
| I. minorities | 14 | 11 | 1 | 2 |
| J. refugees | 13 | 8 | 1 | 4 |
| II. How urgent is the need to build: | | | | |
| A. schools and clinics | 18 | 0 | 3 | 15 |
| B. day care facilities | 19 | 0 | 7 | 11 |
| III. How urgent is the need for curricula in: | | | | |
| A. literacy | 17 | 1 | 2 | 14 |
| B. vocational training | 18 | 0 | 2 | 16 |
| C. aesthetics | 17 | 9 | 6 | 2 |
| D. non-local languages | 17 | 5 | 8 | 4 |
| IV. How urgent is parents' need to improve: | | | | |
| A. nutrition | 17 | 0 | 3 | 14 |
| B. family life | 18 | 1 | 6 | 11 |
| C. child health and safety | 18 | 0 | 2 | 16 |
| D. prenatal care | 18 | 0 | 3 | 15 |
| V. How urgent is the need for technical assistance in developing: | | | | |
| A. teachers | 17 | 3 | 4 | 10 |
| B. physicians | 17 | 1 | 5 | 11 |
| C. nurses | 17 | 4 | 4 | 9 |
| D. social workers | 18 | 3 | 6 | 9 |
| E. others | 12 | 2 | 6 | 4 |

TABLE 7.5 (Cont.)

| ITEM | N | Yes | No | Don't Know | |
|---|---|---|---|---|---|
| F. Are you currently receiving technical assistance from other countries: | 17 | 12 | 3 | 2 | |
| If the answer is yes, list the countries by size of their assistance. | | | | | |
| G. first | | UNICEF | | | N = 4 |
| H. second | | Various | | | N = 9 |
| I. third | | Various | | | N = 9 |
| J. fourth | | -- | | | |
| K. In your country do you receive assistance from Church groups? | 15 | 8 | 3 | 4 | |
| L. Do you seek technical assistance from other countries: | 17 | 15 | 1 | 1 | |
| If the answer is yes, specify | | | | | |
| M. type of aid (1st choice) and N. the preferred country | | Social Services<br>United States | | | N = 4<br>N = 4 |
| O. type of aid (2nd choice) and P. the preferred country | | Various<br>United Kingdom | | | N = 9<br>N = 2 |
| Q. type of aid (3rd choice) and R. the preferred country | | --<br>-- | | | |

| How urgent is your need for: | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| S. Surveys | 16 | 1 | 8 | 7 |
| T. Research Planning | 16 | 1 | 4 | 11 |

VI. Please name your country's most important

| | | |
|---|---|---|
| A. problem in child development | Nutrition | N = 8 |
| B. second most important problem | Education | N = 8 |

VII. What agency in your country conducts research on Childhood? — Various — N = 11

training are important; aesthetics and foreign language are less urgent.

Provision of parent educating services leading to improvements in child welfare are more urgent than in the world at large. The same comment applies to teachers, nurses, and other people in the helping professions. Twelve of seventeen African respondents report that their countries are receiving foreign aid. While sources of aid are various UNICEF is perceived most clearly as providing assistance. Churches are aiding half of the countries, and virtually all of the African respondents wish to receive aid from abroad. Within the wide range of aid sought social services form a cluster; an equally small cluster centers in the United States as a donor, followed by the United Kingdom. There is an interesting shading of urgency in the need for surveys which are considered a less pressing need than planning research. Not surprisingly, half the respondents consider nutrition and education as the country's most important problem in childhood. Eleven of the eighteen were able to name a research agency dealing with problems of children.

On close inspection the pattern of urgency for various topics in eighteen African countries resembles that of the world-wide group. However, there are more entries, proportionately, in the 'very urgent' categories of Table 7.5. An above average (i.e. above the world-group) degree of urgency is evident for children who are physically handicapped, delinquent, abandoned, starving, mentally retarded, have vision or hearing problems and are refugees. Less than normative urgency is expressed for children who are talented or who are members of minorities. The need for schools and clinics in the eighteen African nations is far above that on the world-wide group of respondents, as is the need for specialized curricula. Parent education is more urgently needed, with parent education for prenatal care being most notable in Table 7.5. On the matter of the degree of urgency for technical assistance with training for specialists the urgency is great, especially for Physicians. With regard to urgency for planning research and surveys only one of sixteen respondents in Africa felt the matter was not urgent, and most felt it was very urgent to a degree greater than that in the world-group of respondents.

On other matters in Table 7.5 the degree of urgency was high and not dissimilar to that in the world-wide group.

## ASIA

With a high infant mortality rate and modest life expectancy, as Table 7.3 shows, Asia's children sometimes face an uncertain future; protein needs per day are not usually met. Substantial numbers of girls in selected countries do not receive primary schooling, and less than two-thirds of all children are in elementary school in the eleven countries responding to the survey.

