Improving Competence across the Lifespan

Building Interventions Based on Theory and Research

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POLITICAL AND SCIENTIFIC MODELS OF DEVELOPMENT*

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Scientific efforts to understand child development frequently lead to different views of how these processes are organized (Sameroff, 1983). Although we believe that the results of such research could affect the lives of children, it may be that there are other paradigms that have much more salience and importance that we have tended to ignore in the past. These are the political models of development. If one needs a reminder of why these are so important, the recent political rhetoric in the United States attached to welfare reform legislation is an excellent case in point. Child advocates argued that the lives of millions of children would be jeopardized or enhanced depending on whether one supported the Democratic or Republican version of this legislation.

Scientific considerations may be relevant to understanding laboratory phenomena such as how infants find hidden objects or children learn concepts, but if one were concerned with serious child development issues, like do children grow up at all, political issues may be far more salient. There is a gap, or what may be better described as a paradigm clash between the social scientists who live in a country and the politicians who attempt to govern it. Understanding differences in paradigms or models of development is important for understanding what is happening to children today, but the relevant models are not scientific paradigms. They are political models.

A simplification for politics in the United States is to portray members of the Democratic party as seeing development being determined by social opportunities, where members of the Republican Party see it as determined by personal traits. If opportunities for good education, health, jobs and prosocial friends were available to all, then Democrats believe our social ills would disappear. In contrast, the Republican view is that those who have grit, resourcefulness, intelligence, and motivation will make it on their own and those who don’t, won’t. For Democrats, government has a major role at a minimum to equalize the playing field and at a maximum to tilt it in favor of those with the fewest personal resources to take advantage of what opportunities do exist. For Republicans, govern-

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MENT'S ROLE SHOULD BE MINIMIZED TO LET EACH INDIVIDUAL ACHIEVE ACCORDING TO THEIR INNATE ABILITIES. THE ISSUE FOR SCIENTISTS IS TO TRANSLATE THESE POLITICAL MODELS INTO ANSWERABLE EMPIRICAL QUESTIONS. DOES RESEARCH ON CHILD DEVELOPMENT ADDRESS SUCH ISSUES? A SIMPLIFIED TRANSLATION OF POLITICAL DIFFERENCES CORRESPONDS FAIRLY WELL WITH THE SIMPLIFIED SCIENTIFIC DEBATE OVER THE NATURE–NURTURE QUESTION.

IN ORDER TO DO AN ADEQUATE ASSESSMENT OF THE RELATION BETWEEN CHARACTERISTICS OF THE INDIVIDUAL AND CHARACTERISTICS OF THE ENVIRONMENT MEASURES OF BOTH MUST BE INCORPORATED IN DEVELOPMENTAL STUDIES. WE HAVE BEEN ENGAGED IN A NUMBER OF SUCH STUDIES THAT MAY SHED SOME LIGHT ON THE MODEL ISSUE. ALTHOUGH EACH IS FLAWED IN SOME WAY, TOGETHER THEY OFFER A PERSPECTIVE ON ISSUES AT HAND IN TERMS OF WHERE WE STAND NOW AND WHERE WE NEED TO GO IN THE FUTURE.

DEMOCRATIC MODEL OF DEVELOPMENT

TO EXAMINE THE DEMOCRATIC MODEL WE NEED TO ADDRESS THE ISSUE OF HOW AN INDIVIDUAL’S OPPORTUNITY STRUCTURE AFFECTS HIS OR HER DEVELOPMENTAL OUTCOMES. DESPITE THE NOMINAL INTEREST OF DEVELOPMENTALISTS IN THE EFFECTS OF THE ENVIRONMENT, THE ANALYSIS AND ASSESSMENT OF CONTEXT HAS USUALLY BEEN OVERSIMPIFIED EITHER THROUGH THE SOLE USE OF PROXIMAL INDICATORS OF MOTHER–CHILD INTERACTION AT ONE EXTREME OR DISTAL INDICATORS OF SOCIOECONOMIC STATUS AT THE OTHER. MULTIDISCIPLINARY INTERACTIONS WITH SOCIOLOGISTS AND ECONOMISTS HAVE GRADUALLY EXPANDED THE RANGE OF ENVIRONMENTAL INDICATORS AVAILABLE AND, INCREASINGLY, THESE HAVE BEEN INCORPORATED INTO DEVELOPMENTAL RESEARCH.

