Behavioral Response to Induced Conflict in Families with a Hypertensive Father

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SUMMARY To clarify the possible environmental mediation of familial aggregation of blood pressure (BP), we examined whether the behavior of family members differed between families with a hypertensive (n = 16) or a normotensive (n = 15) father. Three-member families consisting of a father, mother, and a boy or girl aged 8–13 years were videotaped as they interacted under standard conditions calling for disagreement or conflict. Their BPs were recorded before and after interactions. The videotaped material was reliably coded into behavioral categories by independent observers. The aggregate of all three members of families with hypertensive fathers, as well as normotensive mothers and the children in these families, showed significantly more negative nonverbal behavior than their counterparts in families with normotensive fathers.

KEY WORDS • conflict • families • behavior • father • essential hypertension

FAMILIAL aggregation of blood pressure (BP) has been documented in several diverse contexts. Relatives of essential hypertensives more frequently have elevated BPs than those of normotensives.1 The BP levels of children are correlated with those of their mothers.3,4 and the BPs between identical twins are highly correlated.4,5 Adult sons of essential hypertensives show greater vasoconstriction in forearm blood flow in response to noradrenaline than sons of normotensives.6 The more prevalent view7–13 attributes familial aggregation to a genetic source, but others propose joint genetic and environmental effects8–11 or call for concurrent studies of both.10 The role of psychological factors in the family during childhood has also been considered as a precursor for adult hypertension.7,12–14

Data describing personality characteristics that are related to elevated BP15-17 are relevant for a possible role of psychological factors in the family in relation to hypertension. These characteristics can be summarized as reflecting impairment of coping that requires communication of hostile affect, most typically in the form of inhibited verbal expression or conflict avoidance. Coping with conflict and the expression of emotional states including anger are key aspects of the communication among family members that are considered essential for family functioning.18 From a systems view of the family,19 if a significant family member, especially the father, possesses attributes that adversely affect family communication, family functioning is affected, and the behaviors of members of families with a hypertensive father can therefore be expected to reflect the father's influence with regard to the expression of anger, especially if the family's behavior occurs under the duress of family conflict or hostility. Behavioral differences between groups of families with either hypertensive or normotensive fathers should also occur for mothers and children in the families.

Documentation of these differences in behavior is seen as a first step in a search for evidence that families with a hypertensive parent function in ways that could have some bearing on the risk of the children developing hypertension as adults. Investigation of family interactions in relation to hypertension in a parent is important because the family represents a potentially powerful environmental influence that in as yet unknown ways may be significant for familial aggregation of hypertension. In other contexts it has been shown that family interactions can be strongly affected by the presence of chronic illness in a child,18 and it is reasonable to expect that essential hypertension in a parent could have analogous effects.

In our present study, family interactions under standardized conditions were examined to detect...
behavioral differences between families with a hypertensive father and normotensive families. It is important to note that this study represents an initial exploration of family differences related to the presence of parental hypertension, and at this preliminary level, the focus of the study is limited to an attempt to identify such differences.

Methods

There were 31 intact families with natural children studied. In 16, the fathers had essential hypertension, and in 15 they were normotensive, as were all 31 mothers and children. Fathers were chosen both on logistic and theoretical grounds. It was unusually difficult to recruit families with hypertensive mothers. In addition, the role of the father in the family is typically one in which the family power is concentrated, despite the common-sense impression that mothers are especially influential with the children in the family. Families were recruited through referral by local clinicians, and from community BP screenings. To be admitted to the study as hypertensive, each father must have been diagnosed and be currently treated for essential or primary hypertension. Patient's charts were reviewed for hypertensive diagnosis, evidence of BP exceeding 140/90 mm Hg, medication treatment programs, laboratory or clinical evidence of target organ damage, and for information about other conditions. Individuals with disabling target organ damage or secondary hypertension, with other chronic illness or psychiatric disturbance, were excluded.

To qualify for inclusion in the normotensive group, subjects' BP had to be under 140/90 mm Hg, with no history of hypertension, and absence of chronic illness or psychiatric disturbance. To screen the BP levels, trained and supervised recorders took three successive sitting readings 1 to 2 minutes apart after an initial 5 minutes of rest. Table 1 shows the composition of the two groups with respect to socioeconomic status, parental age, and body weight, and the children's age, sex, height, weight, and birth order.

