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## **What Are You Talking About?**

**Applying Cognitive Interviewing to Improve Survey Questions on Women's  
Economic Empowerment for Market Inclusion**

Emily Myers  
Jessica Heckert  
Elizabeth Salazar  
Kenan Kalagho  
Flora Salamba  
Diston Mzungu  
Grace Mswero  
Ygué Patrice Adegbola  
Géraud Fabrice Crinot  
Baudelaire Kouton-Bognon  
Audrey Pereira  
Deborah Rubin  
Hazel Malapit  
Greg Seymour

Poverty, Gender, and Inclusion Unit  
Natural Resources and Resilience Unit

## INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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### AUTHORS

**Emily Myers** ([e.c.myers@cgiar.org](mailto:e.c.myers@cgiar.org)) is a research analyst in the Poverty, Gender and Inclusion (PGI) Unit at the International Food Policy Research Institute (IFPRI), Washington DC.

**Jessica Heckert** ([j.heckert@cgiar.org](mailto:j.heckert@cgiar.org)) is a research fellow in PGI at IFPRI, Washington DC.

**Elizabeth Salazar** ([elisalazar23@gmail.com](mailto:elisalazar23@gmail.com)) was a master's student at Georgetown University McCourt School of Public Policy at the time of this work; she is currently a research fellow at the Inter-American Development Bank, Washington DC.

**Kenan Kalagho** ([ndaghamesho@yahoo.co.uk](mailto:ndaghamesho@yahoo.co.uk)) is an extension support services officer at the Ministry of Agriculture, Irrigation, and Water Development, in Lilongwe, Malawi.

**Flora Salamba** ([florasalamba@gmail.com](mailto:florasalamba@gmail.com)) is a consultant at IFPRI Malawi in Lilongwe, Malawi.

**Diston Mzungu** ([mzungudiston@gmail.com](mailto:mzungudiston@gmail.com)) is a monitoring and evaluation specialist at the Global Project Employment for Empowering Youth in Agriculture (EYA!) Agricultural Technical Vocational Education and Training (ATVET) in Lilongwe, Malawi.

**Grace Msvero** ([gracemsvero@gmail.com](mailto:gracemsvero@gmail.com)) is a consultant at IFPRI Malawi in Lilongwe, Malawi.

**Ygué Patrice Adegbola** ([patrice.adegbola@yahoo.fr](mailto:patrice.adegbola@yahoo.fr)) is a general manager at the International Center for Research and Training in Social Sciences (CIRFoSS) in Cotonou, Benin.

**Géraud Fabrice Crinot** ([fabcrinot@yahoo.fr](mailto:fabcrinot@yahoo.fr)) is a program manager at CIRFoSS in Cotonou, Benin.

**Baudelaire Kouton-Bognon** ([koutonlebeau@gmail.com](mailto:koutonlebeau@gmail.com)) is a director at CIRFoSS in Cotonou, Benin.

**Audrey Pereira** ([pereiraa@email.unc.edu](mailto:pereiraa@email.unc.edu)) was a research analyst in the Poverty, Health, and Nutrition Division at IFPRI at the time of this work; she is currently a PhD candidate in the Department of Public Policy & Carolina Population Center at the University of North Carolina, Chapel Hill.

**Deborah Rubin** ([drubin@culturalpractice.com](mailto:drubin@culturalpractice.com)) is a Director at Cultural Practice, LLC, Bethesda, Maryland.

**Hazel Malapit** ([h.malapit@cgiar.org](mailto:h.malapit@cgiar.org)) is a senior research coordinator in PGI at IFPRI, Washington DC.

**Greg Seymour** ([g.seymour@cgiar.org](mailto:g.seymour@cgiar.org)) is a research fellow in the Natural Resources and Resilience Unit at IFPRI, Washington DC.

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## **ABSTRACT**

Monitoring progress toward women's empowerment requires tools that reflect its underlying concepts. Cognitive interviewing is a qualitative approach for identifying sources of error in how respondents respond to survey items. This study identifies cognitive errors in survey modules included in the project-level Women's Empowerment in Agriculture Index for Market Inclusion (pro-WEAI+MI) in Benin and Malawi. Comprehension, retrieval, judgment, and response errors were all found to different degrees in the nine modules comprising the survey instrument. There are variations in findings by country context and, to a lesser extent, gender. The findings of this study informed revisions to the pro-WEAI+MI survey instrument and offer insights into how best to design survey modules used for monitoring progress toward gender equality in agricultural value chains and development efforts.