The Asian information comes from eleven countries with comparatively large populations, as Table 7.2 indicates. The pattern of needs of groups of special children expressed in the eleven responses in Table 7.6 is almost comparable to the pattern for countries in Africa. Minorities and refugees are a problem in a few instances; the most serious problem is the plight of physically handicapped children, but delinquent children are perceived as less of a problem than in Africa. The degree of need for care facilities is generally serious, and the need expressed for day care facilities is less skewed towards 'Very Urgent'. Literacy curricula are critical for about half the countries responding, and job training is even less critical. The need for aesthetic training is modest to low and training in foreign languages is not perceived to be a problem. Nutrition education for parents is a most urgent need and is matched by importance by health and safety. Family life and prenatal care are urgent needs, but to a lesser degree. Technical training for care-givers is a very urgent need, more so than for the world community as a whole, but quite similar to the profile of urgency of need presented by African respondents. Technical assistance is available to a majority of the Asian respondents, and they desire and receive several types of help from a variety of countries; UNICEF's contribution is perceived by several of the respondents. Virtually all countries responding to the survey felt that assistance with surveys and research was an urgent need. As with the other aggregates of respondents nutrition and education were the most important problems of childhood. Ten of eleven respondents could identify

TABLE 7.6

GROUP OF COUNTRIES: Asia[1]

(N=11)

| ITEM | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| I. How urgent in your country is programming for children who are: | | | | |
| A. physically handicapped | 11 | 1 | 3 | 7 |
| B. talented | 10 | 4 | 4 | 2 |
| C. delinquent | 10 | 4 | 5 | 1 |
| D. abandoned | 11 | 1 | 7 | 3 |
| E. starving | 9 | 2 | 2 | 5 |
| F. mentally retarded | 10 | 2 | 6 | 2 |
| G. visually handicapped | 11 | 3 | 7 | 1 |
| H. hearing impaired | 10 | 4 | 5 | 1 |
| I. minorities | 9 | 7 | 1 | 1 |
| J. refugees | 9 | 3 | 2 | 4 |
| II. How urgent is the need to build: | | | | |
| A. schools and clinics | 11 | 1 | 3 | 7 |
| B. day care facilities | 11 | 3 | 6 | 2 |
| III. How urgent is the need for curricula in: | | | | |
| A. literacy | 11 | 3 | 2 | 6 |
| B. vocational training | 11 | 1 | 7 | 3 |
| C. aesthetics | 10 | 6 | 2 | 2 |
| D. non-local languages | 11 | 9 | 1 | 1 |
| IV. How urgent is parents' need to improve: | | | | |
| A. nutrition | 11 | 3 | 0 | 8 |
| B. family life | 11 | 2 | 5 | 4 |
| C. child health and safety | 11 | 2 | 1 | 8 |
| D. prenatal care | 11 | 2 | 4 | 5 |
| V. How urgent is the need for technical assistance in developing: | | | | |
| A. teachers | 11 | 1 | 3 | 7 |
| B. physicians | 11 | 2 | 3 | 6 |
| C. nurses | 11 | 4 | 1 | 6 |
| D. social workers | 11 | 2 | 4 | 5 |
| E. others | 11 | 1 | 4 | 6 |

TABLE 7.6 (Cont.)

| ITEM | N | Yes | No | Don't Know |
|---|---|---|---|---|
| F. Are you currently receiving technical assistance from other countries: | 11 | 8 | 3 | 0 |
| If the answer is yes, list the countries by size of their assistance. | | | | |
| G. first | | UNICEF | | N = 3 |
| H. second | | -- | | |
| I. third | | -- | | |
| J. fourth | | -- | | |
| K. In your country do you receive assistance from Church groups? | 11 | 6 | 3 | 2 |
| L. Do you seek technical assistance from other countries: | 11 | 10 | 1 | 0 |
| If the answer is yes, specify | | | | |
| M. type of aid (1st choice) and | | Various | | N = 9 |
| N. the preferred country | | Various | | N = 7 |
| O. type of aid (2nd choice) and | | Social Services | | N = 3 |
| P. the preferred country | | United Kingdom | | N = 3 |
| Q. type of aid (3rd choice) and | | -- | | |
| R. the preferred country | | -- | | |

| How urgent is your need for: | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| S. Surveys | 9 | 1 | 3 | 5 |
| T. Research Planning | 11 | 1 | 5 | 5 |

| | | |
|---|---|---|
| VI. Please name your country's most important | | |
| A. problem in child development | Nutrition | N = 4 |
| B. second most important problem | Education | N = 6 |
| VII. What agency in your country conducts research on Childhood? | Various | N = 10 |

an agency conducting studies on childhood.

Turning to the intensity of needs among our small group of eleven Asian respondents we see in the data of Table 7.6 there is a degree of divergence from the views expressed by the world-wide group of fifty two responses to the questionnaire. There is a greater degree of urgency expressed for children who are physically handicapped, starving, and for those who are refugees. Less urgency than the norm of our world-wide group is expressed for children who are delinquent, abandoned, vision- or hearing-impaired, or are members of minorities. The need for schools and clinics is above average. In the matter of curricula the Asian respondents report an above average need, comparatively, for only vocational training. While urgency is indeed the case, the degree is less than in the world-wide group of responses for curricula in literacy, aesthetics, and non-local languages. In the case of parent education the degree of urgency expressed for our four topics is below the norm in each instance, with the greatest discrepancy in parent education for nutrition. Slightly below norm degree of urgency in preparation of specialists is reported for Nurses and Social Workers, with greater urgency expressed for teachers, but not for Physicians. In other respects our Asian respondents report perceptions comparable in degrees of urgency to our normative group of fifty two people around the world.

