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ABSTRACT

An investigation of third- through ninth-graders' health-related cognitions used a health belief model to elicit perceptions of vulnerability to health problems, health benefits accruing to health actions, intentions of taking health actions, preventive attitudes, health motivation, beliefs about toothbrushing frequency, and selected beliefs about teeth. Data were obtained from a group-administered questionnaire including forced-choice, expectancy, and semantic-differential formats. Multiple analysis of variance indicated that health motivation decreased appreciably and in linear fashion with age and that perceived vulnerability was nonlinearly and complexly related to age. Most health-related cognitions remained largely stable and did not change appreciably during childhood or adolescence. Gender had some effect, particularly upon perceived vulnerability. Socioeconomic level had few clearcut and consistent effects. This report details study methodology and procedures, results in each of the categories, and implications including the need for health educators to re-examine their assumptions about socioeconomic, sex, and age effects of students' health attitudes and behaviors. (CB)

YOUNGSTERS' HEALTH COGNITIONS:

CROSS-SECTIONAL AND

LONGITUDINAL ANALYSES

DAVID S. GOCHMAN, PH.D.

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CROSS-SECTIONAL AND LONGITUDINAL ANALYSES

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FOREWORD

This monograph presents a comprehensive analysis of the development of a number of health-related cognitions - - expectations, beliefs, perceptions, motives, etc. - - in young populations. It also analyzes these cognitions in terms of gender and socioeconomic status.

The data were collected between 1969 and 1972 while the author was on the faculty of the University of Michigan School of Public Health. They are part of a larger study of youngsters' health beliefs and health behaviors. Although several articles describing other analyses derived from this study have already been published, and many of the analyses reported here have been presented at professional meetings, workshops and seminars, only fragmentary analyses of the development and demography of these cognitions have appeared in published form. This monograph provides a way of presenting them completely in one work, rather than requiring interested readers to seek them out in several sources. In their entirety, the data and their analyses generate more meaningful conclusions than they might in a series of discrete articles.

SUMMARY

Although a literature is slowly accumulating on youngsters' health-related cognitions, much systematic research is needed in this largely unexplored area. This monograph reports on an investigation of several such cognitions, derived in part from the health-belief model.

Perceptions of vulnerability to health problems, perceptions of health benefits accruing to health actions, intentions of taking health actions, preventive attitudes, health motivation, beliefs about toothbrushing frequency, and selected beliefs about teeth were studied cross-sectionally in a sample of third through ninth graders, and longitudinally in samples of third and seventh graders at five semi-annual intervals. The research objectives were to determine the relationships of these variables to age, gender and socioeconomic status.

Data were obtained from a group-administered questionnaire including forced-choice, expectancy, and semantic-differential formats. Multiple analyses of variance showed that:

¶ Health motivation decreased appreciably and in linear fashion with age;

¶ Perceived vulnerability was nonlinearly and complexly related to age;

¶ Most health-related cognitions remained largely stable and did not change appreciably during childhood and adolescence;

¶ Gender had some effect, particularly upon perceived vulnerability; and,

¶ Socioeconomic level had few clearcut and consistent effects.

The findings:

¶ Raise questions about assumptions held by health professionals about socioeconomic effects;

¶ Identify areas for future research; and

¶ Have implications for health education programs.

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INTRODUCTION

A research literature is slowly and steadily emerging in the area of youngsters' health-related cognitions. Gellert (e.g., 1978) has elaborated on the way in which youngsters perceive various parts of their bodies in relation to health and illness; Campbell (1978) has identified demographic and status characteristics related to youngsters' perceptions of the sick role; Natapoff (1978) has analyzed health-related beliefs from a Piagetian frame-of-reference; Kalnins and Love (1982) have summarized an appreciable amount of research on children's health beliefs and have organized it conceptually; and Gochman and Saucier (Gochman, 1977, 1981b; Gochman & Saucier, 1982) have shown how perceived vulnerability is related to other health beliefs and behaviors.

From a current state-of-the-art summary of research on children's health beliefs and behaviors (Bruhn & Parcel, 1982) it is clear that more systematic research is needed in this largely unexplored area. This monograph reports on complementary cross-sectional (Study I) and longitudinal (Study II) analyses of a cluster of health-related cognitions.

Some of the cognitions studied were derived from the health-belief model (e.g., Rosenstock, 1974): perceived vulnerability to health problems, perceived health benefits accruing to health actions, and intentions of taking health actions. In the original health-belief model perceived vulnerability (sometimes termed perceived susceptibility) was defined with reference to a single health problem. In the present research it is conceptually defined as the degree to which persons believe they are susceptible to - or might encounter - a variety of health problems or

conditions. In the original model perceived benefits were broadly conceived as the set of "beliefs regarding the relative effectiveness of the known available alternatives in reducing the disease threat to which the individual feels subjected (Rosenstock, 1966, p.331)." Because the present research dealt with populations that were not immediately identified as being generally at risk or at risk with regard to some particularly threatening health problem, and because earlier research suggested that health may not be salient in young populations (Gochman, 1971), an alternative, corollary conception of perceived benefits was proposed for perceived benefits: beliefs about the health outcomes or the health impact of specific actions in relation to other outcomes or impacts.

Intentions to take health actions refer to those beliefs about the likelihood of engaging in some specific health promoting behavior at some future time. Such intentions include preventive attitudes.

Another important health cognition, health motivation, was conceptually defined in terms of the strength of the preference for health in relation to other motives.

Other cognitions studied reflected a focussed interest in children's dental health: beliefs about teeth and beliefs about toothbrushing. Although these universes are large, multi-dimensional ones, these beliefs were conceptualized here in a more focussed way, in terms of how youngsters evaluate teeth generally, how they evaluate their own teeth, and their beliefs about toothbrushing frequency. Since these beliefs did not involve the appraisal of the outcomes of any specific behaviors, they are conceptually distinct from perceived benefits. A measure of self-concept was additionally derived from one of the series of questions about teeth.

This research was designed primarily to show whether, and in what way, these cognitions change developmentally, and whether they are related to gender and socioeconomic status. Accumulated literature on children's fears of remote dangers (e.g., Hurlock, 1959, pp. 179-180), suggests that such fears become heightened as children grow older. To the degree that perceived vulnerability to health problems is such a fear, it would be expected to increase with age. A developmental hypothesis thus emerged: perceived vulnerability to health problems is directly related to age. No specific predictions were made relating perceived vulnerability to socioeconomic status or to gender. Nor were any specific predictions made in relation to the development and demography of any of the other variables.

METHOD

MEASURES

PERCEIVED VULNERABILITY

Perceived vulnerability to health problems was measured through responses to a series of fifteen expectancy-type questions. The general form of these was: "What chance is there of your getting the flu during this next year?" The other specific health problems were: a bad accident - like breaking an arm, a rash, a fever, having a tooth pulled, a sore throat, a toothache, a cold, bleeding gums, an upset stomach, being sick enough to miss a week of school, a cavity, a bad headache, breaking or cracking a tooth, and cutting a finger accidentally. An additional set of seven questions dealing with social, family and athletic activities, were included as filler items.

For each question subjects selected the one response from seven alternatives that best expressed their own expectancy. These alternatives were: no chance, almost no chance, a small chance, a medium chance, a good chance, almost certain, and certain. Pilot work had demonstrated the suitability of this format for the target population.

Instructions. Special instructions were provided to insure that the nature of the questions and response alternatives were clearly understood. For example, among the very youngest children, those eight or nine years old, the person administering the questionnaire would point to the "no chance" response and ask how many of them could read it. A respondent volunteer was then sought to read it aloud. Then another volunteer gave an explanation of the phrase. When a satisfactory explanation was provided,

the same procedure was used with the other response alternatives. These instructions conveyed an understanding of the differences among the seven responses and of the continuum underlying them.

In addition, the phrase "during this next year" was clarified as meaning "between today and a year from today."

Scoring. The responses were scored as follows: "1" for the "no chance" alternative, "2" for "almost no chance" and so forth through the continuum to "7" for "certain." These scores were treated as a quasi-interval scale (Cureton, 1968).

Reliability. Analyses of item-pair correlations (e.g., Gochman, Bagramian and Sheiham, 1972) revealed the measure to be reliable in terms of internal consistency for the Study I sample; odd-even r's of .66 and .68 ($p < .0001$) were observed, respectively, in the Study II third and seventh-grade samples (see the PROCEDURES section). A subsample revealed the measure to be reliable in terms of stability as well, with a test-retest r of .82 ($p < .001$).

PERCEIVED BENEFITS

The benefits perceived to accrue to health actions were measured by two forced-choice type questions. In each, the respondent had to select two out of four responses. One question asked:

"If you go to the dentist, finish the sentence by circling the two answers that best tell why you go. If you don't go, circle only "I don't go." The sentence began: "I go to the dentist because," and the four responses were: "I want to keep my teeth for a long time," "I don't want my teeth to look crooked," "I don't want to have toothaches," and "I want my teeth to look clean."

Another question asked:

"If you brush your teeth, finish the sentence by circling the two answers that you think best tell why you do. If you don't brush, circle only "I don't brush." The sentence began: "I brush my teeth because" and the four responses were: "I don't want my teeth to look dirty," I want to stop cavities," "I want to have a nice smile," and "I don't want my teeth to hurt."

In each question, two of the four answers reflected perceived health benefits (I want to keep my teeth for a long time, I don't want to have toothaches, I want to stop cavities, and I don't want my teeth to hurt) and two reflected perceived appearance (nonhealth) benefits (I don't want my teeth to look crooked, I want my teeth to look clean, I don't want my teeth to look dirty, and I want to have a nice smile). Item placement and phrasings were counterbalanced to insure that there were equal numbers of positive and negative statements for each type of reason, and that health responses both preceded and followed nonhealth responses an equal number of times.