**Keywords:** cognitive interviews; gender; agricultural value chains; sexual harassment; qualitative methods

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## ACRONYMS

ATVET4W	Agricultural Technical Vocational Education and Training for Women program
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
Pro-WEAI	project-level Women's Empowerment in Agriculture Index
Pro-WEAI+HN	project-level Women's Empowerment in Agriculture Index for Health and Nutrition
Pro-WEAI+MI	project-level Women's Empowerment in Agriculture Index for Market Inclusion
WEAI	Women's Empowerment in Agriculture Index

## INTRODUCTION

Recent years have seen an increased focus on women's empowerment in the agricultural sector, as well as interest in improving the measurement of women's empowerment (Alkire et al., 2013; Diiro et al., 2018; Galiè et al., 2018). Most existing measures of women's empowerment in the agricultural sector focus heavily on agricultural production. However, rural households often rely on multiple income streams, and participate in agricultural processing and marketing in addition to production (Start, 2001). Additionally, agricultural development interventions increasingly focus on women's empowerment in market systems, meaning the expansion of opportunities in processing and marketing activities (Barrientos, Stephanie Dolan & Tallontire, 2003; Getahun & Villanger, 2018; Said-Allsopp & Tallontire, 2015). At the same time, there has been a considerable focus on indicator development (Galiè et al., 2018; Narayanan et al., 2019; O'Hara & Clement, 2018), as well as the measurement properties of newly developed instruments (Alkire & Foster, 2011; Miedema et al., 2018; Yount et al., 2019), but considerably less focus on reporting the results of methods used to ensure that respondents understand the questions that are being asked.

As survey research aims to measure increasingly complex topics in women's empowerment, respondents are being asked to respond to increasingly complicated questions. The field currently has limited information on how well respondents understand these questions and whether they are providing responses that reflect their experiences. In this paper, we demonstrate how we applied cognitive interviewing in the development of new modules proposed for inclusion as part of the project-level Women's Empowerment in Agriculture Index (pro-WEAI) for market inclusion (+MI). Cognitive interviewing is a method that straddles quantitative and qualitative approaches by using open-ended questions to probe respondents' understanding of structured survey items. The principal purpose of this approach is to identify sources of error in how respondents interpret and formulate responses to survey questions (Willis, 2004). Insights from cognitive interviewing can then be used to revise survey modules so that the items are easy to understand and responses more accurately reflect the experiences of the respondents (ibid).

### **Expanding pro-WEAI to address market inclusion**

The Women's Empowerment in Agriculture Index (WEAI) was developed to measure the empowerment, agency, and inclusion of women in the agriculture sector (Alkire et al., 2013). More recently, the project-level WEAI (pro-WEAI), which includes a survey-based quantitative approach and a suite of complementary qualitative tools, has been developed and validated to diagnose areas of disempowerment and measure the impact of agricultural development projects on empowerment (Malapit

et al., 2019). Pro-WEAI comprises 12<sup>1</sup> indicators, which are mapped to different types of agency: *intrinsic* (autonomy in income, self-efficacy, attitudes about intimate partner violence against women, respect among household members indicators); *instrumental* (input in productive decisions, ownership of land and other assets, access to and decisions on credit and financial accounts, control over use of income, work balance, and visiting important locations indicators); and *collective* agency (group membership and membership in influential groups indicators). Many of indicators focus on agriculture as it remains the most common livelihood among rural peoples (see [weai.ifpri.info/versions/pro-weai/](http://weai.ifpri.info/versions/pro-weai/) for survey modules; Malapit et al., 2019). However, existing indicators do not account for the additional barriers that may limit the economic participation of women who are active in processing and marketing (Galiè et al., 2022; Rubin et al., 2019). These additional barriers suggest the need for new indicators of empowerment that take into account the full range of opportunities and “strategic life choices” that are denied to women (Kabeer, 1999). Thus, to adequately address women’s empowerment in market inclusion, there is a need for new indicators that can be used in addition to the core pro-WEAI. See Heckert, Malapit, et al. (2020) and Ragasa et al. (2020) for more information on why the indicators used were included.

### **Background on cognitive interviewing**

According to Willis and Miller (2011), discrepancies between how researchers ask questions and how respondents interpret them may occur at any point—as a respondent interprets a question, recalls the information requested, or responds to a question. Cognitive interviewing uncovers sources of error by examining four specific cognitive processes: comprehension, retrieval, judgment, and response (Willis, 2004). Per Willis (2004), these concepts are defined as:

- *Comprehension*: A respondent’s understanding of a question’s content, including key terms.
- *Retrieval*: Recall of the information in question, e.g., a time period stated in the question.
- *Judgment*: Discomfort a respondent may feel while answering a specific question, e.g., social desirability bias.
- *Response*: The ease of replying to a question in its suggested format, specifically being able to choose from pre-specified response options.

Beyond identifying these specific sources of errors, cognitive interviewing may also reveal differences in interpretation among different sub-groups of respondents, for example, by language, gender, or age. Furthermore, revisions to the questionnaires can be one step to ensuring validity across

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<sup>1</sup> Pro-WEAI was originally developed with 12 indicators (Malapit et al., 2019). Since its debut in 2019, the tool has been revised to have 10 indicators, where the respect among household members and membership in influential groups indicators are optional.

these different groups (Hannan et al., 2019; Willis & Miller, 2011). In short, cognitive interviewing helps determine whether the right survey questions are being asked and being asked well.