THE DEVELOPMENT OF OUR RESEARCH IN THIS AREA BEGAN WITH SUCH OVERSIMPLIFICATIONS AND MAY BE ARRIVING AT MORE APPROPRIATE DEGREES OF COMPLEXITY. OUR INVESTIGATIONS OF ENVIRONMENTAL INFLUENCES BEGAN WITH OUR COLLABORATORS IN THE ROCHESTER LONGITUDINAL STUDY. AT ROCHESTER, OUR PRIMARY INDEX OF THE ENVIRONMENT WAS SOCIOECONOMIC STATUS (SES) AS MEASURED BY THE HOLLINGSHEAD SCALE. WE EXAMINED THE EFFECTS OF THE ENVIRONMENT ON CHILD DEVELOPMENT IN A LONGITUDINAL INVESTIGATION OF A GROUP OF CHILDREN FROM THE PRENATAL PERIOD THROUGH ADOLESCENCE LIVING IN A SocialLY HETEROGENEOUS SET OF FAMILY CIRCUMSTANCES. THE ORIGINAL PLAN OF THE STUDY WAS FOCUSED ON THE IDEA THAT HAVING A PARENT WITH A PSYCHIATRIC DIAGNOSIS OF SCHIZOPHRENIA WAS A MAJOR RISK FACTOR FOR CHILD DEVELOPMENT, PRIMARILY THROUGH MECHANISMS OF BIOLOGICAL INTERGENERATIONAL TRANSMISSION. AS THE STUDY PROGRESSED WE HAD TO MODIFY THIS BELIEF AS WE PAID INCREASING ATTENTION TO CONTEXTUAL FACTORS.

DURING THE ROCHESTER LONGITUDINAL STUDY (SAMEROFF, SEIFER, & ZAX, 1982) WE ASSESSED CHILDREN AND THEIR FAMILIES DURING THE FIRST YEAR, AND THEN WHEN THE CHILDREN WERE 2½, 4, 13, AND 18 YEARS OF AGE. AT EACH TIME POINT WE EVALUATED TWO GENERAL INDICATORS OF DEVELOPMENTAL STATUS — THE CHILD’S COGNITIVE AND SOCIAL–EMOTIONAL COMPETENCE.

WHEN WE EXAMINED OUR DATA WE FOUND MUCH SUPPORT FOR AN ENVIRONMENTAL HYPOTHESIS THAT DIFFERENCES IN FAMILY SOCIAL STATUS WOULD PRODUCE DIFFERENCES IN CHILD BEHAVIOR. CHILDREN FROM THE POOREST FAMILIES IN OUR SAMPLE EXHIBITED THE POOREST DEVELOPMENT STARTING IN THE SECOND YEAR OF LIFE WHEN ADVANCES IN COMMUNICATION ABILITIES PERMITTED THEM TO BE MORE INFLUENCED BY DIFFERENCES IN COGNITIVE STIMULATION FROM THEIR SOCIAL SURROUND (SAMEROFF & SEIFER, 1983).

BUT AS HAS BEEN OFTEN NOTED, SOCIAL STATUS PER SE DOES NOT HAVE A DIRECT EFFECT ON DEVELOPMENT. IT MUST BE MEDIATED THROUGH MORE PROXIMAL MECHANISMS IF IT IS TO AFFECT THE CHILD. TO BETTER UNDERSTAND THE ROLE OF SES, MORE DIFFERENTIATED VIEWS OF ENVIRONMENTAL INFLUENCES NEEDED TO BE TAKEN. WE HAD TO DISCOVER WHAT WAS DIFFERENT ABOUT THE EXPERIENCE OF CHILDREN RAISED IN DIFFERENT ECONOMIC ENVIRONMENTS.

ENVIRONMENTAL CONDITIONS AS DEVELOPMENTAL RISKS

ALTHOUGH SES IS ONE OF THE BEST SINGLE VARIABLES FOR PREDICTING CHILDREN’S COGNITIVE COMPETENCE, AND AN IMPORTANT, IF LESS POWERFUL PREDICTOR OF SOCIAL–EMOTIONAL FUNCTIONING, IT OPERATES AT MANY LEVELS OF THE ECOSYSTEM OF CHILDREN. IT IMPACTS ON PARENTING, PARENTAL ATTITUDES AND BELIEFS, THEIR FAMILY INTERACTIONS, AND MANY INSTITUTIONS IN THE SURROUNDING COMMUNITY. FROM THE DATA AVAILABLE IN THE ROCHESTER STUDY WE SEARCHED FOR A SET OF VARIABLES THAT WERE RELATED TO ECONOMIC CIRCUMSTANCE BUT NOT THE SAME AS SES.