## LATIN AMERICA

The conditions of life for children in Latin America reflect the range of geographic and economic circumstances. The region is largely urbanized and nearly half the population of the twelve countries participating in the survey live in cities. Correspondingly, schooling is fairly available to both boys and girls and the ambience, as expressed in consumption of newsprint per capita (kg.) rewards and encourages literacy.

The distinctive feature of the survey of special groups of children summarized in Table 7.7 is the attention to abandoned children paid by ten of the twelve respondents. This problem seems unique to some countries and in such instances one encounters youngsters who resemble those in early Nineteenth century France and Britain (Terme and Monfalcon,

TABLE 7.7

GROUP OF COUNTRIES: Latin America[1]

(N-12)

| ITEM | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| I. How urgent in your country is programming for children who are: | | | | |
| A. physically handicapped | 12 | 1 | 4 | 7 |
| B. talented | 11 | 3 | 3 | 5 |
| C. delinquent | 11 | 0 | 4 | 7 |
| D. abandoned | 12 | 2 | 0 | 10 |
| E. starving | 11 | 2 | 1 | 8 |
| F. mentally retarded | 12 | 0 | 4 | 8 |
| G. visually handicapped | 12 | 0 | 9 | 3 |
| H. hearing impaired | 12 | 0 | 8 | 4 |
| I. minorities | 9 | 3 | 3 | 3 |
| J. refugees | 10 | 7 | 1 | 2 |
| II. How urgent is the need to build: | | | | |
| A. schools and clinics | 12 | 0 | 1 | 11 |
| B. day care facilities | 12 | 0 | 0 | 12 |
| III. How urgent is the need for curricula in: | | | | |
| A. literacy | 11 | 1 | 5 | 5 |
| B. vocational training | 12 | 0 | 2 | 10 |
| C. aesthetics | 11 | 4 | 5 | 2 |
| D. non-local languages | 11 | 5 | 6 | 0 |
| IV. How urgent is parents' need to improve: | | | | |
| A. nutrition | 12 | 0 | 0 | 12 |
| B. family life | 12 | 0 | 1 | 11 |
| C. child health and safety | 12 | 0 | 3 | 9 |
| D. prenatal care | 12 | 1 | 3 | 8 |
| V. How urgent is the need for technical assistance in developing: | | | | |
| A. teachers | 11 | 2 | 4 | 5 |
| B. physicians | 11 | 3 | 4 | 4 |
| C. nurses | 10 | 2 | 5 | 3 |
| D. social workers | 11 | 1 | 3 | 7 |
| E. others | 7 | 0 | 1 | 6 |

TABLE 7.7 (Cont.)

| ITEM | N | Yes | No | Don't Know |
|---|---|---|---|---|
| F. Are you currently receiving technical assistance from other countries: | 11 | 8 | 1 | 2 |
| If the answer is yes, list the countries by size of their assistance. | | | | |
| G. first | | UNICEF | | N = 3 |
| H. second | | West Germany | | N = 2 |
| I. third | | Various | | N = 4 |
| J. fourth | | -- | | |
| K. In your country do you receive assistance from Church groups? | 11 | 8 | 2 | 1 |
| L. Do you seek technical assistance from other countries: | 11 | 10 | 0 | 1 |
| If the answer is yes, specify | | | | |
| M. type of aid (1st choice) and N. the preferred country | | Education | | N = 3 |
| | | Various | | N = 6 |
| O. type of aid (2nd choice) and P. the preferred country | | Various | | N = 7 |
| | | Various | | N = 5 |
| Q. type of aid (3rd choice) and R. the preferred country | | Various | | N = 6 |
| | | United States | | N = 3 |

| How urgent is your need for: | N | Not Urgent | Moderately Urgent | Very Urgent |
|---|---|---|---|---|
| S. Surveys | 9 | 1 | 4 | 4 |
| T. Research Planning | 10 | 0 | 3 | 7 |

| | | |
|---|---|---|
| VI. Please name your country's most important | | |
| A. problem in child development | Nutrition | N = 4 |
| B. second most important problem | Health | N = 3 |
| VII. What agency in your country conducts research on Childhood? | Various | N = 11 |

1837). One hundred and forty years later the problem of abandoned children is found in the cities of Latin America. Not surprisingly, our respondents rated starvation a problem of great urgency. Facilities for children were uniformly matters of urgency among respondents.

Among curricular needs vocational training stands out, and literacy seems less compelling; that finding is consistent with the general availability in the region. Languages and aesthetics seem comparatively lacking in urgency. In the case of educational needs for parents the degree of urgency expressed is uniformly high. Several of the twelve Latin American respondents felt that training of people in helping professionals was not urgent.

Eight countries are receiving help from abroad; UNICEF and the churches are the prime sources of help. All respondents could use more help of many kinds. Research resources are needed but not to an extreme extent. Nutrition and health are the most important cluster of problems in a long list. Finally, eleven of twelve respondents could name a center doing research on children.