Family interactions were obtained from three-member family groups consisting of father, mother, and one child between the ages of 8 and 13 years. These age limits were chosen to provide reading capability and prepubertal status. Parents were free to select which child to bring, with the exception of a few instances when either a boy or a girl was needed for balancing out the sex distribution of the children in the two groups. The complexity of behavioral interactions in small groups led us to limit the size of the family to be videotaped to three members. A fee was paid to the family for participation in the study.

Upon arrival at the laboratory, the casual sitting BP of each family member was recorded, using appropriately sized cuffs. All instructions were read in a standard format by technicians who were unaware of the family's BP status. Members of the family then signed consent forms, completed health status questionnaires, psychological inventories, and a form of the Revealed Differences Test (RDT) adapted for use with parents and children. The RDT consisted of 64 brief anecdotal descriptions of differences of opinion in families. The same series was administered to each family member. The reading level was at third grade. All three members completed the entire series without consulting each other. If a child could not read an item, it was read to him or her by a technician. Each family member was asked to choose his or her preference for one of the two available resolutions for each anecdote, and also to indicate the extent of commitment to the preferred solution. An example of an anecdote is:

A 9-year-old girl won't ever eat her vegetables. Should you make her eat them before she can have her favorite dessert, or let her have her dessert anyway?

a. Let her have her dessert.

b. Make her eat the vegetables before she can have dessert.

c. How much do you care about what she does?

very much some not at all

Subsequent activities took place in a video studio in which the family members were seated with the child between the parents. The studio was equipped with four cameras (Hitachi), one focused on each family member, and one on the family group. The positioning of the families was arranged so that the cameras could record a frontal above-the-waist view of each family member. A 10-minute warm-up exercise was conducted so that the family members could become

<table>
<thead>
<tr>
<th>Table 1. Group Characteristics</th>
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<tbody>
<tr>
<td>Groups</td>
</tr>
<tr>
<td>Father</td>
</tr>
<tr>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Weight (lbs)</td>
</tr>
<tr>
<td>Mother</td>
</tr>
<tr>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Weight (lbs)</td>
</tr>
<tr>
<td>Child</td>
</tr>
<tr>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Weight (lbs)</td>
</tr>
<tr>
<td>Height (in.)</td>
</tr>
<tr>
<td>Birth order</td>
</tr>
<tr>
<td>SES*</td>
</tr>
</tbody>
</table>

*Socioeconomic status using the Hollingshead-Redlich formula for occupation and education.
familiar with the videotaping environment. The parents took turns teaching the child to spell words that had been misspelled on the earlier test for the purpose of stimulating the child to participate, and generating a mild degree of competitive conflict. These interactions were monitored by the experimenter, but not taped.

During the spelling exercise, a technician scored the RDTs and selected two sets of six episodes for later use. Episodes were selected that contained disagreements among the three family members that received high ratings for commitment to the preferred solution. Each family member disagreed with the other two on two of the six episodes in each set. Following the spelling exercise, one-half of the families was randomly designated to begin interactions using the RDT. They were given one set of six RDT episodes previously selected, and arranged so that among the first three episodes each of the three family members in turn was the one who disagreed. The episodes were typed on 3 X 5 in. plastic-covered cards, on which the father was to mark a response on which all three members could agree. The instructions were for the family to resolve their disagreements by discussion, and the members were admonished not to yield readily. Ten minutes were allotted to this exercise, which was video taped. All families completed resolutions for the first three episodes, but few completed all six.

The other half of the families first participated in Family Role Playing (FRP), involving a skit for which the family members adopted roles and developed a scenario following explicit guidelines. The general instructions were that the family to be portrayed was "angry and unhappy." More specifically, each of the three family members was separately urged to play the role of a person who is chronically dissatisfied with the other two. The child was told that he or she is usually in trouble, feels deprived, unloved, misunderstood, and rebellious. The mother was told that she strongly objects to the child's recalcitrance and withdrawal, feels irritated, and blames her husband for his lack of support and inability to handle the child. The father was told that he similarly objects to the child, and resents the mother's blaming him, and her judgment of him as an inadequate father. The family was reminded that the exercise was intended to provide information about how families cope with such a situation, and that a resolution of the problem was not expected. Ten minutes were allotted for videotaping the interactions.