Cognitive interviewing methods continue to evolve, and there is no single set of accepted best practices (Beatty & Willis, 2007). In general, approaches differ in how standardized the open-ended cognitive questions are and whether the approach is proactive (initiated by interviewer) or reactive (responses to respondent's behavior) (Beatty & Willis, 2007). Which approach to use for a given study depends on factors such as the skills of the interviewer and the timeframe for analysis and revisions. Regardless of which approach is taken, however, cognitive interviewing is essential to ensuring high-quality survey questions that are consistently understood across diverse populations (Scott et al., 2021).

In earlier work on developing the WEAI family of tools, cognitive interviewing was used in Uganda, Bangladesh, and Haiti to identify potential errors in the original WEAI and helped inform revisions for the abbreviated WEAI (A-WEAI) (Johnson & Diego-Rosell, 2015; Malapit et al., 2017). Additionally, cognitive interviewing in Bangladesh was used to develop an optional add-on module for the pro-WEAI to measure health and nutrition agency (pro-WEAI+HN) (Hannan et al., 2019). Results from these studies found that misinterpretation of the survey items commonly occurred when respondents focused on the second half of questions and that women who were shy or less educated had more difficulty responding to questions on sensitive topics. Moreover, the results of the cognitive interviewing helped inform decisions to drop items that respondents felt were redundant (Heckert et al., 2022; Sinharoy et al., 2021).

### **Objectives**

In this study, we applied cognitive interviewing to new survey modules that were being developed for the pro-WEAI+MI in Benin and Malawi. We aimed to assess whether the questions were well understood by respondents and whether they would elicit responses that accurately reflected the lived experiences of women and men in these contexts. We compare these findings for women and men across countries and language groups within countries. We then explain how we applied these findings to revise the new modules and thereby contribute to the emerging literature on how cognitive interviewing results are used to ensure that respondents understand the survey questions being asked.

## METHODS

The pro-WEAI+MI was developed using an iterative process. Using the core pro-WEAI and lessons learned as a foundation, pro-WEAI+MI was initially piloted in Bangladesh and the Philippines in 2017 and then revised and later implemented in Benin in Malawi in 2019 (Malapit et al., 2023). The cognitive interviewing study described herein was conducted after the Bangladesh and the Philippines studies and at the start of the work in Benin and Malawi before the market inclusion modules were included in quantitative household surveys of individuals active in the rice, compost, soy, and poultry value chains in Benin, and those in the mango, pineapple, aquaculture, and vegetables value chains in Malawi (Heckert, Malapit, et al., 2020; Ragasa et al., 2020). The different modules that we developed for cognitive interviewing were motivated by lessons learned from our work, topics in the literature, and consultations with the implementing partners for the Agricultural Technical Vocational Education and Training for Women program (ATVET4W), an African Union-wide initiative to transform agriculture through skills development in Benin and Malawi. We considered these modules to be candidates for inclusion in pro-WEAI+MI, pending successful cognitive interviewing, as well as future validation that is outside the scope of this specific study. Each module was designed to focus on a specific barrier that individuals may encounter when pursuing economic activities in processing and marketing agricultural commodities. The modules included: entrepreneurial mindset, experiences with sexual harassment when traveling, experiences with sexual harassment in the working environment, access to reliable sanitation, agency over menstrual hygiene management, and entrepreneurship and business management. The intent of each module is summarized in *Table 1*, along with sources from the literature that informed its content. The entrepreneurial mindset module was cognitively tested using a selection of statements that Frese & Gielnik originally developed (2014). Time-use agency and autonomy in decision-making were originally used in Bangladesh and the Philippines, and freedom of movement was also used in Bangladesh, but we determined they could benefit from further revision and insights from cognitive interviewing (Ahmed et al., 2018; Malapit et al., 2020). The other modules were developed specifically for this project.

**Table 1: Modules cognitively tested for project-level Women’s Empowerment in Agriculture Index for Market Inclusion**

<b>Module</b>	<b>Intent</b>	<b>Source of survey content</b>
Time-use agency	To determine the extent to which individuals can exercise agency and make choices about how they allocate and organize their time	Developed by authors
Freedom of movement	To determine whether individuals can freely choose to move about within their communities and to neighboring communities	Heckert, Myers, et al., 2020 Malapit et al., 2020
Autonomy in decision-making	To determine individuals’ motivation for how they use their income	Malapit et al., 2020
Entrepreneurial mindset	To determine the degree of having an entrepreneurial mindset	Frese & Gielnik, 2014

<b>Module</b>	<b>Intent</b>	<b>Source of survey content</b>
Experiences with sexual harassment when traveling	To assess whether individuals experience sexual harassment in their communities and the extent to which it limits their participation in normal activities	Barling et al., 2001 Fitzgerald et al., 1995: subscale B on gender harassment and sexual hostility
Experiences with sexual harassment in the working environment	To determine the extent to which respondents experience gender-based discrimination and sexual harassment in their work environment and the extent to which it limits their economic participation	Barling et al., 2001 Fitzgerald et al., 1995: subscale A on gender harassment and sexual hostility
Access to reliable sanitation	To determine access to safe and clean sanitation facilities in their work environment	Developed by authors
Agency over menstrual hygiene management	To assess women's access to sanitation facilities in which they can manage menstruation adequately; to determine the extent to which menstruation and lack of sanitation facilities interfere with a woman's ability to work	Developed by authors
Entrepreneurship and business management	To determine the extent to which respondents participate in and make decisions about their businesses	Developed by authors

### **Study context**

The cognitive interviewing studies in Benin and Malawi were conducted for ATVET4W, which is implemented under the Comprehensive Africa Agriculture Development Programme framework and the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD), with technical support provided by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The ATVET4W program aims to increase women's access to, and benefits and empowerment from, formal and non-formal training in the agri-food sector in six countries: Benin, Burkina Faso, Ghana, Kenya, Malawi, and Togo.

