Children's Perceptions of Vulnerability to Illness and Accidents

A Replication, Extension, and Refinement

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THREE PREMISES underlie a continuing investigation of children's perceptions of vulnerability to illness and accidents. First, whether a person engages in some preventive or adaptive health behavior is related to whether he perceives himself as vulnerable to some illness or accident (1). Second, "organizational patterns" have important implications for the prediction and understanding of behavior (2–5). Third, behavioral growth and the developmental link between the adult and child is continuous.

The research also has practical value. Authorities of the World Health Organization have suggested that systematic research is needed to determine the effectiveness of educational programs and the relationship of health behavior to a person's beliefs and attitudes (6). Moreover, if health educators knew more about the "organization" of various health beliefs at different ages, for example, the expectan-

cies of encountering health problems, they might plan programs with optimally effective content and timing. To the extent that a high degree of organizational patterning exists within the expectancies or beliefs of some target population, health educators might find it more effective to attempt to modify a person's entire set of expectancies rather than to try to change individual ones.

These considerations converge on the focal point of the study—the consistency in children's expectancies of encountering illnesses and accidents. Consistency refers to the manner in which the degree of expectancy of some specific health problem is related to the degree of expectancy of other such problems. In my exploratory study (7), I noted the existence of two major areas of consistency. Significant relationships were observed (a) among the expectancies of the individual child and (b) among patterns of expectancies across groups of children. More concretely, the degree to which a child expects a certain illness or accident to occur is related to the degree to which he expects other such events to occur; the degree to which a certain illness or accident is expected by one age-sex group is related to the degree to which it is expected by other age-sex groups.

During June and July of 1968 I attempted to repeat, extend, and refine the original study. Replication would counter criticisms that the results

observed in the earlier study reflected idiosyncratic characteristics of the sample selected; extension would counter criticisms that the earlier results represented idiosyncratic selection of questionnaire items dealing with illnesses and accidents.

Refinement of the earlier study would cast some additional light on the developmental aspects of consistency within children's expectancies. According to certain theories of child development (2–5), younger children exhibit less interdependence in their beliefs and expectancies than older children. Accordingly, younger children should exhibit less consistency. Although the original study revealed that consistency exists in younger children's expectancies as well as in older children's, it seemed to be relatively greater in older ones. The 1968 study, it was hoped, would confirm the hypothesis that younger children exhibit less consistency in their expectancy of illness and accidents than older ones.

Subjects and Method

A sample of 108 children was obtained at a family-type summer camp sponsored by a major university. The children, all white, ranged in age from 7 to 18 years. Data provided by the parents revealed that the mean age of the 55 fathers was 39 and that they had completed an average of 18 years of schooling; that the mean age of the 56 mothers was 37 and that they had completed an average of 16 years of schooling; and that the children came from middle-class backgrounds.

The children's expectancies of health problems were assessed through their responses to a series of 16 questions such as, "How likely are you to catch a cold during this next year?" The expectancies dealt with remaining healthy, a bad accident, a rash, fever, sore throat, flu, a toothache, a cold, missing a week of school because of sickness, upset stomach—the 10 items included in the earlier study—plus cutting a finger accidentally, a bad headache, poison ivy, sinus trouble, being stung by a bee, and having a cavity—new items included to expand the sampling. These items on illnesses and accidents were interspersed with others relating to various aspects of the youngsters' lives, for example, "How likely are you to be invited to a friend's party during this next year?"

For each item, a youngster was instructed to select the one response that best expressed his own expectancy from among seven alternatives—no chance, very unlikely, somewhat unlikely, as likely as not, somewhat likely, very likely, or certain. The items and response alternatives were selected so that they would be appropriate for the entire age range of the sample. The instructions were designed so that even the youngest children understood the task. Sufficient time was spent in explaining and clarifying the various response alternatives to insure that these younger children knew what they meant. The children's comments and reactions—including audible affective responses as well as the absence of response sets—led us to believe that the children were responding reliably. The responses were scored from 1 for the "no chance" alternative to a maximum of 7 for a response of "certain."

