Using Mixed Methods to Evaluate Survey Questionnaires

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National Agricultural Statistics Service

"... providing timely, accurate, and useful statistics in service to U.S. agriculture."

Questionnaire Evaluation at NASS

- Limited questionnaire evaluation

- Quantitative methods

- Expert review

- Cognitive interviewing
  - Very few studies, most using small samples

Improving Questionnaire Evaluation at NASS

- Increase input from respondents

- Expanding cognitive interview program

- CARI/Behavior coding

- Quantitative Methods (e.g., field tests, nonresponse analysis, imputation rates)

- Mixed-methods approach

Current Study

- Recent OMB recommendation to modify the answer categories for some questions on our Ag Labor Survey

- Opportunity to do mixed-methods test:
  - Cognitive Interviewing
  - Field Test
  - Behavior Coding

Ag Labor Survey

- Measures types/numbers and hours/wages of farm workers

- Conducted twice a year

- Data primarily collected by mail, with CATI follow up and in-person interviewing

Ag Labor Survey Cont.

- OMB recommended we use Standard Occupational Classification (SOC) Codes to measure types of hired labor

- Longer, more detailed list of occupations

Hired Labor Original Question

2. For the paid workers, record the number of workers, hours worked, and the gross wages paid the week of July ___ through the ____. Separate the workers by the main type of work they were hired to do based on the following groups:

Code	Work Hired to Do
1	**FIELD WORKERS:** Jack-of all-trades and machinery operators on crop farms, fruit or vegetable pickers, greenhouse or nursery workers, hay balers and haulers, etc.
2	**LIVESTOCK WORKERS:** Jack-of-all-trades and machinery operators on livestock or poultry operations, workers hired to fix fences, tend animals, milk cows, gather eggs, etc.
3	**SUPERVISOR/MANAGER:** Hired managers, range foremen, crew leaders, etc. Exclude individuals not directly involved in day-to-day decisions on the farm.
4	**OTHER WORKERS:** Office workers, bookkeepers, pilots, pesticide applicators, etc.

Work Hired to Do	Worker Code (shown above)	Number of Paid Workers	Total Hours Worked	Total Gross Wages That Week (Dollars)
	411	412	413	414
	421	422	423	424
	431	432	433	434
	441	442	443	444
	451	452	453	454