In Malawi, the study was conducted in two districts: in Chiradzulu District, where the primary language is Chichewa, and in Chitipa District where the primary language is Lambya. In Chiradzulu, 71.0% of women and 71.4% of men have some primary education; in Chitipa, 65.3% of women and 60.0% of men have some primary education (National Statistical Office of Malawi & ICF, 2017). Most rural households in Malawi rely, at least in part, on agricultural production to support their livelihoods, with different activities being pursued by women and men (Simtowe, 2010). Households typically contain nuclear families, and woman-only headed households are common. It is expected that men will generally make most decisions, or do so jointly with their wives, but it is uncommon for women to make decisions about agriculture independently if there is also a man in the household to make decisions (Djurfeldt et al., 2018; Meijer et al., 2015).

In Benin, the study was conducted in the Atlantique department where Fon is the most common local language and the Atakora, and Donga departments, where both Dendi and Bariba are commonly spoken. In Atakora, 13.4% of women and 17.5% of men have some primary education; in Atlantique, 25.8% of women and 30.2% of men do; and in Donga, 17.7% of women and 23.3% of men do (INSAE &

ICF, 2019). Across Benin, 45% of men and 23% of women work in agriculture, the largest source of jobs; the second largest employer is commerce, which employs 46% of women and 19% of men (INSAE & ICF, 2019). In Benin, it is also commonly expected that men will be responsible for making the majority of decisions in their households (Atozou et al., 2017).

### Data collection

Data collection took place in June and July 2019 in Malawi and Benin, respectively. Experienced local interviewers (two men and two women in Malawi; three men and three women in Benin) who were fluent in the target local languages were trained to conduct the cognitive interviewing. In both countries, respondents who were not current program participants were selected from areas where the ATVET4W participants lived.<sup>2</sup> Primary respondents were the adult woman working in agriculture and her spouse, if applicable. Respondents were matched with enumerators by gender and language. Interviews were conducted privately in locations inside or immediately outside respondents' homes. Most interviews lasted between one to two hours. Responses were captured on paper by the interviewer and recorded for backup. Enumerators also took notes of their observations during the interview after completing each module and had been trained to look for signs that the respondent was uncomfortable and make notes about the surroundings as appropriate.

In Malawi, 21 dual households and eight women-only households were interviewed for a total of 50 respondents (21 men and 29 women). In Benin, the sample included 29 dual-adult households and 16 women-only households for a total of 74 respondents (29 men and 45 women). *Table 2* provides the total number of interviews by household type and district.

**Table 2: Summary of respondent characteristics**

Country	District	Dual-adult households	Women-only households	Male respondents; dual-adult households	Female respondents; dual-adult households	Total respondents
Malawi	Chiradzulu	9	6	9	15	24
	Chitipa	12	2	12	14	26
MALAWI TOTAL						50
Benin	Atlantique	19	11	19	30	49
	Donga	6	2	6	8	14
	Atakora	4	3	4	7	11
BENIN TOTAL						74
TOTAL						124

### Cognitive interview guide

The cognitive interviewing guide addressed the nine proposed modules and was based on an earlier version used to cognitively test the pro-WEAI health and nutrition module (Hannan et al., 2019).

<sup>2</sup> To avoid response bias, it is recommended that cognitive interviewing respondents not participate in later surveys covering the same content.

After administering the standardized questions for each of the modules (in whole or in part), the discussion guide included scripted probing questions for the cognitive testing. Scripted probing questions reduce the need for enumerators to have an extensive understanding of all content (Willis, 2004). To limit the overall length of the questionnaire, we identified the most common sources of cognitive error (i.e., comprehension, retrieval, judgment, or response error) that we expected to identify in each of the modules, and we limited the cognitive interviewing questions to addressing these types of errors. In some instances, we also asked contextualizing questions to better understand the experiences the individuals were thinking of when responding to these questions. As such, contextualizing questions do not target a specific type of error but elicit information critical to assessing whether prospective survey items function as intended.

Generic cognitive interviewing questions to address specific types of error are described below. Additionally, *Table 3* provides the types of cognitive interview questions asked in each module and examples of the survey items and cognitive questions.