Obviously there are additional reasons for each of these activities. For example, youngsters often go to the dentist because their parents take them, or tell them to go; or brush their teeth because they are told to, or because it is part of a household ritual. However, the purpose of the question was not to determine all of the reasons for engaging in these activities, but to determine the balance between perceptions of health and nonhealth (particularly appearance) benefits.

Scoring. For each question, a respondent choosing two nonhealth responses was given a score of "1;" those choosing one health and one nonhealth response were given a score of "2;" and those selecting two health

responses were given a score of "3." The magnitude of these scores reflected the degree to which youngsters perceived health benefits accruing to their actions. Responses of "I don't go" or I don't brush" were eliminated from major analyses.

INTENTIONS TO TAKE HEALTH ACTIONS

Intentions to take health actions were assessed in two ways: through a measure of preventive attitudes, and through questions about intentions of making dental visits.

Preventive Attitudes

The degree to which young persons see themselves as preventively oriented in the future was assessed through a series of nine expectancy-type questions, such as "What chance is there that when you are grown up you would visit a doctor even if you don't feel sick?" The other preventive behaviors were: probably find yourself smoking some cigarettes every day; eat some vegetables and fruits every day; forget to use safety belts when you ride in a car; get some exercise every day; use a lot of your spending money to buy tasty snacks like candy, cake and potato chips; want to have a fever thermometer in your home; first go to the drugstore if you felt sick and needed help; and, get a flu shot if it were given free.

For each question the youngsters selected one of seven responses alternatives: no chance, almost no chance, a small chance, a medium chance, a good chance, almost certain, and certain.

Scoring. Responses were scored as follows: "1" for the "no chance" alternative, through "7" for the "certain" alternative, with appropriate scoring reversals, so that the highest preventive score would be "7."

Instructions. The questions were prefaced with these instructions: "The next group of questions deals with things you might do when you are older and grown up. At that time you will be on your own and doing the things you want to do. For each question, circle the one answer that best tells what you think you might be doing then. It doesn't matter what you think other people would way or whether they would agree with you or not. We want to know what you think."

Reliability. Significant r's were observed for 21 out of 36 pairs among Study II third graders, and for 19 pairs among Study II seventh graders, with no significant r's in the wrong direction. The split-halves reliability coefficients (controlling for reverse formats) were .26 and .35, respectively (p's < .005, .0005) reflecting statistical significance. Although this is a lower level of reliability than observed for perceived vulnerability, it is acceptable for research purposes.

Intentions of Making Dental Visits

A youngster's intentions of making future dental visits was assessed through two questions. One was an expectancy-type question: What chance is there of your going to the dentist during this next year?" The seven response alternatives and scoring used for perceived vulnerability were used: "1" reflecting the lowest intention of taking action; "7," the highest.

In the second question, the youngster was asked: When do you think you will visit the dentist again?" For November administrations the choices were: this fall, this winter, next spring, next summer, sometime later next year, or never. For May administrations the choices were: this spring, this summer, this fall, this winter, sometime next year, or never. Responses reflecting the least amount of delay were scored as "1;"

increasing expectations of delay as "2," "3," etc. For purposes of data analysis, responses were treated as a quasi-interval scale (Cureton, 1968).

Of course, dental visits are determined by a variety of other factors, especially socioeconomic status; and intentions, particularly of younger children are not veridical indices of reality. But intentions of making a visit are an important psychological dimension in this research.

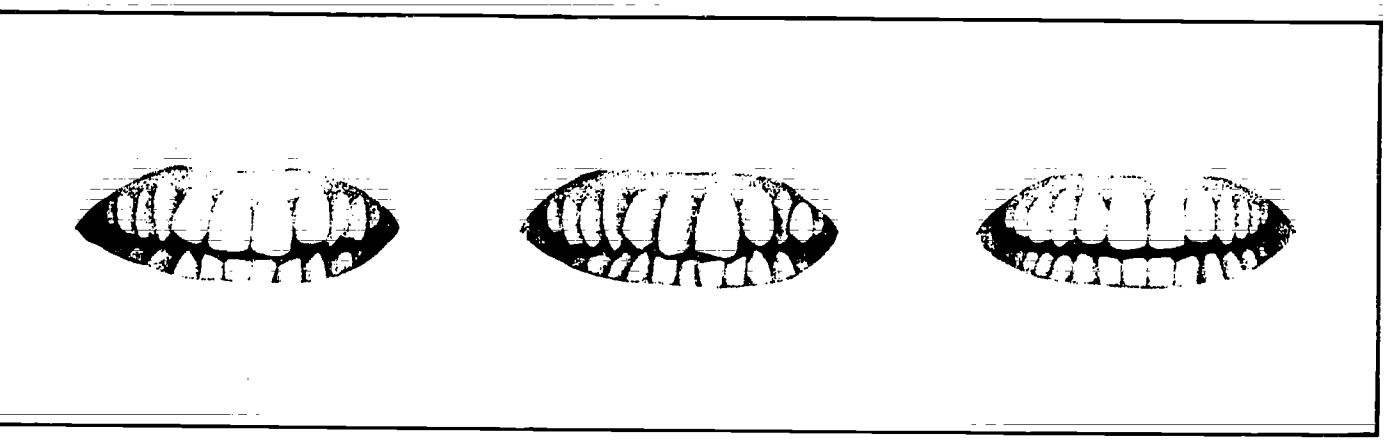
HEALTH MOTIVATION

Health motivation was measured by the Mouth Appearance Pictures (MAP), an internally consistent set of nine pairs of pictures which require a child to choose between a more attractive by less healthy mouth and a less attractive but healthier mouth. Respondents circle the one mouth in each pair that they would like to have. There are three degrees of attractiveness (straight, moderately crooked, and severely crooked teeth) and three degrees of health (two, five and eight cavities).

Considerable care was taken in the drafting of the pictures to eliminate apparent racial characteristics. As an additional precaution, the pictures were printed on buff-toned paper to minimize cues for racial identification. Figure 1 shows the basic pictures used in Study II. (In Study I the pictures had lip contours; these were eliminated in Study II.) In Study I 99% of the sample selected the mouth with the straight teeth as the one most wanted; 93.3% selected the one with the most crooked teeth as the one least wanted. Among Study II third graders, 97.8% selected the mouth with the straight teeth as the one most wanted; 94.9% selected the one with the most crooked teeth as the one least wanted. Among Study II seventh graders, the figures were 99.4% and 97.7%. The basic assumptions underlying the relative attractiveness of the mouths were thus confirmed.

Figure 1

The Mouth Appearance Pictures (MAP)



Moderately Crooked

Severely Crooked

Straight

(Details of the development of the task are provided in Gochman, 1972b, 1975.)

Scoring. Responses reflecting an appearance choice were scored as 1; those reflecting a health choice, as 2.

Reliability. Analyses of item-pair correlations (e.g., Gochman, 1975) revealed the measure to be reliable in terms of internal consistency for the Study I sample; phi coefficients ranged from .56 to .76 ($p < .0005$). In Study II odd-even r's of .94 and .87 (p's $< .0001$) were obtained in the third and seventh grades respectively, confirming the internal consistency of the measure.

DENTAL BELIEFS

General Evaluative Beliefs

The evaluative beliefs that a young person maintains about teeth in general were assessed through two series of five questions. These were modified semantic-differential sentence completion types of measures. In each series, the child is asked to finish a sentence by circling the one answer in each pair of five answers that tells what the child thinks. In the first series the sentence begins: "Bad teeth are_____;" in the second series the sentence begins: "Good teeth are_____." In each series the pairs of answers from which the child must choose are sick/healthy, straight/crooked, strong/weak, ugly/nice looking, and clean/dirty. No special scoring system was needed since there was no intention or necessity to create a scale or composite measure based on these items.

Beliefs About Toothbrushing

Beliefs about toothbrushing frequency were assessed through responses to the question, "How often do you think you should brush your teeth?" In the Study I format respondents were given the following alternatives (in

order): less than once a day, once a day, 2 times a day, 3 or more times a day, or never; scored respectively, 1, 2, 3, 4 and 0. In Study II, greater variability was introduced by adding "4 or more times a day" and modifying "3 or more..." to "3 times a day." (These were scored "5" and "4", respectively.) For purposes of data analysis, responses to these questions were treated as quasi-interval scales (Cureton, 1968).

SELF-CONCEPT

The manner in which youngsters evaluate their own teeth was used as a measure of self-concept. These evaluations were determined through a series of questions similar to those described in the preceding section, except that the sentence to be completed was: "My teeth are_____."

Scoring. Positive choices were scored as "1;' negative ones as "2." The average number of negative (i.e., sick, crooked, weak, ugly, dirty) choices made by each respondent was used as an index of self-concept, i.e., an average score of "1" would reflect a totally positive self-concept, while scores greater than "1" would reflect a less positive, or negative, self concept. It must be pointed out that such a measure is not an attempt to assess total self-concept but a severely limited segment of it.

PROCEDURES

THE TWO STUDIES

Study I was a cross-sectional investigation of youngsters in grades 3 through 9. Measures were obtained only once. Study II, begun a year and a half later, was a longitudinal investigation of 3rd and 7th grade youngsters. Measures were obtained from these respondents 5 times at 6-month intervals, over the 2-year period. At the study's termination the children were in the 5th and 9th grades, respectively.