Revised Hired Labor Question

Original Revised Questionnaire, Page 1

	Code	Work Hired to Do
FIELD WORKERS	11	**AGRICULTURAL EQUIPMENT OPERATORS - CROP, NURSERY AND GREENHOUSE:** Drive and control farm equipment to till soil and to plant, cultivate, and harvest crops. May perform tasks, such as crop baling or hay bucking. May operate stationary equipment to perform post-harvest tasks, such as husking, shelling, threshing, and ginning. *Examples: Combine Operator, Cotton Ginner, Hay Baler, Tractor Operator*
	12	**FARMWORKERS - CROP, NURSERY AND GREENHOUSE:** Manually plant, cultivate, and harvest vegetables, fruits, nuts, horticultural specialties, field crops, Christmas trees and short rotation woody crops. Use hand tools, such as shovels, trowels, hoes, tampers, pruning hooks, shears, and knives. Duties may include tilling soil and applying fertilizers; transplanting, weeding, thinning, or pruning crops; applying pesticides; or cleaning, grading, sorting, packing, and loading harvested products. May construct trellises, repair fences and farm buildings, or participate in irrigation activities. *Examples: Citrus Picker, Flower Picker, Greenhouse Transplanter, Harvest Worker, Orchard Hand, Pecan Gatherer, Pepper Picker*
	13	**GRADERS AND SORTERS - CROP, NURSERY AND GREENHOUSE PRODUCTS:** Grade, sort, or classify agricultural crops by size, weight, color or condition. *Examples: Cotton Grader, Fruit Sorter, Peanut Grader*
	14	**HAND PACKERS AND PACKAGERS - CROP, NURSERY and GREENHOUSE PRODUCTS:** Pack or package by hand a wide variety of products and materials. *Examples: Carton Wrapper*
	15	**AGRICULTURAL WORKERS, ALL OTHER - CROP, NURSERY, AND GREENHOUSE:** All agricultural workers working with crops, nursery or greenhouse products not included in codes 11- 14. *Examples: Crop Scout, Irrigation Worker*
LIVESTOCK WORKERS	21	**FARMWORKERS - FARM, RANCH, AND AQUACULTURAL ANIMALS:** Attend to live farm, ranch, or aquacultural animals that may include cattle, sheep, swine, goats, horses and other equines, poultry, finfish, shellfish, and bees. Attend to animals produced for animal products, such as meat, fur, skins, feathers, eggs, milk, and honey. Duties may include feeding, watering, herding, grazing, castrating, branding, de-beaking, weighing, catching, and loading animals. May maintain records on animals; examine animals to detect diseases and injuries; assist in birth deliveries; and administer medications, vaccinations, or insecticides as appropriate. May clean and maintain animal housing areas. *Examples: Cattle Brander, Chicken Handler, Egg Gatherer, Groom, Hatchery Worker, Livestock Handler, Sheep Shearer, Shrimp Pond Laborer*
	22	**GRADERS AND SORTERS - FARM, RANCH, AND AQUACULTURAL ANIMAL PRODUCTS:** Grade, sort, or classify unprocessed food and other agricultural products by size, weight, color, or condition. *Examples: Egg Grader, Meat Grader, Oyster Sorter, Wool Grader*
	23	**HAND PACKERS AND PACKAGERS - FARM, RANCH AND AQUACULTURAL ANIMAL PRODUCTS:** Pack or package by hand a wide variety of products and materials. *Examples: Egg Packer*
	24	**AGRICULTURAL WORKERS, ALL OTHER - FARM, RANCH AND AQUACULTURAL ANIMALS:** All agricultural workers working with farm, ranch and aquacultural animals or products not included in codes 21 – 23. *Examples: Livestock Showman*
SUPERVISORS	31	**FARMERS, RANCHERS AND OTHER AGRICULTURAL MANAGERS:** Plan, direct, or coordinate the management or operation of farms, ranches, greenhouses, aquacultural operations, nurseries, tree farms, or other agricultural establishments. May hire, train, and supervise farm workers or contract for services to carry out the day-to-day activities of the managed operation. May engage in or supervise planting, cultivating, harvesting, and financial and marketing activities. *Examples: Animal Husbandry Manager, Beef Farm Operator, Christmas Tree Farm Manager, Dairy Farm Manager, Fish Hatchery Manager, Greenhouse Manager, Orchard Manager*
	32	**FIRST-LINE SUPERVISORS OF FARM WORKERS:** Directly supervise and coordinate the activities of agricultural, aquacultural, and related workers. *Examples: Corn Crop Supervisor, Corral Boss, Cranberry Bog Supervisor, Fish Hatchery Supervisor, Harvest Crew Supervisor, Ranch Hand Supervisor*
OTHER WORKERS	41	**AGRICULTURAL INSPECTORS:** Inspect agricultural commodities, processing equipment and facilities, and aquacultural operations, to ensure compliance with regulations and laws governing health, quality, and safety. *Examples: Cattle Examiner, Grain Sampler, Meat and Poultry Inspector, Milk Tester*
	42	**ANIMAL BREEDERS:** Select and breed animals according to their genealogy, characteristics, and offspring. May require knowledge of artificial insemination techniques and equipment use. May involve keeping records on heats, birth intervals, or pedigree. *Examples: Dairy Husbandry Worker, Horse Breeder, Poultry Inseminator, Stallion Manager*
	43	**PESTICIDE HANDLERS AND SPRAYERS:** Mix or apply pesticides, herbicides, fungicides, or insecticides through sprays, dusts, vapors, soil incorporation, or chemical application to all crops including nursery and greenhouse products and facilities, and livestock, and livestock facilities. Usually requires specific training and State or Federal certification. Excludes pilots who dust or spray crops from aircraft. *Examples: Fruit Sprayer, Herbicide Sprayer, Weed Sprayer*
	44	**ANY OTHER WORKER NOT LISTED ABOVE** *Examples: Accountant, Aerial Crop Duster, Agricultural Pilot, Agricultural Equipment Mechanic, Bookkeeper*

