

## Reduction of Risk for Hypertension in Urban Adolescents

### Grantee

Medical College of Pennsylvania

### Investigator

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**Project Number** 420610

**NTIS Number** PB-96-183736

**Project Period** 10/01/91-09/30/94

| Costs  | Awarded   | Requested |
|--------|-----------|-----------|
| Year 1 | \$179,648 | \$199,183 |
| Year 2 | \$171,014 | \$208,417 |
| Year 3 | \$173,518 | \$218,127 |
| Year 4 | n/a       | n/a       |
| Year 5 | n/a       | n/a       |
| Year 6 |           |           |

### Year 2000 Objectives

1.1\*, 1.2\*, 1.3\*, 1.5, 1.7\*, 2.1\*, 2.3\*, 2.5\*, 2.7\*,  
2.8, 2.9, 2.19, 3.1\*, 8.10, 15.1\*, 15.4, 15.5, 15.9\*,  
15.10\*, 15.11\*, 16.7\*, 17.12\*, 17.13\*, 17.14, 21.6,  
22.4

### Study Design

Experimental

### Time Design

Longitudinal

### Care Emphasis

Interventional

### Population Focus

Adolescents (not pregnancy related)

### Racial/Ethnic Focus

African Americans, Hispanics-Puerto Ricans

## Summary

### *Statement of the Problem*

Hypertension is a major health problem. Epidemiologic studies have demonstrated racial and geographic differences in incidence rates for essential hypertension (EH). In the United States, blacks have a greater prevalence of EH. This difference is further accentuated by vital statistics data on mortality. Blacks have a threefold greater mortality from hypertensive disease than whites. This disproportionate mortality rises to more than six times greater among blacks ages 35-54. Thus, the consequences of morbidity associated with hypertensive diseases are several times greater in blacks, particularly in young to middle adulthood. Risk factors for future cardiovascular disease, including EH, can be identified in the young.

Emerging evidence indicating the presence of significant risk of cardiovascular disease in the adolescent population demonstrates a need for comprehensive and effective intervention programs. Surveys that focus on the health behaviors of adolescents indicate that nutrient intake does not meet recommended guidelines, fitness levels are compromised, and substance abuse is not unusual. The risk of EH in low-income urban adolescents is increased by environmental stress, fragmented use of available health care, and lack of a network for reinforcing positive health behaviors. In adults and younger populations, behavioral interventions designed to modify cardiovascular risk factors have been applied with some success.

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## ***Research Questions or Hypotheses***

The goal of this project was to modify health-related behaviors that contribute to cardiovascular disease, specifically the cardiovascular disease of essential hypertension. The overall goal was to deliver a comprehensive and effective risk-factor intervention program to a young urban population at high risk for essential hypertension. The project was designed to test the following hypothesis: Behaviors that contribute to the development of essential hypertension can be modified in a high-risk urban adolescent population.

## ***Study Design and Methods***

This project focused on modification of risk factors for essential hypertension. The study design included randomization of high-risk high school students to intervention and nonintervention (control) groups. Behavioral objectives for the intervention group were to (1) attend intervention classes, (2) participate in a fitness program, (3) modify diet, (4) reduce stress, and (5) achieve normal weight. Dependent variables used to assess changes in risk-related behaviors included measures of anthropometrics, blood pressure, dietary content, and physical fitness. Repeat assessments of these variables in control and intervention groups before and after intervention permitted an evaluation of the intervention to achieve a reduction of risk factors and alter health-related behaviors.

The intervention program consisted of health education and behavior modification methodologies provided during two classes held weekly at each of six high schools. Health educators sensitive to the needs of the study population taught the intervention classes. A curriculum was designed by the project staff to meet the needs of the target schools and the project goals. The 10-week intervention class replaced the students'

standard health class.

Instruments used to test the effectiveness of the program were (1) measurement of blood pressure, (2) the Canadian fitness test (step-test), (3) standard 24-hour food intake with computer analysis, (4) the American Heart Association cardiovascular knowledge quiz, and (5) measures of height, weight, fat-folds, and circumference. Intervention students completed a program evaluation.

Basic and descriptive statistics and correlations have been computed for each subject on all variables. Data have been obtained for both intervention and control subjects at baseline and postintervention. A repeated measures three-way (treatment versus control, obese versus thin, schools) analysis of covariance (ANCOVA) was used to test for statistically significant differences between intervention and control groups. The significant changes that occurred in each of the parameters for the intervention group alone were also examined. Using a repeated measures analysis of variance (preintervention versus postintervention, and obese versus thin), the researchers tested for significant changes between time points.

## ***Study Sample and/or Population***

The target population consisted primarily of African-American urban adolescents, the population that carries the greatest risk for developing EH and attendant morbid sequelae. The population for the study was identified through blood pressure screenings performed at six urban public high schools. All 9th and 10th grade students present in the school on the days of the screenings were evaluated for blood pressure, weight/height, and family cardiovascular risk factors. The project's health educators coordinated the screenings with each school through the physical education departments. Medical and nursing students, volunteers certified in blood pressure measurement tech-

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nique, and school nurses assisted the project staff during the screenings. Students found to be at risk during the screening were recalled 1 week after screening to have their blood pressure rechecked. The rechecks were performed by the project's health educators. Students who were at risk following four blood pressure measurements on two separate occasions were invited to join the project.

### ***Findings***

Staff from the target high schools and school district administration were engaged in regular meetings to review project activities and discuss school-specific needs such as space, student schedules, and grading systems. The meetings facilitated open communication between the project staff and the schools, thereby enhancing project activities.

There was a significant increase in the knowledge score for both the thin and obese students who attended the intervention group. Similar improvement was not seen in the control group. There was a small but not statistically significant decrease in body mass index (BMI) for both the intervention and control groups. Although there was no change in the activity score for the control group or the thin intervention group, as measured by the usual activity scale, the obese intervention group did show a significant increase in reported usual exercise. The increase in reported exercise in combination with no change in BMI for the obese intervention group may indicate some change in exercise behavior and the intent to modify usual exercise behavior, but not to a level that would reduce weight. Measures of systolic blood pressure in the intervention and control groups showed no significant change. The diastolic pressure showed a significant reduction in the thin and obese intervention groups.

All subjects provided dietary information by means of the 24-hour food intake. In general, the students rarely consumed vegetables or fruit; they replaced fruit juice with fruit punch and frequently obtained meals from street vendors, neighborhood stores, or fast food restaurants. Analysis of dietary intake revealed little modification in the diet of the thin intervention group. There appears to be a small but not statistically significant decrease in this group's calorie, sodium, cholesterol, and fat intake. Postintervention analysis of the obese intervention group clearly indicates a modification of food intake. There was a statistically significant reduction in total sodium and cholesterol intake. This group reduced the percentage of calories derived from fat. The increase in calories from carbohydrates, with a corresponding decrease in calories derived from sucrose, indicates that fat calories were replaced by complex carbohydrates.