Next, those families who did the FRP first, then did the RDT, while the families who did the RDT first then did the FRP. After completion of the FRP, BP was once again recorded. A final exercise consisted of a second interaction using the RDT, for which the second set of episodes was used. The instructions for the RDT were repeated, except that one-half of the families was given instructions to express and communicate emotion as openly as possible, while the other half was told to carefully inhibit and withhold communication of emotion. Families were debriefed after the videotaping session, and each member completed a questionnaire that in part asked about how well they thought each had roleplayed, and how well they had communicated emotions.

The videotaped behaviors occurring during the RDT and FRP were subjected to coding using our modification of the Marital Interaction Coding System 21 (MICS) for three member families. The system consisted of 28 behavioral codes, subsets of which were classifiable into four categories, positive and negative verbal, positive and negative nonverbal. A special-effect generator split the monitor screen with three quadrants displaying one of the three participants, and the fourth showing the entire family. Each tape was independently coded by three trained coders who underwent an intensive 25-hour training course. Training was conducted by an experienced coder and consisted of memorizing written definitions, reviewing precoded criterion tapes, and practice coding with the trainer. During the coding process, each of three coders was assigned to watch one family dyad, father-mother, mother-child, father-child. Table 2 shows the four MICS categories, the major behavioral codes subsumed under each, with a behavior code asterisked if it was largely responsible for the category's overall score. Behavioral examples for several codes are also given. A random set of 16 tapes was selected to check reliability. Percentage agreement scores were computed between all combinations of coder pairs according to procedures suggested by Hartmann. The average percent agreement is also presented in table 2 and was judged acceptable for three of four categories. Percentage agreement of 0.70 and greater is considered acceptable for the MICS. The reliability values reported in this study are comparable to those previously published.

Table 2. Percent Agreement on Four Code Categories for Two Independent Coders of 16 Videotapes of Family Interactions During the Revealed Differences Test and Family Role Playing, with the Codes Subsumed Under the Categories

<table>
<thead>
<tr>
<th>Code category</th>
<th>Agreement</th>
<th>Behavior codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive verbal</td>
<td>78%</td>
<td>Agree*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Humor</td>
</tr>
<tr>
<td>Negative verbal</td>
<td>50%</td>
<td>Complain*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Criticism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deny responsibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excuse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Put down (insult)</td>
</tr>
<tr>
<td>Positive nonverbal</td>
<td>78%</td>
<td>Assent (nodding)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laugh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Positive touching</td>
</tr>
<tr>
<td>Negative nonverbal</td>
<td>70%</td>
<td>Not tracking (gaze aversion)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No response</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turn off (grimace)</td>
</tr>
</tbody>
</table>

*Codes with highest frequency within category.
Data Analysis

The statistical treatment of the data was designed to be responsive to both general and specific investigatory questions. Most important, we were interested in the possibility that the behavior of families interacting among themselves would be different when the families included a hypertensive parent, contrasted to families in which both parents were normotensive. In addition, we attempted to enhance the likelihood of differences between the two groups of families experimentally by manipulating the degree of conflict and hostility entailed in the interactions. In view of data implicating the role of hostility for individual hypertensives, we reasoned that the families of hypertensives might be affected by that characteristic. Consequently, it was expected that the groups of families would be more likely to differ when interacting with FRP. Although the initial proposition about differences between the families rested on previously reported differences between adult hypertensives and normotensives, by definition a family-centered view incorporates other members of the family in the assessment of family interactions.

The initial, more general analyses took two parallel routes. In the first, the FRP and first RDT data were separately analyzed using multivariate analyses of variance (MANOVA), a conservative test that allows for an integrated assessment of a linear composite of the four dependent measures taking the intercorrelations among measures into account. In the present instance, this meant that a significant main effect between families would take into account behavioral differences representing a compilation of all four measures, including their error terms. This type of analysis is the preferred alternative for testing general experimental hypotheses correcting for the inflation of the experiment-wide error encountered when separate analyses are performed on each variable. The MANOVA also yields main and interaction effects for the variables, group membership (hypertensive fathers vs normotensive fathers), members of the family (father, mother, child) and dependent measures (positive and negative verbal, positive and negative nonverbal). Although the MANOVAs did not permit direct comparison between the tasks (FRP and RDT), they did permit comparison of the families, family members, and measures. Indirect contrast for the FRP and first RDT was possible, since a significant effect might be obtained for one task, but not the other. Because of the special instructional feature of the second RDT, it did not specify which of the four behavior code categories treated as dependent variables, group membership (hypertensive fathers vs normotensive fathers), members of the family (father, mother, child) and dependent measures (positive and negative verbal, positive and negative nonverbal). Although the MANOVAs did not permit direct comparison between the tasks (FRP and RDT), they did permit comparison of the families, family members, and measures. Indirect contrast for the FRP and first RDT was possible, since a significant effect might be obtained for one task, but not the other. Because of the special instructional feature of the second RDT, it was not included at this time.