In twelve Latin American countries the assessment of the degree of urgency for groups of special children is quite straightforward. In all ten categories of children in Table 7.7 the degree of urgency is above that of the normative world-wide group of respondents. Only for refugee children is the degree of urgency virtually the same. In four categories, children who are delinquent, mentally retarded, visually and hearing-impaired, urgency occurs without exception. The same observation applies to the need to build schools, clinics and other facilities for child care; the latter is exceptionally urgent. In the case of four types of curricula the degree of urgency is also above average. The urgency for parent education is high for all four topics in Table 7.6 and exceeds the normative level, which is also high, in all instances except prenatal care. With regard to technical training for experts and specialists the need for technical assistance in training physicians is high, but less so than in the normative, world-wide group. For other categories the degree of urgency exceeds that of the total group of fifty two

respondents world-wide. The urgency of need for assistance with technical planning is above the already high level of the normative group.

Survey Data. Of the aggregates of countries we have analyzed the Latin American set of twelve provides the most unique data. Needs seem to be most extreme, and to remain so even when educational provisions for largely urban populations are fairly good. The plight of abandoned children is the most distinctive element.

In some respects this problem parallels the phenomenon of children living in the streets of early Victorian England. That time was an age in which government bureaucracy, for good or ill, scarcely existed as an agent of social action. The response at the time was establishment of 'ragged schools' by Mary Carpenter (Manton, 1976) and others. In that sense we see in Latin America a social anachronism. It is the persistence of a problem which Mid-Victorian society coped with by means of private philanthropy. It is a matter which twentieth century governments in the region are equipped to solve, if they have the will (Hasan, 1982).

In other respects the responses of our fifty two informants are generally similar. They value parent education as a form of child care, and they are sensitive to the needs of special groups of children, especially the physically handicapped. The needs of the gifted and the value of aesthetic education are rated low; we judge that to be a consequence of more pressing problems rather than an indifference. The low value placed on non-local languages may be explainable in the same way. However, we observe that foreign languages and a concern for educating the talented constitute a bridge to technical assistance from abroad. In that regard, we are impressed by the value perceived in technical assistance from UNICEF. In general, sources of aid are varied and diverse; however, there is one small cluster within the list of countries supplying aid and it is the 'country' UNICEF. Finally, we note the presence of nutrition and education in the list of persisting needs.

## PART II

## CHILDHOOD POPULATION TRAITS AND THE DEGREE OF NEED

In the previous section of this chapter we have identified problems

in the world of childhood through the eyes of in-country specialists. Our survey suggests that urgent needs exist in aggregate, generalizable form; accordingly, a complementary approach is to attempt to identify the traits in countries' populations which relate to the degree of need expressed in our survey. We use the method described at the beginning of this Chapter.

Multiple Linear Regression Analysis of Need. Our use of this multivariate technique for relating antecedent variables to a criterion is described in Chapter Three. Briefly a model of rationally selected predictors is used to explain criterion variance. Alternate models are constructed and the loss of predictive power for the same criterion is calculated and assessed by the F-statistic. When the loss of predictive power, i.e. a lower $R^2$ in the restricted model, is significant, we conclude that the omitted predictor variable of interest is statistically related to the criterion.

In Table 7.8 are descriptive data on the thirty countries used in the regression analysis of aggregated need in Table 7.9. The N of thirty is far less than the fifty-two countries on whom questionnaire data were assembled and described. The reason is the degree to which all five predictor variables could be assembled for every country. For the five predictors in Table 7.8 thirty countries could be assembled. The countries employed can be grouped into four continents with the occasional anomaly such as Jamaica; in that case, we set aside the more generic "Western Hemisphere", since so many countries were clearly Hispanic. The thirty countries tend to be poor and some are in Table 5.8's list of poor countries.

| AFRICA | ASIA | EUROPE | LATIN AMERICA |
|---|---|---|---|
| Ghana | India | Monaco | Brazil |
| Ivory Coast | Indonesia | Portugal | Chile |
| Madagascar | Jordan | Turkey | Colombia |
| Senegal | Pakistan | | Dominican R. |
| Sierre Leone | Philippines | | Ecuador |
| Somalia | Singapore | | El Salvador |
| Tanzania | Sri Lanka | | Guatamala |
| Tunisia | Syria | | Honduras |
| | | | Mexico |
| | | | Peru |
| | | | (Jamaica) |

TABLE 7.8

DESCRIPTION OF COUNTRIES USED IN REGRESSION ANALYSIS OF AGGREGATED NEEDS OF CHILDHOOD (N=30)

| | PREDICTORS | | | | | CRITERION |
|---|---|---|---|---|---|---|
| | 1970 Population (000) | 1970 % gm. Protein Daily | 1970-80 Urban Growth Rate | 1970 Persons/$km^2$ | 1970 Urban per capita Newsprint | Aggregated Needs |
| Mean | 40.32 | 57.33 | 4.39 | 172.90 | 1.72 | 57.03 |
| Standard Deviation | 115.05 | 9.78 | 1.34 | 675.70 | 2.15 | 10.46 |

Our full regression of five predictors from three domains, in Table 7.9 is statistically different from a model of zero information ($p=.01$), and explains forty three percent of the variance of scores representing aggregated urgency scores of six aspects of child welfare. Three of the five predictors are statistically significant. What is interesting is that they all account for nine percent of the total variance and for about one-fifth of the model's predictive power. Two of the three predictors, protein consumption and newsprint, use reach statistical significance. The proportion of people per square kilometer almost reaches statistical significance; since the drop in $R^2$ is also .09 we conclude there is functional if not statistical significance for this third predictor variable. In terms of domains there is one significant predictor from each of the Health, Environmental, and Demographic domains, bearing in mind the equality of $R^2$ contribution, if not the requirement that $p<.05$ in the case of the Demographic variable of people per km.