This project also provided an opportunity for project staff to become closely involved with health-related activities within each school. Project staff members participated in school-based health fairs, taught topic-specific classes for 11th and 12th grade health classes, assisted in student health promotion video production, provided continuing education for school nurses, and were available as resource personnel for school staff. One staff member wrote and performed health raps. The raps proved to be a very effective means of communicating health information to the students. The health educators became closely involved in the management of several students identified through screenings as being in immediate health danger from high blood pressure; the health educators made home visits to assist families in obtaining appropriate care for their children. In order for students to receive a grade, they had to attend the intervention class and complete a cardiovascular risk reduction project. In an evaluation of the intervention pro-

gram, the students enthusiastically supported its concept and content.

This project has demonstrated that (1) public high schools will allow cardiovascular risk reduction programs to be provided to their students; (2) students will participate in screening and intervention programs; (3) students at risk for cardiovascular disease can be identified; (4) increase in cardiovascular knowledge can be achieved; (5) some modification in specific health-related behaviors can be accomplished; and (6) use of nontraditional teaching methods such as raps are effective. In general, adolescents do not worry about the impact of current behavior on future health status. Knowledge obtained by students through participation in this project may be utilized as the students become older and more concerned about health-related behaviors.

The health behaviors of high-risk adolescents identified through this project are similar to the behaviors of all students in the target high schools. All students would benefit from participation in this curriculum, which encourages them to evaluate and modify health-related behaviors for themselves and their families. Through exercises in self-efficacy and increased knowledge, students gain the information necessary to make appropriate health-related decisions and take appropriate action.

## Publications

### **Articles, Books, and Chapters**

Falkner B. 1993. Characteristics of prehypertension in black children. In J Fray, J Douglas, eds., *Hypertension in Blacks* (pp. 50–65). New York, NY: Oxford University Press.

Falkner B. 1993. Evaluation of the child and adolescent with hypertension. In JL Izzo, H Black, eds., *Hypertension Prime* (pp. 239–242). Dallas, TX: American Heart Association.

Falkner B. 1993. Hypertension in children and adolescents. *Journal of Clinical and Experimental Hypertension* 15(6):1315–1326.

Falkner B, Michel SH. 1997. Blood pressure response to sodium in children and adolescents. *American Journal of Clinical Nutrition* 65(Suppl.):618S–621S.

Rabinowitz A, Falkner B, Kushner H. 1993. Racial differences in blood pressure among urban adolescents. *Journal of Adolescent Health* 14:314–318.

### **Abstracts**

Falkner B, Michel SH, Kushner H. 1995. Cardiovascular risk reduction in minority adolescents. *Pediatric Research* 37(4, Part 2):5A.

Michel SH, Falkner B. 1993. Health behaviors of adolescents at risk for cardiovascular disease. *Annals of Behavioral Medicine* 15:S95.

Michel SH, Falkner B. 1992. Nutrient intake of African-American adolescents and young adults: Diet patterns related to hypertension risk. Abstract from the Seventh International Interdisciplinary Conference on Hypertension.

Michel SH, Falkner B. 1992. Nutrient intake of African-American adolescents and young adults: Diet risk for cardiovascular disease. *Abstract Booklet*, "Minority Health Issues for an Emerging Majority," National Heart, Lung, and Blood Institute, National Institutes of Health.

Michel SH, Falkner B. 1991. Dietary intake of adolescents at risk for cardiovascular disease. *Abstract Booklet*, "National Conference on Cholesterol and High Blood Pressure Control," National Heart, Lung, and Blood Institute, National Institutes of Health.

Michel SH, Falkner B, Kushner H. 1996. Cardiovascular risk reduction in minority adolescents. *Journal of the American Dietetic Association*.

Michel SH, Falkner B, Kushner H. 1996. Cardiovascular risk reduction in minority adolescents. *Annual Meeting of the American Public Health Association: Abstracts*.

Michel SH, Falkner B, Kushner H. 1996. Nutrient intake of adolescents at risk for hypertension. *Annual Meeting of the American Public Health Association: Abstracts*.

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## **Presentations**

Barr S. 1993. *Building self-esteem*. Presented to the Philadelphia Department of Human Services.

Barr S. 1993. *Building self-esteem*. Presented at the Teen Parent Employment Education Program.

Barr S. 1993. *Drugs, violence and sexually transmitted diseases*. Presented to Healthcare Management Alternatives, Inc.

Barr S. 1993. *Hypertension, nutrition, and drinking and driving*. Public service announcements (rap format), Channel 35.

Barr S. 1993. *Nontraditional health education methods*. Presented at the Bryn Mawr Rehabilitation Center.

Barr S. 1993. *Teaching nutrition through rap*. Greater Media Cable TV, Philadelphia, PA.

Barr S. 1993. *Use rap to address, it gets the facts across the best. Creative teaching methods in health education*. Presented at the Pennsylvania Public Health Association meeting.

Barr S. 1992. *Use rap to address, it gets the facts across the best. Minority health issues for an emerging majority*. Presented at a conference of the National Heart, Lung, and Blood Institute, National Institutes of Health.

Barr S. 1992. *Your future, where are you going? Career opportunities in health care*. Presented at a meeting of the Academy for Fitness, Health Promotion, and Sports Education, Ben Franklin High School.

Falkner B. 1994. *Atherosclerosis begins in youth, the role of childhood hypertension*. Presented at the annual meeting of the American Heart Association.

Falkner B. 1994. *Hypertension in childhood and adolescence*. Presented at the World Health Organization/Intra-American Society of Hypertension (WHO/ISH) Meeting on Mild Hypertension.

Falkner B. 1993. *Should hypertension in children be treated?* Presented at the annual meeting of the Intra-American Society of Hypertension.

Falkner B. 1991. *High blood pressure in children and adolescents*. Presented at the "National Conference on Cholesterol and High Blood Pressure Control," National Heart, Lung, and Blood Institute, National Institutes of Health.

Falkner B. 1991. *Risks for high blood pressure in black children*. Presented at the annual meeting of the American Society of Physiology, Federation of American Societies for Experimental Biology.

Falkner B, Michel SH, Kushner H. 1995. *Cardiovascular risk reduction in minority adolescents*. Presented at the annual meeting of the Society for Pediatric Research.

Michel SH, Barabin DS, Falkner B. 1993. *Use of school sites to identify cardiovascular risk in minority adolescents*. Presented at the annual meeting of the Pennsylvania Public Health Association.

Michel SH, Falkner B. 1993. *Health behaviors of adolescents at risk for cardiovascular disease*. Presented at the Fourteenth Annual Scientific Session, The Society of Behavioral Medicine.

Michel SH, Falkner B. 1992. *Nutrient intake of African-American adolescents and young adults: Diet risk for cardiovascular disease*. Presented at "Minority Health Issues for an Emerging Majority," National Heart, Lung, and Blood Institute, National Institutes of Health.

Michel SH, Falkner B. 1992. *Nutrient intake of African-American adolescents and young adults: Diet patterns related to hypertension risk*. Presented at the Seventh International Interdisciplinary Conference on Hypertension in Blacks.

Michel SH, Falkner B. 1991. *Dietary intake of adolescents at risk for cardiovascular disease*. Presented at the "National Conference on Cholesterol and High Blood Pressure Control," National Heart, Lung, and Blood Institute, National Institutes of Health.

