1998

4. Reasoning about moral aspects of illness and treatment by preschoolers who are healthy or have a chronic illness.

Pamela M. Kato, *Stanford University*
Thomas D. Lyon, *University of Southern California*

Original Articles

Reasoning About Moral Aspects of Illness and Treatment by Preschoolers Who Are Healthy or Who Have a Chronic Illness

PAMELA M. KATO, PH.D.

Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, Stanford

THOMAS D. LYON, PH.D., J.D.

University of Southern California Law School, Los Angeles

CHRISTINA RASCO, R.N.-C., M.N., P.N.P.

Department of Pediatrics, Stanford University, and Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, California

ABSTRACT. Our study evaluates the moral reasoning skills of healthy and chronically ill 3 and 4 year olds with respect to illness and treatment, by use of an interview technique that reduces verbal demands on the child. We presented children with pairs of scenarios comparing ill characters with characters acting immorally and characters being punished, as well as with pairs of scenarios comparing treated characters with characters acting immorally and characters being punished. We asked children to point to the character who did something "naughty." With the exception of the chronically ill 3 year olds, the children performed consistently above chance and did not confuse illness and immorality. Older and healthy children performed better than younger and chronically ill ones (differences were the result of differing receptive vocabulary skill levels). This research has implications for evaluating young children's reasoning abilities and suggests that medical professionals should use tools that reduce demands on children's verbal proficiency. *J Dev Behav Pediatr 19:68–76, 1998.* Index terms: *cognitive development, health education, illness concepts, moral development, treatment concepts.*

It is often claimed that young children associate illness with badness, thinking that illness and treatment are forms of punishment.[1-4] When asked what causes illness, young children frequently refer to the violation of rules, e.g., going out in the cold without a coat.[5-9] Children frequently fail to specify a mechanism by which rule violations lead to illness, apparently thinking that there is a direct causal link.[6,10,11] When asked specifically whether accidents and illnesses are attributable to immoral actions, children frequently answer affirmatively.[12,13] Kister and Patterson[12] reported that when children aged 4 to 9 years were told stories about a boy who disobeyed his mother and "got a cold," a majority of the children expressed the belief that the cold was attributable to the boy's misbehavior. Given potential misconceptions that young children might have concerning the causes and consequences of illness, educating them concerning illness-related concepts presents special challenges.

Children's confusion of illness and immorality might be characterized as a combination of *phenomenistic thinking*

and *immanent justice thinking*. Children who show phenomenistic thinking fail to recognize the necessity of a causal mechanism between causes and effects. Children who show immanent justice reasoning believe that Nature is capable of seeking retribution for misdeeds, and they might also think that Nature intends to punish "naughty" children with illness. This type of reasoning might lead children to fail to recognize:

- that there is a linking mechanism needed if immoral acts and illnesses are to be causally related;
- that people are not morally responsible for unintentional behaviors;[14] and
- that because most illnesses are unintentional, sick people should not be blamed for their illness.

Children might also be confused by medical treatment. Children have difficulty inferring reasons why things occur.[15] This might lead them to fail to make accurate inferences concerning reasons for treatment. In addition, children view severe punishment as appropriate for even mild transgressions.[16] Children, therefore, might confuse treatment with punishment because they are unable to infer why they are being treated or punished. Moreover, the similarities between treatment and punishment might also confuse children. Both are typically involuntary, frequently cause pain, and often restrict

Address for reprints: Pamela M. Kato, Ph.D., The Children's Health Council, 700 Sand Hill Road, Palo Alto, CA 94304; e-mail: kato@psych.stanford.edu.

freedom. Anna Freud[2] noted that when a child is ill, parents must restrict the behaviors of their child in ways that are similar to punishment, e.g., confinement to a room, deprivation of favorite foods.

It is also possible, however, that children's apparent misconceptions concerning the immorality of illness and treatment merely reflect the insensitivity of the methods by which their understanding is assessed. Children cite misdeeds when asked to generate causes of illness. For example, they often say that a child got a cold because he went outside without a jacket. A standard interpretation is that they do not think that such acts directly cause illness; rather, they are ignorant of the precise causal mechanism by which the actions make one susceptible to illness. Alternatively, their poor performance might be attributed to an inability to articulate their understanding when asked to explain. Indeed, when children as young as 4 years of age are asked to recognize the causes of illness rather than to generate causal explanations, they show an impressive understanding, choosing contamination over immanent justice explanations.[17-19] As in many other contexts, children can recognize what they cannot articulate.[20]

It is possible, therefore, that young children will not exhibit confusion between illness and immorality if the verbal demands of the task are minimized. Such a finding would be of substantial practical importance. It would counsel medical professionals against assuming that young children are incapable of understanding the relationship between illness and moral transgressions, or, even worse, against assuming that children hold false beliefs concerning treatments. It would also guide professionals in assessing children's understanding of illness and in developing age-appropriate interventions to communicate with young children, to promote their adjustment to illness, and to improve their compliance with treatment.

Minimizing the verbal demands of tasks has the additional advantage of allowing one to examine the beliefs of 3 year olds, a group generally overlooked by researchers examining children's understanding of illness. For several reasons, 3 year olds might be particularly susceptible to confusing illness with immorality. First, 3 year olds have difficulty in appreciating the necessity of a mechanism linking causes and effects.[21-23] This failure to appreciate the necessity of causal mechanisms might lead them to think that "badness" directly causes illness. Second, 3 year olds, in particular, have difficulty understanding that people are not morally responsible for unintentional behaviors.[14] This might lead them to think that sick people are morally responsible for their illness and that treatment is a form of punishment. Previous research, however, has not directly evaluated the generalizability of these findings to 3 year olds' understanding of illness and immorality.