- *Comprehension:* Can you describe to me in your own words what the term “[KEY PHRASE]” means?
- *Retrieval:* What period of time were you thinking about when I asked you the question on being able to [KEY PHRASE]?
- *Judgment:* Did the question make you feel uneasy or uncomfortable?
- *Response:* Can you repeat this question to me in your own words?
- *Contextualizing:* Can you tell me about a time when you wanted to do something and were able to [KEY PHRASE]

**Table 3: Types and examples of cognitive questions**

<b>Module</b>	<b>Type of cognitive question(s)</b>	<b>Example survey item(s)</b>	<b>Example cognitive question(s)</b>
Time-use agency	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Contextualizing</li> <li>• Retrieval</li> </ul>	<p>When you want to do something for yourself that is related to your livelihood, training, or care for yourself, are you able to reorganize your tasks so that you have time to do it?</p> <p>If you had two extra hours in a day, how would you use the extra time?</p>	<p>Can you describe to me in your own words what the term “reorganizing tasks” means?</p> <p>Can you repeat this last question about two extra hours in a day to me in your own words?</p>
Freedom of movement	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Judgment</li> <li>• Retrieval</li> </ul>	<p>During the past 12 months, were you ever prevented from going to the closest market to either buy or sell goods when you wanted to?</p>	<p>How well do you remember going to different places in the past 12 months?</p>
Autonomy in decision-making	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Contextualizing</li> </ul>	<p>“[MARIAN / MARIO] uses (her/his) income how (her/his) spouse, or another person or group in (her/his) community tell (her/him) (she/he) must use it there. (She/He) does what they tell (her/him) to do.”</p> <p>Are you like [MARIAN / MARIO]?</p>	<p>Can you describe this story to me in your own words?</p>
Entrepreneurial mindset	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Response</li> </ul>	<p>Tell me whether you strongly disagree, disagree, neither agree or disagree, agree, or strongly agree.</p> <p>I look forward to returning to my work when I am away from work.</p>	<p>Why do you think you are you (like/not like) [NAME]?</p> <p>Can you describe for me in your own words what the [statement] means?</p>
Experiences with sexual harassment when traveling	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Judgment</li> <li>• Response</li> </ul>	<p>When you want to travel somewhere, how often do you avoid going somewhere or use a different way of getting there out of concern that someone will make offensive remarks about your appearance, body, or sexual or romantic relationships?</p>	<p>I just asked you how often you avoid going somewhere or use a different way of getting there when you want to travel there. Can you repeat this question to me in your own words?</p> <p>Can you describe for me in your own words what it means when [OCCURRENCE]?</p> <p>Would another [woman/man] of your age in your community be reluctant to talk about [OCCURRENCE]?</p>

<b>Module</b>	<b>Type of cognitive question(s)</b>	<b>Example survey item(s)</b>	<b>Example cognitive question(s)</b>
Experiences with sexual harassment in the working environment	<ul style="list-style-type: none"> <li>• Comprehension</li> </ul>	When you are at the place where you work, how often do people make remarks that people of your sex are not suited for the kind of work you do?	<p>Can you describe for me in your own words what the [statement] means?</p> <p>Was this statement easy or difficult for you to understand? Why?</p>
Access to reliable sanitation	<ul style="list-style-type: none"> <li>• Comprehension</li> </ul>	At your place of work, is there a place where you think it is acceptable for you to defecate without fear of being attacked or exposed?	Can you describe to me in your own words what you understand by the term “a place where you think it is acceptable for you to urinate without fear of being attacked or exposed?”
Agency over menstrual hygiene management	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Contextualizing</li> </ul>	At your place of work, is there a place where you can dispose of your [cloth/pad] when needed?	Can you describe to me in your own words what you understand by the term “place where you think it is acceptable for you to change your [cloth/pad] without fear of being attacked or exposed?”
Entrepreneurship and business management	<ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Contextualizing</li> </ul>	Who in the household are/were the principal manager/administrator of the business (responsible for day to day operations)?	Earlier, I asked you whom in your household you consider the owner of different businesses. In your own words, could you please describe the term “owner?”

## **Analysis**

Translated responses (English in Malawi and French in Benin) were entered into spreadsheets for analysis. Open-ended questions were analyzed thematically using a codebook of emergent themes (all codes were inductive). Close-ended questions were analyzed in conjunction with their related open-ended questions to contextualize individual respondents' answers. We conducted gendered comparisons to determine if women and men had different cognitive errors while responding to survey items. We also compared geographic location, both intra- and inter-country, though no consistent trends emerged on that basis, and it is therefore largely omitted from the presentation of the results. In select instances, we compared spouses' responses to better understand respondents' cognitive processes in answering survey items. These instances are explained in greater detail in the relevant results sections below.

## **Ethics**

All study procedures were approved by the Institutional Review Board of the International Food Policy Research Institute. At the national level, the National Committee on Research Ethics in the Social Sciences and Humanities of Malawi and the National Ethics Committee for Research in Health of Benin also approved the studies. Oral informed consent was obtained from each respondent prior to conducting the interview and additional consent was obtained to record the interviews. Participants received soap, snacks, or bread valued between 1.00-3.00 USD as compensation for their time.

## RESULTS

We found examples of all four types of cognitive errors. Below we summarize the types of errors found in each module. *Table 4* summarizes the findings for each country separately and indicates the specific revisions that were made.

