JNEB Journal Club
Face & Content Validity, Cognitive Interviews with Children, Sensitivity

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At the end of this webinar attendees will be able to:

- Describe at least 3 challenges researchers face when developing valid measures of child dietary intake
- Distinguish the definitions and processes to measure face and content validity
- Identify the purpose and effective strategies for conducting cognitive interviews with children
- Describe at least 1 strategy to assess the sensitivity of an instrument to measure real change
Validation of a group–administered pictorial dietary recall with 9– to 11–year–old children

Instrument: Day in the Life Questionnaire – Colorado (DILQ – CO)
Challenges of Measuring Child Dietary Intake

- **Child’s age**
  - Recall and cognitive ability; 7+ Y.O. generally accepted
    - Errors include omissions (exclusions) and intrusions; amount eaten
    - Retention interval and prompts (Baxter, et al., 2015)
  - Parent/caregiver as proxy – may not observe all meals/snacks (Byers, et al., 1993)

- **Usual methods**
  - 24-hr recall, usually 2 week days, 1 weekend day, multiple pass
  - FFQ and screeners (Hunsberger, et al, 2012)
  - Method/s selected dependent upon nutrients or dietary groups/patterns of interest
Validity Definitions & Processes

- Instrument validity – ability of the instrument to measure what is intended
  - 4 types
  - Subsequent webinars will discuss construct and criterion validity
- **Content** – confirm all items reasonably represent larger domain
  - Clarify concept/construct through literature review
  - expert (panel) review
- **Face** – determine language, format & procedures are understandable & reasonable to target audience
  - testing with target audience
  - When assessing for children can also include adults (parents, teachers)

(Contento, 2015; Sharma & Petosa, 2014)
Cognitive Interviews (CI)

- **Purpose**
  - Assess language, format & processes are understood by target audience
  - One way to assess face validity

- **Processes**
  - Done individually, not in groups
  - Administer instrument as intended
  - Followed by ‘think-aloud’ and probing questions to assess comprehension and any missing content (e.g., response options)

(Beatty & Willis, 2007; Drennan, 2003; Shafer & Lohse, 2005)
Special Considerations for CI with Children

- Awareness of developmental stages of cognitive abilities is critical; influenced by age, experience
  - Age of 7 generally accepted as earliest to interview
  - Language expands, reading skills acquired, distinguish points of view

- Youth continue to develop cognition and communication skills through adolescence and early adulthood

- Establish trust; undistracted & unhurried environment

- Model type of questions to be asked; probing necessary

(de Leeuw, Borgers & Smits, 2004)
Measuring Sensitivity

Does the instrument detect a true condition?
  ◦ Often discussed for biological tests in comparison to specificity
  ◦ Determined by ‘true positives’ divided by sum of true positives and false negatives (TP / TP + FN)

(Sharma & Petosa, 2014)
Original Day in the Life Questionnaire (DILQ)

- Rationale – identify feasible method to collect children’s individual self-report of FV intake in a group (classroom) setting
- Original DILQ
  - Development – yesterday’s report of food intake and physical activities
  - Face validity with focus groups
  - Performed well/acceptably for reliability, validity, sensitivity

(Edmunds & Ziebland, 2002)
Our Study

- Similar rationale to original DILQ; assess all food groups

- Purpose –
  - Assess content & face validity of DILQ adapted to Denver, CO 4th-graders – DILQ–CO
  - Assess feasibility of administration and analysis of DILQ–CO
  - Determine DILQ–CO’s sensitivity to novel eating occasion & accuracy of children’s recall of school lunch
Assessing Content & Face Validity

- Procedures
  - Child nutrition education research expert review
    - Content, order of items, language & graphics (US v. UK)
    - How to include estimation of amounts of foods eaten?
    - Is forward or reverse recall (end/start after lunch/recess) more comprehensible? (Baxter et al., 2003; Moore et al., 2007)
  - Elementary teacher review
    - Language, format, feasibility of classroom administration
  - Cognitive interviews with children of similar age & demographics
    - DILQ item interpretation & comprehension
    - Format, instructions
    - Ability to quantify amounts of foods eaten
Revisions to DILQ

- Wording, phrasing & item order
  - For example replaced “pudding” with “dessert” & “school dinner, pack lunch” with “lunch from home, school lunch”
  - Made embedded instructions more direct (e.g., “check box”)