FROM THE 4, 13, AND 18-YEAR ASSESSMENTS OF THE CHILDREN IN THE ROCHESTER STUDY WE CHOSE A SET OF 10 ENVIRONMENTAL VARIABLES (SAMEROFF, SEIFER, BAROCAS, ZAX, & GREENSPAN, 1987). THESE DEFINITIONS WERE: (A) A HISTORY OF MATERNAL MENTAL ILLNESS; (B) HIGH MENTAL ANXIETY; (C) PARENTAL PERSPECTIVES THAT REFLECTED RIGIDITY IN THE ATTITUDES, BELIEFS, AND VALUES THAT MOTHERS HAD REGARD TO THEIR CHILD’S DEVELOPMENT; (D) HIGH POSITIVE MATERNAL INTERACTIONS WITH THE CHILD OBSERVED DURING INFANCY; (E) MINIMAL MATERNAL EDUCATION; (F) HEAD OF HOUSEHOLD IN UNSKILLED OCCUPATIONS; (G) DISADVANTAGED MINORITY STATUS; (H) SINGLE PARENT-HOOD; (I) STRESSFUL LIFE EVENTS; AND (J) LARGE FAMILY SIZE.

WHEN WE COMPARED THE HIGH-RISK AND LOW-RISK GROUP FOR EACH VARIABLE SEPARATELY, WE FOUND, INDEED, THAT EACH OF THESE VARIABLES WAS A RISK FACTOR. FOR BOTH THE COGNITIVE AND MENTAL HEALTH OUTCOMES, THE LOW-RISK GROUP HAD BETTER SCORES THAN THE HIGH-RISK GROUP. MOST OF THE DIFFERENCES WERE MODERATE EFFECT SIZE, ENOUGH TO DEMONSTRATE THE EFFECTS FOR GROUP COMPARISONS BUT CERTAINLY NOT ENOUGH TO SPECIFY WHICH INDIVIDUALS WITH THE RISK FACTOR WOULD HAVE AN ADVERSE OUTCOME.

ACCUMULATING RISK FACTORS

IN THE ROCHESTER STUDY IT WAS THE RARE CHILD WITH ONLY ONE RISK FACTOR THAT ENDED UP WITH A MAJOR DEVELOPMENTAL PROBLEM. BUT WHAT WOULD BE THE RESULT IF A COMPARISON WAS MADE BETWEEN CHILDREN GROWING IN ENVIRONMENTS WITH MANY RISK FACTORS COMPARED TO CHILDREN WITH VERY FEW? WE NOTED THAT PARMELEE (PARMELEE & HABER, 1973) AND RUTTER (1979) HAD ARGUED FROM AN EPIDEMIOLOGICAL PERSPECTIVE THAT IT WAS NOT ANY PARTICULAR RISK FACTOR BUT THE ACCUMULATED NUMBER OF RISK FACTORS IN A CHILD’S BACKGROUND THAT LED TO DEVELOPMENTAL PROBLEMS. CONSEQUENTLY, WE CREATED A MULTIPLE RISK SCORE THAT WAS THE TOTAL NUMBER OF RISKS FOR EACH INDIVIDUAL FAMILY.

WHEN THESE MULTIPLE RISK SCORES WERE RELATED TO THE CHILD’S INTELLIGENCE AND MENTAL HEALTH, MAJOR DIFFERENCES WERE FOUND BETWEEN THOSE CHILDREN WITH FEW RISKS AND THOSE WITH MANY. ON AN INTELLIGENCE TEST, CHILDREN WITH NO ENVIRONMENTAL RISKS SCORED MORE THAN 30 POINTS HIGHER THAN CHILDREN WITH SEVEN TO NINE RISK FACTORS, A DIFFERENCE OF 2 STANDARD DEVIATIONS. EVEN WHEN WE CORRECTED FOR THE CONTRIBUTION OF MOTHER’S IQ SCORES, THERE WAS STILL MORE THAN A STANDARD DEVIATION DIFFERENCE. ON AVERAGE, EACH RISK FACTOR REDUCED THE CHILD’S 4-YEAR IQ SCORE BY FOUR POINTS.