In this research, we examined 3- and 4-year-old children's understanding of the distinction between illness concepts and immorality concepts. We tested both healthy children and children with a chronic illness, because health status might be associated with conceptions of illness causation.[7,24] We also administered a test of receptive vocabulary to evaluate the extent to which group differences in verbal abilities between healthy children and children with a chronic illness explain group differences in their ability to distinguish illness and immorality concepts. Perrin et al[24] found that poorer understanding of illness among children who were chronically ill compared with children who were healthy was primarily attributable to differences in general reasoning abilities and verbal intelligence.

In our study, we told the children stories concerning two characters, and we asked the children to identify the story character who had done something "naughty." To test for the various ways in which children might confuse illness and immorality concepts, we asked our participants to compare story children who were sick or being treated with story children who were immoral or being punished. The children were required to point to the story character they thought had done something "naughty," thus minimizing the necessity to articulate a response. We expected the children who thought that illness was the consequence of immoral action to confuse sick and treated characters with characters who were being punished. The children who thought that illness was itself immoral were expected to confuse sick and treated characters with characters engaging in "naughty" actions.

We tested the following hypotheses, on the basis of our review of the literature and pilot testing:

- 4 year olds will perform better than 3 year olds;
- children who are healthy will perform better than children with a chronic illness;
- children's performance on the illness and "naughty" action stories will be better than their performance on the punishment and treatment stories because punishment and treatment require participants to infer why a character is being punished or treated, and children have difficulty making inferences;
- differences between the sample of healthy children and the sample of children with a chronic illness on receptive vocabulary abilities will account for differences between the two groups in their abilities to distinguish examples of illness and treatment from examples of moral transgressions; and
- children as young as 3 and 4 years of age will be able to distinguish illness and treatment concepts from moral transgressions when presented with tasks that reduce verbal demands.

METHOD

Participants

Eighty-two 3- and 4-year-old children participated in this study. Thirty-two were healthy children, and 50 were children with a chronic illness. The healthy subsample was drawn from a university preschool serving primarily upper middle class families. It consisted of 16 3 year olds (8 girls, 8 boys; age range, 3.28–3.98 yr; mean, 3.64 yr; standard deviation (SD), 0.22 yr) and 16 4 year olds (8 girls, 8 boys; age range, 4.26–4.94 yr; mean, 4.62 yr; SD, 0.23 yr). Parents of children attending the university preschool sign a consent form that includes all research conducted at the preschool, and parents are given notice of ongoing research projects and allowed to withdraw their consent from specific research. No parents did so with respect to this study.

The subsample of children with a chronic illness was drawn from a private university teaching hospital serving primarily upper middle class families with greater socioeconomic and

ethnic diversity than the healthy subsample. The subsample consisted of 26 3 year olds (11 girls, 15 boys; age range, 3.16–3.98 yr; mean, 3.57 yr; SD, 0.25) and 24 4 year olds (11 girls, 13 boys; age range, 4.01–4.95 yr; mean, 4.46 yr; SD, 0.29). Four of the 3 year olds and 4 of the 4 year olds spoke only Spanish, and they were administered a Spanish version of the task by a native Spanish speaker. Approximately two-thirds (n = 32) of the children with a chronic illness had been diagnosed with cancer, whereas the other one-third (n = 18) had diabetes, with an equal distribution across age groups. Parental consent was obtained from a parent or legal guardian of all of the children at the hospital. Among the subsample of children with a chronic illness, there were three refusals. There were also three refusals as a result of language incompatibility with protocol (the parent and/or child spoke a language other than English or Spanish).

Procedure

We administered the task to the healthy children in a small room reserved for research at the university preschool. The experimenter sat across from the child at a small table. The children with chronic illnesses were administered the task during their regular clinic visit at a children's hospital. They were tested in a private conference room at the Hematology/Oncology Clinic or the Endocrinology Clinic of the Lucile Salter Packard Children's Hospital, Palo Alto, California, with a parent present to reduce the child's anxiety. The parent sat out of the child's line of sight and was instructed not to speak during the procedure.

The experimenter introduced the task by saying that he or she was going to tell the child some stories and ask the child some questions. The experimenter noted that "sometimes these children did things that are naughty, sometimes they did things that are nice, and sometimes they did things that are just OK. You can help me figure out which children did things that are naughty."

Each child was given three "warm-up" stories and then 16 "illness and treatment morality" stories. The stories used cards of simple line-drawings of protagonists of the same sex as the subject. Figure 1 presents a representative drawing from each condition. For ease of explanation, we will assume that the participant is a girl. Siblings depicted in the cards were always the opposite sex of the story protagonist (making it clear to whom the test questions referred).

Warm-Up Stories

The warm-up stories tested the child's ability to affirm that an immoral act was "naughty" and that a prosocial act and a neutral act were not "naughty." The warm-up also served to familiarize the child with the upcoming task of the experiment, i.e., to identify who did something "naughty." In these stories, the experimenter showed the child a picture of a story protagonist and her sibling while he or she described the action in the picture and then asked the child whether the story protagonist had done something "naughty." The three situations depicted were a girl hitting her brother ("naughty"), a girl giving her brother a present (not "naughty"), and a girl asking her brother to throw her a ball (not "naughty"). If the child answered incorrectly, she was given corrective feedback. The experimenter then reiterated the comment, quoted above, that children are sometimes naughty, nice, or OK.