The questionnaire was administered to the children as a group. The children were assured of anonymity and confidentiality, and although they were permitted to decline to participate, only one child did. Each question was read aloud. The sessions generally lasted 30 minutes.

Results

Consistency within children's expectancies. Pearson product-moment correlation analyses were performed to determine the relationships between a child's answers to questions about one health problem and his answers to others (8). In 82 of a total of 120 possible pairs, the correlations were statistically significant. As in the previous study, the expectancy of remaining healthy was not consistently significantly related in a negative way to the expectancies of encountering specific health problems. Among 105 pairs of specific health problem expectancies, the correlations were significant in 81.

Age and sex differences in consistency. Separate

Table 1. **Mean expectancy scores for total sample of 108 children**

Expectancy	Mean	Rank
Accident	2.86	1
Poison ivy	2.89	2
Missing school because of sickness	3.16	3
Sinus	3.49	4
Toothache	3.55	5
Rash	3.70	6
Flu	3.74	7
Bee sting	3.77	8
Fever	4.42	9
Cavity	4.45	10
Headache	4.78	11.5
Sore throat	4.78	11.5
Upset stomach	5.07	13
Remaining healthy	5.10	14
Cold	5.20	15
Cutting a finger accidentally	5.26	16

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 16.

Table 2. Mean expectancy scores and rankings for the 108 children, by age group

Expectancy	Under 10 years (N=53)		10–18 years (N=55)	
	Mean	Rank	Mean	Rank
Accident	2.62	2	3.09	2
Poison ivy	2.51	1	3.25	3
Missing school because of sickness	3.42	4	2.91	1
Sinus	3.30	3	3.67	5
Toothache	3.55	5	3.55	4
Rash	3.60	6.5	3.80	6
Flu	3.60	6.5	3.87	8
Bee sting	3.71	8	3.82	7
Fever	4.15	9	4.67	10
Cavity	4.48	11	4.42	9
Headache	4.66	12	4.89	11.5
Sore throat	4.47	10	5.07	13
Upset stomach	5.26	16	4.89	11.5
Remaining healthy	5.02	14	5.18	14
Cold	5.04	15	5.36	15
Cutting a finger accidentally	4.92	13	5.58	16

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 16.

analyses for children under 10 years and those 10 years and over revealed that the same general type of correlation existed in the two age groups, although the smaller size of the samples reduced the number of significant correlations. There were, however, fewer such correlations in the younger group than in the older. To test the hypothesis that the degree of consistency is lower in younger children than in older ones, a consistency score—in essence, a measure of average deviation—was computed for each child.

First, a composite illness expectancy score was obtained by computing the mean of the child's scores on the 15 specific expectancy items (responses to the questions about "remaining healthy" were omitted). The absolute values of the differences between each of the scores for the 15 specific expectancies and this composite score were then determined and averaged. This average was used as a measure of consistency. To the extent that all of a child's responses were close to his composite illness expectancy score, that is, were consistent, this value would be low. Conversely, to the extent that there was wide variability—his responses differing considerably from this composite score, that is, were not consistent—this value would be high.

The mean consistency score for children under 10 years was 1.30; the mean for those 10 and older was 1.16. A t-test (8) revealed that the difference between these means, although not dramatically

large, was significant; relatively less consistency exists within the younger child's expectancies than within those of the older child.

Consistency in patterns of expectancy. The mean expectancy scores within the entire sample for each health-related question are presented in table 1. The children perceived a bad accident as least likely among all the health-relevant events and accidentally cutting a finger as most likely. The consistency of this pattern of expectancies was determined by rank correlation analyses (9).