A SIMILAR BUT LESS POWERFUL EFFECT WAS FOUND WHEN HIGH AND LOW RISK CHILDREN WERE COMPARED ON THEIR 4-YEAR SOCIAL–EMOTIONAL OUTCOMES. WHERE OUR MULTIPLE RISK VARIABLES HAD EXPLAINED 50% OF THE VARIANCE IN THE INTELLECTUAL OUTCOME, ONLY 25% OF THE VARIANCE IN THE SOCIAL COMPETENCE OUTCOME WAS EXPLAINED. YET, IT IS CLEAR THAT THE EFFECT OF COMBINING THE 10 RISK VARIABLES INTO A SINGLE MEASURE WAS TO STRONGLY ACCENTUATE THE DIFFERENCES NOTED WHEN THE RISKS WERE EVALUATED SEPARATELY. AS THE NUMBER OF RISK FACTORS INCREASED, PERFORMANCE DECREASED FOR CHILDREN AT 4 YEARS OF AGE (SAMEROFF, SEIFER, ZAX, & BAROCAS, 1987).
CONTINUITY OF ENVIRONMENTAL RISK

Because of the potent effects of our multiple risk index at 4 years, we calculated new multiple environmental risk scores for each family based on their situation 9 and 14 years later. To our surprise there were very few families that showed major shifts in the number of risk factors across the 14-year intervening period. Between the pre-school period and adolescence, the factor that showed the most improvement was maternal education, where the number of mothers without a high school diploma or equivalent decreased from 33 to 22% of the sample. The risk factor that increased the most was single parenthood with the number of children being raised by their mothers alone increasing from 24 to 41%. In the main, however, there was little change in the environments of the children in our sample.

The effects of multiple risk were not restricted to the 4-year behavior of the Rochester children. When they were 13 years old and again when they were 18 we recalculated their multiple risk scores and examined their relation to contemporary IQ and mental health measures. Again we found strong linear relations where the more environmental risk factors, the worse the outcomes (Sameroff, Seifer, Baldwin, & Baldwin, 1993).

SECULAR TRENDS

The thrust of a contextual analysis of developmental regulation is not that individual factors in the child are non-existent or irrelevant, but that they must be studied in a context larger than the single child. The risk analyses discussed so far have implicated parental characteristics and the immediate social conditions of family support and life event stress as important moderators of healthy psychological growth in the child. To this list of risks must be added changes in the historical supports for families in a given society. The importance of this added level of complexity was emphasized when we examined secular trends in the economic well-being of families in the United States.

At 4-years we had divided the Rochester sample into low, medium, and high risk groups. We found that 22% of the high-risk group with four or more risks had IQs below 85 whereas none of the low-risk sample did. Conversely, only 4% of the high-risk sample had IQs above 115, but 59% of the low-risk group did.

After the 13-year assessment we made the same breakdown into high, medium and low-risk groups and examined the distribution of IQs within risk groups. Again we found a preponderance of low IQ scores in the high risk group and a preponderance of high IQ scores in the low risk group indicating the continuing negative effects of an unfavorable environment. But strikingly, the number of children in the high-risk group with IQs below 85 had increased from 22% to 46%, more than doubling.

If our analysis was restricted to the level of the child and family, we would hypothesize that high-risk environments operate synergistically to further worsen the intellectual standing of these children during the period from pre-school to adolescence, placing them in a downward spiral of increasing incompetence. An alternative hypothesis is that society itself was changing during the nine years between the Rochester study 4- and 13-year assessments.

In a government report (Passel, 1989) it was found that between the years 1973 to 1987, the period we were doing this study, the average household income of the poorest fifth of Americans fell 12% while the income of the richest fifth increased 24%. As the income disparity between rich and poor increased in society at large, so did the disparity between the number of children with high and low intelligence scores in our research study.

THE PHILADELPHIA STUDY

The success of the Rochester study was that we were able to gain a greater understanding of the many ways in which environments affected children. In Rochester the Democratic model of development was strongly supported. However, there was a problem of the study that limited its generalizability. The sample had a large overrepresentation of families where a parent had a psychiatric diagnosis. Would we find the same effects of multiple risks in a sample more representative of the general community? Would the Democratic model hold up in another major city?

Another opportunity to examine the effects of multiple environmental risks on child development was provided by data emerging from a study of adolescents in a large sample of Philadelphia families (Furstenberg, Cook, Eccles, Elder & Sameroff, in press). We interviewed mothers, fathers, and children in close to 500 families where there was a youth between the ages of 11 and 14. The sample varied widely in socioeconomic status and racial composition. There were 64% African-Americans, 30% non-Hispanic whites, and 6% other groups, primarily Puerto Rican families.