Immorality and Illness Stories

These stories assessed the child's ability to identify the immoral child when comparing children who were depicted as acting immorally or as being punished with children who were depicted as sick or as being treated. We asked our participants to make four types of comparisons:

- a child committing a "naughty" act versus a child who is sick;
- a child committing a "naughty" act versus a child being treated;
- a child being punished versus a child who is sick; and
- a child being punished versus a child being treated.

The comparisons are summarized in Table 1, and the specific scenarios are depicted in Table 2.

The experimenter showed the child a pair of pictures, describing each picture in turn and then asking the child, "Did any of these girls [boys] do something naughty?" If the child failed to pick one of the two pictures, a forced-choice question was asked that made clear that one of the two protagonists did indeed do something "naughty." If the child answered "no," "yes" without choosing, or "both," the experimenter would repeat the information concerning the two story protagonists and then state, "One of them did something naughty. Which one did something naughty?" putting emphasis on the word "one." If the child answered, "I don't know," either to the original question or to the forced-choice follow-up, the experimenter would say, "What [which one] do you think?" emphasizing the word "think," and then repeat the question.

On each trial, the children saw two pictures. One of the pictures always depicted an illness-related concept, i.e., an illness or treatment scenario. The other picture always depicted a morality-related concept, i.e., an immorality or punishment scenario. On the first trial, one-half of the children saw the correct picture first and one-half saw it last. The con-

Table 1. Comparison Conditions

"Naughty" vs. Sickness
"Naughty" vs. Treatment
Punishment vs. Sickness
Punishment vs. Treatment

Table 2. "Naughty," Punishment, Sickness, Treatment Stimuli

| Condition	Description of Card
"Naughty"	A child who ate her brother's cookies; one who threw a rock at her brother; one who stole her brother's playdough; and one who drew on the wall
Punishment	A child who wasn't allowed to eat dessert; one who wasn't allowed to play with her toys; one who had to stay in her room; and one who couldn't go to the fair
Sickness	A child with bumps all over her body; one who is throwing up; one with a headache; and one with a stomach ache
Treatment	A child who had to stay in the hospital; one who had to get a shot; one who had to have a tube put in her arm; and one who had to take "yucky-tasting" medicine
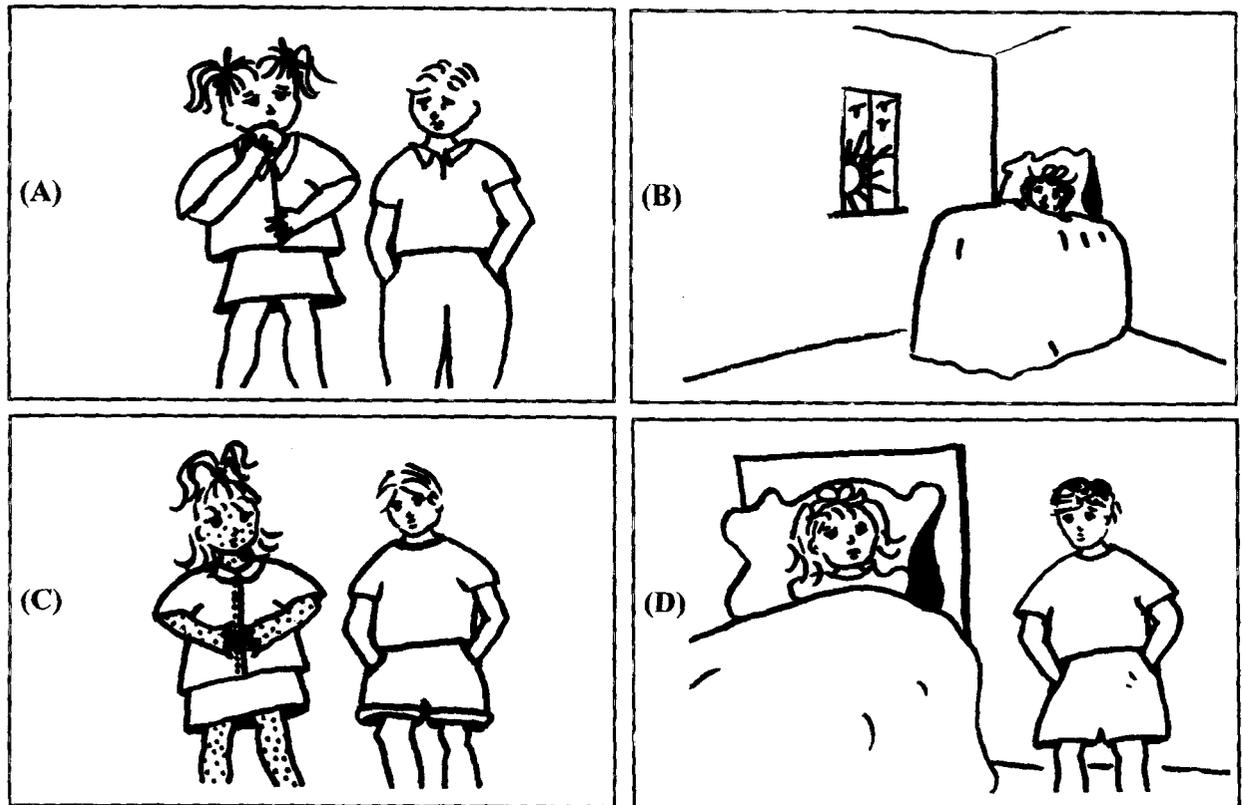
FIGURE 1. Representative line drawings used in the scenarios. "Naughty" (A) is a child who ate her brother's cookies. "Punishment" (B) is a child who wasn't allowed to eat dessert. "Sickness" (C) is a child with bumps all over her body. "Treatment" (D) is a child who had to stay in the hospital.