Michel SH, Falkner B, Kushner H. 1996. *Cardiovascular risk reduction in minority adolescents*. Presented at the annual meeting of the American Public Health Association, New York, NY.

Michel SH, Falkner B, Kushner H. 1996. *Nutrient intake of adolescents at risk for hypertension*. Presented at the annual meeting of the American Public Health Association, New York, NY.



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## Single Parents and Early Intervention Programs: Participation and Goodness of Fit

### Grantee

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### Investigator

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**Project Number** 420598

**NTIS Number** PB97-155436

**Project Period** 10/01/90–09/30/94

| Costs  | Awarded           | Requested |
|--------|-------------------|-----------|
| Year 1 | \$176,038         | \$182,044 |
| Year 2 | \$153,216         | \$217,601 |
| Year 3 | \$194,027         | \$227,364 |
| Year 4 | \$172,996         | \$179,592 |
| Year 5 | no cost extension |           |
| Year 6 |                   |           |

### Year 2000 Objectives

6.5, 6.8, 6.9, 6.13, 6.14, 8.3, 8.10, 17.14, 17.20

### Study Design

Observational

### Time Design

Longitudinal

### Care Emphasis

Noninterventional

### Population Focus

Parents, Infants, Toddlers, Preschool children

### Racial/Ethnic Focus

African Americans

## Summary

### *Statement of the Problem*

With this country's expanding number of low-income, single-parent families with young children, empirically based descriptions of the unique needs, resources, characteristics, and functioning of this population become increasingly critical for early childhood service providers. Early intervention programs (EIPs), along with Head Start and other community-based early childhood centers located within major urban settings, serve a disproportionate number of children from low-income, single-parent families, a population with a substantial incidence of high-risk factors. In order to reduce risk and improve general developmental outcomes, many of these publicly funded "interventive" early childhood programs have begun to offer a variety of family support services in addition to traditional child-focused educational services, an idea embraced in P.L. 99-457.

The success of EIPs and other related early childhood programs in reducing risk and improving developmental outcomes for low-income, single-parent families depends on each program's ability to involve or engage parents in available support services. Parent utilization of family support services depends in turn on the program's ability to match services with the unique characteristics, needs, functioning, and resources of low-income, single-parent families. Currently, there are major gaps in available empirical data for programs to use in creating an optimal "goodness of fit" model for low-income, single-parent families. When studies focus on single-parent families, they

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tend to be treated as a one-dimensional family form without regard to the many different possible household and caregiving configurations that exist in low-income communities. It is not known which variations in this population are important to consider when developing policies and programs; inattention to this contextual variable could lead to policies and programs that do not sufficiently reflect the differing needs within this population.

Although no reported studies to date address actual service utilization rates with a specific focus on low-income, single-parent families, several reports suggest that these families are less likely to become involved in parent-related services than two-parent, middle-income families. A related problem is the absence of empirical data to identify those factors that influence the use of family support services by this population. This information is needed in order to address the equally important question of the types or patterns of service utilization that may be related to specific parent or family outcomes. Such knowledge could promote more meaningful parent participation in early childhood programs and prevent the development of chronic patterns of disengagement between families and educators.

### ***Research Questions or Hypotheses***

The overarching purpose of this study was to provide data that will enhance the delivery of family support services for urban low-income, single-parent families with young children. Four major research questions were addressed:

1. What is the structure and functioning of low-income, single-parent families who have children attending an early childhood program that offers family support services?
2. What types of services and relationships do low-

income, single parents want from early childhood programs?

3. For low-income single parents with children in early childhood programs, what is the nature of the parent-professional relationships and the services received?
4. How do parent/family and program characteristics influence the services received by this population?

### ***Study Design and Methods***

This nonexperimental, naturalistic study involved four data collection phases. Within the first 6 months of the child's enrollment in an early childhood program, a structured interview was administered to the primary caregiver, consisting primarily of standardized questionnaires. Information was obtained on child and family demographics, parental expectations of programs, parent support network, sources of stress, individual child and parent functioning, parent-child interaction, family functioning, and parenting knowledge. A 20-minute free play observation of the caregiver and child was also recorded.

The second data collection phase was ongoing, occurring during the period between the first and second interviews with the primary caregiver (between 8 and 12 months). During this phase, a standardized developmental assessment was administered to the child. The study also regularly sampled the nature and scope of parent participation in or use of services. Every 6 to 8 weeks, a one-page questionnaire was completed by as many as four early childhood program staff members who regularly interacted with specific parents. In addition, a 5-minute questionnaire was periodically administered to parents by telephone, to ascertain parent participation in program activities and parent interaction with pro-

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gram staff members.

The third data collection phase included a second structured interview with the primary caregivers. In total, 92 percent of the sample completed this second interview. Child and family demographics were updated and information was again obtained on parent support networks, sources of stress, parent and family functioning, parent-child interaction, and parenting knowledge. The 20-minute free-play observation of the caregiver and focus child was again recorded.

The fourth and final data collection phase consisted in administering two instruments to the program staff and administrators. One instrument, developed by the authors, involved a program environment questionnaire administered at staff meetings; the other involved a semistructured interview with the program directors about their programs.

### ***Study Sample and/or Population***

A sample of 218 low-income single parents was recruited from 21 different early childhood programs; the study sample was primarily African American (87.6 percent). The sample comprised EIP families (67 percent), Head Start families (15 percent), and at-risk program families (18 percent). The primary caregivers ranged in age from 15 to 63, with a median age of 27.5 years. The children ranged in age from 1 to 5, with a median age of 2.4 years.

### ***Findings***

Question 1: Four major findings were related to the first research question. First, the low-income, single-parent families served by the three most common types of publicly funded interventive early childhood programs were found to be more alike than different in family needs, family structures, and family func-

tioning. The top three family needs reported by parents in all of the programs were finances, personal discretionary needs, and employment.

Second, low-income, single-parent families across all types of programs and differing family structures were found to be a highly stressed population. A total of 68 percent of parents scored above the 75th percentile for parenting-related stress and 39 percent reported psychological symptoms of distress at sufficient levels to warrant a referral for treatment.

A third finding was the presence of significant diversity in family structure or household composition among low-income, single-parent families. Only 35.8 percent of single-parent households in our sample contained a solo caregiver. Other common family structures included the three-generational household, the couple-headed household, and the kinship household. Fourth, the family structure of low-income, single-parent families was found to be more descriptive of single-parent resources and sources of stress than the one-dimensional term “single-parent” conveyed.

Question 2: Findings related to the second research question suggested that, although low-income, single parents prefer child-focused services, they also have a strong desire for parenting-related services such as support groups, parent training groups, and family counseling. Parents were also open to mental health-oriented support services. Parents across all three types of programs were virtually unanimous in their expectation that programs should welcome input and involve parents in all decisions about their children’s education or treatment.