In the next analyses, direct comparison among the three family tasks was included for four separate univariate analyses of variance (ANOVA), one for each of the four dependent measures, and for two additional analyses focusing on either positive or negative behavior, combining the verbal and nonverbal components. At this time, all three tasks comprised one factor of the ANOVAs, FRP, first RDT, and second RDT, in addition to group membership, and member of the family. These analyses permitted an opportunity to examine the family behavior in more detail while also allowing direct comparison between the interaction tasks. There were several secondary analyses. As a follow-up to the preceding analyses, ANOVAs were computed separately, one for each of three family members. In these analyses only the factor of group membership was examined for the four behavior measures. In these analyses there was no direct comparison between family members, allowing the demonstration of group differences for each family member, in the event that effects for individual family members had been obscured in the previous analyses.

Because of interest in the possible contribution of the child's sex to the behaviors obtained during the videotaped family tasks, two MANOVAs were conducted, one for the first RDT, and one for FRP. The factors were group membership; the child's sex; father, mother, or child; and the four dependent behavior code categories. The instructional manipulation introduced for the second RDT, emphasizing either communication or withholding of emotion, was analyzed with four separate ANOVAs, for each of the four behavior code categories treated as dependent measures. The factors were the two family groups; type of instruction; and father, mother or child. These analyses were intended to explore further the possibility that families with hypertensive fathers might be affected by a tendency to inhibit hostility. Such an effect might be particularly notable under experimental conditions that could enhance it, specifically, the instruction to withhold communication of emotion. In view of the responses of BP to transient stress conditions, such as those imposed by FRP, we assessed the BP values obtained from the participants following FRP, and BP changes between initial recording and following FRP. These analyses should be viewed as exploratory, since the occasions and precision of measurement were limited to two instances of casual recording. We compared the BPs obtained in the two groups, tested the effects of FRP on BP, and calculated the correlations between BP after FRP and the frequencies of behavior in only those code categories that differed significantly between the two family groups. The correlational analysis was intended to explore the possibility of direct relationship between behavioral manifestations during FRP and BP following FRP. Such a correlation could be obtained whether or not the groups differed in BP after FRP. A correlation is not sensitive to group differences, but would be informative about individual differences in behavior as they relate to a target variable, BP.

Results

A significant F(1,29) = 2.68 p < 0.05 was obtained for a multivariate comparison of the two groups of families. While this result showed that the families as units differed in their overall behavior on the four code categories during FRP, it did not specify which of the
four behavior code categories significantly contributed to the difference. Sub-analyses within the MANOVA showed that only the code category of negative nonverbal behavior differed, $F(1,29) = 5.36$, $p < 0.05$, with the families with hypertensive fathers having significantly higher rates of negative nonverbal behavior than families with normotensive fathers. The two groups of families did not differ on the other three code categories. An analogous MANOVA for the scores obtained during the first RDT did not yield statistical significance at $p < 0.05$, although the mean values for the negative nonverbal category differed in the same direction as was found for FRP.

At the next level of analysis, ANOVA was used to compare the relative capacity of the three family tasks in eliciting differences between the groups of families on each of the code categories. Table 3 shows means and standard deviations for the four code categories for all three tasks and for the three family members combined. A significant difference between the two groups was obtained for all three tasks combined, but only for the negative nonverbal category, $F(1,87) = 5.54$, $p < 0.05$. The tasks did not differ among themselves in eliciting group differences. It was also found that the two RDTs produced significantly more positive verbal behavior than FRP, $F(2,174) = 20.41$, $p < 0.01$ for both groups combined. This finding serves to support the presumed capability of FRP to induce conflict. To control for possible differences in the total number of coded behaviors, these analyses were also conducted with the frequency of behaviors in each code category expressed as percentages of the total number of coded behaviors. The results were in all respects similar to those reported above. An analysis, with the dependent measure consisting of frequencies of negative behavior combining both verbal and nonverbal components, also yielded a significant difference between the groups of families $F(1,87) = 6.91$, $p < 0.01$, the families with a hypertensive father having higher frequencies.