- Added semi-quantitative scale for portions of recalled items
  - Circle = ate all, √ = ate more than 1/2, x = ate less than 1/2, line through = ate none

- Created 2 versions – either could be administered after lunch/recess
  - Forward recall order (yesterday to today); reverse recall order (today to yesterday)

- Adapted original DILQ administration protocol
Cognitive Interview Testing Results

- 10 4th-grade students from school with similar demographic
  - 8 girls, 2 boys; ½ received forward v reverse format
- Applied standardized interview protocol
- In general students enjoyed & comprehended DILQ–CO
  - Including quantification scale
  - Memory perceived as better with reverse recall order (from lunch/recess today backwards to after lunch/recess yesterday); supported by literature (Baxter, et al. 2003, Baxter, et al., 2009)
- Results indicated minor revisions to wording and graphics
  - E.g., changed front yard gate to house door; evening meal to dinner
Did you have anything for lunch today?

CIRCLE: Yes  No

If yes, was it: (check box)

- Lunch from home?
- School lunch?

If yes, what did you have?

Food:

Drink:

Did you have anything for dinner yesterday?

Circle: Yes  No

If yes, what did you have?

Food:

Drink:

After school yesterday, did you:

Please circle one:

- go home
- go to an activity at school
- go to an activity outside of school
Feasibility, Sensitivity & Accuracy Sample

- 2 low-income Denver, CO schools; 1 randomly assigned to receive morning fresh fruit snack (FSS, NFSS)
- 125 4th graders in 6 classrooms
  - Power calculation to detect moderate effect size indicated sample > 115
- ≥ 77.5% eligible for F/R-priced lunches; 51% male; ≥ 77% Hispanic
- DILQ–CO completed after lunch/recess
- 35 minutes to complete per classroom; few problems or questions
Assessing Sensitivity of Fruit Snack

- **Procedures**
  - FSS students were offered pre-portioned banana or grapes for morning snack
  - We observed and recorded amount wasted

- **Analysis**
  - Averaged reported instances of fruit snack between schools
  - Man–Whitney U test

(Penkilo & Hoelscher, 2008)
Assessing Lunch Recall Accuracy & Sensitivity

- **Procedures**
  - Observation of lunch (recorded item selection/brought from home)
  - Weighed plate waste
  - Compared against standard weight samples (school lunches)

- **Analysis**
  - Food selection/plate waste compared to DILQ–CO for school lunch
  - *Matches* = item recorded/not recorded on both data sources
  - *Exclusions* = item missing from DILQ–CO
  - *Intrusions* = item only recorded on DILQ–CO (inaccurate recall)
  - *Sensitivity* = percent matches/(percent matches + percent exclusions)
Students accurately recalled “instances” of morning fruit intake:

- FSS 1.18 $\pm$ 0.93 v NFF 0.02 $\pm$ 0.13 (mean $\pm$ SD; $P < .001$)
DILQ–CO & Lunch Recall Results

- DILQ–CO demonstrated high level of validity & sensitivity compared to plate waste (Table 1)
  - K coefficients of substantial to almost perfect agreement for entrees, fruit, vegetables, bread, and milk
  - Only dessert (cookie) had poorer agreement
- Accurate recall for specific fruit & vegetable types
- Significant correlations between quantified & weighed amounts for 6 of 10 food items ($P \leq .05$)
  - Poorer correlations with vegetables, turkey wrap, milk, bread
- No differences by gender or school
Conclusions

- Feasible DILQ–CO classroom administration
- Students were quite accurate with recall of recent lunch & fruit snack selections
  - recall of more distal timeframes unknown
- Amounts consumed were less accurate & varied by food type
  - No clear pattern; this warrants further investigation
- Challenges with analyses – extensive time to score/code
- Inconsistent validation (studies) using original DILQ
  - Moore, et al., 2007 reported comparable k coefficients & percent matches
  - Lim, et al., 2015, results do not support validity of DILQ
Implications

- Recommendations for collecting children’s self-report
  - Reverse recall for immediate 24 hour period
  - Parent-involved report for non-school meals

- Strategies to measure FV change that don’t rely on self-report
  - Plate waste (Smith & Cunningham-Sabo, 2014)
  - Skin carotenoid assessment of FV intake (Mayne, 2013; Aguilar, 2014)
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References


References

Cognitive interview protocol and DILQ administration protocol available upon request

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