Although essentials remained the same through the several stages of the research, minor changes and some substantive additions were incorporated into the procedure during the three and one-half years of the research. For example, the preventive attitude scale was not introduced until the third session of Study II, and the MAP were slightly modified to remove lip contours at the start of Study II.

The several measures were incorporated into a single questionnaire. To overcome test associations the pages of the questionnaires were prepared on paper of six different colors. The questions were designed for, and administered during, regular class hours by two members of the research team. The potential respondents were assured of confidentiality and anonymity, that there were no right or wrong answers, and that the questionnaire was not a test. They were permitted to decline to participate if they wished. In all classes, to insure standardization, each item was read aloud.

SAMPLE SELECTION

In Study I, a sample of 774 children was obtained through the Flint, Michigan school system. At Grades 3 through 6, 1 class was obtained in each

of 4 elementary schools, 2 located in inner-city and two in noninner-city areas. For grades 7 through 9, 2 classes at each level were obtained in an inner-city and 2 in a noninner-city junior high school. A total of 28 classes, 4 at each of 7 grade levels was thus obtained.

Study II began with a sample of 1341 youngsters, obtained from the same school system: 686 3rd graders and 655 7th graders. A total of 48 classes were made up of two 3rd grade classes in each of 12 elementary schools and six 7th grade classes in each of 4 junior high schools. Of the 12 grade schools, 4 were located in inner-city areas, 6 in noninner-city areas, and 2 in areas that were located between inner-city and noninner-city communities. Of the 4 junior high schools, 1 was located in the inner city, 1 in a noninner-city area, and 2 could not be readily classified as either in one area or another.

Neither of these studies involved a probability sample, since in neither study was there some known chance of including either every child, every classroom, or every school within the system. Instead, the samples were selected from a population of schools with the following characteristics:

1) a principal who maintained a favorable attitude toward the research, 2) students who were thought to be willing to cooperate, 3) teachers who were willing to cooperate, 4) the requisite number of classes at each grade level, and, for Study II, 5) location in a relatively stable community, one with an expected low rate of family mobility. When these factors were considered in conjunction with the necessity of seeking socioeconomic heterogeneity, there was virtually no freedom to permit probability sampling.

Youngsters' Health Cognitions

Of the respondents who participated in the first questionnaire administration in Study II, 605 completed all five sessions. Two factors account for this unexpected attrition: 1) a school that had initially agreed to participate, subsequently withdrew from the study after the first two sessions, for reasons unrelated to the research, and 2) several new schools were constructed in neighborhoods adjacent to those in the study, leading to the transfer of numerous respondents between the third and fourth questionnaire sessions. This only came to light after the fact. On the basis of very acceptable attrition levels between the second and third sessions (when, in fact, a considerably higher level had been anticipated) only minimal attrition was expected at these later sessions. Although no resources were available for systematic follow-ups, a rigorous attempt was made between the fourth and fifth sessions to reach all respondents who had completed the initial four sessions, as well as those who had completed at least the first and third.

SOCIOECONOMIC STATUS

In Study I, socioeconomic status was defined essentially in terms of geography: the inner-city schools drew their students from residential areas that were thought to differ considerably in terms of income and other indices of social class from the schools in noninner-city areas. However, no attempt was made to devise a more precise rating or ranking scheme, since there was apparently markedly little variability within the two geographical groupings. (Evidence gathered later in Study II based on census surveys confirmed the validity of the distinction between inner-city and noninner-city.)

Youngsters' Health Cognitions

In Study II, with a larger number of schools drawn from a more heterogeneous group of neighborhoods it was possible to develop a more systematic measure of socioeconomic status. Using income and educational level data (1970 figures, relevant to time of data collection) for each of the city's residential areas (made available by the Flint City Health Department and the Michigan Department of Public Health Center for Health Statistics), and superimposing maps of the school districts on maps of these residential areas, it became possible to rank each school district in terms of the following indices: percent of families reporting an income of less than $4,000 per year, percent of families reporting an income of at least $12,000 per year, percent of persons reporting completion of less than 12 grades of school, and percent of persons reporting completion of at least four years of college.

The school districts were ranked independently by both the investigator and an assistant; rho's for the two rankings ranged from .80 to .92 for the four dimensions for the twelve elementary schools. The sum of their two sets of ranking provided a single measure for each school in each of the four dimensions. These were then totalled across each of the four dimensions to provide a single, final sum for each school. The distribution of these sums led to grouping the twelve elementary schools into three socioeconomic levels: low (2), middle (6), and high (4); and the 4 junior high schools into low (1), low-middle (2) and high-middle (1) levels.

Complete sample characteristics are provided in Table 1.

Table 1

Sample Characteristics

	Study I		Study II			
			3rd Grade		7th Grade	
			First session		First session	
Age						
Months	146		104		152	
Years	12.16		8.67		12.67	
SD	24 Months		6 Months		6 Months	
Race						
White	429	57.2%	348	52.6%	331	51.6%
Nonwhite	321	42.8%	313	47.4%	310	48.4%
M.D.	24		25		14	
Gender						
Male	397	51.3%	376	55.1%	326	50.1%
Female	377	48.7%	306	44.9%	325	49.9%
M.D.	0		4		4	
SES						
IC / Lo / Lo	372	48.1%	109	15.9%	174	26.6%
NIC /Mid/LoMid	402	51.9%	347	50.6%	330	50.4%
/Hi /HiMid			230	33.5%	151	23.0%
N	774		686		655	
(Completed five sessions)			(327)		(278)	

RESULTS

AVERAGE VALUES

This section describes the average values for each variable for the three samples. Where data in the text are presented in series, they are ordered as follows: Study I, Study II 3rd-graders, Study II 7th-graders. All of these values are also presented in Table 2, which appears at the end of this section. This section is followed by analyses of developmental and demographic effects.

PERCEIVED VULNERABILITY

Respondents do not see themselves as either decidedly vulnerable or decidedly invulnerable to health problems. Perceived vulnerability scores were close to the mid-point of the 7-point scale in all three samples (4.10, 3.49, 4.34).

PERCEIVED BENEFITS

Visiting the Dentist

Respondents answering with the requisite two reasons revealed a relatively neutral stance in their attribution of benefits to a dental visit. Going to the dentist was not perceived as decidedly beneficial either to health or to appearance, although it was believed to have slightly greater health benefits in Study I and among 7th graders in Study II (2.18, 2.20), and slightly fewer health benefits among Study II 3rd-graders (1.98).

Moreover, strong consensus exists about the reasons for going to the dentist. The reasons most frequently selected in all three samples by those who selected at least one reason, was "I want to keep my teeth a long time" (42.4%, N=678; 32.9%, N=557; 41.9%, N=560). (For additional details on these

responses, see Gochman, 1984.)

Brushing Teeth

Even greater neutrality in attribution of benefits exists for brushing teeth. The mean perceived benefits scores clearly indicate that brushing teeth is not seen as especially beneficial either to health or to appearance among those respondents answering with the requiste two reasons (2.00, 1.99, 1.97).

In addition, strong consensus exists on the reasons for brushing. The reason most frequently selected in all three samples, among those who selected at least one reason, was "I want to stop cavities" (39.0%, N=761, 34.0%, N=642, 43.4%, N=637).

Composite Benefits

A composite benefits score, the mean of the two indices just described, was introduced in Study II. It also reflects the equivocality of the individual perceived benefits measures. In neither sample was there appreciable attribution of either health or appearance benefits (1.98, 2.07).

INTENTIONS TO TAKE HEALTH ACTIONS

Preventive Attitudes

Both Study II samples showed relatively positive preventive attitudes (first measured when they were 4th and 8th graders (5.45, 5.12)): they believed they would be relatively likely to engage in future preventive behaviors.

Dental Visits

In each sample, respondents believed themselves to be relatively likely to make a dental visit within the coming year (5.66, 4.93, 5.36).

Youngsters' Health Cognitions

Timing of Dental Visits

Although nearly two-thirds of the Study I sample believed they would visit the dentist again within the next four months (combined responses of "this spring" and "this summer"), about one-fifth believed that such a visit would not be made during that year (combined responses of "sometime next year" and "never").

The modal response to the question, "When do you think you will visit the dentist again", was "this summer" (45.9%), followed by "this spring" (17.2%; in reality, only 6 weeks of spring remained), "this fall" (13.9%), "sometime next year" (12.1%), "never" (8.7%), and "this winter" (2.2%).

Fewer Study II respondents believed they would make a dental visit within the ensuing four months than in Study I. The modal response among third graders was "sometime later next year" (23.1%), although this was apparently not appreciably a more frequent response than "this winter" (18.9%). These were followed by "next summer" (13.0%) and "next spring" (10.1%). Among seventh graders, the modal response was "this winter" (30.0%), followed by "sometime later next year" (22.0%), "next spring" (16.3%), "this fall" (13.8%), "next summer" (9.6%), and "never" (8.3%).

HEALTH MOTIVATION

With the exception of the youngest sample (3rd graders, and only for the first two sessions), respondents chose mouths which were more attractive, but less healthy (1.37, 1.64, 1.26), indicating a general preference for appearance over health.

DENTAL BELIEFS

Good Teeth and Bad Teeth

There was virtual unanimity and little variability in any sample in beliefs about "good teeth" and "bad teeth." Good teeth were uniformly

characterized as "healthy," "straight," "strong," "nice looking," and "clean." Bad teeth were uniformly characterized as "sick," "crooked," "weak," "ugly," and "dirty." See Table 2 for these percentages.

Toothbrushing

Respondents in all three samples indicated a belief in relatively frequent daily toothbrushing, at least 3 times a day. Moreover, the proportion who believed that teeth should be brushed at least 3 times a day is virtually identical in all 3 samples. The modal response in Study I was "3 or more time a day", (78.6%), while "2 times a day" was the next most often selected (18.1%). The remaining alternatives were selected by very few (3.3%).