Table 2 shows the mean scores for each expectancy for youngsters under 10 years of age and for those 10 and older, as well as the ranks assigned to each mean. The correlation coefficient for these two sets of rankings was .90, a figure indicating extremely high agreement between the rankings of the two age groups. (Such coefficients can range only between −1.00 and 1.00.) Table 3 presents the mean expectancy scores for each question by sex; the correlation computed for these two sets of rankings was .84, a figure again indicating marked agreement. To determine whether the same pattern existed when age and sex were considered conjointly, the sample was divided further into four groups—boys under 10 years, boys 10 and over, girls under 10, and girls 10 and over (table 4). The correlation (9) was .88, indicating marked agreement among the four sets of rankings.

To compare the patterns of expectancies of these

Table 3. Mean expectancy scores and rankings for the 108 children, by sex

Expectancy	Boys (N=57)		Girls (N=51)	
	Mean	Rank	Mean	Rank
Accident	2.68	1	3.06	2
Poison ivy	3.05	3	2.71	1
Missing school because of sickness	3.04	2	3.29	5
Sinus	3.77	5	3.18	4
Toothache	3.89	7	3.16	3
Rash	3.82	6	3.57	6
Flu	3.58	4	3.92	8
Bee sting	3.93	8	3.59	7
Fever	4.30	9	4.55	11
Cavity	4.52	10	4.37	10
Headache	5.19	15	4.31	9
Sore throat	4.70	11	4.86	12
Upset stomach	5.05	14	5.10	13
Remaining healthy	4.96	12	5.25	15
Cold	5.04	13	5.39	16
Cutting a finger accidentally	5.39	16	5.12	14

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 16.

four age-sex groups with patterns observed in the four age-sex groups studied previously, the means of the six new items were eliminated, a new ranking was established for the remaining 10 items (that is, only for those items used in the original study), and an analysis was performed on all eight groups of children (table 5). The correlation of agreement (9) was .88, a result indicating marked consistency among the eight sets of rankings.

Age-sex differences in expectancy levels. A *t*-test (8) revealed no significant difference between the composite illness expectancy scores of older and younger children. Nor did any consistent relationship emerge when the expectancies of specific illnesses or accidents by younger and older children were compared (table 2).

In addition, there was no significant difference between the composite illness expectancy scores of girls and boys. Moreover, no consistent relationship between sex and specific expectancies emerged when specific illness expectancies were compared (table 3).

Discussion

The correlations observed among responses to questions about expectancies of health problems corroborate the results of the earlier, exploratory study. The same results were obtained with two different samples, which were drawn from two different geographic populations and whose members were questioned at two different times of the year. In boys as well as in girls, in younger as well

Table 4. Mean expectancy scores and rankings for the 108 children, by age and sex

Expectancy	Boys				Girls			
	Under 10 (N=30)		10–18 (N=27)		Under 10 (N=23)		10–18 (N=28)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Accident	2. 57	1	2. 81	2	2. 70	2	3. 36	5
Poison ivy	2. 77	2	3. 37	3	2. 17	1	3. 14	2
Missing school because of sickness	3. 30	3	2. 74	1	3. 57	6	3. 07	1
Sinus	3. 43	4	4. 15	8	3. 13	4	3. 21	3
Toothache	3. 97	8	3. 81	6	3. 00	3	3. 29	4
Rash	3. 90	7	3. 74	5	3. 22	5	3. 86	7
Flu	3. 57	5	3. 59	4	3. 65	7. 5	4. 14	8
Bee sting	3. 76	6	4. 11	7	3. 65	7. 5	3. 54	6
Fever	4. 13	9	4. 48	10	4. 17	10	4. 86	11. 5
Cavity	4. 66	11	4. 37	9	4. 26	11	4. 46	9
Headache	5. 30	16	5. 07	14	3. 83	9	4. 71	10
Sore throat	4. 40	10	5. 04	13	4. 57	12	5. 11	13
Upset stomach	5. 17	15	4. 93	11	5. 39	16	4. 86	11. 5
Remaining healthy	4. 97	13	4. 96	12	5. 09	14	5. 39	15
Cold	4. 97	13	5. 11	15	5. 13	15	5. 61	16
Cutting a finger accidentally	4. 97	13	5. 85	16	4. 87	13	5. 32	14