Question 3: With respect to the third research question, the findings supported the idea that parent involvement is a multidimensional construct. Two important contextual dimensions providing insight into the nature of parent involvement were (1) the mechanisms by

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which parent-professional contact occurred (such as phone, informal conversation, planned meetings) and (2) the type or focus of the services utilized (i.e., basic or enhanced activities). Although most single parents in this study showed some level of involvement with their children's early childhood programs, service utilization was directly related to the emphasis that programs placed on parent-related services. Parents involved in at-risk programs utilized a significantly higher number of total services and a greater diversity of services than parents in either EIPs or Head Start programs. There was a general decrease in parent-related service utilization over the first year of a child's enrollment. This decrease was most dramatic for parents in at-risk programs and was due primarily to decreased utilization of enhanced or discretionary services.

Question 4: Findings related to the fourth research question strongly suggested that parent involvement was dependent on the needs, stresses, and support systems of the caregivers. The single parents who used parent/family-related services most frequently had numerous family needs and high stress levels but were not involved with a romantic partner and/or were in conflict with their mothers. The only child variable related to service utilization was age. The most critical program variable related to service utilization was the quality of the caregiver's relationship with the child's teacher.

This study has identified significant diversity among low-income, single-parent families and has demonstrated the importance of considering family diversity when designing meaningful services that focus on caregivers and their families. Participation rates are linked to family diversity. In order to ensure accurate identification of the primary caregiver(s), providers of early childhood services will need to review assessment and enrollment procedures. Programs need to guard against assuming that the single parent is par-

enting alone or in a social vacuum or that family structures are permanent. Changes in caregiving arrangements and program participation status are relatively common in this population of families and must be incorporated into program planning.

For all publicly funded interventive early childhood programs serving this population of families, the child's diagnosis or developmental status may be the least relevant factor when designing services for the parents. While the majority of low-income, single parents are functioning well, as a group they are highly stressed, with a sizable subgroup experiencing significant psychological symptoms of distress. A greater focus on the emotional health of children and families in these programs is strongly recommended. The findings suggest that this population of parents would be open to using mental health-oriented services associated with the early childhood programs, particularly if the orientation is one of "promoting" coping and problem-solving strategies, as opposed to more traditional pathological approaches. The parents strongly indicated a desire to be collaborators with service plans that are developed for themselves or their children.

Dialogue and debate are needed among policymakers, service providers, and parents regarding the future role of early childhood programs in fostering family development. Programs participating in this study were clearly ambivalent about their mission as related to goals for family-focused change, and this was reflected in tremendous variability in the ways parent/family-related services were implemented. Further research is recommended to determine the extent to which more effective matching of parent/family-related early childhood services in low-income, single-parent family populations would influence parenting and family outcomes.

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## Publications

### **Articles, Books, and Chapters**

Filer-Hill JL. 1993. *Parent-child interaction among low-income, single-parent families*. Honors thesis, Department of Psychology, Temple University, Philadelphia, PA.

Griffiths DL, Waanders CE. 1994. *PL 99-457: Providing services to low-income caregivers in Philadelphia's early intervention centers*. Master's thesis, Graduate School of Social Work and Social Research, Bryn Mawr College, Bryn Mawr, PA.

### **Abstracts**

None to date.

### **Presentations**

Faude J. 1994. *Family involvement in early childhood programs*. Paper presented at the Annual Conference of the Delaware Valley Association for the Education of Young Children, Philadelphia, PA.

Griffiths DL, Unger DG, Waanders CE. 1995. *Early intervention families with special needs: Implications for program evaluation*. Paper presented at the Society for Community Research and Action Conference, Chicago, IL.

Jones CW, Unger DG. 1996. *Promoting parent involvement in early childhood programs*. Paper presented at the Third National Head Start Research Conference, Washington, DC.

Jones CW, Unger DG, Faude J. 1991. *Cultivating family-professional relationships: The Family Partnerships project*. A paper presented at the Second National Head Start Research Conference, Washington, DC.



## Familial Adaptation to Developmentally Delayed Children

### Grantee

University of Washington

### Investigator

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**Project Number** 530517

**NTIS Number** PB95-208641

**Project Period** 05/01/85-04/30/89

| Costs  | Awarded           | Requested |
|--------|-------------------|-----------|
| Year 1 | \$123,571         | \$123,571 |
| Year 2 | \$140,599         | \$131,857 |
| Year 3 | \$149,409         | \$140,434 |
| Year 4 | no cost extension | \$149,194 |
| Year 5 |                   |           |
| Year 6 |                   |           |

### Year 2000 Objectives

6.5, 6.14

### Study Design

Quasi-experimental

### Time Design

Mixed

### Care Emphasis

Noninterventive

### Population Focus

Toddlers, Preschool children, Parents

### Racial/Ethnic Focus

None

## Summary

### *Statement of the Problem*

The impact of mental retardation within a family has effects that are both reciprocal and circular. Family members are affected by the presence of retardation in a child and the child is affected by the family's response. The interactional and transactional nature of this process is likely to be influenced primarily by the family's adaptation.

Although the importance of familial adaptation has long been a focus of clinical concern, little empirical research has addressed this issue. In general, pathological outcomes have been expected in families of children with retardation because of the stresses associated with the presence of retardation in a child, with such outcomes subsequently related to less adaptive outcomes for the retarded child. However, not all families seem to demonstrate poor adaptation, suggesting the existence of some combination of factors that mediate familial response.

This study proposes a model in which familial adaptation to a child with retardation is a function of the degree of perceived stress related to the presence of retardation in the child, moderated by the availability and use of varying coping resources. The coping resources in turn are mediated by the various ecological contexts in which the family operates. Further, it is proposed that the adaptive skill of children with retardation is likely to vary as a function of familial adaptational response. As yet, little data are available to test this model, and the current project was

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specifically directed toward explicating aspects of these processes.

Previous research on various attributes of families with retarded children suggests the potential utility of the model, although little is generally known about these families. Perhaps the greatest reason for this lack of knowledge is that the methodological approaches involved in the previous research have been narrow in focus. Research in this area has been unidimensional (focusing on a specific family member or one specific variable) and unimodal (using only interviews, questionnaires, ratings, or, rarely, behavioral observations). Additionally, no prospective longitudinal studies have been reported that assess family functioning and its consistency over time. The descriptive information on families of children with mental retardation is similarly inadequate. Many descriptive studies have involved clinical case reports or group data without controls. This project was designed to consider the informational needs in this area and to overcome the methodological inadequacies of previous work.

The stresses associated with the presence of a developmental delay or disability in a child are likely to have a significant impact on both the physical and psychological well-being of all family members. The ways in which the family members cope with such stress are likely to dictate adaptational response and subsequently each member's general well-being, as well as the integrity of the family as a whole. In this sense, the study of stress and familial adaptation to a child with a developmental delay or disability has specific implications for health care delivery to these families. Identification of the specific stressors as well as the most effective coping strategies may suggest specific interventions with families to promote more positive adaptations.

## ***Research Questions or Hypotheses***

This investigation was directed toward examining differences both within and between two groups of families, those having a young child with nonspecific developmental delay (DD), and those having a young child without DD. Coping with the stress of a child with developmental delay is the primary variable of interest, particularly in determining its impact on familial functioning and adaptation. Further, this study examined the effects of a number of variables that may be used by the family and its members in the coping process. Since coping is not a static process, the longitudinal nature of this study was central to the ability to explicate not only the process of coping with this crisis over time, but also the pattern of parental use of coping resources.