Table 3 also shows the mean frequencies and standard deviations of behaviors in the four code categories for each of the family members in the two groups. The mothers in the two groups differed significantly for the negative nonverbal category $F(1,92) = 6.56$, $p < 0.05$, and the children differed for the negative nonverbal category, $F(1,92) = 4.30$, $p < 0.05$, as well as for the positive verbal category, $F(1,92) = 4.37$, $p < 0.05$. The difference for the negative nonverbal behavior of the fathers was in the same direction as for the mothers and children, but it did not reach statistical significance. In these analyses, the frequency of negative nonverbal behavior was greater and the frequency of positive verbal behavior was less for the members of families of hypertensive fathers compared to members of families of normotensive fathers.

With respect to the child's sex, only the results of the MANOVA on the first RDT yielded significant results. Two significant univariate interactions were obtained. In the first, the hypertensive fathers showed more negative nonverbal behavior in the presence of a male child than did normotensive fathers, $F(1,27) = 4.91$, $p < 0.05$. In the second, male children of hypertensive fathers showed less positive verbal behavior than male children of normotensive fathers, $F(1,27) = 4.86$, $p < 0.05$. In neither case did these differences occur for female children.

Comparisons between the subgroups who had the two types of instructions yielded several significant interactions, showing that the two groups reacted quite differently to the instructions. With the instruction to express emotion, the families with hypertensive fathers showed more negative nonverbal behavior than the normotensive families, while with the instruction to inhibit expression of emotion, the families with hypertensive fathers showed less negative nonverbal behavior than the normotensive families $F(1,81) = 6.89$, $p < 0.01$. Conversely, with the "out" instruction, the families with hypertensive fathers showed less positive nonverbal behavior than the normotensive families, while with the "in" instructions the families with hypertensive fathers showed more positive nonverbal behavior than the normotensive fathers, $F(1,81) = 4.94$, $p < 0.05$.

The mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) obtained on arrival at the laboratory and after FRP for all family members of

<table>
<thead>
<tr>
<th>Behavior code category</th>
<th>Families with normotensive father</th>
<th>Families with hypertensive father</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Father</td>
<td>Mother</td>
</tr>
<tr>
<td>Positive verbal</td>
<td>3.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Negative verbal</td>
<td>0.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Positive nonverbal</td>
<td>9.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Negative nonverbal</td>
<td>5.6</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Table 3. Means and Standard Deviations of Frequencies of Coded Behaviors of Family Members and of the Combined Family During the Revealed Differences Tests and Family Role Playing by 16 Families with a Hypertensive Father and 16 Families with a Normotensive Father.
both groups are shown in Table 4. For both readings, the hypertensive fathers' SBP and DBP differed significantly from those of normotensive fathers, t = 2.1, t = 4.1, t = 2.5, t = 2.8, all p < 0.05. The BP of neither the mothers nor the children differed significantly, although the average BP of the children was higher in the hypertensive group, particularly after FRP. Shifts of BP from arrival at the laboratory to following the FRP yielded no significant differences. It is worth noting, however, that both SBP and DBP of children in the hypertensive families rose after FRP, while those of children in the normotensive families fell.

Further analyses were conducted to determine if a relationship existed between the parental behavior that was significantly different between the groups and children's BP. Product moment correlations were computed between frequency of negative nonverbal behavior during FRP of fathers and mothers, and children's SBP and DBP after FRP. For the hypertensive group, the correlations for DBP were not significant, but a significant \( r = 0.51, p < 0.05 \) was obtained between the children's SBP and the frequency of the father's negative nonverbal behavior. The analogous correlation for mothers was \( r = 0.39 \), and for the children themselves, \( r = 0.13 \). The correlation computed using the combined frequencies of negative nonverbal behavior for both parents was \( r = 0.52, p < 0.05 \). No similar relationships were found for normotensive families, largely because of the low rate of negative nonverbal behavior during FRP. When the children's BP was expressed in age-adjusted percentages, similar results were obtained.