dition of whether the child saw the correct card first or last on each succeeding trial then alternated. Each child was presented with 16 trials, 4 trials in each condition. The children were always presented a condition first that included one of the "naughty" action situations, because pilot studies suggested that these situations were most clearly immoral and therefore enabled those children with some understanding to "catch on" to the task. Thus, one-half of the children heard the treatment versus "naughty" action story condition first, and one-half heard the sick versus "naughty" actions story condition first. In the second condition, we presented each child with the two types of scenarios not heard in the first condition. For example, if a child was in the treatment versus "naughty" action story condition first, she heard the sickness versus punishment story condition in the second condition. Presentation of conditions was counterbalanced. At the end of the task, we gave corrective feedback to children who incorrectly picked the ill or treated story child as the "naughty" character, i.e., we correctly identified the "naughty" or punished child as the "naughty" character.

Assessment of Receptive Vocabulary Skills

After the stories, we administered the Peabody Picture Vocabulary Test–Revised (PPVT-R)[25] to the healthy children and a subsample of the chronically ill children, and we assigned a standardized score. Administration of the PPVT-R was not introduced until after the study had begun. The

PPVT-R is a standardized measure of receptive vocabulary. We used it to control for differences between the sample of healthy children and the sample of chronically ill children to evaluate the extent to which receptive vocabulary skills explained differences between the groups. Spanish-speaking children were not included in analyses along with the larger sample of children with a chronic illness because the test was not standardized for this population.

RESULTS

Preliminary analyses of the children's total correct responses (indicating that the card depicting a "naughty" or punished child was the "naughty" one) revealed no sex or order effects (treatment vs. "naughty" action stories first or sick vs. "naughty" action stories first; correct child shown first on first comparison vs. correct child shown last on first comparison) and no significant interaction with the variables of interest, i.e., age and health status. Scores, therefore, were collapsed across sex and order in subsequent analyses.

To test the hypotheses that 4 year olds would perform better than 3 year olds and that healthy children would perform better than chronically ill children, we performed a two-way repeated measures multivariate analysis of variance (MANOVA) on children's responses on each condition, with age and health status as the between-subjects variables. There was a significant main effect of age ($F(1,78) = 7.37$, $p < .01$), with 4 year olds performing better than 3 year olds;

a significant main effect for health status ($F(1,78) = 9.74$, $p < .01$), with healthy children performing better than children with a chronic illness; and no significant interaction between age and health status. There was also a significant main effect of story type ($F(3,231) = 9.03, p < .001$), with no significant two-way interactions of age or health status. There was, however, a significant age by health status by story type interaction ($F(3, 233) = 3.71, p < .05$). To clarify the three-way interaction effect, we performed planned contrasts. Comparisons of each age and health status group to all others combined within each story-type condition revealed that the 3 year olds with a chronic illness did not perform as well as all the other age and health groups combined on the treatment versus punishment stories ($t(78) = 2.99$, $p < .001$). Figure 2 reports the children's mean number of correct responses (out of a possible four correct) on each story type by age and health status.

Next, we tested the hypothesis that children would perform better on immorality stories than on punishment stories. A MANOVA evaluated the children's combined scores on stories depicting immoral actions (sickness/treatment vs. "naughty" action stories) versus scores on stories depicting punishment (sickness/treatment vs. punishment stories). There was a significant between-subjects effect of age, with 4 year olds performing better than 3 year olds ($F(1,78) = 7.37$, $p < .01$), and health status, with healthy children performing better than chronically ill children ($F(1,78) = 9.74$, $p < .01$), with no significant interaction between age and health status. As predicted, the children performed better on the stories depicting immoral actions than on the stories depicting punishment ($F(1,74) = 23.42, p < .001$). There were no two-way interactions between age and health status. There was, however, a significant three-way interaction between age, health status, and story type ($F(1,74) = 5.33, p < .05$).

To clarify the interaction, planned contrasts compared all age and health groups within each combined story-type comparison. On the immorality stories, healthy 4 year olds performed better than all other groups combined ($t(78) = 3.79$, $p < .01$), and 3 year olds with a chronic illness did not perform as well as all the other groups combined ($t(78) = 3.44$, $p < .01$). The remaining comparisons of performance on immorality stories were not significant. On the punishment stories, 3 year olds with a chronic illness did not perform as well as all the other groups combined ($t(78) = 5.70, p < .001$). The remaining comparisons of performance on punishment stories were not significant.