Within the group of families with a developmentally delayed child, the research team examined the relationship of stress to (1) the child's developmental status, and (2) parent-child interactions. Additionally, the research team attempted to find those variables predictive of differential family adaptation from the initial diagnosis through the preschool years. The project intended to fill both the descriptive and methodological gaps apparent in previous research on families of children with mental retardation through a prospective longitudinal design that used a multimodal approach (interview, questionnaire ratings, and observation).

## ***Study Design and Methods***

The quasi-experimental design matched families of preschoolers with developmental delay (DD group) and families of preschoolers without DD (comparison group) on the child's age, sex, race (Caucasian versus non-Caucasian), public assistance (presence versus absence), mother's marital status, and mother's

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education. Groups were also balanced for child's birth order.

Both groups were seen two times in a 12-month period. For the DD group, the visits included a clinic visit at the initial formal diagnosis and a second clinic visit 12 months after diagnosis. In the interim, a phone interview was conducted 6 months after diagnosis to maintain subject contact and collect additional data. For the comparison group, visits took place at chronological ages matched to those of the developmentally delayed group. Both of the visits to the laboratory involved direct behavioral observations of mother-child interaction, developmental assessment of the child, a family interview that included background information, and assessment of maternal attitudes. Measures of stress, social support, marital functioning, maternal and paternal coping style, and family functioning were obtained.

### ***Study Sample and/or Population***

The research team longitudinally followed 40 families of developmentally delayed preschoolers and 66 families of preschoolers without DD for 12 months from the time the children with DD were diagnosed. (More children without DD were needed in order to provide two comparison groups: One matched to the DD sample on mental age, the other on chronological age.)

The specific criteria for selection of subjects in the DD group included the following: (1) Diagnosis of mild or moderate developmental delay based on one or more psychometric tests (e.g., Bayley Scales of Infant Development, Stanford-Binet Intelligence Scale); (2) child's age between 1 and 5 years; (3) no moderate or severe sensory handicaps (vision or hearing), motor syndromes, or bodily disfigurements; (4) no known biological/genetic syndrome that would be related to potential mental delay; (5) child's residence

with biological mother; and (6) residence within 2 hours' driving distance of the University of Washington.

### ***Findings***

At time of diagnosis, families of children with developmental delay did not appear to differ significantly from families of comparison children in important functional attributes, when matched carefully for socioeconomic status and other confounding factors unrelated to child status. In fact, the two groups of families were remarkably similar despite the fact that many families of children with DD suspected the developmental problems before they were diagnosed. The two groups of children varied greatly in terms of developmental skills. Chronological age matching allowed for more direct comparisons between the families of children with DD and those of children without DD.

Of most interest were the group comparisons at followup. This represents a time period during which the families of children with DD had 1 year to respond to their children's diagnosis. Pathological models of family functioning would suggest that the families of the children with DD should be less functional across a variety of domains. However, this was not the case. In fact, the families of children with DD and the families of children in the comparison group remained similar at followup (as at the time of diagnosis). Although families were carefully matched along many dimensions to ensure demographic equivalence, the finding of similar functioning across the two groups gives credence to recent suggestions that pathological family reactions to children with DD are not ubiquitous.

The amount of stress experienced by families of children with DD did not differ from that experienced by families of children without DD, either at time of diagnosis or at followup, with the exception that fathers

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of children with DD perceived more daily parenting hassles. Nonetheless, it was apparent that families experiencing more stress were less functional across domains than were families reporting less stress. This was the case for single-parent families especially. In general, this was true for both groups, although the effects were more dramatic for the DD group: Single-parent families of children with DD reported the highest mean levels of stress.

Previous research studies have established that families of developmentally delayed children are more stressed, but those studies have addressed the stress specific to the condition of DD. This project addressed stress from a more generic perspective, which probably accounts for the finding that families of children with DD did not necessarily report greater stress consistently. Nevertheless, this research broadens the literature on stress, with the findings that families with developmentally delayed children may not experience more generalized stress, but the stress experienced appears to have more pervasive effects across multiple levels of family functioning and mother-child interactions .

As the findings indicate, there is great heterogeneity in the family life, stress levels, and coping ability of families with young children with nonspecific developmental delays. Aside from the issue of understanding and appreciating individual differences, the findings point toward a “de-pathologizing” of such families. However, having a child with DD is likely to place a family at greater risk under conditions that may already be challenging. Thus, single parents of children with DD appeared to have the greatest challenge and difficulties in this current sample of largely middle-class families.

Since it is unlikely that fully funded support programs will be available to all families of children with mild to moderate early delays, it is important to begin to identify what risk factors are the best indicators

of need for additional emotional, financial, and/or technical support services. To do so requires that broader, larger studies be conducted in which samples of families with DD are representative of the ecologies of different segments of American life.

## **Publications**

### ***Articles, Books, and Chapters***

None to date.

### ***Abstracts***

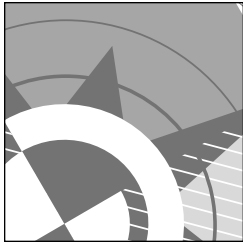
None to date.

### ***Presentations***

Crnic K, Greenberg MT. 1991. *Social support prediction to family functioning one year following initial diagnosis*. Presented at the Gatlinburg Conference on Mental Retardation and Developmental Disabilities.

Greenberg MT. 1991, March. *Attachment processes among mild mentally delayed and normally developing children in the preschool years*. Presented before the MacArthur Foundation Working Group on Attachment in the Preschool Years, Seattle, WA.

Greenberg MT, Slough N. 1991. *Attachment security and its correlates in preschool children: Validation of reunion assessment*. Presented before the Society for Research in Child Development, Seattle, WA.



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## Prevention of Drowning of Young Children

**Grantee**

University of Washington

**Investigator**

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Center  
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**Project Number** 530607

**NTIS Number** PB96-183447

**Project Period** 07/01/91-06/30/94

| <b>Costs</b> | <b>Awarded</b> | <b>Requested</b> |
|--------------|----------------|------------------|
| Year 1       | \$192,292      | \$226,226        |
| Year 2       | \$227,758      | \$227,758        |
| Year 3       | n/a            | n/a              |
| Year 4       | n/a            | n/a              |
| Year 5       | n/a            | n/a              |
| Year 6       |                |                  |

**Year 2000 Objectives**

9.1, 9.2, 9.5, 9.18

**Study Design**

Experimental

**Time Design**

Longitudinal

**Care Emphasis**

Interventional

**Population Focus**

Toddlers, Preschool children

**Racial/Ethnic Focus**

None

**Summary*****Statement of the Problem***

Each year, 700 children under the age of 5 die from drowning in the United States, making it the third leading cause of death in this age range. In this age group, children between 2 and 3 years of age are at greatest risk. Drowning carries a high risk of serious neurological sequelae in survivors ("near-drowning" victims), with poor outcomes from CPR and medical treatment. Thus, primary prevention remains the most effective way to significantly reduce the risk of mortality and serious morbidity from drowning.