The essential value of this regression analysis is that it allows us to essay data-based observations through a multivariate analysis. The sample size is not large, and the subjects/variables ratio is not high; however, the survey data have been subjected to a multivariate analysis and our conceptual model of three domains is proved useful. In addition, we have treated the anterospective data in chapters Four to Six in the same fashion as the survey data in chapter Seven; we connect them through a common three-domain model of Demographic, Health, and Environmental information.

The meaning of these findings in Table 7.9 is that our data predict quite well the degree of urgency in thirty relevant countries on the needs of childhood. In particular, we see that three domains of information are all important and to an equal degree. In countries when the daily supply of protein calories was high in 1970 the needs of childhood were great a decade later. The correlation coefficient between level of protein and degree of need is .27. Similarly where density of population is high the degree of need in childhood is high ($R=.48$, $p<.01$). Finally, in places where consumption of newsprint is high the degree of urgency

TABLE 7.9

MULTIPLE LINEAR REGRESSION ANALYSIS OF AGGREGATED NEEDS OF CHILDHOOD: N=30 COUNTRIES

| Predictor Variable | | Criterion: Urgency of Childrens Needs $R^2$ | F | P* |
|---|---|---|---|---|
| | Full Model 1 | .43 | | .01* |
| | | | .72 | .40 |
| 1978 $ GNP Per Capita | Model 2 | .41 | | .007* |
| | Full Model 1 | .43 | | .01* |
| | | | 3.93 | .05 |
| 1970 % gm. Protein | Model 3 | .34 | | .03* |
| | Full Model 1 | .43 | | .01* |
| | | | .43 | .51 |
| 1970-80 % Urban Rate of Growth | Model 4 | .42 | | .006* |
| | Full Model 1 | .43 | | .01* |
| | | | 3.75 | .06 |
| 1970 persons/km$^2$ | Model 5 | .34 | | .02* |
| | Full Model 1 | .43 | | .01* |
| | | | 3.90 | .05 |
| 1970 Urban per Cap. Newsprint Consumption | Model 6 | .34 | | .02* |

*Significance of the difference from zero

on behalf of children is low ($R = -.45$, $p < .01$).

In this analysis the variables themselves are interesting, but they are representatives of domains which are more important. That is, by choosing relevant and representative variables we can show that knowledge of objective facts about a country can lead to informed views on the severity of childhood's unmet needs. As a policy matter, the data of the survey and the statistical analysis shows that one can assemble relevant aggregates of data. Once assembled they can be analyzed to shed light on antecedents to problems; this had the effect of increasing the predictability of problems as criteria.

The description of the questionnaire data plus the regression analysis of complementary data in this chapter show that data can be obtained, although not always in the quantity we would like. The validity of the data has two aspects. The views of informed people are self-validating because we put credibility in them when we invited their submission via the questionnaire. Second, the population data are of a different quality. That is, the case of extant statistics presumes, unavoidably, that they have been checked for dependability. In that regard, we cautiously accept the act of disseminating statistics as evidence of their validity. However, we note that there is safety in numbers; our analyses have used grouped data. A greater degree of reservation would apply to consideration of statistics on any particular country. In this volume we have not analyzed countries one-by-one, but we have aggregated data, and have increased our avoidance of error by that approach.

# CHAPTER EIGHT
# DISCUSSION

*Regression Analyses.* The beginning of an empirical analysis of child traits is guided by hypotheses about probable relationships within the world of childhood and by an expectation that there will be a few interesting findings along the way. In the case of this monograph the interesting finding is that our fifteen predictor variables in three models relate to subsequent fiscal and social criteria so well. The regression models are powerful and in this regard, we report having evaluated them by means of Cohen's (1977) statistic and found them quite robust.

*Antecedents to National Development.* From the statistical analyses we feel quite confident in asserting that investment of nations' resources at strategic points in childhood is a shrewd and self-advancing ploy. National attainment of goals which are fiscal and social requires that childhood be considered.

Of course, the question arises of where to place resources strategically. In this regard, we turn to the fifteen variables of interest in three domains which we have applied to three criteria in six aggregates of nations. We note that our observations apply to the fifteen child variables we have chosen; another, different set would produce different findings. In particular, we note that the salience of a childhood variable depends for its role on the other four variables in our model. Salient variables would be less so, more so, or insignificant in the presence of a quite different set of childhood traits.