The MANOVA was used to compare children's combined scores on stories depicting illness (sickness vs. "naughty" action/punishment) versus scores on stories depicting treatment (treatment vs. "naughty" action/punishment). This was a test of the hypothesis that the children would perform better on the illness stories than on the treatment stories. The within-subjects comparisons revealed that the children did not differ in their performance on the stories depicting illness versus the stories depicting treatment, with no two-way interactions between age and health status by story type. There was a significant three-way interaction between age, health status, and story type ($F(1,78) = 5.09, p < .05$).

We used planned contrasts to clarify the interaction effect. On the stories depicting illness, healthy 4 year olds performed better than all other groups combined ($t(78) = 3.17, p < .01$), and 3 year olds with a chronic illness did not perform as well as all other groups combined ($t(78) = 3.58, p < .001$). The remaining comparisons of performance on stories depicting illness were not significant. On the stories depicting treatment, chronically ill 3 year olds did not perform as well as all other groups combined ($t(78) = 3.90, p < .001$). The remaining comparisons of performance on stories depicting treatment were not significant.

Overall, analyses revealed that 4 year olds consistently performed better than 3 year olds except on the treatment versus "naughty" action stories, on which they did not differ. Healthy children performed better than chronically ill children for each story type. There were no age × health status interactions, with the exception that 3 year olds with a chronic illness did not perform as well as the other groups on the treatment versus punishment stories. On comparisons of combined story types, as predicted, children performed better on stories depicting immoral actions than on punishment stories, with healthy 4 year olds performing particularly well, and 3 year olds with a chronic illness performing particularly poorly. On comparisons of combined stories depicting illness and combined stories depicting punishment, the children did not differ in their performance. Healthy 4 year olds, however, performed particularly well on the stories depicting illness, and the 3 year olds with a chronic illness performed particularly poorly on the stories depicting treatment.
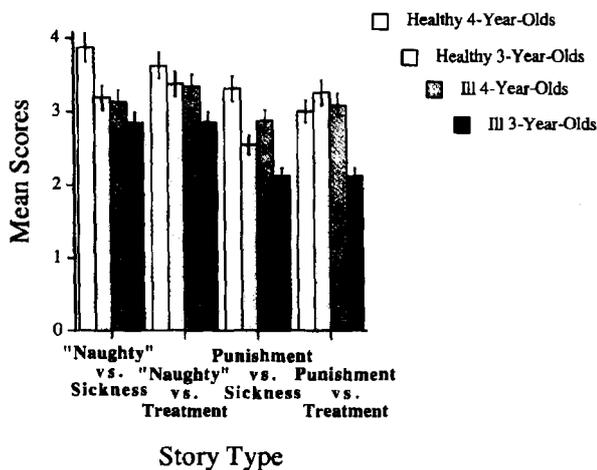

Figure 2. Each bar represents the mean number of correct responses (plus or minus the standard error of the mean) from four trials within one story-type condition for each age and health status group. A trial was coded as *correct* if the participant correctly identified the "naughty" child or the child receiving punishment (not the ill or treated child) as the one worthy of moral blame.

Controlling for Vocabulary Scores

A two-way univariate analysis of variance (ANOVA) on vocabulary scores with a subset of children who were administered a standardized test of receptive vocabulary (31 healthy children, 28 chronically ill children) with age and health status
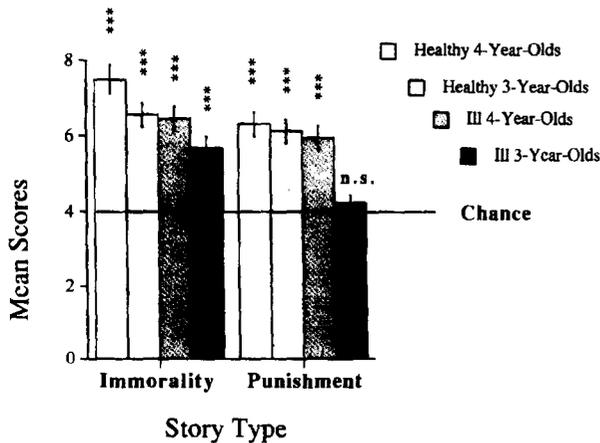
Figure 3. Each bar represents the mean number of correct responses (plus or minus the standard error of the mean) from eight trials within combined story types for each age and health status group. A trial was coded as *correct* if the participant correctly identified the "naughty" child or the child receiving punishment (not the ill or treated child) as the one worthy of moral blame. One-sample *t* tests comparing mean performance to chance (4 of 8 correct) ($p < .001$) revealed that mean performance was better than chance for all groups in both conditions, with the exception of the 3 year olds with a chronic illness on the punishment story type.

as the between-subjects variables revealed a main effect of health status ($F(1,57) = 13.26$, $p < .001$), no effect for age, and no significant two-way interaction between age and health status. Inspection of the means revealed that healthy children had higher vocabulary scores than did the chronically ill children and that 3 and 4 year olds did not differ on their vocabulary scores. Table 3 presents the children's mean scores on receptive vocabulary by health status and age.

To test the hypothesis that differences between the healthy sample and chronically ill sample on receptive vocabulary abilities will account for observed differences in their reasoning concerning illness and punishment, we performed multiple regression analyses. For each analysis, all of the independent variables (vocabulary scores, health status, and age) were entered in a single step in order of decreasing tolerance to test their independent contribution to predicting performance on all of the stories and on the combined immorality and combined punishment stories. Table 4 presents the results of these multiple regression analyses.