Among third graders in Study II (using the expanded response format), the modal response was "4 or more times a day" (44.9%), while "3 times a day" was next most often chosen (36.4%). The remaining alternatives were selected by fewer than one-fifth (18.7%). Among seventh graders, the modal response was "3 times a day" (47.8%), followed by "4 or more times a day" (25.7%).

SELF-CONCEPT AND "MY TEETH"

Responses to "my teeth" overwhelmingly characterize them as "healthy," "straight," "strong," "nice looking," and "clean," although the percentages were lower than the comparable ones for "good teeth." Most respondents evaluated their own teeth consistently in a positive manner, i.e., as healthy, straight, strong, nice looking, and, clean (61.3%, 68.7%, 68.8%), while the remainder evaluated their teeth negatively on at least one dimension. Negative self-concept scores are thus relatively low (1.14, 1.13, 1.12).

Table 2

Mean Values for Health Cognitions

Cognition	Study I			Study II					
				3rd Grade			7th Grade		
	M	SD	N	M	SD	N	M	SD	N
Vulnerability									
	4.10	0.94	774	3.49	1.13	686	4.34	0.83	655
Benefits									
Visits	2.18	0.51	660	1.98	0.54	537	2.20	0.52	550
Brushing	2.00	0.54	747	1.99	0.55	621	1.97	0.49	626
Composite				1.98	0.44	661	2.07	0.42	642
Intentions[a]									
Preventive Attitudes				5.48	1.00	508	5.12	0.81	506
Visit	5.66	1.67	772	4.93	1.98	682	5.36	1.89	655
Motivation	1.37	0.40	771	1.64	0.42	684	1.26	0.36	647
Good Teeth									
Healthy	99.4%		773	95.3%		679	98.5%		653
Straight	98.6%		771	95.9%		675	99.2%		652
Strong	99.5%		773	96.0%		670	98.7%		651
Nice	99.7%		773	96.2%		678	99.2%		652
Clean	99.2%		772	97.6%		676	99.2%		651

(table continues)

Table 2 (continued)

Cognition	Study I			Study II					
				3rd Grade			7th Grade		
	M	SD	N	M	SD	N	M	SD	N
Bad Teeth									
Sick	98.1%		772	86.9%		672	98.8%		652
Crooked	97.0%		771	89.3%		670	97.8%		651
Weak	98.2%		774	89.3%		674	97.7%		650
Ugly	98.4%		771	89.2%		676	98.3%		652
Dirty	97.6%		772	90.5%		671	98.3%		649
My Teeth									
Healthy	89.3%		773	88.0%		675	91.0%		652
Straight	75.8%		770	79.9%		678	79.1%		650
Strong	93.4%		769	91.4%		675	94.3%		647
Nice	82.7%		769	88.1%		675	84.1%		647
Clean	90.7%		771	89.1%		677	92.9%		649
Should Brush									
Mode	>3x	78.6%	774	>4x	44.9%	671	>3x	47.8%	651
Self Concept	1.14	0.21	762	1.13	0.24	675	1.12	0.21	650

[a] Data in text suffice for Timing of Next Visit

DEVELOPMENTAL AND DEMOGRAPHIC EFFECTS

Since age, gender and socioeconomic status interact at times, each health cognition is discussed comprehensively. Developmental and demographic analyses were performed for most variables, except for those dental beliefs where virtually no variability existed, i.e., beliefs about good and bad teeth. Tables organizing these analyses appear at the end of the section on each cognition.

In Study I the basic statistical technique was a general linear hypothesis model for multiple analysis of variance with unequal cell ns. Gender and socioeconomic status were each treated as dichotomous variables, and the total sample was broken down into 4 age groups: 8-9 year-olds, 10-11 year-olds, 12-13 year-olds, and 14 and older. While such analyses reveal the degree to which the several group means differ among themselves, they do not test whether such differences reflect linear progressions or relationships. Where analysis of variance showed that a variable was significantly related to age, linearity was determined by comparing the overall correlation ratio, eta (the general descriptive statistic tested by F), with the correlation coefficient, r, computed between the variable and age scores (collapsed into the 4 groupings). Where eta is both significant and significantly larger than r (tested by F_3; McNemar, 1955, p.251), the overall relationship between the two variables cannot be described as linear (even if the value of r is significant). When r is significant and is not significantly smaller than eta, then the notion of linearity cannot be rejected.

Study II data required a different multiple analysis of variance model

for major variables, one based on repeated observations at different times (e.g., Cole and Grizzle, 1966; Grizzle and Allen, 1969). Main effects, interactions, and linearity and curvilinearity, were tested with F distribution statistics. The strength of this model is its use of repeated measures. This is a mild liability in determining the main effects of gender and socioeconomic status since the model uses data only from those respondents who participated in all five sessions, a number smaller than those who participated once or twice. However, this was the only way of determining age effects and the most efficient way of assessing interactions. Where either additional one-way analyses of variance or t tests were required because of interactions, these are based on more complete cases, generally at the first and fifth sessions. For simplicity, exemplar reference is made to values at the first and fifth session. At times, while an overall gender or socioeconomic effect is detected, the scores reported as examples may not themselves be significantly different from one another. This repeated measures model was not used in analyses of specific perceived benefits scores or for the timing of the next dental visit.

To determine cross-sectional age differences in Study II, t tests were performed between 3rd and 7th grade scores at the first session.

Perceived Vulnerability and Tests of the Hypothesis

In Study I significant main effects were observed for age ($F(3, 734) = 11.08$, $p < .001$), socioeconomic status ($F(1, 734) = 28.30$, $p < .001$), and gender ($F(1, 734) = 8.83$, $p < .01$). There was also a significant interaction between age and socioeconomic status ($F(3, 734) = 5.85$, $p < .001$), which modifies interpretations of their main effects.

While levels of perceived vulnerability increased through the first three age groups, and then decreased (3.74, 4.06, 4.26, 4.22), one-way analyses of variance within each socioeconomic group, with the four levels of age as the independent variable, showed that perceived vulnerability scores increased significantly with age among inner-city youngsters (3.22, 3.89, 4.16, 4.17 ($F(3, 349) = 13.48$, $p < .001$), but were not related to age among noninner-city youngsters (4.14, 4.20, 4.36, 4.28). Moreover comparisons of significant etas and rs within the total Study I sample and within the inner-city respondents indicated that the relationships between age and perceived vulnerability are nonlinear ($F_3(2, 746) = 3.54$, $p < .05$; $F_3(2, 349) = 4.58$, $p < .05$). Perceived vulnerability increases, then decreases. Furthermore, the relationship in the total sample is attributable primarily to developmental changes among inner-city respondents.

While inner-city respondents at first glance appear to have lower levels of perceived vulnerability than noninner-city respondents (3.94 vs. 4.25), t tests within each of the four age groups revealed that significant differences in levels of perceived vulnerability between inner-city and noninner-city youngsters existed only in the two groups younger than twelve years ($ts(103.32, 191.99) = 4.93, 2.32$; $ps < .001, .05$).

Females showed significantly higher levels of perceived vulnerability than did males (4.21 vs. 4.00).

Among 3rd graders in Study II a significant main effect was observed for age, i.e., change over time, in the entire sample ($F(4, 318) = 25.43$, $p < .001$). However, a significant three-way interaction between gender, socioeconomic status and change over time ($F(8, 636) = 2.31$, $p < .02$) necessitated analyses of each gender / socioeconomic group. Significant change over time was observed in each of these six groups: each group showed significant positive slope; each female group showed significant curvilinearity as well.

Among 7th graders a significant main effect was observed for age in the entire sample ($F(4, 269) = 2.79$, $p < .05$), with no significant two-way or three-way interactions. This change over time, however, showed significant negative slope ($F(1, 272) = 5.55$, $p < .02$), and no curvilinearity. In addition, 7 graders had significantly higher levels of perceived vulnerability than 3rd graders (4.34 vs. 3.49; $t(1260.87) = 15.64$, $p < .001$).

Age is thus significantly, but nonlinearly, related to perceived vulnerability. Perceived vulnerability increases developmentally up to about age 14, but the precise shape of the developmental curve varies with gender. After age 14, perceived vulnerability decreases developmentally. The hypothesis is only partially confirmed: older respondents do demonstrate higher levels of perceived vulnerability than younger ones.

Table 3 outlines the analyses of perceived vulnerability.

Table 3

Levels of Perceived Vulnerability by Age (Session), Gender and Socioeconomic Status (SES)

Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	3.74	4.06	4.26	4.22	4.00	4.21	3.94	4.25
SD	1.13	.99	.83	.75	.97	.89	1.04	.80
n	133	224	221	172	397	377	372	402
F	11.08[c]				8.83[b]		28.30[c]	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	3.49	3.75	3.94	4.03	4.22	3.47	3.53	3.14	3.52	3.62
SD	1.13	1.10	1.01	1.05	.97	1.13	1.12	1.06	1.13	1.12
n	686	674	510	478	508	376	307	109	347	230
F	25.43[c]					4.42[a]		4.44[a]		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	4.34	4.32	4.27	4.32	4.23	4.29	4.38	4.25	4.31	4.49
SD	.83	.87	.85	.85	.92	.85	.82	.88	.86	.70
n	655	647	505	462	430	326	325	174	330	151
F	2.79[a]					7.65[b]		N.S.		