Some variables are relevant to our criteria of national development in the broadest way. The order of importance, defined as frequency of significance for three criteria in six aggregates - a total of eighteen possible occasions for statistical significance - is as follows: 1965-70 crude birth rate, 1960 percentage of girls in primary education, 1955-60 birth rate, 1960 life expectancy, 1960 persons per physician, 1965-70 birth rate. This set is followed by several factors which appear three times; they are: 1960 persons per hospital bed, 1960 rate of child labor,

TABLE 8.1

PROBABILITY LEVEL OF STATISTICALLY SIGNIFICANT PREDICTORS OF THREE CRITERIA IN RICH AND POOR COUNTRIES AND IN A WORLD-WIDE SET OF COUNTRIES

| PREDICTOR | Criteria | REGION: World I | World II | World III | Rich Countries I | Rich Countries II | Rich Countries III | Poor Countries I | Poor Countries II | Poor Countries III |
|---|---|---|---|---|---|---|---|---|---|---|
| N Births (000) 1960 | | | | | | | | | | |
| % Girls in Primary Education 1960 | | | | | | .0008 | .002 | .01 | .07 | .00001 |
| Crude Birth Rate per 000 1965-70 | | .002 | .006 | .00001 | | .004 | .0003 | | | .01 |
| Population (000) CA 0-4 Yrs. 1975 | | | | | | | | | | |
| Population (000) CA 5-9 Yrs. 1975 | | | | | | | | | | |
| N Children CA 0-14 Yrs. 1960 | | | | | | | | | | |
| Birth Rate per 000 1955-60 | | .0001 | | .0001 | .004 | | .009 | | | |
| N Persons per Physician 1960 | | | .01 | .00001 | | | .0002 | .00009 | | .001 |
| N Person per Hospital Bed 1960 | | | | .02 | | .001 | | | | |
| % Needed Calories per Capita 1970 | | | | | | | | | | |
| Birth Rate 1965-70 | | | | | | .007 | | | | |
| Life Expectancy at Birth 1960 | | | | .00001 | | | .00001 | | | .00001 |
| Children Working per 000 1960 | | | | .03 | .05 | | | .01 | | |
| Primary School Pupil-Teacher Ratio 1970 | | .02 | | | | | | | | |

TABLE 8.2

PROBABILITY LEVEL OF STATISTICALLY SIGNIFICANT PREDICTORS OF THREE CRITERIA IN AFRICA, ASIA, AND LATIN AMERICA

| PREDICTOR | REGION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Africa* | | | *Asia* | | | *Latin America* | | |
| Criteria | I | II | III | I | II | III | I | II | III |
| N Births (000) 1960 | | | .05 | | | | | | |
| % Girls in Primary Education 1960 | | | .001 | | | .00001 | | | .002 |
| Crude Birth Rate per 000 1965-70 | | | | | .05 | | | | .03 |
| Population (000) CA 0-4 Yrs. 1975 | | | | | | | | | |
| Population (000) CA 5-9 Yrs. 1975 | | | | | | | | | |
| N Children, CA 0-14 Yrs. 1960 | | | | | | | | .01 | |
| Birth Rate per 000 1955-60 | | | | .01 | | .02 | | | |
| N Persons per Physician 1960 | | | .01 | | | | | | |
| N Persons per Hospital Bed 1960 | | | | | | | | | |
| % Needed Calories per Capita 1970 | | | | | | | | | |
| Birth Rate 1965-70 | .01 | .04 | | | | | | .02 | |
| Life Expectancy at Birth 1960 | .05 | | .001 | | | .00001 | | | .0002 |
| Children Working per 000 1960 | | | | | | | | | |
| Primary School Pupil-Teacher Ratio 1970 | | | | | | | | .03 | |
| Radios per 000 1960 | | | | | | | | .04 | |

the 1970 pupil/teacher ratio, and the availability of radios in 1960.

When we turn to the acuteness of the problem of national development in poor countries, Africa, Asia, and Latin America, we can come a little closer to unique clusters.

*Poor Countries*. For poor countries the education of girls in primary school is important, as Tables 8.1 and 8.2 show. Bearing in mind that our analyses specify this variable more than a decade before our criteria we speculate that literate women can contribute more of a direct economic nature than pre-literate women. However, we note from our prospective longitudinal studies (Jordan, 1980) that better-educated women are more likely to have a child-developing orientation. That is, they inculcate greater verbal facility in their children and make them more receptive to schooling. Accordingly, we see education of women as a step which has merit on its own, but it also has merit as insurance for investments in schooling the next generation. Selowsky (1981) has pointed out that education in Latin America is a powerful way to increase family incomes and standards of nutrition and living. The same phenomenon has been reported from East Africa (World Development Report 1980, p. 44). Our next strategic item is the birth rate. This self-evident element is drawn from our 1960-1980 data set. Today, birth rates are falling in many parts of the world. However, stationary size of population for most of the poor countries of the world are projected to occur around the year 2150, at the present rate. For industrialized countries it is as close as 2005. Health care in the form of the ratio of people to physicians is no less important than in the years of our data set. In this instance, the health of children is the focus, and we refer the reader to our citation of Dr. K. Zaki Hasan's writing in Chapter Three.

Finally, the problem of child labor needs to be considered. In 1979 the International Labor Organization addressed this question in the form of a resolution at its sixty fifth session in Geneva. Abuses and exploitations, such as night work, still exist and the ILO observed that fifty of fifty two million children working although under fifteen years were in Third World countries. This problem, like the others, is susceptible

to education of parents. Our survey data in Chapter Seven show that techniques of parent education are needed in poor countries. Parent education is a technique with excellent long-term results to place girls in school and to keep them there. We can also educate them to value education for children.