Preliminary regression analyses revealed no difference between regression slopes for each independent variable. Therefore, we did not include interaction terms in the regression models. As Table 4 indicates, when age and receptive vocabulary are considered, the healthy children did not differ from the children with a chronic illness on all of the stories and on the combined immorality and punishment stories. The children's health status consistently entered the model last for each equation and was not a significant predictor of performance in any model tested. In all of the three
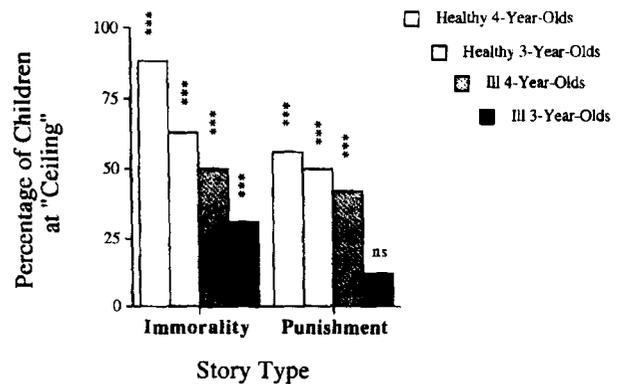
Figure 4. Each bar represents the percentage of children performing at ceiling on combined story types by age and health status. Ceiling performance was set at seven or eight of eight trials correct for each child. Binomial tests used to assess the probability that the proportion of children observed at ceiling occurred by chance revealed that performance at ceiling did *not* occur by chance for each age and health status group ($p < .001$), with the exception of the 3 year olds with a chronic illness.

Table 3. Mean Scores on Receptive Vocabulary Assessments by Health Status and Age

Health Status	Age (yr)	n	Mean	SD
Healthy	3	16	115.31	11.22
	4	15	113.60	17.24
III	3	20	95.35	17.22
	4	10	101.00	27.48

SD, standard deviation.

equations, however, age was consistently the best predictor of performance on the stories. Age entered the model first for each equation, although it was not a significant predictor of performance on the punishment stories. The level of receptive vocabulary skills was the next strongest predictor of performance after age, although, like age, it did not significantly predict performance on the punishment stories.

Children's Understanding of Stories

The children's performance across the four types of stories varied according to whether immoral action or punishment was depicted, but not according to whether sickness or treatment was depicted. Therefore, we reported performance in terms of the percentage correct on the eight combined immorality stories ("naughty" action vs. sickness; "naughty" action vs. treatment) and the eight combined punishment stories (punishment vs. sickness; punishment vs. treatment). To test the hypothesis that children as young as 3 and 4 years of age will be able to distinguish illness and treatment concepts from moral transgressions when presented with tasks that

Table 4. Effects of Age, Receptive Vocabulary Scores, and Health Status On Performance

Outcome	Predictor Variable	B	SE B	β	p	R²
All stories*						.26
	Age	1.92	.77	.29	.02	
	PPVT-R	.05	.02	.29	.03	
	Health status	−.97	.84	−.15	NS	
Immorality stories**						.26
	Age	1.05	.36	.34	.005	
	PPVT-R	.02	.01	.31	.02	
	Health status	−.20	.39	−.07	NS	
Punishment stories***						.19
	Age	.88	.52	.20	NS	
	PPVT-R	.02	.01	1.18	NS	
	Health status	−.77	.57	.23	NS	

B, estimated slope of variable; SE, standard error of the mean; PPVT-R, Peabody Picture Vocabulary–Revised; NS, not significant.
*p = .0007, **p = .0006, ***p = .008.

reduce verbal demands, we performed two types of tests. First, we compared the children's performance to chance, with chance defined as four of eight correct, using one-sample t tests. Second, we analyzed the distribution of individual rates of responding using a binomial test. Given that with each individual comparison, children had a 0.5 chance of choosing the immorality or punishment scenario, we tested the probability that the number of children we observed performing at "ceiling" occurred by chance. We defined *ceiling performance* for an individual child as seven or eight of eight correct, because one child answering randomly would answer seven or eight of eight questions correctly less than 5% of the time (binomial p = .0351). We then tested with the binomial test the hypothesis that the number of children observed at ceiling for each age and health status group on the combined stories did not occur by chance. Figure 3 presents the mean scores on combined story types compared with chance. Figure 4 presents the percentages of children performing at ceiling. In sum, overall performance was consistently good, with the exception of 3 year olds with a chronic illness on the stories depicting punishment.

DISCUSSION

In this study, with a simplified interview technique, 3 year olds, especially healthy 3 year olds, showed impressive abilities to distinguish illness concepts from moral concepts; 4 year olds showed even more impressive abilities. This is not consistent with a large body of research[6,10,11] that documents a developmental progression in children's understanding of causal mechanisms and moral blame. This research claims that children as young as 3 and 4 years of age are unable to understand causal mechanisms and to assign moral blame. The children in our study displayed these abilities when asked to distinguish illness and treatment from moral transgressions.

The chronically ill children in our study consistently did not perform as well as participants who were healthy, although the chronically ill 4 year olds did remarkably well on the tasks. Previous studies that compared healthy children with children who are ill showed mixed findings. Some showed that children who are ill:

- are more sophisticated in their reasoning concerning illness-related concepts than are healthy children;[26]
- are no different from healthy children;[27,28] or
- show more primitive responses.[17,24]

Clearly, researchers should measure more than merely age and health status.