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$

(table continues)

Table 3 (continued)

Additional Developmental Analysis for 3rd Grade

Sample	N	Level of perceived vulnerability					Change over time		Slope over time		Curve over time	
		Session					F (df=4/318)	p	F (df=1/321)	p	F (df=3/319)	p
		1	2	3	4	5						
SES	34	3.14	3.48	3.45	3.53	3.84	2.96	.0199	7.96	.0053	.76	N.S.
w	21	3.07	3.63	4.20	4.06	4.08	5.92	.0003	14.29	.0004	3.39	.0181
le SES	71	3.66	3.76	3.86	3.98	4.11	2.58	.0366	9.95	.0022	.02	N.S.
dle SES	62	3.82	3.79	3.93	3.73	4.49	10.92	.0001	11.60	.0011	8.88	.0001
SES	78	3.54	3.72	4.03	4.09	4.24	7.47	.0001	27.68	.0001	.86	N.S.
gh SES	61	3.55	4.10	4.30	4.26	4.38	8.79	.0001	23.13	.0001	3.67	.0126

Perceived Benefits

Visiting the dentist. In Study I, both socioeconomic status and age were observed to have significant main effects upon attribution of health benefits to a dental visit ($F(1, 623) = 7.45$, $p < .01$; $F(3, 623) = 4.04$, $p < .01$). There was no main effect for gender, and no interactions. Respondents in inner-city schools attribute significantly higher levels of health benefits to a dental visit than do their noninner-city counterparts (2.25, 2.13). Comparisons of the mean scores across the 4 age groups (2.07, 2.16, 2.28, 2.19), together with the comparison of *eta* and *r*, indicated that the significant relationship between age and attribution of health benefits to a dental visit is nonlinear ($F_3(2, 623) = 3.33$, $p < .05$); attribution of health benefits increases with age until age 14, after 14 it decreases.

In Study II, no significant differences were observed between first and fifth session scores for either sample, although 3rd graders did attribute significantly lower health benefits to a dental visit than did 7th graders (1.98, 2.20; $t(1085) = 6.92$, $p < .001$). There were no gender effects for either sample at the first session. However, at the fifth session, among 3rd graders, significantly greater health benefits were attributed to a dental visit by males than by females (2.11, 1.98; $t(396) = 2.83$, $p < .01$). Among 7th graders at the fifth session, the reverse was true: females attributed significantly greater health benefits than did males (2.31, 2.15; $t(345) = 3.06$, $p < .01$).

There were no socioeconomic status effects at the first session. However, by session five, a significant curvilinear relationship was observed among 3rd graders ($F(2, 437) = 3.47$, $p < .05$; $F_3(1, 437) = 4.86$, $p < .05$): the middle socioeconomic level attributes greater health benefits than the low or high levels. A significant inverse relationship with

socioeconomic status was observed at the fifth session among 7th graders ($F(2, 355) = 5.15$, $p < .01$).

Attribution of health benefits to a dental visit is at times inversely related to socioeconomic status, especially among older respondents: those from lower socioeconomic levels attribute greater health benefits to a dental visit than do those from higher levels, but the relationship is not unequivocal. Attribution of health benefits is related to age in a nonlinear way, apparently increasing developmentally up to age 12 or 13, and then decreasing. Gender is not consistently related to attribution of health benefits to a dental visit.

Brushing teeth. In Study I, a significant gender effect was observed. Males attributed higher levels of health benefits to toothbrushing than did females (2.07, 1.92; $F(1, 707) = 12.86$, $p < .001$). There were no main effects for age or for socioeconomic status, but these were observed to interact ($F(3, 707) = 2.98$, $p < .05$). Further analyses showed that age and perceived benefits were significantly related only among noninner-city respondents ($F(3, 381) = 3.31$, $p < .05$). Among respondents aged 12 - 13, those in the inner city attributed fewer health benefits to brushing their teeth than did noninner-city residents ($t(204) = 2.28$, $p < .05$).

The respective means for the 4 age groups of noninner-city respondents were 2.04, 2.10, 2.05, and 1.88, suggesting an initial increase in perceived health benefits between ages 8 and 11, followed by a decrease. However,

the difference between eta and r is not significant, and the relationship between age and attributing health benefits to brushing cannot be described as nonlinear.

Among 3rd graders in Study II, attribution of health benefits at the first session was significantly higher than at the fifth session (1.99, 1.87, $t(360) = 2.85$, $p < .01$), but no such age effect was observed among 7th graders. Moreover, no difference was observed between 3rd and 7th graders at the first session. There were no socioeconomic effects for either sample at either session, but a gender difference was observed among 7th graders at the first session; males attributing greater health benefits to toothbrushing than females (2.02, 1.93; $t(620) = 2.26$, $p < .05$). At the fifth session this relationship was observed among 3rd graders (1.94, 1.82; $t(420.96) = 2.12$, $p < .05$), and approached significance among 7th graders.

Attribution of health benefits to toothbrushing thus appears to be related in a consistent way only to gender, males attributing greater health benefits than females in most instances. Limited developmental and socioeconomic effects exist, but they are not clear-cut or consistent.

Composite benefits. Among 3rd graders, only gender was observed to have an effect on benefits ($F(1, 280) = 3.82$, $p < .05$), males attributing greater health benefits than females to the actions involved, both at the first session (2.02, 1.93) and at the fifth session (2.03, 1.89). Among 7th graders there were no gender or socioeconomic effects, and a main effect for age only approaches significance. Seventh graders showed significantly higher levels of perceived health benefits than third graders (2.07, 1.98; $t(1301) = 3.73$, $p < .001$).

Table 4 summarizes the analyses of perceived benefits.

Table 4

Levels of Perceived Benefits by Age (Session), Gender and Socioeconomic Status (SES)

Benefits: Study I

Visits	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	2.07	2.16	2.28	2.19	2.18	2.19	2.25	2.13
SD	.57	.51	.51	.47	.49	.54	.53	.49
n	117	195	178	149	336	324	276	384
F	4.04^b; $F_3 = 3.33^a$				N.S.		7.45^b	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	1.98	2.03	1.99	2.05	2.06	2.01	1.93	1.99	1.97	1.98
SD	.54	.52	.53	.49	.46	.51	.57	.51	.54	.55
n	537	557	462	440	440	294	241	81	258	198
t	1st - 5th, N.S.					1st, N.S.		1st, F = N.S.		
						5th, 2.83^b		5th, $F = 3.47^a$		
								$F_3 = 4.86^a$		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	2.20	2.17	2.23	2.21	2.23	2.20	2.19	2.24	2.17	2.20
SD	.52	.51	.51	.54	.50	.52	.52	.56	.50	.51
n	550	504	437	379	358	276	272	140	285	125
t	1st - 5th, N. S.					1st, N. S.		1st, F = N.S.		
	3rd - 7th, 6.92^c					5th, 3.06^b		5th, $F = 5.15^b$		

(table continues)

Table 4 (continued)

Benefits:

Brush

Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	2.06	2.04	1.97	1.94	2.07	1.92	1.97	2.02
SD	.57	.58	.54	.48	.54	.53	.58	.50
n	131	222	206	164	381	366	357	390
F	N.S.				12.86[c]		N.S.	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	1.99	1.90	1.91	1.91	1.89	2.02	1.94	1.88	1.98	2.04
SD	.55	.58	.63	.60	.61	.58	.51	.56	.57	.52
n	621	625	464	440	467	337	281	95	316	210
t	1st - 5th, 2.85[b]					1st, N.S.		1st, N.S.		
						5th, 2.10[a]		5th. N.S.		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	1.97	1.87	1.90	1.89	1.92	2.02	1.93	1.95	1.98	1.99
SD	.49	.54	.58	.55	.60	.51	.46	.51	.51	.42
n	626	568	473	414	365	303	319	172	310	144
t	1st - 5th, N.S.					1st, 2.26[a]		1st, N.S.		
	3rd - 7th, N.S.					5th, N.S.		5th, N.S.		

(table continues)

Table 4 (continued)

Benefits:

Composite

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	1.98	1.96	1.95	1.98	1.97	2.02	1.93	1.93	1.97	2.01
SD	.44	.44	.47	.43	.44	.45	.42	.42	.44	.44
n	661	652	498	469	487	361	297	103	335	223
F	N.S.					3.82[a]		N.S.		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	2.07	2.00	2.04	2.03	2.07	2.10	2.04	2.06	2.06	2.08
SD	.42	.47	.46	.44	.47	.43	.41	.46	.42	.36
n	642	614	495	437	397	316	322	172	324	146
F	N.S.					N.S.		N.S.		

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$

Intentions to Take Health Actions

Preventive attitudes. Among 3rd graders, a significant 3-way interaction was observed for curvilinearity of age effects ($F(2, 348) = 3.96$, $p < .05$), but not for linearity. This cautions against ready interpretation of the main effect for age ($F(2, 347) = 5.12$, $p < .01$). No 2-way interactions were observed. Significant main effects were observed for gender ($F(1, 348) = 9.79$, $p < .01$), and socioeconomic status ($F(2, 348) = 5.26$, $p < .01$). Males showed significantly lower levels of preventive attitudes than females (at session three: 5.38, 5.53; at session five: 5.33, 5.63). Socioeconomic status was positively associated with levels of preventive attitudes (at session three: 5.25, 5.30, 5.67; at session five: 5.43, 5.40, 5.57, but scores at this latter session do not themselves differ significantly from one another).

The 3-way interaction necessitated examining different demographic groups. One group, high socioeconomic status males, showed significant slope ($F(1, 348) = 6.99$, $p < .01$), and curvilinearity ($F(1, 348) = 15.04$, $p < .001$); two others, middle and high level socioeconomic status females, showed curvilinearity ($F(1, 348) = 9.55$, $p < .01$; $F(1, 348) = 3.68$, $p < .06$). However, no changes over time were observed in the remaining three groups.