Other studies of multiple risk factors, like the Rochester Longitudinal Study, were important in demonstrating the power of such analyses but did not use explicitly an ecological model to identify domains of risk. Typically, there was a selection process in which the risks were chosen from the available measures already in the data set of the study. In the Philadelphia project we took a more conceptual approach in designing the project so that we had environmental measures at a series of ecological levels.

For our analyses of environmental risk we examined variables within systems that affected the adolescent, from those microsystems (Bronfenbrenner, 1979) in which the child was an active participant to those systems more distal to the child where any effect had to be mediated by more proximal variables. We made a distinction between the characteristics of systems that were theoretically independent of the child and those in which the child was an active participant. For example, the family system was subdivided into management processes where it is difficult to determine if the behavior is influenced more by the parent or the child, such as behavioral control, and structural variables, such as marital status and household density, that were relatively independent of the child (see Table 1).

The risk factors were placed in six groups reflecting different ecological relations to the adolescent (Sameroff et al., in preparation). We selected 20 variables to serve as risk factors, twice as many as in the Rochester study. Our intention was to be able to have multiple factors in each of our six ecological levels. Family Process was the first grouping and included variables in the family microsystem that were directly experienced by the child. These included support for autonomy, behavior control, parental involvement, and family climate. The second grouping was Parent Characteristics which included the mother's mental health, sense of efficacy, resourcefulness, and level of education. This group included variables that influenced the child but, generally speaking were less influenced by the child. The third grouping was Family Structure that included the parents' marital status, and socioeconomic indicators of household crowding and receiving welfare payments. The fourth grouping was Family Management of the Community and was comprised of variables that characterized the family's management of its relation to the larger community as reflected in variables of institutional involvement, informal networks, social resources, and adjustments to economic pressure. The fifth grouping, Peers, included indicators of another microsystem of the child, the extent to which the youth was associ-
Table 1. Risk variables in Philadelphia study

<table>
<thead>
<tr>
<th>Domain</th>
<th>Variable</th>
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<tr>
<td>Family process</td>
<td>Support for autonomy</td>
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<td>Discipline effectiveness</td>
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<td>Parent characteristics</td>
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<td>Resourcefulness</td>
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<td>Mental health</td>
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<tr>
<td>Family structure</td>
<td>Marital status</td>
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<tr>
<td></td>
<td>Household crowding</td>
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<td></td>
<td>Welfare receipt</td>
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<tr>
<td>Management of community</td>
<td>Institutional involvement</td>
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<td>Informal networks</td>
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<td>Social resources</td>
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<td>Ecoomic adjustment</td>
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<td>Peers</td>
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<td>Antisocial</td>
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<td>Community</td>
<td>Neighborhood SES</td>
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<td></td>
<td>Neighborhood problems</td>
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<td>School climate</td>
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that environmental risk. For those variables that met the criteria, we chose a cutoff score to optimize the difference between the outcomes for adolescents with the risk factor and those without. In general, the cutoff separated about 25% of the sample as a high-risk group from the remaining 75% defined as low risk.

The first important conclusion was that, indeed, we were successful in identifying risk factors. We found that there were risks at every ecological level associated with child outcomes. It was not only the parent or the family that had an influence on child competence, but also the peer group, neighborhood and community together with their interactions with the family. Some of the variables were risks for each of our five outcomes. These included lack of support for autonomy, a negative family climate, and few prosocial peers. At the other extreme were variables that affected only a few outcomes such as having parents who lacked education and resourcefulness, single marital status and much economic adjustment, a lack of informal networks, and low census tract socioeconomic status.

Many risk factors have been identified in previous research that used only a single adolescent outcome such as delinquency (Stouthamer-Loebber, Loebber, Farrington, Zhang, van Kammen, & Maguen, 1993). To examine the generalizability of risk factors requires that there be multiple outcomes in the study. In the Philadelphia study we found that the pattern of relations between ecological variables chosen as our risk factors and adolescent behavior was different for each outcome. On the one hand, academic performance, psychological adjustment, and problem behavior were related to risks at every ecological level. On the other hand, the correlates of self-competence and activity involvement presented two more limited and contrasting pictures. Activity involvement was strongly related to family management of the community and community characteristics, whereas self-competence was unrelated to either. In contrast, family structure played a significant role in adolescent self-competence but not in their activity involvement.

As in the Rochester study, when the differences between high and low risk groups were examined for each individual risk factor, the effect sizes were small or moderate, rarely exceeding ½ of a standard deviation. But as in Rochester we could ask the question of what would be the consequence on adolescent competence if the youth experienced a number of these risk factors? Moreover, what would be the increase in predictive efficiency if we used a cumulative risk score as our predictor for adolescent success?