We did find evidence that our participants, especially the chronically ill 3 year olds, did not perform as well when asked to make moral judgments concerning ill or treated children when asked to compare them with children being punished. Although one might attribute this confusion to a belief in immanent justice, our study participants performed exceedingly well when asked to distinguish depictions of children who were ill or receiving treatments from depictions of children acting immorally. Because punishment demands that the child infer that the one being punished acted immorally, the confusion might be related to the difficulties children have in making inferences in general. This is consistent with research that suggests that young children find it hard to "figure out" why things occur.[15] Our data *do not* support the claim that children think that illness and treatment are a form of immanent justice. Our data *do* support the claim that children have difficulty distinguishing illness and treatment from punishment. Their tendency is toward confusion and chance responses. Alternatively, the nature of the stories we selected to depict punishment might have been more likely to be confused with outcomes of being ill. Had we presented other forms of punishment, e.g., spanking, placement in a chair in a corner of a room for a "time out," participants might have shown less confusion.

In this study, we found that healthy children and chronically ill children performed differently on the scenarios and that they also differed in their performance on a test of receptive vocabulary. In both cases, the healthy children performed better. Our analyses suggested that the performance of the children with a chronic illness, especially on the immoral action stories, might be largely attributed to their receptive verbal skills. Some previous research supports the contention that verbal skills and general reasoning ability contribute to apparent lags in illness understanding among children who have an illness,[24] although other studies do not support this claim. In addition to differ-

ences in receptive vocabulary abilities, the socioeconomic status groups that made up the samples differed. Both receptive vocabulary abilities and socioeconomic status could contribute to differences in young children's ability to reason about illness and treatment concepts. Future research, therefore, should assess the effects of socioeconomic status as well as other variables, including family interaction, patient education, and past experiences with illness and treatment.

Consistent with other research that uses a simplified interview methodology,[29,17-19] we found that significant numbers of young children were able to show sophisticated reasoning skills concerning illness and immorality when they are asked to *recognize* rather than *generate* reasons for illness and treatment. This is especially impressive given that the children in our study were so young. We found elevated mean group scores even among the healthy 3 year olds in our study.

In addition, our findings do not support the current theory that claims that very young children have a primitive understanding of concepts of illness and treatment.[5,6,24, 27,28,30-32] These theorists used clinical interview methods to question children concerning their understanding of illness and treatment. Our findings suggest that research showing poor performance on causality-of-illness tasks might not be documenting young children's confusion of illness with immorality but rather their difficulty with tasks that require explanations. Children as young as 3 and 4 years old in our study who were given simplified tasks and asked to distinguish between immoral and ill characters were surprisingly proficient at doing so.

Theorists who use a clinical interview technique, i.e., ask open-ended questions, might argue that our methods only reveal children's superficial understanding and that deeper probing of children would bring their moral confusion to the surface. With our simplified methodology, however, we give children the material they need to make moral judgments concerning illness and treatment. We ask them simple questions, give them pictures to aid their memory, and ask them merely to point to a picture to indicate their beliefs. We argue that these simplified tasks decrease demands on the child to understand descriptions and questions and that they remove virtually all demands on the child to verbalize a response, thus revealing a deeper understanding than tasks that require the child to generate responses to global questions.

Finally, it should be noted that our findings are not fully negative findings. Although most of the children (except for the 3 year olds with a chronic illness) performed better than chance in distinguishing between illness/treatment and naughty action/punishment scenarios, there were some children who did not. Even if immanent justice thinking is not associated with the majority of children with respect to ideas concerning illness and treatment, some children, nevertheless, do hold such beliefs. Future research should address why some children have trouble distinguishing between illness/treatment and naughty action/punishment scenarios and if, in fact, the inability to distinguish the two has adverse physical or mental health consequences for these children.

Alternative Explanations

There are several possible alternative explanations for the results reported here. First, it could be argued that the children thought that *both* characters did something "naughty" but that the immoral actor had done something that was more clearly "naughty." Future research should test this possibility.

Second, participants in our study might have performed so well because they adopted the low level strategy of saying that whoever had performed some action had done something "naughty." If children define immorality in terms of actions, then they would be able to distinguish between immoral behavior and illness/treatment, because the child is passive in the latter cases. Follow-up research should ask participants which child was "naughty" to control for this strategy.

Third, participants in our study might have failed to identify illness and treatment as immoral because they were unfamiliar with the aversiveness of the scenarios depicted. Although we think that this is unlikely, given what seems to be the obvious unpleasantness of the scenarios (particularly those dealing with treatment), future research should present children with details concerning the aversiveness of illness and punishment to assess whether they use this information when making judgments concerning wrongdoing.

Fourth, the children with a chronic illness in our study might have performed poorly compared with the healthy participants as a result of contextual differences in the interview process. The fact that the children with a chronic illness were interviewed with a parent in the room at a hospital, rather than at their regular preschool, might have biased these children toward forming a stronger association between illness/treatment and punishment. This alternative explanation, however, does not explain the differences seen in performance between the 3 and 4 year olds with a chronic illness. That aside, future research should equalize setting differences to investigate the role of context in children's ability to reason about the moral aspects of illness and treatment.

In conclusion, this study has potential implications for patient education with young children. If young children's difficulty in understanding illness is attributable to difficulty in inferring why things are happening to them, rather than a spontaneous inference that they must have done something immoral, we should focus on teaching children about the true causes of illness and treatment rather than the moral aspects of illness and treatment. Also, education for preschool children should focus on tools that facilitate their ability to understand what they are told and to express what they know.