- *Comprehension*: We found comprehension errors in all nine modules in Malawi and all modules except for agency over menstrual hygiene management in Benin.
- *Retrieval*: Of the two modules where we asked retrieval questions (time-use agency and freedom of movement), we found retrieval errors only in the time-use agency module in Benin.
- *Judgment*: Asked for the freedom of movement and experiences with sexual harassment when traveling modules, we identified judgment errors for freedom of movement questions in Benin and questions on experiences with sexual harassment when traveling in Malawi.
- *Response*: Asked for entrepreneurial mindset and experiences with sexual harassment when traveling, response errors for the entrepreneurial mindset questions were found in both Benin and Malawi. Response errors for the experiences with sexual harassment when traveling questions were found only in Malawi.

**Table 4: Findings by country and survey revisions**

<b>Module</b>	<b>Malawi results</b>	<b>Benin results</b>	<b>Survey revision(s)</b>
Time-use agency	<ul style="list-style-type: none"> <li>Comprehension error; key concepts (i.e., reorganize tasks, two extra hours) were not understood by participants</li> <li>Important to distinguish emergency from non-emergency situations</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; key concepts (i.e., reorganize tasks, two extra hours) were not understood by participants</li> <li>Important to distinguish emergency from non-emergency situations (e.g., family member falls ill)</li> <li>Retrieval errors (i.e., time frames mentioned did not align with the question as intended)</li> </ul>	<ul style="list-style-type: none"> <li>Rephrased questions about reorganization</li> <li>Included questions for emergency and non-emergency situations</li> <li>Eliminated one question with poor comprehension</li> </ul>
Freedom of movement	<ul style="list-style-type: none"> <li>Comprehension error; key concepts (e.g., prevented) were not understood by participants</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; key concepts (e.g., object) were not understood by participants</li> <li>Comprehension error; different places were not understood to be mutually exclusive (e.g., office of a local official and group meeting place; office of a local official and training center)</li> <li>Judgment error (e.g., some women may be uncomfortable talking about their experiences with their spouse)</li> </ul>	<ul style="list-style-type: none"> <li>Added response options to allow for respondents to be precluded from visiting various locations due to anyone, any inclement weather, or an emergency</li> </ul>
Autonomy in decision-making	<ul style="list-style-type: none"> <li>Comprehension error; vignettes were not understood by participants</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; vignettes were not understood by participants</li> </ul>	<ul style="list-style-type: none"> <li>Vignettes were shortened and simplified</li> <li>Eliminated one vignette with poor comprehension</li> </ul>
Entrepreneurial mindset	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (i.e., strongly dis/agree vs. agree; entrepreneurial qualities)</li> <li>Response error; Likert scale too expansive for response</li> <li>Respondent fatigue because module was too long</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (e.g., entrepreneurial qualities)</li> <li>Response error; Likert scale too expansive for response</li> </ul>	<ul style="list-style-type: none"> <li>Reduced Likert scale from five to three response options</li> <li>Dropped ten attitudinal items</li> <li>Simplified remaining attitudinal items</li> </ul>
Experiences with sexual harassment when traveling	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (i.e., avoiding going somewhere)</li> <li>Response error (e.g., describing going somewhere despite sexual harassment experienced, not avoiding sexual harassment)</li> <li>Judgment error; perceived as too sensitive (i.e., refused to answer questions)</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (i.e., avoiding going somewhere)</li> </ul>	<ul style="list-style-type: none"> <li>Eliminated entire module</li> </ul>
Experiences with sexual harassment in the working environment	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (i.e., sexual touching, lack of consent)</li> </ul>	<ul style="list-style-type: none"> <li>Comprehension error; key concepts were not understood by participants (i.e., nonconsensual and sexual touching, poor</li> </ul>	<ul style="list-style-type: none"> <li>Revised survey items for clarity</li> </ul>

<b>Module</b>	<b>Malawi results</b>	<b>Benin results</b>	<b>Survey revision(s)</b>
Access to reliable sanitation	<ul style="list-style-type: none"> <li>• Comprehension error; key concepts were not understood by participants (i.e., without fear of being attacked and exposed)</li> </ul>	<p>treatment as punishment for refusing sexual favors)</p> <ul style="list-style-type: none"> <li>• Comprehension error; conflated meaning of different items (e.g., unwanted relationship with nonconsensual touching)</li> <li>• Comprehension error; key concepts were not understood by participants (i.e., without fear of being attacked and exposed)</li> </ul>	<ul style="list-style-type: none"> <li>• Revised survey items for clarity</li> </ul>
Agency over menstrual hygiene management	<ul style="list-style-type: none"> <li>• Comprehension error; key concepts were not understood by participants (i.e., without fear of being attacked and exposed)</li> </ul>	<ul style="list-style-type: none"> <li>• No errors</li> </ul>	<ul style="list-style-type: none"> <li>• Revised survey items for clarity</li> </ul>
Entrepreneurship and business management	<ul style="list-style-type: none"> <li>• Comprehension error; key concepts were not understood by participants (i.e., distinction between owner and manager)</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehension error; key concepts were not understood by participants (i.e., distinction between owner and manager)</li> </ul>	<ul style="list-style-type: none"> <li>• Questions were combined to reduce comprehension error and redundancy</li> </ul>

We report the results by module in detail below. In each section, we report the results according to the cognitive stages of responding to a question. The contextualizing questions are also reported to shed additional light on how questions were interpreted. We do not elaborate on content that was well understood by respondents.