NOTE: The expectancy scores themselves range from 1 (lowest) to 7 (highest); the means are then ranked from 1 to 16

Table 5. Rankings of expectancies for children in two different samples, by age and sex

Expectancy	Scouts				Camp study			
	Boys		Girls		Boys		Girls	
	Under 10 (N=32)	10 and over (N=41)	Under 10 (N=23)	10 and over (N=36)	Under 10 (N=30)	10 and over (N=27)	Under 10 (N=23)	10 and over (N=28)
Accident	1	1	3	1	1	3	1	2
Missing school because of sickness	2	3	2	3	4	1	2	1
Toothache	5	2	5	5	2	2	5	5
Rash	3	4	4	2	3	4	4	4
Flu	4	5	1	4	5	5	3	3
Fever	6	6	6	6	6	6. 5	6	6
Sore throat	7	7	8. 5	9	7	8	7	9
Upset stomach	8	9	8. 5	8	10	6. 5	10	7
Remaining healthy	9	10	7	7	8	9	8. 5	8
Cold	10	8	10	10	9	10	8. 5	10

as in older children, the degree to which a child expects some specific illness or accident to occur is related to the degree to which he expects other such illnesses and accidents to occur, and this consistency within an individual exists independently of a particular sample and extends beyond the range of the original set of health problems.

Since the original study was conducted during the fall and winter, the observed consistencies might conceivably have reflected seasonal variations in the incidence, for example, of colds and influenza. However, since data for the second study were collected over a shorter period and in a season when such illnesses were less prevalent, the observed consistencies need not be attributed to a seasonal factor.

The lower degree of consistency observed in younger children in comparison with that in older children supports the study's hypothesis and is congruent with several theories of, and data on, child development (2–5). Younger children do not have so great a facility as older ones for perceiving or imposing relationships between events occurring in their environments. Also, in younger children, the expectancy of remaining healthy was not consistently and negatively related to their expectancies of encountering specific health problems.

These results confirm those of the original study and support the view that a general concept of health may be too abstract for the younger child to grasp. Because specific illnesses or accidents (for example, cut fingers and colds) are concrete, tangible components of the child's experience, they are more readily integrated into his perceptual system. On the other hand, older children, because they are more adept at handling abstract concepts, can link the concept of health to components of their own experience and thus consistently incorporate the expectancy of remaining healthy into their perceptual systems.

The consistency among a child's expectancies of various health problems, as well as the developmental progression of that consistency, indicates clearly that these expectancies exhibit the same properties as other components of a child's conceptual system. Thus, psychologists might reasonably and profitably begin to explore health-related behavior as a meaningful and regular human process.

Furthermore, the repeated observations of consistency in expectancies strengthen the argument that the perception of vulnerability to illness and accidents may be a personality characteristic of theoretical importance and empirical value to public health workers. Also, composite illness expectancy scores would provide a reliable measure of such a characteristic.

The observation that age and sex do not appreciably affect the pattern of health problem expectancies corroborates my earlier results; a comparison of the patterns observed across the four groups of Boy and Girl Scouts and the four summer-camp groups indicates that such patterns exist independently of sample selection. The replication strengthens the assertion that at some early age, undetermined as yet, children begin to acquire a perceptual pattern of health problem expectancies that remains stable over time. In neither study do the data suggest that subsequent experience and growth alter this pattern. Thus, health problems that younger girls see as relatively unlikely are also perceived as relatively unlikely by younger boys, older boys, and older girls. The converse is also true. In general, the degree of perceived expectancy of a certain health problem that is observed in one age-sex group is highly related to the degree observed in other age-sex groups.

Implications

Although it is still premature to generalize beyond cross-sectional data, four points of interest to public health personnel should be considered.

First, if the longitudinal research now in progress confirms the stability of a person's expectancies of illnesses and accidents, then attempts to change the levels of perceived vulnerability conceivably might begin far earlier in the person's life than they do now. For example, rather than waiting until children are in high school, educational programs ultimately designed to discourage drug-taking, smoking, and individual pollution of the environment or to encourage some desirable health behavior might more effectively begin in primary grades. Moreover, the teaching might be geared more toward increasing the children's perception of vulnerability to health problems to some level that might affect their behavior rather than toward teaching particular facts about disease.