REFERENCES

1. Eiser C: The Psychology of Childhood Illness. New York, NY, Springer-Verlag, 1985
2. Freud A: The role of bodily illness in the mental life of children.

Psychoanal Study Child 7:69–81, 1952
3. Sheridan M: Talk time for hospitalized children. Soc Work 20:40–44, 1975

4. Whitt JK: Children's understanding of illness: Developmental considerations and pediatric intervention. Adv Dev Behav Pediatr 3:163–201, 1982

5. Brewster AB: Chronically ill hospitalized children's concepts of their illness. Pediatrics 69:355–362, 1982

6. Perrin EC, Gerrity PS: There's a demon in your belly: Children's understanding of illness. Pediatrics 67:841–849, 1981

7. Sayer AG, Willett JB, Perrin EC: Measuring understanding of illness causality in healthy children and in children with chronic illness: A construct validation. J Appl Dev Psychol 14:11–36, 1993

8. Sigelman CK, Alfeld CJ: Wear your coat: Age and ethnic differences in cold weather and germ theories of infectious disease. Presented at the meeting of the Society of Research in Child Development, Indianapolis, IN, 1995

9. Simeonsson RJ, Buckley L, Monson L: Conceptions of illness causality in hospitalized children. Pediatr Psychol 4:77–84, 1979

10. Bibace R, Walsh ME: Children's conceptions of illness, in Bibace R, Walsh ME (eds): New Directions for Child Development. San Francisco, CA, Jossey-Bass, 1981, pp 31–48

11. Walsh ME, Bibace R: Children's conceptions of AIDS: A developmental analysis. J Pediatr Psychol 16:273–285, 1991

12. Kister MC, Patterson CJ: Children's conceptions of the causes of illness: Understanding of contagion and use of immanent justice. Child Dev 51:839–846, 1980

13. Piaget J: The Moral Judgment of the Child. New York, NY, Free Press, 1965

14. Wellman HM, Larkey C, Somerville SC: The early development of moral criteria. Child Dev 50:879–873, 1979

15. Das Gupta P, Bryant PE: Young children's causal inferences. Child Dev 60:1138–1146, 1989

16. Catron TF, Masters JC: Mothers' and children's conceptualizations of corporal punishments. Child Dev 64:1815–1828, 1993

17. Springer K: Beliefs about illness causality among preschoolers with cancer: Evidence against immanent justice. J Pediatr Psychol 19:91–101, 1994

18. Springer K, Ruckel J: Early beliefs about the cause of illness: Evidence

against immanent justice. Cogn Dev 7:429–443, 1992

19. Siegal M, Patty J, Eiser C: A re-examination of children's conceptions of contagion. Psychol Health 4:159–165, 1990

20. Flavell JH, Miller PH, Miller SA: Cognitive Development, 3rd ed. Englewood Cliffs, NJ, Prentice Hall, 1993

21. Bullock M: Preschool children's understanding of causal connections. Br J Dev Psychol 2:139–148, 1984

22. Koslowski B, Spilton D, Snipper A: Children's beliefs about instances of mechanical and electrical causation. J Appl Dev Psychol 2:189–210, 1981

23. Shultz TR, Pardo S, Altmann E: Young children's use of transitive inference in causal chains. Br J Psychol 73:235–241, 1982

24. Perrin EC, Sayer AG, Willett JB: Sticks and stones may break my bones: Reasoning about illness causality and body functioning in children who have a chronic illness. Pediatrics 88:608–619, 1991

25. Dunn L, Dunn L: Manual for the Peabody Picture Vocabulary Test, Revised. Circle Pine, MN, American Guidance Service, 1981

26. Jay SM, Green V, Johnson S, Caldwell S, Nitschke R: Differences in death concepts between children with cancer and physically healthy children. J Clin Child Psychol 16:301–306, 1987

27. Carraccio CL, McCormick MC, Weller SC: Chronic disease: Effect on health cognition and health locus of control. J Pediatr 110:982–987, 1987

28. Vando-Myers R, Steward MS, Folkins CH, Hines P: The effects of congenital heart disease on cognitive development, illness causality concepts, and vulnerability. Am J Orthopsychiatry 49:617–625, 1979

29. Siegel M: Children's knowledge of contagion and contamination as causes of illness. Child Dev 59:1353–1359, 1988

30. Berry SL, Hayford JR, Ross CK, Pachman LM, Lavigne JV: Conceptions of illness by children with juvenile rheumatoid arthritis: A cognitive developmental approach. J Pediatr Psychol 18:83–97, 1993

31. Bibace R, Walsh ME: Development of children's concepts of illness. Pediatrics 66:912–917, 1980

32. Susman EJ, Dorn LD, Fletcher JC: Reasoning about illness in ill and healthy children and adolescents: Cognitive and emotional developmental aspects. J Dev Behav Pediatr 8:266–273, 1987

MEETING ANNOUNCEMENT

The SOCIETY FOR DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS will conduct its 16th Annual Scientific Meeting and Workshops on September 24–28, 1998 at the Embassy Suites Hotel in Cleveland, Ohio. The SDBP Lectureship will be awarded to John H. Kennell, M.D. For further information and registration forms, please contact Ms. Noreen Spota by phone (215-248-9168) or e-mail (nmspota@aol.com).