### **Time-use agency**

Time-use agency is the extent to which individuals can make choices over how their time is allocated. Through cognitively testing how to measure this novel concept, we found comprehension errors in time-use agency questions in both Malawi and Benin. The troublesome items were: (1) “If you had two extra hours in a day, how would you use the extra time?”; and (2) “When you want to do something for yourself that is related to your livelihood, training, or care for yourself, are you able to reorganize your tasks so that you have time to do it?”

The concept of “two extra hours of free time,” which was intended to capture the tradeoff between leisure and work, was not well understood by respondents in either country, but especially in Malawi. In both countries, many respondents explained that everyone needs to rest and that it is important to work more efficiently. In Benin, 24 participants correctly described the question as asking what participants would choose to do if they had two hours of free time; of the 24 participants who understood the question as intended, many shared statements similar to this woman’s: “If you happen to have two more hours, what do you do with it?” Further, 17 more described it as a chance to rest, though it was unclear if respondents considered “free time” and “rest time” as synonymous. Eighteen Benin participants described the question as there being 26 hours in a day, indicating the question is illogical. The remaining participants from Benin could not repeat the question or did not respond.

Relative to Benin respondents, the respondents from Malawi had given a wider range of explanations for what the question meant, indicating the question did not elicit a coherent and universal understanding. For instance, examples from Malawi include “What work can you do when you are tired?” (woman); “One has not to stay idle in two extra hours, but she has to do something” (woman); and “Two hours equals many minutes which one can use” (man). Additionally, some participants from Malawi simply stated they did not understand the question, while others perceived it as illogical. As one man from Malawi stated, “The mere fact that someone asks what you can 'use' these hours for means these are no longer free hours. They are embedded in working hours.” Given that the survey item “If you had two extra hours in a day, how would you use the extra time?” confused many respondents, it was eliminated from the survey instrument.

For the second problematic question, many participants did not understand the phrase “reorganize one’s tasks.” In both countries, some participants perceived the phrase to mean planning tasks in general;

as a man from Malawi and a woman from Benin shared, respectively, the phrase means “getting organized to be able to do some work” and “to plan tasks.” One respondent in Benin outright rejected the idea of reorganizing tasks; he explained, “I take myself seriously and do what tasks I planned,” implying it is better not to reorganize tasks, even if he wanted to or could.

There was some variation by geographic location and gender in Malawi, though no such patterns emerged in Benin. In Malawi, Lambya speakers interpreted “reorganizing tasks” as meaning to do something before they originally planned to do it. This finding may be due to difficulty translating subtleties of this phrase, or an interviewer effect. Women from Chiradzulu (Chichewa speakers) interpreted the phrase by giving a description of their daily domestic tasks. For instance, one woman stated, “reorganizing one’s tasks” means “in the morning you are supposed to go draw water, clean the house and provide food for the children.” Overall, the differences among the participants’ perceptions of the meaning of “reorganize one’s tasks” reveal participants did not interpret the phrase consistently – evidence of comprehension error. Given these differing interpretations of “reorganize one’s tasks,” we rephrased the item to ask respondents about their ability to change their schedules.

Retrieval errors for the time-use agency module in Benin commonly occurred when asking about the ability to “reorganize one’s tasks.” The survey items are written to assess respondents’ current time use agency. When asked, “What period of time were you thinking about when I asked you the question on being able to reorganize tasks?” participants thought of specific tasks or events, rather than a time period, making it impossible to determine whether their answer reflected their current or past time-use agency. For instance, one woman in Benin said she thought about when she learned sewing. A man shared that, “When you asked me this question, I remembered the time when I was going to the field and they came to see me to inform me that we had a seven-day training to do in Sèhouè and I was forced to leave the field to go.” In contrasting these two examples, an ambiguity emerges. While it is likely safe to assume the man referred to an event that occurred as an adult, it is unclear how recent the event mentioned was. The woman could have learned to sew as a child, youth, or an adult. It is unclear what general time period most respondents in Benin thought of while answering – a clear retrieval error, given we intended to ask about their current ability to reorganize their tasks.

In Malawi, most respondents gave time frames in response to retrieval questions. The most common time frames given were times of day (e.g., morning, evening) or times of year (e.g., harvest or fallow seasons, rainy or dry season, specific months). As a woman shared, “In the morning and also during the rainy season, I make a program of how I am going to do the tasks for the next day according to their priorities.” Further, her comment demonstrates that participants may perceive the time frame over a span of months or on a quotidian basis, revealing how participants may be flexible with the time frame, but ultimately think of a recent time period as intended.