Multiple-Risk Scores

Multiple environmental risk scores were calculated for each adolescent. The resulting range was from a minimum of 0 to a maximum of 13 with a mode of 5 out of a possible 20 risk factors. Only one family had no risk factors. For the multiple risk analysis we wanted to have an adequate sample size in each group so we combined the single family with no risk factors with the one-risk factor group and at the other extreme the 65 families with 9 or more risk factors into a single group. When the five normalized adolescent outcome scores were plotted against the number of risk factors a very large decline in outcome was found with increasing risk.

As can be seen in Figure 1 the maximum effect of cumulative risk was on psychological adjustment and academic performance, with a difference of more than one and a half standard deviations between adolescents with only one risk factor compared to those with nine or more. The smallest effects were for the youths' report of self competence and activity involvement where the difference was less than a standard deviation.
Odds-Ratio Analysis

Whether our cumulative risk score meaningfully increases our predictive efficiency can be demonstrated by an odds-ratio analysis. We could compare the odds of having a bad outcome in a high risk versus a low risk environment. For the typical analysis of relative and attributable risk the outcome variable is usually discrete, succumbing to a disease or disorder. For our sample of young adolescents, there were few discrete negative outcomes. They were generally too young to have many pregnancies or arrests and the rate of academic failure was not particularly high. We had to artificially create bad outcomes by making cut scores in our outcome measures. We dichotomized each of the five outcomes by making a cut at the 25th percentile for worse performance. These were the 25% of adolescents who were doing the most poorly in terms of mental health, self-competence, problem behavior, activity involvement, or academic performance. To simplify the report we examined the relation between these bad outcomes and adolescent environmental risk scores subdivided into four multiple risk groups: a low risk group defined as 3 or less, two moderate risk groups of 4–5 and 6–7 risks, and a high risk group with 8 or more (see Figure 2).

The relative risk in the high risk group for each of the bad outcomes was substantially higher than in the low risk group. The strongest effects were for academic performance where the relative risk for a bad outcome increased from 7% in the low risk group to 45% in the high risk group, an odds ratio of 6.7 to 1. The weakest effect was for activity involvement where the relative risk only increased from 12 to 33%, an odds ratio of 2.7 to 1. In some sense this is not unexpected because where everyone would agree that academic failure and poor mental health are bad outcomes, there might be some dispute whether an adolescent’s desire not to participate in the scouts, religious activities, or sports reflects a lack of competence. In any case, for the important cognitive and social–emotional outcomes of youth there seem to be powerful negative effects of the accumulation of environmental risk factors.

Republican Model of Development

At this point it would seem that environmental factors play a major role in the achievement of children in our society, both in academic accomplishment and in the mental health that characterizes good social and emotional functioning. But it’s time to consider the Republican model. Can differences in achievement be better explained by individual characteristics of the child? Is it possible that despite social adversity those children with high levels of personal resources, what is coming to be called psychological capital (Coleman, 1988), are able to overcome minimal resources at home and in the community to reach levels of achievement comparable to children from more highly advantaged social strata.

The psychological constructs that most approximate Republican “true grit” are resourcefulness and efficacy. In the Philadelphia study we were able to measure this construct with a set of questions asked of the parent and child about the youth’s capacity to solve problems, overcome difficulties, and bounce back from setbacks. We divided the sample into high and low efficacy groups and looked at their adolescent outcomes. Indeed, high efficacious youth were more competent than those with low efficacy on our measures of adolescent competence. A sense of personal resourcefulness did seem to pay off.

But what happens to this effect when we take environmental adversity into account? When we matched high and low efficacy children for the number of environmental risk factors, the difference in general competence between youth in the high and low environmental risk conditions was far greater than that between high resourceful and low resourceful groups (see Figure 3). High efficacious adolescents in high risk conditions did
worse than low efficacious youth in low risk conditions. It may not be a surprise to learn that the ineffective offspring of advantaged families may have a much easier ride than resourceful multi-risk children (Sameroff, Bartko, & Eccles, in preparation).

We did the same analysis using academic achievement as an indicator of competence and examined whether their good work at school was related to better mental health, more engagement in positive community activities, and less involvement in delinquent problem behavior. Again for every outcome, high academic achieving adolescents in high risk conditions did worse than youth with low school grades in low risk conditions.