*Africa.* In the case of African states the list of variables influencing national development is similar to the narrative patterns of the world-wide group of countries, but briefer. For the criteria as a whole five childhood variables are salient in the African data, as opposed to fourteen in the normative data. This brief set excludes none in the world-wide analysis. The variables not present are mostly from the Environmental sub-set, as Tables 8.1 and 8.2 show.

More particularly, the pattern of childhood Demographic antecedents for social criteria in Africa uses the 1960 primary schooling of girls and 1965-70 birth rate. The Health model uses the 1955-60 birth rate but ignores hospitals and physicians. The Environmental factors are represented by 1960 life expectancy but not 1960 child labor. For the two fiscal criteria in African nations there is greater uniqueness; three rather than seven child variables are influential, and 1965-70 birth rate is salient.

In summary, the role of childhood in African national attainment, comparatively speaking, is that it is quite influential and in a comparatively parsimonious way. Fewer specific variables predict as well as the longer set in the world-wide data. This suggests quite focal approaches with corresponding economies would have been effective in the sixties and seventies, the era from which our childhood antecedents come.

*Asia.* In our Asian countries a small set of six childhood variables, rather than the fourteen in the normative world context, predicts national attainments quite well. The mechanisms employ four of the criteria to understand social development in the form of the PQLI (1979). For the two fiscal criteria only two variables are used in contrast to seven in the normative analyses. Brevity with strong effects describes the situation within the Asian data, and this may be described as a situation of

parsimony with intensity. From a policy view, one might be able to project strategies for future development in Asia based on a few parameters of childhood.

*Latin America.* In commenting on the analysis of Latin America we observe that the variables which are important fall within the list of those identified in the world-wide normative set. A role for the number of children under age fourteen years in 1960 is anomalous, however. The brief list of salient antecedents to the three criteria exercise their influence within models which are slightly better predictors of Latin America criteria than of world criteria.

Considering our four national groupings of special interest, poor, African, Asian, and Latin America countries, we see some similarities. The three continetal groupings identify only about one half of the variables found in the world-wide and poor countries' data sets. The six to seven salient variables for each continent are a sub-set of the salient variables in the world-wide analyses, and they tend to be the same from continent to continent. Of twenty salient variables from the three continents seven are from the Demographic group; they show consistency for the PQLI social criterion, but are not relevant to the fiscal criteria. Within the Health variables there is a little consistency for life expectancy and birth rate; the latter, as we have pointed out, occurs in some form in all three models. The similarities between continents are mostly due to Demographic variables, followed by Environmental, and then Health variables. We close these observations by recalling that the salient findings for the three continental groupings are affected by the overall sub-sets of variables within which their influence is evinced and by the size of the samples, generally but not always adequate for regression analyses. Were other sets of variables used or, hypothetically one variable changed in any of the three subsets or models of antecedent variables, the apparent salience of important childhood variables might well change.

*Survey of Needs of Childhood.* Our comments on the survey begin with the plausibility of the approach which, as far as we can tell has not been

tried before. The survey gives a picture of what countries around the world, through the eyes of representative experts, see as the next tasks to be addressed in order to improve the lot of children. Our survey did not elicit responses from some countries and could be broadened by some prominent international agency undertaking a survey. In a more positive sense, the survey provides 1981-82 baseline data, and would be a way to begin systematic reviews of the needs of childhood at intervals of several years. The survey instrument would be lengthened, and it could be modified for use within countries by raising questions within political sub-divisions and administrative units. For example, we made no attempt to differentiate urban and rural zones, or to specify childhood by age.

We note that the degree of need among countries was analyzable by multiple linear regression. The three domain model of information which is Demographic, Health, and Environmental was statistically significant, and two or three specific antecedent variables were identified. For planning this suggests that extant information on countries of the world can be used to screen countries. It should be possible to set up a profile leading to preliminary identification of countries by degree of urgency; procedurally, the important element would be of course to use objective data in order to identify countries with the highest potential need. Statistically, one could imagine discriminant analyses of extant data as a major tool in policy planning for groups of nations. We point out, that selection of domains of data, and specific variables, is not a simple matter. However, the important element is that we have demonstrated that data exist, they can be aggregated, and they can be analyzed with profit for the children of the world.

In this regard, our final comments are on the manageability of childhood as a problem around the world. The topic is approachable on a quantitative basis, and our methodology shows that much could be done to put formation of policy on an empirical basis, as opposed to wholly subjective appraisals. Action requires commitment, which is ideology. Action which is productive requires strategy, which is evidential and data-based.

## PLANNING

One of the hazards of research emphasizing data is that the findings may be specific to a decade which has passed. In the case of this report, the criteria are quite recent and do not lack relevance. The predictors come from the decade of the sixties, a necessary degree of separation in our design in order to identify the fifteen childhood traits as temporal antecedents to criteria from recent years. In generalizing from this study we need to see the validity of the temporal, anterospective design and the temporal relevance of the criteria. However, in the case of the predictors we need to be quite careful. A 1960 predictor, however powerful in our multivariate analyses, may not be relevant to a future decade. That is, there may well be substantial differences in birth rates, in levels of schooling; radios may be less sensitive social indicators due to virtual throw-away prices, and television sets may represent both the fiscal level and mode of acculturation of a people, currently and in the future.