To address this problem, passive approaches such as four-sided fencing around pools and pool alarms and covers have received attention. Despite their effectiveness when applied, these have not been widely adopted in the United States. Another prevention strategy involves teaching swimming and water safety skills to young children. This has been vigorously promoted by the Red Cross, the YMCA, and other organizations and institutions, and widely publicized by the mass media. Nevertheless, its effectiveness in reducing mortality and morbidity has not been adequately evaluated empirically. Some experts have even raised concerns that swimming lessons may increase the risk of drowning by lessening toddlers' fear of the water and creating a false sense of security in parents.

***Research Questions or Hypotheses***

The purpose of this study was to initiate an investigation of the possibility of reducing the risk of drown-

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ing among preschool children by providing training in swimming skills and water safety. It was not feasible to conduct a prospective trial with decreased drowning episodes as an outcome. The annual rate of drowning in this age group is approximately 6 deaths per 100,000; thus, over 1,000,000 children would have to be entered to observe confidently a 50 percent risk reduction. Increase in water safety skills and recovery from a simulated episode of falling into a pool were used as a proxy for decreased drowning risk.

The study was based upon five hypotheses. First, swimming ability would be positively related to the degree of participation in the water safety training program. Second, children with water safety training would exhibit safer behavior at poolside than children with less training. Third, children with training would act more competently in simulated high-risk situations than children with less training. Fourth, children's swimming ability would be positively related to their water safety behavior. Fifth, children's developmental and behavioral characteristics would have independent effects on water safety behavior prior to training and on changes due to instruction.

### ***Study Design and Methods***

The research study used a randomized control design with repeated measures at four times. Children were randomly assigned to either 12 weeks or 8 weeks of twice-weekly swimming and water safety instruction. To be included in the analysis at the conclusion of the study, children in the 12-week group had to have missed no more than 5 of the 24 lessons given, and children in the 8-week group had to have missed no more than 3 of their 16 lessons.

All children participated in twice-weekly water safety and swimming lessons. The curriculum was designed for preschool-age children, based on the American Red Cross program. It emphasized three sets

of skills: Out-of-water safety behavior (deck behavior), swimming ability, and in-water safety skills. Instruction was provided in groups of approximately six children, accompanied in the pool by their parents.

Children's water safety skills were measured by direct observation in three ways. The first measure, "deck behavior" (the risk of falling into the pool from the side, playing too close to the edge, and going near the water without parental permission), was assessed while the children were clothed and in their swimsuits. Deck behavior was scored during the few minutes before the actual swimming lessons began, with higher scores indicating riskier behavior. The second measure, "water recovery" (the ability to recover and stand up when dropped from 2 feet above the water) was assessed by the instructor releasing the child (or, if the child resisted, with the parent releasing the child). If the child resisted release from 2 feet above the water, the adult would attempt release from the water's surface. The third measure, "jump-and-swim" (the ability to jump from the edge of pool into the pool and swim back to the side) was initially assessed by the instructor (or the parent, if the child resisted). If the child resisted jumping from the side, she/he was released by the adult in the pool to swim to the side. Water recovery and jump-and-swim were ordinally rated from increasingly difficult series of challenges given to the children, with higher scores indicating greater skill. All were assessed four times (T1, T2, T3, and T4).

Using a structured grading scheme developed by Erbaugh, instructors rated children's swimming ability. In this system, in which higher scores indicated greater ability, children were tested at T1, T2, and T3 for the 12-week group, and at T2 and T3 for the 8-week group. Examples of the skills on which the children were rated included holding their face in water for 3 seconds, recovering from prone position, rolling from back to front, propulsive kicking,

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doing a beginner stroke for 5 feet, independently entering and exiting the pool, and jumping into the pool independently.

Water safety skills were initially measured in both groups at T1. The swimming ability of the 12-week group was measured at this time. Training in the 8-week group was delayed by 8 weeks (from the initial observation time) to allow assessment of the reactivity of the study instruments. After 8 weeks of training for the 12-week group, and 8 weeks of no training for the 8-week group, water safety skills were again measured (at T2); the swimming ability of both groups was measured at this time. After 4 more weeks of training for the 12-week group and 8 weeks for the 8-week group, water safety skills and swimming ability were measured in both groups (at T3). A final measurement of water safety skills was conducted 12 weeks following the end of the training in both groups (at T4). No attempt was made to control the amount of time spent in the water other than during the intervention.

A number of variables were assessed in the participating children and families. At the beginning of the study, parents were asked to provide information on their own and their spouse/partner's education and occupation. They completed the General Development Scale of the Minnesota Child Development Inventory (MCDI) to estimate their children's developmental levels, and the Achenbach Child Behavior Checklist (CBCL) for children ages 2–3 to measure behavioral concerns.

### ***Study Sample and/or Population***

At the beginning of the study (T1), 162 children were enrolled; 91 were randomly assigned to the 12-week group and 71 to the 8-week group. The entire sample's average age at T1 was 34.1 months (SD ± 5.6 months), with boys constituting 53 percent of the

sample. The two groups did not differ significantly on these characteristics. About 67 percent of the sample fell in the two highest socioeconomic status (SES) categories. While fewer families in the 12-week group were in the highest SES category than in the lower categories in comparison with the 8-week group, the variation was not significant.

By the end of the study, 109 children had met all of the criteria for inclusion in the analyses (61 had missed no more than 5 lessons for the 12-week group, and 48 had missed no more than 3 lessons for the 8-week group). Their average age was 34.2 months (SD ± 5.5 months), with boys constituting 54 percent of the sample. As at T1, the two groups did not differ significantly on these characteristics. Once again, 67 percent of the sample fell in the two highest SES categories. Despite apparent underrepresentation of families in the highest SES category in the 12-week group compared with those in the 8-week group, the variation did not reach significance.

Children and families were recruited in the Seattle area from middle-income area child care centers near public pools used in the study. Children were accepted only if they had no prior swimming training and no chronic medical or developmental disability, based on parents' completion of the Revised Denver Prescreening Developmental Questionnaire (R-PDQ).

### ***Findings***

Swimming ability: Both groups showed highly significant improvements in ability during the 8 weeks following the beginning of training (T1 to T2 for the 12-week group, and T2 to T3 for the 8-week group) ( $p < .0001$ ). This improvement continued significantly for the 12-week group to week 12 ( $p < .0001$ ). The 8-week group was significantly superior to the 12-week group at the first lesson (T1 for the 12-week group,

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and T2 for the 8-week group) and at 8 weeks (T2 for the 12-week group and T3 for the 8-week group), but not when compared with the 12-week group's final ability. However, the improvement in the two groups over time did not differ significantly between groups.

Deck behavior: This varied significantly from T1 to T4, only because of a significant improvement at T4 ( $p < .03$ ). There were no significant differences between the 12-week and 8-week groups.

Water recovery: With training, water recovery scores improved steadily and significantly in both groups ( $p < .001$  for change over time). The 12-week group improved immediately and continued to do so through T4. The 8-week group made significant improvement between T2 and T3 (their training period). At the end of the training, there was no significant difference between the two groups.

