Establishing Scale Structure, Reliability and Construct Validity of a Forced-Choice Measure of Preschoolers' Illness Knowledge

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Background

- Cognitive developmental theory
  - Children's knowledge about illness
  - Focus early in childhood (4 to 5 years)
- Illness knowledge
  - Concept poorly defined
  - Measures not well suited for preschoolers
  - Reliable and valid measure was not available

Purpose

To determine reliability, construct validity, and scale structure of a forced-choice measure of preschoolers' illness knowledge called the

Illness Knowledge Questionnaire (IKQ)

Conceptual Framework for the IKQ

- Piagetian

- Intuitive

- Common sense representations of illness

- Illness Dimensions: Identify, Cause, Consequence, Timeline, Cure

Illness Knowledge Questionnaire

- 32-item questionnaire
- Four brief vignettes
  - Cold, asthma, skinned knee, and upset tummy
- Two items for each illness dimension
  - Identify, Cause, Consequence and Cure
- Forced-choice responses
  - Correct and incorrect choice
  - 64 choice/image pairs
- Total score range 0-32
- 20 minutes to administer

This is Billy. He has a cold. His teacher asks the kids in his class questions about his cold. You tell me which kid has the right answer.

1. The teacher asks the kids, "What is a cold?"
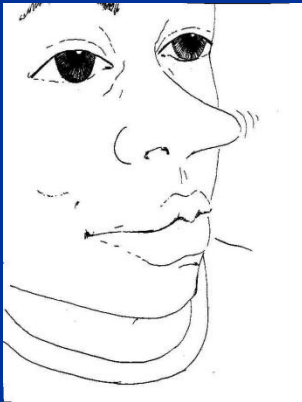
1- A. One kid says,
"A cold makes your nose grow longer."

1- B. Another kid says,
"A cold makes you have a runny nose."

Which kid is right?

2. Two other kids answer the teacher's question, "What is a cold?"

2- A. One kid says
"A cold makes you cough."

2- B. Another kid says,
"A cold makes you hiccup."

Which kid is right?

Study Elements

- Design: Cross-sectional descriptive

- Settings: three private schools & a primary care pediatric clinic

- Sample: 230 children/guardians

- Measures: IKQ and Health history questionnaire

- Procedure: Child interview and guardian completes health history questionnaire

Sample

SITE	AGE GROUP			
	4 - 6	7 - 9	10 - 12	
School 1	25	24	20	69 (30%)
School 2	6	11	9	26 (11%)
School 3	13	20	12	45 (19%)
Clinic	35	38	17	90 (40%)
TOTAL	79 (34%)	93 (41%)	58 (25%)	230 (100%)

Child Demographics

Gender (*n* = 230)	Girls	52%
	Boys	48%
Ethnicity (*n* = 173)	Hispanic or Latino	6%
	Not Hispanic or Latino	94%
Race (*n* = 226)	African American	29%
	White	64%
	Other	7%

Psychometric Analyses

PSYCHOMETRIC PROPERTY	STATISTICAL TEST
Evaluation of Items	❖ Correlation of items ❖ Item difficulty ❖ Item discrimination index
Reliability	❖ Coefficient alpha
Construct Validity	❖ Regression analysis ❖ ANOVA
Factor Structure	❖ Factor analysis

Evaluation of Items

- 20 items (40 choice/image pairs) retained
- 12 items (24 choice/image pairs) dropped
  - Non-significant correlation
  - Negative correlations
  - Too easy or too hard
  - Poor discrimination

Reliability

SCALE	ALPHA	INTER-ITEM CORRELATIONS
Identify	.72	.16 - .60
Cause	.72	.22 - .63
Consequence	.71	.16 - .59
Cure	.57	.22 - .40

Older children will be more knowledgeable about illness than younger children.

DEPENDENT VARIABLE	R^2	(Beta) B	F (df)	p
Total IKQ	.28	.53	90.38 (1, 228)	< .01
Identify subscale	.18	.42	48.61 (1, 228)	< .01
Cause subscale	.25	.50	74.64 (1, 228)	< .01
Consequence subscale	.24	.49	72.97 (1, 228)	< .01
Cure subscale	.11	.34	28.83 (1, 228)	< .01

Older children will be more knowledgeable about illness than younger children.

	AGE GROUPS		
	4 - 6	7 - 9	10 - 12
Identify	4.9	5.9[a]	5.9[a]
Cause	3.8	4.9[a]	4.9[a]
Consequence	4.9	5.9[a]	6.0[a]
Cure	3.6	3.9[a]	4.0[a]

a = means are not significantly different at the .01 level

Difference between preschool children whose guardians discussed health issues and those who do not.

Dependent Variable	F (df)	p
Total IKQ	4.83 (1, 46)	.03
Identify subscale	4.20 (1, 46)	.05
Cause subscale	9.10 (1,46)	< .01
Consequence subscale	.37 (1, 46)	.54
Cure subscale	1.47 (1, 46)	.23

Factor Analysis

FACTOR	EIG.	# OF ITEMS	FACTOR LOADING
Identify/Cause	6.3	7	.41 - .53
Respiratory	1.7	4	.52 - .87
Illness Consequence	1.5	5	.45 - .78
Illness Cure	1.2	4	.39 - .85

Summary

- Theoretically based illness knowledge measure

- Initial establishment of construct validity

- Support that illness knowledge is multi-factorial

- Partial confirmation of factor structure

Limitations

- ❖ Small pool of IKQ items
- ❖ Small sample size
- ❖ Early development of tool

Strengths

- Rigorous systematic evaluation
- Technology
- Subject recruitment strategies
- Diverse samples

Conclusions

- IKQ begins to fill an important gap

- Measures illness knowledge in preschoolers

- Able to detect differences between preschoolers and older pediatric groups

Questions?