Second, health educators might well note that to the extent that a person's system of expectancies is consistent, it has a coherence of its own, and expectancies of specific health problems may be extremely resistant to change one by one. Thus it may be necessary to devise new educational techniques

with which to alter the person's total sense of vulnerability if specific expectancies of health problems are to be changed.

Third, research might be undertaken to determine (a) whether some high-risk groups contain disproportionate numbers of persons who have consistent, relatively low perceptions of vulnerability (that is, low expectancies of encountering a variety of health difficulties) and (b) whether these perceptions act as a barrier to preventive or adaptive health behavior.

A fourth point concerns the relatively lower degree of consistency observed in children under 10 years and their apparent inability to deal with "health" as an abstract concept. Both characteristics reflect the generally poorer ability of these younger children to relate events in their environment. For children in grades 4 or below, health education programs oriented to a variety of specific diseases or health difficulties might be more effective than programs geared to a concept of health as something above and beyond the absence of disease, even though programs of the second type are favored by a number of public health professionals. And, because lower consistency may indicate relatively less coherence among a person's expectancies, children in grades 4 or below might be more receptive than older ones to educational programs designed to change these expectancies, notwithstanding the evidence that even at younger ages much consistency exists.

Research in progress deals with hundreds of children, both white and nonwhite, drawn from inner-city and non-inner-city schools. These children will be studied longitudinally for 2½ years as a way of validating cross-sectional results. The possible relationship of perceptions of vulnerability, of consistency in such perceptions, and of socioeconomic factors to certain aspects of adaptive dental health behavior will be explored.

REFERENCES

(1) Rosenstock, I. M.: Why people use health services. Milbank Mem Fund Quart 44: 94–127 (1966).
(2) Gochman, D. S.: A systemic approach to adaptability. Percept Motor Skills 23: 759–769 (1966).
(3) Gochman, D. S.: Systems analysis: Psychological systems. In International encyclopedia of the social sciences, edited by D. L. Sills. Macmillan Company and Free Press, New York, 1968, vol. 15, pp. 486–495.
(4) Harvey, O. J., Hunt, D. E., and Schroder, H. M.: Conceptual systems and personality organization. John Wiley & Sons, Inc., New York, 1961.
(5) Rokeach, M.: The open and closed mind. Basic Books, Inc., New York, 1960.
(6) Research in health education. WHO Techn Rep Ser No. 432, Geneva, 1969.
(7) Gochman, D. S.: Children's perceptions of vulnerability to illness and accidents. Public Health Rep 85: 69–73, January 1970.
(8) McNemar, Q.: Psychological statistics. John Wiley & Sons, Inc., New York, 1955.
(9) Siegel, S.: Nonparametric statistics for the behavioral sciences. McGraw-Hill, Inc., New York, 1965, ch. 9, pp. 195–239.

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A study in the summer of 1968 replicated, extended, and refined some earlier exploratory research dealing with the consistency children show in perceptions of their vulnerability to various illnesses and accidents. Responses of 108 children, 7 to 18 years old, to 16 questions about the likelihood of encountering various health events confirmed previous results indicating that vulnerability is consistent across health problems. As predicted, the perceptions of vulnerability of younger children were relatively less consistent than those of older children. Moreover, a consistent pattern of expectancies was found that was not affected by age, sex, or sampling characteristics.

These results have relevance for public health professionals who are concerned with the content and timing of educational programs. For example, the evidence suggests that health educators interested in heightening children's expectancies of health difficulties might find it appropriate, as a first step in shaping or inducing adaptive health behaviors, to deal with a child's entire set of such expectancies rather than with the expectancies of one particular health problem. And health education programs for children in grade 4 or below might more appropriately be oriented to specific, concrete health problems rather than to some abstract concept of health.