Jump-and-swim: Similar to the water recovery scores, the jump-and-swim scores improved over time ( $p < .005$ ), with the 12-week group's improvement slightly but not significantly greater than the 8-week group's improvement. Swimming ability was not significantly correlated with deck behavior, water recovery, and jump-and-swim scores for either the 12-week or the 8-week group at the beginning of training. Likewise, swimming ability was not significantly correlated with deck behavior at the last lesson for either group (end of week 12 or end of week 8, respectively), but was strongly correlated at the last lesson with water recovery scores ( $r = .54, p < .0001$  for the 12-week group;  $r = .51, p < .0003$  for the 8-week group) and the 12-week group's jump-and-swim scores ( $r = 0.72, p < .0001$ ), and moderately correlated with the 8-week group's jump-and-swim scores ( $r = 0.28, p < .06$ ).

Modest correlations (in the 0.2–0.3 range) were found between the developmental characteristics of chronological age, MCDI developmental age, and MCDI developmental quotient, and the swimming

and water safety outcomes of swimming ability, deck behavior, water recovery, and jump-and-swim. In general, older children (chronologically and developmentally) had better water recovery and jump-and-swim scores at T2 and T3. However, none of the correlations between the developmental variables and the outcome variables at T4 were significant. Gender and the CBCL score were not significantly related to any of the outcome variables.

In this study of 109 young preschool-age children, instruction in swimming and water safety significantly improved their swimming ability as well as two measures of in-water safety skills that attempted to simulate drowning risk; out-of-water safety skills showed minimal improvement. The greatest changes took place during the first 8 weeks of instruction, although some improvements continued for children receiving 4 additional weeks of training. Improvement was stronger and appeared earlier for water recovery skills than for jump-and-swim skills. Water safety behavior was strongly related to swimming ability after 8 weeks' training. This improvement in water safety skills was not only statistically significant but also reflected real changes in their abilities. The swimming skills acquired and the increased ability to recover from a fall into a pool represent potentially lifesaving skills.

While this study provided one of the few direct tests of the benefits of water safety instruction for young preschool-age children, it had several limitations. First, it used simulated risk as a proxy for drowning and near-drowning. The reasons behind this included poor feasibility of a cohort study or experiment with submersion incidents as the outcome, human subjects limitations on placing children at any greater risk, and the belief that the proxy used was a reasonable simulation of a young child falling into a pool. Second, the comparison group (8-week) received training as well as the full treatment group (12-week), diminishing the possible contrasts between

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the two treatments. This control group allowed the research team to test the short-term changes in swimming skills without an intervention, as well as the possible effect of the testing procedures themselves on skills. In addition, it would have been difficult to recruit subjects without offering any training. Third, the study sample was self-selected (i.e., parents volunteered their children), and thus more likely to have some interest in water safety; the effect of this on the children's outcome variables is unknown. Fourth, the artificiality of the study setting (i.e., participating in a research and training study, receiving payment) may have affected the behavior of the children and their parents, although the children's age would lessen this effect. Fifth, the relatively short duration of the children's involvement in the study limited the research team's ability to assess how long the effect persists, especially if it is not reinforced.

Despite the above limitations, the results of this study offer several implications for parents and others interested in the safety of young children around water. First, water safety is not a simple entity. Different aspects are affected by training in different ways (e.g., deck behavior did not improve significantly, despite the improvement of in-water safety skills). Although water safety training for young preschool-age children may reduce their risk of drowning, it does not have a similar effect on their poolside behavior and the risk of falling in. Finally, while there was no support for the concern that water safety instruction increases young children's risk of drowning, their improved skills do not reduce the need for adult monitoring, supervision, and safety awareness. The potential impact of such a program on decreasing parental vigilance must be further assessed. Vigilance must remain a crucial element of any drowning prevention program.

These results show that there are potential benefits for young preschool-age children in learning swimming and water safety skills. This study should be repeated by others; if the results are replicated, swimming and water safety training should be promoted as part of an overall drowning prevention program for this age range. A comprehensive approach would incorporate passive protection such as water barriers and personal flotation devices and active measures such as water safety and swimming instruction, and parental awareness and supervision. All such elements should be advocated strongly in order to optimize water safety and enjoyment for young children.

## **Publications**

### ***Articles, Books, and Chapters***

Asher KN, Rivara FP, Felix D, Vance L, Dunne R. 1995. Water safety training as a potential means of reducing risk of young children's drowning. *Injury Prevention* 1:228-233.

### ***Abstracts***

None to date.

### ***Presentations***

Asher K, Rivara FP, Vance L. 1993. *Water safety training: Effectiveness for drowning prevention*. Presented at the Second World Conference on Injury Control, Atlanta, GA.



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## Infant Temperament: Stability and Change in Rural Appalachia

### Grantee

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### Investigator

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**Project Number** 540615

**NTIS Number** PB97-155394

**Project Period** 05/01/92-04/30/95

| Costs  | Awarded   | Requested |
|--------|-----------|-----------|
| Year 1 | \$102,656 | \$143,992 |
| Year 2 | \$105,247 | \$136,485 |
| Year 3 | \$91,486  | \$115,413 |
| Year 4 | n/a       | n/a       |
| Year 5 | n/a       | n/a       |
| Year 6 |           |           |

### Year 2000 Objectives

6.3, 22.4

### Study Design

Observational

### Time Design

Longitudinal

### Care Emphasis

Noninterventional

### Population Focus

Neonates, Infants, Toddlers, Parents

### Racial/Ethnic Focus

None

## Summary

### *Statement of the Problem*

Infant temperament is recognized as an important influence on early parent-child interaction, with difficult temperament associated with subsequent behavior problems in the family and school. Despite the links between early temperament and socioemotional development, relatively few studies have examined infant and caregiving environment factors associated with stability and change in temperament. The low to moderate levels of stability typically reported for early temperament indicate significant instability or change. Learning more about factors associated with stability and change in infant temperament will increase understanding of paths of early socioemotional development, particularly with regard to risk and protective factors for behavior problems and early school adjustment. Such information will be especially useful for early intervention programs in high-risk populations.

### *Research Questions or Hypotheses*

The aim of this investigation was to identify infant and family characteristics and interactional processes associated with stability and change in temperament in a group of economically disadvantaged infants in rural Appalachia. Infant temperament and individual differences in the caregiving environment were then related to infant attachment security and verbal communications skills early in the second year. The focus of the study involved the two broad dimensions of

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temperament believed to be most salient for caregivers, peers, and teachers: Negative emotionality/difficulty, and positive emotionality/social responsiveness. In addition, in this largely unstudied population of low-income rural Appalachian families, specific risk and protective factors were explored.

It was hypothesized that positive maternal and infant antecedent characteristics would distinguish infants whose negative emotionality/difficulty decreased or remained low and whose social responsiveness/positive emotionality increased or remained high, whereas less positive antecedents would distinguish infants whose negative emotionality increased and whose social responsiveness declined. In addition, it was expected that change in temperament would both foster and be influenced by particular patterns of mother-infant interaction and would lead to differences in attachment relationships and early communication skills. Specifically, it was expected that infants whose social responsiveness increased and/or negative emotionality declined would have mothers rated as more sensitive and less intrusive in their interactions and would be more likely to be securely attached and have above-average communication skills than infants whose social responsiveness decreased and/or negative emotionality/difficulty increased.