Among 7th graders, the significant main effects of gender ($F(1, 307) = 5.70$, $p < .05$), and socioeconomic status ($F(2, 307) = 4.72$, $p < .01$) were again observed: males showed significantly lower levels than females (at session 3: 5.05, 5.19; at session 5: 4.99, 5.20), and socioeconomic status was positively associated with levels of preventive attitudes (at session three: 4.95, 5.10, 5.32; at session five: 4.97, 5.12,

5.21 -- but these latter scores do not differ significantly from one another).

Development thus seems to have no consistent effect on preventive attitudes in either sample. Gender is consistent in its effects: females are more likely than males to believe they will engage in future preventive behaviors. While respondents from higher socioeconomic levels are generally more likely to believe they will engage in future preventive behaviors than those from lower socioeconomic levels, the effects of socioeconomic status diminish with age.

Dental visits. In Study I, socioeconomic status was observed to have a significant main effect on the expectancy of making a dental visit ($F(1, 732) = 168.35$, $p < .001$); inner-city youngsters showing a lower expectancy than noninner-city youngsters (4.94, 6.34). Age and gender were observed to interact significantly ($F(3, 732) = 3.68$, $p < .05$), but the additional one-way analyses of variance and t tests revealed only that among children aged 14 and older, males had somewhat lower expectancies of making a visit than females.

In Study II there was a significant age effect among 3rd graders, intentions being lower at the first session than at the fifth session (5.00, 5.56; $t(419) = 4.70$, $p < .001$), but not among 7th graders. However, 7th graders showed higher expectancies than 3rd graders (5.36, 4.93; $t(1335) = 4.01$, $p < .001$). There were no significant gender differences at either the first or fifth session. Socioeconomic status was significantly and directly related to intention among 3rd graders at the first session (3.98, 5.02, 5.25; $F(2, 504) = 16.46$, $p < .001$); and among 7th graders at the first session (4.93, 5.46, 5.62; $F(2, 652) = 6.46$, $p < .01$) and at the fifth session (4.84, 5.32, 5.53; $F(2, 427 = 3.26$, $p < .05$).

The intention to make a dental visit is thus consistently and directly related to socioeconomic status. Respondents from higher socioeconomic levels believe themselves more likely to make a dental visit during the coming year than respondents from lower socioeconomic levels. Gender is not related in any consistent way to intention, and only among the very young is there a developmentally related increase in the intention to make a visit.

Timing of visit. In Study I, one-way analyses of variance revealed no significant relationship between age and timing of the next visit for the total sample, but a significant and linear increase among inner-city residents: the very oldest group of respondents anticipated less delay than younger ones (3.29, 3.29, 3.28, 2.51; ($F(3, 346) = 4.30$, $p < .01$; $F_2(1, 348) = 7.55$, $p < .01$). Inner-city youngsters showed significantly greater delay in their projection of their next dental visit than did noninner-city youngsters ($t(650.47) = 6.23$, $p < .001$). Males showed significantly greater anticipation of delay than females ($t(767) = 2.67$, $p < .01$).

In Study II, among 3rd graders, there was a significant decrease in the degree of expected delay between the first and fifth sessions (3.57, 3.16; $t(400) = 3.96$, $p < .001$). There was no age-related change among 7th graders, who expected significantly less delay than 3rd graders at the first session (3.61, 3.21; $t(1298) = 4.25$, $p < .001$).

There were no significant gender effects at either session for either sample. Socioeconomic status was significantly and inversely related to the expected timing of the next visit among 3rd graders at the first session ($F(2, 660) = 10.34$, $p < .001$) and fifth session ($F(2, 492) = 7.46$, $p < .001$), and significantly, but not completely inversely, among 7th

graders at the first session: while the lowest socioeconomic level had the greatest anticipated delay, the low-middle group had the least $F(2, 634) = 3.13$, $p < .05$). However, by the fifth session, socioeconomic status was not at all related to the anticipated timing of the next visit among 7th graders.

The timing of the next visit thus bears some, but not a consistent, relationship to socioeconomic status: respondents from lower socioeconomic levels anticipate the greatest delay, i.e., that their next visit will occur at a more future date, than respondents from higher socioeconomic levels, but among older respondents, this is not observed. The amount of anticipated delay in some way, but not consistently, decreases developmentally. Gender is not consistently related to the anticipated timing of the next visit, although males at times anticipate greater delay than females.

Table 5 summarizes the analyses of intentions to take health actions.

Table 5

Intentions to Take Health Actions by Age (Session), Gender and Socio-economic Status (SES)

Preventive Attitudes	Study II 3rd Grade							
	Session			Gender (3rd session)		SES		
	3	4	5	M	F	L	M	H
M	5.45	5.67	5.48	5.38	5.53	5.25	5.30	5.67
SD	.91	.96	1.00	.96	.82	.99	.88	.86
n	508	475	505	264	203	73	221	214
F	5.12[b]			9.79[b]		5.26[b]		

Study II 7th Grade

	Session			Gender (3rd session)		SES		
	3	4	5	M	F	L	LM	HM
M	5.12	5.20	5.10	5.05	5.19	4.95	5.10	5.32
SD	.81	.81	.82	.82	.80	.71	.82	.84
n	506	460	429	248	248	108	276	122
F	N.S.			5.70[a]		4.72[b]		

(table continues)

Table 5 (continued)

Intention to Visit — Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	5.54	5.71	5.69	5.66	5.58	5.75	4.94	6.34
SD	1.78	1.67	1.66	1.66	1.73	1.61	1.75	1.27
n	132	224	220	172	395	377	371	401
F	N.S.				N.S.		168.35[c]	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	4.93	5.45	5.53	5.62	5.58	4.82	5.10	3.98	5.02	5.25
SD	1.98	1.90	1.90	1.90	1.93	1.97	1.97	1.82	1.94	1.98
n	682	668	506	476	507	373	306	108	347	227
t	1st - 5th, 4.70[c]					N.S.		F = 16.46[c]		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	5.36	5.44	5.32	5.39	5.25	5.31	5.41	4.93	5.46	5.62
SD	1.89	1.93	1.93	1.87	1.88	1.89	1.90	1.92	1.85	1.88
n	655	647	505	461	430	326	325	174	330	151
t	1st - 5th, N.S.					N.S.		F = 6.46[b]		
	3rd - 7th, 4.01[c]							F_{5th} = 3.26[a]		

(table continues)

Table 5 (continued)

Study I

Delay of Visit	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	2.81	2.72	2.86	2.46	2.87	2.57	3.08	2.40
SD	1.64	1.57	1.62	1.25	1.55	1.51	1.75	1.22
n	133	224	220	168	392	377	369	400
F	N.S.				t = 2.67[b]		t = 6.23[c]	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	3.61	3.07	3.43	2.83	3.12	3.63	3.57	4.04	3.75	3.20
SD	1.78	1.79	1.63	1.72	1.70	1.80	1.77	1.85	1.80	1.66
n	663	570	507	473	495	363	297	107	328	228
t	1st - 5th, 3.96[c]					N.S.		F = 10.34[c]		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	3.21	2.95	3.30	3.03	3.20	3.21	3.20	3.47	3.10	3.13
SD	1.59	1.70	1.63	1.70	1.65	1.57	1.66	1.67	1.53	1.61
n	637	640	500	459	416	318	315	171	317	149
t	1st - 5th, N.S.					1st, N.S.		1st, F = 3.13[a]		
	3rd - 7th, 4.25[c]					5th, N.S.		5th, N.S.		

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$

Youngsters' Health Cognitions

HEALTH MOTIVATION

Study I data revealed significant main effects for age ($F(3, 731) = 18.70$, $p < .001$) and for socioeconomic status ($F(1, 731) = 43.75$, $p < .001$), as well a significant interaction between them ($F(3, 731) = 3.53$, $p < .05$). For the total sample, health motivation in relation to appearance motivation decreased progressively with age, and health motivation was higher among inner-city respondents than among those living in noninner-city areas (1.47 vs. 1.29). There was also a significant interaction between gender and age ($F(3, 731) = 3.06$, $p < .05$), but no significant main effect for gender.

Age remained significantly and linearly related to health motivation among both inner-city ($F(3, 346) = 15.35$, $p < .001$) and noninner-city ($F(3, 393) = 6.32$, $p < .005$) respondents. However, significant socioeconomic differences were observed only among the two youngest age groups ($t(131) = 3.60$, $p < .001$; $t(198.69) = 5.26$, $p < .001$): inner-city respondents demonstrating higher levels of health motivation than those from noninner-city areas. These differences only approached significance in the older groups.

Among Study II third graders, a significant main effect was observed for age, i.e., change over time ($F(4,295) = 15.79$, $p < .0001$), with no interactions. Moreoever, this change over time was observed to have significant negative slope ($F(1, 298) = 62.72$, $p < .0001$): MAP scores decreased in linear fashion as respondents grew older.

A significant main effect was also observed for socioeconomic status ($F(2, 298) = 13.25$, $p < .0001$): health motivation decreased as socioeconomic status increased. Health motivation scores for the three SES levels at the first session were 1.72, 1.68, 1.53.

No main effect was observed for gender.

Among seventh graders, significant main effects were also observed for age, i.e., change over time ($F(4, 240) = 3.57$, $p < .01$), and for negative slope ($F(1, 243) = 5.61$, $p < .02$). While there was a significant interaction between gender and age in amount of change over time ($F(4, 240) = 2.62$, $p < .05$), there was no significant interaction between gender and slope. In addition, seventh-graders showed significantly lower levels of health motivation than third-graders (1.26 vs. 1.64; $t(1329) = 17.55$, $p < .001$).