The findings of this study tell us how nations achieved their recent social and fiscal levels in terms of childhood's traits. However, one would also like to project into the future, and to plan ways to strengthen childhood for its own sake, but also as a way to advance the development of the poorer nations. In that case it will be necessary to appraise current or projected characteristics of a nation's population for a proposed period of years. With those data multivariate analyses can be run in order to identify child variables of strategic interest. One might, for example, take extrapolations of predictor variables of interest for a date five years from now and then formulate extrapolated criterion variables of national development for periods five, ten or twenty years beyond the predictor dates. By that process one could provide by statistical means a picture of salient child variables to be the objects of planned change as a means to pursuit of national goals.

In this regard, we note the relevance of Chapter Seven's 1981-82 survey data. Those materials are contemporary to the development of this report. They show that experts in-country can provide authoritative,

informed information. Of course, someone must ask them, but the step is worthwhile. More broadly put, it is possible to see in our study a general methodology of data gathering, strategic planning, and follow through, which can be applied in many parts of the world. Not every agency of national planning, however, need start to plan in isolation, nor need it buy expensive computers. The essential element is that people see childhood as a condition whose improvement is possible, and which is justifiable on empirical as well as sentimental grounds. The decision to take childhood seriously is the first step. The next steps are procedural. In theory, the steps may be quite similar procedures although in quite different environments. In that case, the steps might be standardized and might be conducted in several countries simultaneously. That possibility would led to interesting comparative studies as nations chose slightly different aapects of childhood to emphasize as a mode of national advancement. The major hazard would be sufficient similarity of criteria and procedures to permit cross-national comparisons. In practice, this would amount to a light overlay of standardized definitions, and procedures to impose a quasi-experimental design on the data.

In this regard, skill at beginning such a multi-national program might take the form of a partnership between nations with the experience and resources and nations wishing to identify and emphasize strategic aspects of childhood.

## TRANSFER OF KNOWLEDGE

We live in a world of interdependence, in which the lives of all are critically affected by forces in operation half-way around the world. In that context the welfare of the developed and developing peoples is identical. Poor countries may control resources, strategic as well as mineral, vital to the economic health of all. This balance carries with it implications for those who control resources but who lack the means to use them fully, as well as for those who seem less affected. Poor countries need technical assistance to advance their growth, and rich countries need to see that process as in their own interests; literate, educated countries are likely to be more stable, rational and predictable

than those lacking those attributes. With regard to transfer of technology the preceding remarks are trite; however, we have shown in the earlier chapters of this work that those conditions of childhood range from excellent to poor, and that those conditions are an element, like technology, in pursuit of national strategies of social and economic growth. For decades there has been a flow of technical assistance in agriculture, industry, and science from the developed to the developing countries. The findings of this volume suggest a parallel process should flow at the same rate into developing countries, and addressing the strategies which are child-developing.

Chapter Seven's survey shows that information has flowed from the developed to the developing world. UNICEF, for example, is credited with providing much assistance. Our analyses lend urgency to this pattern, and suggest that the pace should be stepped up. However, we see an additional mechanism, one less dependent on large amounts of money. What is needed, our data suggest, is a process or mechanism to focus resources at strategic points; we should apply the best current thinking and research to the problems of childhood in the Third and Fourth Worlds. We envisage a process of analyzing research findings in order to synthesize policy statements appropriate to given circumstances. We see provision of careful thought and reflection to guide investments of international and local resources as a highly economical step. As a part of that process local, national, pursuit of questions already answered in other parts of the world would lead to savings. It should not, for example, be necessary for every undeveloped country to launch massive, slow, expensive longitudinal studies, a point we have made elsewhere (Jordan, 1982). Existing data could be used from other countries by making appropriate adjustments in norms. That act of adjustment is an example of policy-level contribution which would be highly cost-effective.

We need an agency in the world to broker the exchange of data from the developed to the developing world. The brokerage also suggests drawing on experts in developing countries to help people in other countries. As an example, experts on educating blind children in the devel-

oped world deal with a relatively small problem; Third World experts have a grasp, we surmise, of unique aspects of blindness in children not within the experience of experts in developed countries or temperate climates.

An agency to conduct programs of brokerage in the welfare of children would have much to offer. It would complement those now providing training on specialized topics such as medicine by going into parent education, socialization, and education. The relative cost, as a proportion of programs in operation, would be small. The gain would flow from the sense that programs in operation were based on more complete reflection and planning; the latter obviously exist and are conducted by dedicated cadres. Expansion of the policy component and an increase in transfer of knowledge between nations are the essential components.

World-wide communication via satellite transmission would make programs of in-service training possible. When combined with the technology of video tape and disc the potentials for a flow of information around the world, in a highly economical way, are remarkable. Via modern technology the advanced and developing worlds can become members of the same community. The children of that community can be the beneficiaries of up-to-date information, and of in-service education for local specialists all around the globe.

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