### ***Study Design and Methods***

This was a longitudinal multimethod investigation, beginning with prenatal assessments of mothers and neonatal assessments of infants. Assessments included interviews, questionnaires, and a variety of videotaped behavioral observations.

Initial assessments of the caregiving environment were obtained prenatally (mother personality and social support measures and family demographics) and initial assessments of the infant were obtained neonatally (alertness/orientation and negative reac-

tivity), in order to have independent measures of mother and baby before any substantial interaction. At 4 and 9 months, the mother and infant were seen together in a variety of structured laboratory observations designed to elicit individual differences in infant temperament and mother interactional style. In addition to temperament ratings from these behavioral observations, mother-reported temperament measures were also obtained at these ages. At 15 months, two standardized outcome measures were administered, the Strange Situation and the MacArthur Communicative Development Inventory.

### ***Study Sample and/or Population***

Subjects were recruited from women receiving prenatal care at the Lincoln Primary Care Center (LPCC) in Hamlin, West Virginia, from May, 1992, to December, 1993; the acceptance rate was 69 percent. The cooperation of the LPCC Board of Directors and staff was crucial in gaining acceptance in the community, recruiting subjects, and carrying out the research.

Of 116 women enrolled who gave birth to normal term neonates, 17 either moved or declined to participate over the course of the study, and data on 5 other infant-mother pairs were excluded due to infant characteristics that might affect early development; this resulted in a sample of 94 at 15 months.

### ***Findings***

The study was successful in identifying infant, mother, and caregiving environment factors that significantly distinguished infants of stable temperament from those of changing temperament, infants with secure attachment from those with insecure attachment relationships, and infants with high verbal skills from those with low verbal communication skills. Overall, the results identify potential protective

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and risk factors in a low socioeconomic status (SES) population and suggest that some degree of prediction of temperamental trajectories is possible.

Looking at groups of infants identified as high or low on a temperamental dimension indicated that both mother and infant characteristics contributed to predicting future temperament. Some general findings follow: (1) Maternal social support is associated with decreasing infant negative emotionality and stable high positive and social behavior in this population; (2) increased infant negative emotionality and stable high negative emotionality were more likely in families receiving public assistance; (3) maternal experience, as indexed by parity, was a predictor only for infants who were more negative early in life; and (4) perinatal risk was consistently higher in infants who subsequently changed in temperament.

Additional regression analyses also revealed that predictors differed depending on whether infants increased or decreased in negative emotionality and positive/social behavior over time. From the neonatal period to 4 months, infants who became more negative tended to be male, whereas becoming less negative was best predicted by neonatal alertness and orienting to stimuli. From 4 to 9 months of age, infants of primiparous mothers were likely to exhibit both more negative emotionality and more positive and social behavior. Infants with perinatal risk and those in families receiving public assistance were more likely to be more negative at 4 months but not at 9 months. Thus, a "risk" may affect temperament differentially by dimension or at an early age but not later. Higher focused attention in infants and more social support for mothers predicted positive changes in temperament.

Factors that distinguished infants with secure attachment relationships from those with insecure attachment relationships supported the hypothesis that more positive infant and caregiver characteristics would be

associated with attachment security. Mothers of secure infants were less likely to be receiving public assistance, had more support from friends, had a more responsive attitude toward their infant, and were more facilitative when interacting with their infant. Mothers of insecure/avoidant infants were more likely to be receiving public assistance and tended to report lower support from friends; their infants had high toy focus (rather than orientation to persons) at 9 months. Mothers of insecure/disorganized infants had lower maternal responsive attitude scores and their infants had lower positive affect, were less likely to use mother as a secure base, and were more likely to be male.

Similarly, generally positive characteristics of infants, mothers, and families distinguished infants with higher productive vocabularies and use of communicative gestures at 15 months. Infants high in productive vocabulary more often were firstborn and had mothers with higher occupational status and social support. Even though these infants were more likely to have had minor perinatal risk and to have been less positive/social at 4 months, their positive/social behavior increased by 9 months and their mothers provided more contingent feedback at 9 months. Infants high in using communicative gestures had mothers with higher occupational status, more positive personalities, more positive feelings about their partner relationship, and more likelihood of being employed at 15 months. Their fathers also had more education.

For the entire sample of rural Appalachian infants, 15-month outcomes presented a mixed picture of infant development in a low SES group. Verbal communication skills at 15 months were very similar to those of normative samples, while rates of insecure attachment relationships (49.5 percent) were somewhat higher than typically found in low-risk, middle-class samples.

Prior information about infants and their caregiving environment has utility for predicting stability

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and change in temperament and early socioemotional development. It is particularly important to consider the interaction of infant temperament and characteristics of the caregiving environment. In all cases, several indicators are more useful than single measures. Such findings lend themselves to the identification of sets of risk and protective factors for children's development. It is the overall or cumulative pattern of indicators that is most useful in distinguishing between infants who will develop a more difficult or less difficult temperament, a secure or insecure attachment, high or low communication skills. It is recommended that health care providers and others working with low-income families who have infants attend to information beyond the family's physical health, especially the overall pattern of family functioning. Early intervention with families who are experiencing an accumulation of stressors or risk factors may be helpful. In particular, infants who are notably low in positive affect and social responsiveness and who do not appear to use mother as a source of comfort/security may indicate infant-caregiver relationships that are not optimal.

## Publications

### **Articles, Books, and Chapters**

Fish M. 1996. Factors related to mother sensitivity and infant-mother attachment in rural Appalachian families. *West Virginia Journal of Psychological Research and Practice* 5:7-15.

### **Abstracts**

None to date.

### **Presentations**

Fish M. 1997, April. *Stability/change in infant temperament: Discriminating factors in rural Appalachian infants*. Presented at the Society for Research in Child Development, Washington, DC.

Fish M. 1996, August. *Interaction and attachment relationships of rural Appalachian mothers and infants*. Presented at the American Psychological Association, Toronto, Canada.

Fish M. 1996, June. *Verbal communication skills in rural Appalachian infants*. Paper presented at the Head Start Third National Research Conference, Washington, DC.

Fish M. 1996, April. *Factors related to mother sensitivity and infant-mother attachment in rural Appalachian families*. Paper presented at the West Virginia Psychological Association, Charleston, WV.

Fish M. 1995, March. *Determinants of parenting in rural Appalachian mothers*. Presented at the Society for Research in Child Development, Indianapolis, IN.

Fish M. 1994, June. *Determinants of parenting in a rural, low SES sample, compared to a middle class sample*. Presented at the International Conference on Infant Studies, Paris, France.

Fish M. 1994, June. *Stability and change in infant temperament as a function of mother and infant characteristics*. Presented at the International Conference on Infant Studies, Paris, France.

Fish M, Fish SE. 1996, April. *Strategies used by 9-month-olds when confronted by a novel object*. Paper presented at the International Conference on Infant Studies, Providence, RI.

Fish S, Fish M. 1995, March. *Variability in neonatal heart rate during orientation tasks and its relation to later social and coping behavior*. Paper presented at the Society for Research in Child Development, Indianapolis, IN.