One of the major weaknesses in the Philadelphia study is that it is cross-sectional. Causal modeling is impossible unless one has longitudinal developmental data, and difficult even then. The Rochester study did have a series of developmental assessments which permitted a longitudinal view of the contribution of individual factors to developmental success.

From the Rochester data collected during the first year of life we created a multiple competence score for each child during infancy that included 12 factors. These were neonatal behavioral test scores, easy temperament scores, and developmental quotients. We then divided the sample into low, medium and high competence groups of infants and examined as outcomes their 4-year IQ and social-emotional functioning scores.

We found no relation between infant scores and 4-year IQ, especially when compared to the effects of contemporaneous infant environmental multi-risk scores. Similarly, there was no relation between infant multiple risk scores and the global rating of 4-year social competence.

However, there is a general feeling that infant developmental scales may be weak predictors because they assess different developmental functions than are captured by later cognitive and personality assessments. Perhaps, if we move up the age scale we may find that characteristics of these children at 4 years of age contribute to adolescent achievements at our 18-year assessment.

We did not have a specific measure of resourcefulness at 4 years but we did have our global measures of child social competence and IQ. We divided the 4-year-olds into high and low social competence groups and high and low IQ groups. We then compared these groups on how they did at 18 years on their mental health and measures of school achievement (see Figure 4). More resourceful children did better on average than less resourceful children but as in the Philadelphia data, when we controlled for environmental risk, the differences between children with high and low levels of human capital paled when compared to the differences in performance between children in high and low-risk social environments. In each case, high competent children in high risk environments did worse than low competent children in low risk environments.

Perhaps 4-year competence is still too ephemeral to resist the negative consequences of adverse social circumstance. Would competent children at 13 years succeed where competent children at 4 years had failed? How would they stack up at our 18 year assessments of mental health and school achievement? At 13 years we did have an index of resourcefulness in scores on an internal sense of locus of control. We divided the sample...
of children into a high and low internal locus of control group and a high and low intelligence group and examined their 18-year behavior.

Again, in each case when we controlled for environmental risk we found that the highly competent children in personality or intelligence did far less well than we would expect. Those groups of children with high levels of human capital living in conditions of high environmental risk did worse than similar groups in low-risk conditions, but even more to the point, did worse than low competent children in low-risk environments (see Figure 5).

The Republican model of development may hold on a level playing ground where children are faced with similar levels of environmental advantage or adversity, but this is not yet true in the United States, where environmental inequality is generally pervasive. The negative effects of a disadvantaged environment seem to be more powerful contributors to child achievement at every age than the personality characteristics of the child.

DEMOCRATS VS. REPUBLICANS

The results from the two aforementioned longitudinal studies, where some rough comparisons were made between the effects of environmental circumstance and individual competence on developmental achievements, would seem to support the Democratic model of development over the Republican one. Environments play a critical role in supporting child development and to the extent that we wish to improve the life accomplishments of our children we need to strongly support efforts to improve those environments.

But at the beginning of this chapter a question was raised about the difference between scientific and political models of development. Examining this difference could be considered merely a semantic exercise, if it did not have major implications for finding a workable solution for many of our current social problems.

What would be defined as a difference in scientific models would be a difference in level of complexity, as for example the differences between mechanistic and organismic paradigms (Sameroff, 1983). Where in the mechanistic model, all more complicated systems can be reduced to a single set of underlying components, in the organismic, each part must be considered in relation to an organizing holistic structure. In contrast, differences in political models are usually between two views at the same level of paradigm complexity.

For the most part, politicians from both American parties use the same level of complexity, and unfortunately, it is a simplistic one. Life’s problems have simple solutions. The Republican view is that if we simply unfetter our citizens from government constraint they will be free to achieve wealth, health, and happiness. The Democratic path to the same goal is that all we have to do is to provide more resources to families and they will achieve happiness. The paradigm that both sets of politicians try to avoid is that life is more complicated.

We have presented data to show that an individually oriented view of development is generally powerless by environmental considerations. However, we needed to add a further amplification of the contextalist position. Environments are not simple. If one were looking for an easy way to improve them, one would be at a great loss in the face of the complexity of ecological models.

Some natural scientists, and even some politicians, make fun of social scientists for presenting life as more complicated than they believe is necessary. This is based on the mechanistic notion that life is indeed simple. Perhaps if we examine some simple biological process we will be able to see how easy it is to describe. The regulation of blood pressure would seem to be such a simple function, but unfortunately, 200 subsystems are engaged in this process. The role of each component has been empirically documented. In comparison the small sets of 10 or 20 risk factors we use to examine environmental effects are quite simple. But there are many who wish to make it even simpler.