### Discussion

The results obtained in our present study extend earlier findings that conflict resolution and communication of hostility could be dimensions relevant to hypertension. This had been noted only for adults with elevated BP. In the present instance an elaboration of these findings has been obtained with families that include a father with essential hypertension and two family members. Although the fathers with essential hypertension themselves did not differ significantly from normotensive fathers in their behavior during family conflict, the families of the hypertensive fathers taken as a unit did behave differently. This finding is consistent with a systems view of the family, which posits that families as a social unit are strongly affected by characteristics of individual members, particularly those with power or authority roles. Whether the behavioral family characteristics that were found for families with hypertensive fathers have long-term consequences on the offspring remains to be investigated. The basis for further investigation, however, has been established by the present results.

The family groups did not differ in all of the four categories of behavioral interaction that were studied. The differences between the families were limited to two categories of behavior, and the principal difference occurred for the category of negative nonverbal behavior. In addition to the linear composite of all four behavior frequency scores, negative nonverbal behavior considered alone appeared significantly more often in families with a hypertensive father than in families with a normotensive father for the three family members as a unit, and for mothers and children separately. The fact that negative nonverbal behavior yielded the most prominent differences between the two family groups is of particular interest because of the category's theoretical relevance to conflict resolution and communication of hostility. When conflict-laden tasks were imposed on the families, the families in which the hypertensive fathers and mothers engaged in negative behavior — behavior that reflects hostility or interpersonal rejection. The nonverbal aspect implies that communication occurred in an indirect fashion. The families with a hypertensive father did not differ from normotensive families in verbally expressing the extent of their dissatisfaction to each other. Findings that the families with a hypertensive father differed from normotensive families primarily in their negative nonverbal behavior raise questions about whether the members of families with a hypertensive father were as aware of the extent of their negative attitudes dur-

### Table 4. Mean Systolic and Diastolic Blood Pressures (mm Hg) of Fathers, Mothers, and Children Initially and After Family Role-Playing

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Father</th>
<th>Mother</th>
<th>Child</th>
<th>After role-playing</th>
<th>Father</th>
<th>Mother</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive father</td>
<td>16</td>
<td>134/90</td>
<td>120/77</td>
<td>118/72</td>
<td>135/90</td>
<td>120/78</td>
<td>119/75</td>
<td></td>
</tr>
<tr>
<td>Normotensive father</td>
<td>15</td>
<td>124/72</td>
<td>119/73</td>
<td>120/77</td>
<td>118/73</td>
<td>116/73</td>
<td>112/72</td>
<td></td>
</tr>
</tbody>
</table>
ing conflict interactions. The finding for nonverbal or indirect communication also appears consistent with previously reported traits of hypertensive adults, that they have difficulty with respect to the management of hostility and that they have a diminished capacity for freely expressing and resolving hostile feelings.

A secondary behavior category that yielded significant results was observed only for the children in the two groups of families. The children in families with a hypertensive father showed reduced frequency of behaviors in the positive verbal category compared to children of normotensive fathers, in addition to showing more negative nonverbal behavior. These dual results appear to compliment each other. Interestingly, although the mothers in families with a hypertensive father also demonstrated more negative nonverbal behavior, they did not differ in positive verbal behavior from mothers of normotensive families, possibly because adults have more expertise in controlling verbal output than children. Further, the behavioral differences found for children also suggested a gender difference. Because the finding was obtained on only one of the tasks rather than on a compilation of all three, it should be interpreted cautiously. The differences with regard to negative nonverbal behavior and positive verbal behavior of the children of hypertensive fathers occurred significantly among boys, but not among girls. In future work it will be important to determine whether analogous results can be obtained in a study of mothers with essential hypertension.

The two groups of families also differed in terms of their response to instructions that asked them either to express or withhold expression of emotion while they interacted during a conflict resolution task. The instruction was specifically intended to test families with a hypertensive father for their particular inclination to withhold or express negative feelings. The outcome was that hypertensive families responded to the instruction to express feelings by demonstrating more negative nonverbal behavior and less positive behavior, and to the instruction to withhold expression by less negative verbal behavior and more positive verbal behavior. Families with a hypertensive father differed with respect to both instructions, not simply to the one requesting them to withhold expression. Response to the latter instruction was considered consistent with an expectation generalized from reports that hypertensive adults have a tendency to withhold expression of hostile emotion. However, that the families with hypertensive fathers responded to both instructions more than normotensive fathers suggests either that they are sensitive to whether emotions should be expressed, or that they are more yielding to instructions than normotensive families.