No significant main effects were observed for either socioeconomic status or for gender. (Additional details about gender differences in the shape of the developmental curves are found in Gochman, 1982a.)

Table 6 summarizes the analyses of health motivation.

Table 6

Levels of Health Motivation by Age (Session), Gender and Socioeconomic Status (SES)

Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	1.54	1.42	1.30	1.25	1.37	1.38	1.47	1.29
SD	.42	.43	.36	.34	.40	.41	.43	.36
n	133	224	219	171	397	374	369	402
F	18.70[c]				N.S.		43.75[c]	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	1.64	1.51	1.47	1.40	1.39	1.66	1.61	1.72	1.68	1.53
SD	.42	.45	.44	.44	.44	.42	.43	.40	.41	.44
n	684	665	503	470	492	374	307	109	346	229
F	15.79[c]					NS		13.25[c]		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	1.26	1.25	1.24	1.22	1.20	1.26	1.25	1.29	1.23	1.28
SD	.36	.36	.34	.33	.32	.35	.37	.40	.33	.37
n	647	618	489	449	414	322	321	173	326	148
F	3.57[b]					NS		NS		

[b] $p < .01$; [c] $p < .001$

TOOTHBRUSHING FREQUENCY

Analyses of Study I data revealed significant main effects for age ($F(3, 734) = 6.96$, $p < .001$), and gender ($F(1, 734) = 6.02$, $p < .05$), and no interactions. To a small but significantly greater degree than males, females believed in more frequent daily brushings.

The comparison of eta and r revealed that the relationship between age and beliefs about brushing frequency is probably linear and inverse: younger respondents believed in more frequent daily brushing than did older ones.

Among Study II 3rd graders, main effects were observed for gender ($F(1, 304) = 12.14$, $p < .001$) and age ($F(4, 301) = 7.25$, $p < .001$), with no interactions, and no socioeconomic effects. Females generally believed in more daily brushings than males (first session scores -- not frequencies -- of 4.27, 3.95; at fifth session, 4.36, 4.10), and the age effect was found to be curvilinear ($F(3, 302) = 8.81$, $p < .001$): after an initial large increase, there was some decrease, and then another increase.

Among 7th graders, main effects were also observed for gender ($F(1, 265) = 4.84$, $p < .05$) and age ($F(4, 262) = 3.75$, $p < .01$), with no interactions, and no socioeconomic effects. Again, males generally believed in fewer daily brushings than did females (at the first session: 3.69, 4.11; at the fifth session: 3.60, 3.87) and the age effect was found to be curvilinear ($F(3, 263) = 3.37$, $p < .05$); some initial increase, then a decrease.

Third graders believed in significantly more daily brushings than did seventh graders (4.10, 3.90; $t(1275.35) = 3.47$, $p < .001$).

Beliefs about toothbrushing frequency are clearly related to gender: females believe in more frequent daily brushings than males. While some

developmental relationships are observed, e.g., younger respondents believe in more frequent toothbrushing than older ones, these relationships are not clearly linear. Socioeconomic level is not related to beliefs about toothbrushing frequency.

Table 7 summarizes the analyses of beliefs about toothbrushing frequency.

Table 7

Beliefs About Toothbrushing Frequency by Age (Session), Gender and Socio-economic Status (SES)

Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	3.84	3.84	3.68	3.64	3.71	3.78	3.73	3.76
SD	.59	.45	.52	.58	.58	.48	.57	.50
n	133	224	221	172	397	377	373	402
F	6.96[c]				6.02[a]		N.S.	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	4.10	4.33	4.32	4.27	4.18	3.95	4.27	3.92	4.11	4.16
SD	1.15	.92	.91	1.08	1.07	1.28	.95	1.37	1.16	.99
n	671	668	505	478	503	366	302	105	343	223
F	7.25[c]					12.14[c]		N.S.		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	3.90	3.94	3.96	3.85	3.73	3.69	4.11	4.05	3.82	3.90
SD	.92	.89	.85	.88	1.00	1.03	.75	.93	.94	.85
n	651	644	503	458	426	325	322	173	329	149
F	3.75[b]					4.84[a]		N.S.		

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$

Youngsters' Health Cognitions

SELF CONCEPT

In Study I, self-concept was observed to be related to socioeconomic factors. Overall, inner-city respondents had lower negative (i.e., more positive) evaluations of their teeth than noninner-city respondents (1.12, 1.15; $t(769) = 1.97$, $p < .05$), but within the four age groups this difference was not always significant. No overall relationship to gender or age was observed; however, within the inner-city group, negative scores increased significantly with age ($F(3, 346) = 3.18$, $p < .05$). And, while at age 8 - 9 inner-city youngsters have significantly lower negative scores than noninner-city youngsters, by age 14 or so this difference disappears and is nearly reversed.

No relationships were observed in Study II 3rd graders between self-concept scores and age, gender, or socioeconomic status. Among 7th graders, gender and socioeconomic status interacted significantly ($F(2, 256) = 3.16$, $p < .05$), necessitating further examination of a significant main effect observed for gender($F(1, 256) = 4.73$, $p < .05$). Only at session two, within the low socioeconomic group was a significant effect observed, with males showing higher negative scores than females (1.15, 1.07, $t(107.97) = 2.18$, $p < .05$). Although among the high-middle group, some of the differences approached significance, at no other session and in no other group were significant gender differences observed. And no significant difference was obtained between 3rd and 7th graders. (One of the few such non-significant comparisons.)

Clearly, youngsters' beliefs about their own teeth represent a relatively stable characteristic, largely unaffected by age, gender or socioeconomic factors.

Table 8 summarizes the analyses of self-concept.

Table 8

Self-Concept (Negative) by Age (Session), Gender and Socioeconomic Status(SES)

Study I

	Age				Gender		SES	
	8-9	10-11	12-13	14+	M	F	IC	NIC
M	1.12	1.14	1.14	1.15	1.14	1.13	1.12	1.15
SD	.21	.23	.21	.21	.22	.20	.21	.21
n	133	223	220	171	396	375	369	402
F	N.S.				N.S.		t = 1.97[a]	

Study II 3rd Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	M	H
M	1.13	1.10	1.10	1.13	1.10	1.14	1.11	1.17	1.14	1.09
SD	.24	.21	.20	.23	.19	.25	.23	.27	.26	.17
n	675	661	503	469	496	368	304	107	342	226
F	N.S.					N.S.		N.S.		

Study II 7th Grade

	Session					Gender (1st session)		SES		
	1	2	3	4	5	M	F	L	LM	HM
M	1.12	1.11	1.11	1.14	1.12	1.13	1.10	1.07	1.14	1.13
SD	.21	.20	.20	.24	.22	.24	.19	.17	.23	.22
n	650	636	502	455	423	324	322	172	328	150
F	N.S.					4.73[a]		N.S.		

[a] $p < .05$

DISCUSSION

DEVELOPMENTAL EFFECTS

Although some variables exhibited some developmental effects, with few exceptions these were largely of a gross, overall nature: either a significant correlation ratio, a significant difference between third and seventh graders, or a non-specific change over five points of time.

HEALTH MOTIVATION

Only one variable, health motivation, showed any clear, consistent, linear developmental progression: as age increased, health motivation in relation to appearance motivation decreased. Moreover, the significance of this developmental decrease is unaffected by gender or socioeconomic status. As they get older, males and females drawn from different socioeconomic strata progressively increase their preference for nicer-looking, more attractive mouths over mouths that are healthier. In addition, it is only among younger and/or lower socioeconomic level respondents that there is any absolute preference for health. In Study I, this was observed in innercity respondents under 12; in Study II, only in the first three sessions in the third grade and, even so, more prominently among the low socioeconomic group.

These findings are readily understandable in terms of social development. Older youngsters and young adults are thought to be far more sensitive than younger ones to the image they project to their peers and to their acceptability as attractive sexual partners. Moreover, with increasing age, they have longer cumulative exposure to media, advertising and other community and societal socializing factors that emphasize the potential cultural value of attractiveness. Denny (1975, p. 20) has pointed

to the strong "sociocultural expectations for an attractive" appearance that exist pervasively in our own culture as well as in many others.

PERCEIVED VULNERABILITY

The development effects on perceived vulnerability are less clear-cut. Perceived vulnerability levels increase up to about age 14 and then decrease, but the nature of these developmental changes is affected both by gender and socioeconomic status. There is thus only conditional support for the hypothesis that perceived vulnerability to health problems increases developmentally. As Muller (1978) has suggested, the observed curvilinearity may be a mirror of the curvilinearity of the stress, tension and anxieties that accompany the pubescent and post-pubescent developmental stages.

Moreover, the significant developmental effects are not appreciable ones. In contrast to health motivation, which exhibits sharp qualitative changes, mean values of perceived vulnerability hover around "4," the mid-point of the scale - - a point of neutrality - - indicating that the respondents view themselves as neither especially vulnerable or invulnerable. While this scale value was labelled "a medium chance," a response alternative that was readily grasped as being a midpoint by all elements of these heterogeneous samples, in two earlier studies where the response alternative was labelled "as likely as not" and the question format differed slightly, the results were similar (values of 4.10, 4.06). Regardless of the phrasing of the question or of the response alternatives, children and young adults do not perceive themselves as generally vulnerable to health problems. In natural environments where no specific attempts are made to alter them, these beliefs do not change appreciably by themselves.