In the Philadelphia study we did a further set of analyses to illuminate some problems in the Democratic position. We examined the effect of some single risk factors that social activists have been very concerned about, income level and marital status. Although one would think that these factors should have powerful effects on the fate of children, the differences in competence disappeared when we controlled for the number of environmental risk factors in each family. First we split our sample of families into those with high, middle, and low income levels. Then we split the sample into groups of children living in two-parent vs. single-parent families. The outcome lines seem to be completely overlapping when we compare groups of children with the same number of risk factors raised in richer or poorer families or families with one or two parents (see Figures 6 and 7).

What our analyses of the data reveal is that it is not single environmental factors that make a difference but the constellation of risks in each family’s life. The reason that income and marital status seem to make major differences in child development is not because they are overarching variables in themselves, but because they are strongly associated with a combination of other risk factors. Table 2 depicts the percentages of families with different income levels and families with one- or two-parent homes in groups with different numbers of risk factors. One can see in the last row of Table 2 that where 44% of poor children lived
in high-risk families, only 6% of affluent children did. Similarly, where 22% of single parent families lived in high risk social conditions, only 15% of two-parent families did.

What these analyses reveal is that income or marital status taken alone may have statistically significant effects on adolescent behavior, but that these differences are small in comparison with the effects of the accumulation of multiple negative influences that characterize our high risk groups. The overlap in outcomes for youth in high and low income families, and in single and two-parent families is substantial for any and all psychological outcomes. There are many successful adults who were raised in poverty and unsuccessful ones who were raised in affluence. There are many healthy and happy adults who come from broken homes, and there are many unhappy ones who were raised by two parents.

### Table 2. Percent risk by income and marital status*

<table>
<thead>
<tr>
<th>Income level</th>
<th>N</th>
<th>Single parent</th>
<th>Two parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10,000</td>
<td>113</td>
<td>208</td>
<td>250</td>
</tr>
<tr>
<td>$10-30,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;$30,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Percent of Philadelphia study families in different risk groups with household incomes less than $10,000 and $30,000, and greater than $30,000 and in single-parent vs. two-parent homes.

The important implication is that a focus on single characteristics of individuals, like resourcefulness or intelligence, or families, like welfare or marital status, can never explain more than a small proportion of variance in normal behavioral development involving a wide variety of environments. But major differences do emerge when comparisons are made between groups of children reared in conditions with many risk factors and those with only a few. To truly appreciate the determinants of competency requires attention being paid to a broad constellation of ecological factors in which these individuals and families are embedded.

### CONCLUSIONS

What we have described are the results of a research agenda for understanding why all children do not grow up to be healthy, happy, productive citizens. Republicans would argue that children do poorly in conditions of adversity because they do not have individual characteristics that would promote resilience, overcome challenge, and eventuate in productive work and family life. In contrast is the Democratic position that in conditions of poverty opportunities do not exist for positive development even if the child does have excellent coping skills.

What is clear from our research is that there is no emergent simplification on either the environmental or constitutional side that can explain how successful development occurs or how development can be changed. Single factors can be potent in destroying systems — an earthquake can destroy a city, or a gunshot can destroy a child. But single factors cannot create a child or any other living system. At the biological level 100,000
genes are required to transform an egg cell into an adult human body, each gene expressing itself in precise degrees at precise times in precise locations. It may take far more than 100,000 events to produce the complex psychological functioning of the adult human.

What we have demonstrated in our work is that no one of these events alone determines outcomes. Each makes its small contribution to the developing child, positively for the fortunate, negatively for those less lucky. In the data analyses we described, even using sets of 20 risk factors, heavily biased on the environmental side, we rarely explain more than a quarter of outcome variance in large populations. But by using such sets of multiple variables we may do a better job of identifying those youth most in danger because of the large number of risk factors they are experiencing, or helping to create. Perhaps we can maximize the efficiency of intervention efforts when we realize that it is not being poor alone, or living in a bad neighborhood alone, or having a single parent alone that places children at risk, but rather the combination of these factors that saps the lives of families.

While political models of development may dominate the rhetoric devoted to explaining why children succeed or fail, it is equally clear that neither will offer a strategy that will substantially change the lives of children living in contemporary society. Within science, metaphors of complexity are coming to dominate thinking in most current disciplines, with the accompanying need to attend to multiple levels of analysis, multiple value systems, and multiple life styles. Hopefully, within such a framework more adequate solutions to the problems of child development may emerge.

REFERENCES