Children in families with hypertensive fathers may be learning that it is difficult to deal with conflict, that negative emotions should not be expressed directly, but that they can find expression in indirect, nonverbal channels. According to these results, possible familial influence in this regard on a child seems clearly not limited to the father's influence. It was of interest to note that mothers in families in which the father is hypertensive behave during conflict in ways that possibly can serve to facilitate the development of hypertension-related personality characteristics in the child. Why mothers in families with a hypertensive father show more negative nonverbal behavior than mothers in families with a normotensive father remains to be explored.

As had been conjectured in the design of this study, the greater the degree of conflict within the family, the more likely that the families with hypertensive fathers would differ with families with normotensive fathers; it was found that FRP, a situation in which hostile feelings were induced and heightened, yielded the best demonstration of differences between the two groups of families. Despite the effect of FRP on family behavioral interactions, there was no significant effect of FRP on BPs for any of the three family members. This lack of effect raises questions about a connection between BP and the ways in which families with a hypertensive father manage conflict. That behavior during FRP and BP was not significantly related may have no direct bearing on the significance of the behavioral effects observed for the group of families with a hypertensive father. It is possible that pressor reactivity to family conflict occurs under other circumstances and in other environments, or that the measurement of BP in this study was insensitive. The BP changes should be examined more closely at times when the significant behaviors actually occur during the course of interaction, rather than following termination of a period of interaction, which was done in our present study. The relationship between BP levels and pressor reactivity during family conflict is also not well understood.

There was limited evidence that a relationship does exist between family interaction and BP. Analysis of data for such a relationship was conducted only for the one category of behavior that produced the most significant behavioral difference between the two groups of families — negative nonverbal behavior. Because of our interest in the effects of parental behavior on children, our analysis focused on correlations between the extent of negative nonverbal behavior of parents during FRP and the child's BP following FRP. Sixteen correlations were computed for the two groups of families: for the father, mother, child, and both parents combined, for both DBP and SBP, and for both groups. Two correlations were statistically significant for the families with a hypertensive father. Both the frequency of the father's negative nonverbal behavior, and the frequency of the negative nonverbal behavior of the father and mother combined, were significantly correlated with the child's SBP following FRP. This preliminary finding suggests that the greater the frequency of parental negative nonverbal behavior, the more elevated the child's SBP after the parental negative nonverbal behavior had occurred, as indicated by the SBP elevation following the termination of the FRP. Although there is some possibility that these may have been chance correlations, they fall within a range for con-
sideration since, of a total of 16 correlations, two were significant at $p < 0.05$.

In reviewing the behaviors subsumed under the heading of negative nonverbal behavior, it appeared that the principal behavior responsible for the negative nonverbal scores was "gaze aversion." Gaze aversion was coded if the interactions of the three family members involved looking away from each other during the communication process, by the speaker or either of the two listeners. Gaze aversion can be defined in terms of disruption of visual behavior that normally occurs during communication, in that speakers and listeners look in the general direction of one another while actively communicating. It was not possible under the present circumstances to observe eye contact. It was possible however, to code head and

defined in terms of disruption of visual behavior that

possible under the present circumstances to observe

one another while actively communicating. It was not

normally occurs during communication, in that

orientated in one another's direction during com-

munication. Under the stress of conflict, members of

speakers and listeners were posturally and visually

established in one another's direction during com-

munication. Under the stress of conflict, members of

families with a hypertensive father showed more dis-

rupted visual behavior, which has been interpreted as

an indication of reduced or inhibited interpersonal

contact. It has been hypothesized that such disruptions occur to minimize direct personal confrontation during hostile communication, and to foster a protective distance between the participants which can in part include reduction of autonomic activation. The results suggest a multifaceted course of future research. Studies should be made of families with hypertensive mothers, and of precise behavioral sequences that demonstrate continuities in a family's interactions, such as the precursors and consequences of the behavior of one family member in terms of the behavior of other members. Aspects of parent-child interactions or parenting behavior should be explored in other settings to determine whether the specialized laboratory-centered videotaping procedure produces effects that are unique to it. It is important to compare the behavior of families with a hypertensive parent to families in which a parent has another chronic condition, such as diabetes or gastric ulcer, to determine whether the present findings are unique to hypertension or are also found in a family associated with chronic illness. Finally, hypertension-related personality characteristics in hypertensive parents should be examined for their effect on family interactions.

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