Cognitive Interviews

- Two rounds of testing (n=24)
- Only tested the questions related to categorizing workers (original and two revised versions)
- Interviews conducted by 9 interviewers in 6 states

Cognitive Interview Findings

- Order of worker codes and question was confusing for new version

- Respondent had trouble finding correct code
  - Major groupings; "Other" categories were not seen

- Respondents had trouble picking one code

- Examples of types of workers seemed helpful to respondents, but they caused incorrect answers

- Term 'hired to do' caused some confusion

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AGRICULTURE
NASS
COUNTS

Cognitive Interview Findings

- Issues we weren't looking for
  - Definition of hired worker (e.g., family members, operator, children?)
  - Level of reporting (by category [what we wanted]or by worker?)
  - Wages and hours – some workers are paid different wages for different jobs

Paper Instrument Improvements

- Order of presentation of worker codes and question

- New layout of worker codes
  - More obvious major categories (e.g., spacing, fonts)
  - Removal of definition text and examples

CATI Instrument

First ask respondents:

What type of work were they hired to do?

1. Field work

2. Livestock work

3. Supervision/Management

4. Other work

CATI Instrument

Then asked:

More specifically, which type of work were they hired to do? (open ended - Interviewer then selects appropriate code based on the response)

Challenges & Limitations of CIs

- Tested the paper version only

- Cognitive interviewers with limited training/little or no experience

- Convenience sample/couldn't sample large ops

- Must incorporate SOC codes

Field Test

- Respondents were administered the original question during the survey
- After survey completed, respondents were read the following statement and then asked the new question version:

NASS is testing a new set of worker groups for the Agricultural Labor Survey, and we are asking for your help with this project. You will be asked to report on the same workers from the previous questions, separating the workers by the main type of work they were hired to do based on the expanded list of worker codes.

Field Test Findings

- Less useable records for the new version across all regions (ranged from 1%-19% by region)

- Comparisons of the estimates were made by region for number of paid workers

- Of the 51 possible comparisons made, 5 were statistical significant at the 0.05 level… BUT….

Challenges & Limitations of FT

- Did not do a split sample field test

- Respondents always received the original question first

- Data from new question versions not edited; estimates not released

- Interviewer effects – more on this in a minute

Behavior Coding

- Quantitative, systematic coding of interviewer respondent interaction
- Use representative sample

Behavior Coding

- Audio recorded and captured screen shots of 500 interviews from the October 2013 Ag Labor Survey.

- Loaded these recordings/screen shots into CARI for behavior coding

- Plan is to code 50 interviews; using 5 coders

Behavior Coding

- 1st level exchange

  - Interviewer behavior

  - Respondent behavior

- Final response

  - Respondent behavior

  - Data entry

  - Number of exchanges required

Findings

- None yet! Still trying to achieve good agreement

Preliminary Findings:

- Interviewers skipping new questions and entering data from old questions.

- New questions are hard to administer; burdensome on interviewers & respondents.

Challenges & Limitations of BC

- Technical Challenges
    - Working with new CARI system
    - Sound Issues
    - Interviewers advancing too quickly/system lag

Challenges & Limitations of BC

- Methodological Challenges
  - poor agreement
  - complex instrument/conversational
  - interviewer variability
  - lack of training in BC

Outcomes

Was this mixed-methods approach worth it?

- CI: Made changes to format of paper form – don't know if this made improvements

- FT: Few differences in nonresponse in the CATI – but know based on BC new questions not always asked

- BC: No findings yet; but made aware of burden, flaws in field test

- Need to have more collaboration for testing

Moving forward

- How can we better plan out mixed-methods tests?

- How can we do better tests in production?

- How can we get all players on same page? (survey administrators, research staff, call center supervisors, enumerators all have different motivations.)

Questions? Comments?

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