

# Assessing a Food Safety Behavior Questionnaire for Criterion Validity

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## Introduction

- Food safety education programs generally rely on self-reported behavioral questions administered pre and post education to measure program impact.
- Observational studies indicate that errors in food handling are more common than reported on questionnaires (Jay et al. 1999; Anderson et al., 2000)

## Purpose

- Develop a validated bank of food safety behavior questions that could be used with confidence when evaluating consumer education programs.
- Determine if self-reported behaviors can be a valid way to assess behavioral outcomes of food safety education programs among low-income groups.

Medeiros, Hillers, Kendall 1999-2001  
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## Development of Behavioral Questions

- Sub-group (n=8) from Expert Panel developed behavioral questions for each of 29 behaviors identified by Expert Panel as being important in reducing risk of foodborne illness in the home.
- First draft reviewed for content and face validity by tri-state team, faculty in three states, and 2 groups from target audience.
- Questionnaire revised and shortened based on feedback received.

## Question Bank

- Question Bank to be tested for reliability and validity contained 52 behavior questions:
  - Practice personal hygiene (5 questions)
  - Cook foods adequately (12)
  - Avoid cross contamination (7)
  - Keep foods at safe temperatures (12)
  - Avoid foods from unsafe sources (16)

## Questionnaire

- Two part questionnaire addressed food safety issues for the general public and those specific to pregnant women
- Contained a variety of question types:
  - 5 point Likert scale (20 questions)
  - Dichotomous Y/N (41)
  - Multiple choice (1)

## Reliability Testing

- Test/retest:
  - Target audience members (n=20) took questionnaire at 2 time points; responses correlated and compared via paired t-tests
  - Questions considered reliable if:
    - P-value > 0.05 &  $r \geq 0.70$  or Agreements/Agreements + Disagreements  $\geq 70\%$
- Internal consistency:
  - Assessed using Cronbach alpha; run on all items within a particular construct
  - Questions with  $\alpha \geq 0.60$  considered internally consistent (Osterhof, 2001; Taylor et al., 2001; Murphy et al., 2001)

## Reliability Results

- Test/Retest:
  - 47 of 52 questions met reliability criteria
- Internal consistency:

	Cronbach alpha
– Personal Hygiene:	.60
– Cook Foods Adequately:	.90
– Avoid Cross-contamination:	.46
– Keep Foods at Safe Temperatures:	.76
– Avoid Unsafe Foods:	.06

## Validity

- Degree to which an instrument measures what it is intended to measure
- Assessed several types of validity:
  - Content Validity: Reflects domain of content to be measured
  - Face Validity: Measures what intended to measure
  - Criterion Validity: Correlates with other more accurate instrument

## Validity Testing

- Criterion Validity – focus of this study.
- Established by comparing questionnaire response to observed behavior and interview responses during a kitchen activity session held ~ one week later.

## Validation Study Subjects

- 70 FSNEP and EFNEP participants in CO, WA, and OH
  - 50 post education only
  - 20 pre and post education
- Primary food preparers
- Had completed an education program that included a 30- to 60-minute food safety component

## Study Design Post-Education



Food  
Safety  
Class

Week 4



Take  
Questionnaire  
-Recruit-

Week 5



Observation +  
Interview  
Session

Week 6 to 7



# Study Design Pre-Post Education



Recruit &  
Take  
questionnaire

Week 2



Observation  
& Interview  
session

Week 3



Food  
Safety  
Class

Week 4



Take  
Question-  
naire

Week 5



Observation  
& Interview  
session

Week 6-7

## Kitchen Activity Session



- Cooking Observation in Community Kitchen:
  - Cook a chicken breast to desired doneness
  - Slice an apple to garnish the chicken
  - Cook a hamburger to desired doneness
  - Slice a tomato to go with the hamburger
- In-depth interview
  - Asked the same questions on the questionnaire in a conversational, open-ended manner

## Kitchen Activity Protocols



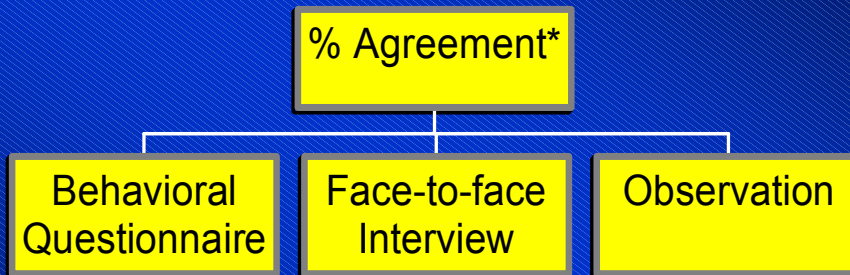
- Extensive training of research assistants on conducting cooking observations and interview sessions. Mock interviews conducted & videotaped.
- Two research assistants conducted each session (safety reasons).
- Each subject provided with same food items, utensils, equipment, instructions.
- Cooking sessions videotaped and interviews audio-taped.
- Actions and responses coded by research assistant who conducted session, then re-coded by one researcher in Colorado and responses compared to ensure comparability of data. Differences in coding reviewed by 3<sup>rd</sup> party and resolved.

## Limitations

- Non-randomized design
- Observations not performed in homes
  - No interruptions
  - Subjects could focus on food preparation/cooking
- Intervention for pre/post design wasn't controlled



## Validation Design



\*Validation criteria:

- Observable behaviors:  $\geq 70\%$  agreement among all 3 instruments (counting correct & incorrect behaviors)
- Non-observable behaviors:  $\geq 70\%$  agreement between questionnaire & interview

## Validity Results

- Observable Questions:
  - 54.5% (6 of 11) met validity criteria
- Non-observable Questions:
  - 66% (27 of 41) met validity criteria

## Validity Results

Control factor	# of valid questions	# of invalid questions
Personal hygiene	5	0
Cook foods adequately	6	6
Cross-contamination	3	4
Safe temperatures	8	4
Avoid foods	11	5
Total questionnaire	33	19

## Instrument Sensitivity

- Potential ceiling effect:
  - Good questions are those that capture range of responses
  - Looked for questions that 20-80% gave less desirable response at pre education
- Change in mean scores from pre to post education (n=20)

(Parmenter and Wardle, JNE 32:269; 2000)

## Instrument Sensitivity Results

- Among validated questions, several in 4 of 5 control factors showed good response variety pre-workshop, with room for change.
- Pre and post scores on Cross-contamination questions generally high, but improvements needed in skill level.
- Improvements in behavior pre to post seen for washing hands prior to cooking and not leaving meat on counter.

## Conclusions

- 33 of 52 behavioral questions met reliability and validity criteria ( $\geq 70\%$  agreement), including several questions from each pathogen control factor.
- Agreement between observed and self-reported behaviors was better when incorrectly performed behaviors were included.
- Further study is needed using these questions in educational settings with controlled interventions.

# Thank You !

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*Knowledge to Go Places*