Youngsters' Health Cognitions

While the data suggest that developmental change in the direction often assumed to be most desirable by health professionals is more likely to occur prior to age 14; but the degree to which such change occurs in the absence of change inducing agents is minimal. Nor do these beliefs change as a result of well-developed intervention strategies (e.g., Stone, 1976). By the time youngsters have reached the age of these samples, they had already acquired a relatively stable set of beliefs about being vulnerable to health problems.

OTHER HEALTH COGNITIONS

There are no clearcut developmental effects upon the remainder of the health cognitions examined. Such effects are either nonlinear, nonexistent, nondescribable or appreciably modified by gender and socioeconomic factors. For example, attribution of health benefits to dental visits and to toothbrushing both increase until about age 12, then decrease. The general attribution of health benefits first decreases then increases among seventh graders and shows no developmental effect among third graders. In the absence of consistent developmental change, the undifferentiated sample values take on additional meaning: the attribution of health benefits to dental visits and toothbrushings hovers around a neutral point. Moreover, 60.2% in Study I, and 70.8% and 69.3%, respectively, in Study II, selected both a health and non-health reasons for dental visits. Similar observations obtain for reasons for brushing teeth (68.2%., 69.6% and 75.9%). Clearly health is not perceived as an overwhelmingly strong determinant of making a dental visit or of brushing teeth.

Youngsters' Health Cognitions

While respondents 12 and older apparently believe in significantly fewer brushings than do those younger than 12, both studies showed that there is no consistent linear relationship between age and such beliefs.

Neither self-concept nor preventive attitudes show any consistent developmental effects. Moreover, self-concept is one of the very few variables in which the Study II subsamples did not differ from one another! Clearly, evaluations of self -- albeit in a very focused way -- are extremely stable. These data are thus consistent with a large body of evidence and concepts in self-theory, and consonant as well with the concepts of Rokeach who considered beliefs about the self -- "beliefs about the way we orient ourselves in physical space, beliefs about self identity, beliefs about autonomy or dependence on others, or self-worth, etc." (1960, p. 41) -- to be part of the content of a person's permanent primitive beliefs, beliefs that are assumed "to have formed early in life...the validity of which he does not question" (p. 40). Clearly such beliefs are not themselves expected to change, but instead provide the basis for development and change in other cognitive areas.

GENDER EFFECTS

In contrast to the equivocal nature of the developmental effects, gender differences at the time the studies were conducted (1969-1972) are clearly consistent.

PERCEIVED VULNERABILITY

Females in nearly every instance showed higher levels of perceived vulnerability than males. In contemporary American society differential socialization of the genders begins virtually at birth. The process has traditionally differentially reinforced dependency, and females are more likely than males to be made aware of a variety of potentially distressing environmental and

experiential encounters. Such reinforcement patterns, together with the greater ease with which females traditionally have admitted to anxieties and concerns about bodily dangers (e.g., Mussen, Conger & Kagan, 1963, p. 463), are consistent with the observed differences in perceived vulnerability. Data on children's health status at the time the studies were conducted (United States Department of Health, Education, and Welfare. 1970, 1971) offer no consistent evidence that females are in fact more often sick than males. If anything, males at that time seemed to suffer more from a variety of health problems. Thus, there would be no support for an experiential determinant of gender differences in perceived vulnerability. (There have been no comparable reports in more recent years.)

PREVENTIVE ATTITUDES AND BELIEFS ABOUT TOOTHBRUSHING

Females show higher levels of preventive attitudes, and believe in more frequent daily toothbrushings than males. Accumulated research revealed that gender differences in interests, values, emotionality, and temperament haven arise in American youth at early ages (Stone and Church, 1957, pp. 224-241). Young girls have tended to show greater fearfulness, social sensitivity, cooperation, and conformity than young boys (Stone and Church, p. 230), greater interest in the unfortunate and in social welfare, and less willingness to take risks (Tyler, 1968, pp. 209-210). The gender differences in preventive attitudes and in beliefs about toothbrushing frequency are thus not surprising, and are congruent with differential socialization patterns. To the degree that gender becomes a less critical determinant of socialization and of differential attitudes and fears, questions will arise about whether gender differences in health cognitions will continue to be observed.

OTHER HEALTH COGNITIONS

In contrast to these clear-cut gender differences, are the lesser degrees to which females at times attribute health benefits to dental visits and to toothbrushing, although in these instances the gender effects are not consistent. One explanation may lie in parents' differentially emphasizing the cosmetic or appearance outcomes of dental visits and toothbrushing to their daughters. But such an explanation must be considered in the context of no gender differences in health motivation in relation to appearance motivation.

SOCIOECONOMIC EFFECTS

Although the financial barriers to dental care in contemporary America make understandable the relationship between socioeconomic status and intentions of making dental visits, of greater interest are the absence of consistent and enduring socioeconomic effects upon a larger number of other health cognitions. With the exception of the linkage between socioeconomic status and preventive attitudes, and its limited relationships with perceived vulnerability and health motivation in younger respondents, there are no clear cut effects upon perceived benefits, beliefs about toothbrushing frequency or self-concepts.

PERCEIVED VULNERABILITY

The absence of consistent and enduring socioeconomic effects upon perceived vulnerability is of great interest. Although socioeconomic status is directly related to perceived vulnerability among younger respondents, its effect disappears among older ones. One explanation of this is derived from Green's model of status identity (1970) which suggests that persons in low socioeconomic goups who increase their contact and communication with members of middle and higher socioeconomic groups are more likely to be

influenced by the norms of these latter groups. In these studies, the socioeconomic differences seem to disappear at the time that the youngsters move away from their community-based, neighborhood elementary schools and into junior high schools where their contacts with a more heterogeneous population are appreciably increased.

An additional, complementary explanation is found in Koos' seminal work (1954) in which he asserts that social and cultural factors enter into appraisals of what sensory input, feelings or subjective states will be labelled as illnesses. Possibly such factors are more potent in younger than in older respondents; social and cultural factors may thus be more important determinants of threshold levels for interpreting experiences of illness in younger populations.

HEALTH MOTIVATION

The socioeconomic differences in levels of health motivation among younger respondents may present a paradox to certain health professionals. Reactions to reports of Study I findings revealed that health professionals expect health motivation to be directly -- not inversely -- related to socioeconomic status. Too often, health professionals infer motives from behaviors such as utilization rates which are heavily determined by economics, rather than from independent measures. Allen took issue with this methodological problem that often permeates research on impoverished groups some time ago (1970), and argued convincingly against using a motive inferred from a behavior as a way of explaining that behavior. Utilization of health services is complexly determined, with income as a major factor. Lack of income serves as a strong barrier to utilization. In the face of

such barriers, the present data corroborate the lack of justification for inferring and expecting correspondingly low levels of health motivation in poor populations.

By measuring health motivation independently of behavior, these studies provide data that take issue with some of the myths of the "culture of poverty," and reinforce Allen's point that these myths must be critically evaluated. Moreover, the effect of socioeconomic status on health motivation diminishes in older youngsters. The absence of any effect in the seventh-grade, together with the failure of the effect to reach a level of significance in those over 12 in Study I, suggests that whatever socioeconomic differences exist in younger children disappear as they grow older.

Possibly, enormous unmet health needs generate a greater level of concern for health within lower socioeconomic communities. This concern in turn is transmitted to, and shared by, younger children in these communities. As these children mature, and their exposure to media, advertising, and the larger community increases, their initially higher levels of health motivation are modified and lowered by this wider range of socializing agents, in much the same way that their levels of perceived vulnerability increase. However, this is only one possible explanation, and demonstrates the need for additional systematic research into the roots of health motivation.

Health professionals sometimes assume that socioeconomic factors have pervasive and debilitating effects on health beliefs; these data challenge such assumptions.

IMPLICATIONS

The data generated by these studies continue to confirm what their earliest antecedent (Gochman, 1969) revealed: that health-related cognitions can be assessed in young populations, and that with some ingenuity, conceptually-rooted questionnaires can be developed and successfully administered to respondents as young as eight. As a result of such instrument development, it became possible to obtain and analyze data in areas where none had previously existed. These complementary studies thus represent a first attempt to examine in a systematic way, a number of health beliefs in large, heterogeneous, younger populations, drawing upon measures that had conceptual meaning and standardized formats. Furthermore, the literature on human development revealed that virtually no longitudinal studies had been conducted using measures based on more than two points in time. In this sense, Study II is additionally a pioneer venture.

Moreover, the combined use of complementary cross-sectional and longitudinal investigations led to observations that were parallel and mutually supportive. Such findings cannot then readily be attributed to spuriousness in the sampling process.

These studies, through both their focus and method, clearly help to fill a general knowledge gap in the area of health behavior research, a problem already attested to strongly by others (e.g., APA Task Force, 1976; Evans and Dembroski, 1975). The studies also point to the need for future research to explore the determinants of health cognitions in young populations. How, and in what manner, youngsters derive their beliefs about health and illness is an open question. Systematic analyses of family

factors, peer influences, health status, personal experiences, etc. are needed in order to achieve a more thorough understanding of youngsters' health beliefs. To date, there have been virtually no such studies.

Moreover, the marked developmental stability of these cognitions with the exception of health motivation, suggests that health education programs should be planned, developed and implmented for very young children, perhaps for preschoolers as young as two or three. The seemingly natural "conservatism" of these beliefs might be a clue relevant to the general lack of success of health education programs aimed at elementary and junior high school populations.

Additional program implications of the stability and consistency of cognitions such as perceived vulnerability are provided elsewhere (e.g., Gochman, 1981a; Gochman & Saucier, 1982), as are program implications deriving from health motivation data (Gochman, 1982a, 1982b).

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