Finally, responses to the contextualizing questions in this module suggested that participants' perception of time-use agency may depend on the urgency of the situation (i.e., emergency vs. non-emergency) and their overall priorities. For instance, a woman from Malawi stated that she was able to reorganize her tasks when a family member fell sick unexpectedly; she "started off to harvest maize and then heard that someone in [her] family [was] sick and [she went] back to prepare food for the children." In her case, caring for sick family members took priority over earning household income. However, an emergency does not necessarily increase one's time-use agency (and may reduce it if one is responding to the needs of others). For example, a man from Benin was unable to reorganize his tasks when he fell ill, as there was no one to take over his work; in his words, "one day I had to go to the field, but at night I fell ill, and no one could complete my fieldwork." In his case, engaging in production was of the highest priority, but he was physically unable to do so. The urgency of the circumstance may inform to what degree a participant feels like they can exercise agency over time, though other constraints (e.g., illness) may preclude them from exercising their agency as they desire. As such, items were revised to include emergency (e.g., illness) and non-emergency situations (e.g., a community event) based on participants' answers to contextualizing questions.

### **Freedom of movement**

The freedom of movement module aimed to understand limits on an individual's ability to go to important places, particularly limits imposed on them by other people. In both countries, comprehension errors emerged when asking about the types of restrictions respondents experience. When asked about being prevented from going to the nearest market, many respondents from both Malawi and Benin mentioned limitations such as bad weather and emergencies that called them elsewhere. While constraints on freedom of movement, these examples are not other people constraining one's agency, as the module intended, but rather facts of life. Both women and men explained that "prevented" means *something* else – not necessarily *someone* else – blocks them from going where they originally planned. As a man from Malawi stated, "prevented" means "something comes up and stops you from going somewhere. For example, rains can stop you." In Benin, a woman said it meant, "An unplanned situation that forces you to miss an activity already planned." A handful of respondents from Benin (five total) described "prevented" as being "blocked," though did not specify whether the block would be by someone or something. None of the respondents from Malawi described the concept this way (possibly due to linguistic or cultural differences). Twenty respondents in Malawi (nine men and 11 women) understood "prevented" to mean someone stopped them from going somewhere. In Benin, only two men understood "prevented" in that way. Since less than half of respondents in either country understood the question as primarily about limitations imposed by other people, it shows that the questions were phrased too ambiguously to discern

between limits imposed by people and limits imposed by uncontrollable factors, such as weather or sickness.

Since less than half of respondents in either country understood the intent of the question, we revised the response options to include being prevented by people, inclement weather, or an emergency. While adding response options typically occurs when a response error is identified, in this case the revision ensures that it is possible to distinguish among the reasons why someone is prevented from going to a place to better assess empowerment.

The retrieval cognitive question about how well respondents remember going to different places in the past 12 months did not identify possible errors. Nine participants in Malawi and 15 in Benin outright stated it was easy to remember. Forty-two others in Malawi and 32 others in Benin explained what they thought about before answering the question, for instance, important places they remember well, places they visit frequently, or significant community events that occur in a particular place (e.g., a football match).

Only women were asked if their spouse/partner objected to them going alone to the closest market to either buy or sell goods. This item was then followed by judgment cognitive questions on whether it made them uneasy or uncomfortable and whether other women of their age in their community would feel reluctant to answer this question, along with asking them to explain why. Women overwhelmingly did not find these questions too sensitive in Malawi (two exceptions), although this was not the case in Benin. Seven women in Benin said women would feel uncomfortable answering this question. As one woman explained, “Our neighbor will be very embarrassed, because it is the husband who goes to the market. He opposes that she go herself.” However, ten women in Benin (compared to two in Malawi) said that some women would be comfortable answering, while others might not. Thus, in this case we find judgment errors in one context, but not another, which may be related to cultural differences or the subtleties of translation.

### **Autonomy in decision-making**

This module asks respondents the extent to which they identify with characters in vignettes who have differing degrees of autonomy over decision-making over income. In both countries, results revealed the vignettes were too long and too complex for respondents to remember, indicating a lack of comprehension. When asked to describe each of the four vignettes in their own words, in Malawi, between seven and 32 respondents for each vignette could not describe it accurately. In Benin, between three and 51 people could not describe each one accurately. There were no differences in difficulties with comprehension by gender or language group, and comprehension was generally poor, except for one vignette in Benin, which we attribute to its alignment with existing norms around intrahousehold respect in West Africa. Given that comprehension cognitive questions found the vignettes were too long and

confusing, the vignettes were shortened. For example, the vignette “[NAME] uses her (his) income in the way that her (his) family or community expect. She (He) wants them to approve of her (him)” was revised to say “No one tells [NAME] how to use her (his) income. But, she (he) uses her (his) income in the way that her (his) family or community expects.” Additionally, one vignette was eliminated entirely, considering the vignettes were too long and too complex for respondents to remember, ultimately reducing the length of this module and its burden on respondents.

In asking contextualizing questions, it became clear that most participants believed that money should be spent for the good of the household and/or on necessities. As a woman from Benin stated, “I think about what's best for me and for my kids” in deciding how to spend her money. Further, 12 women and eight men in Malawi and 22 women and ten men in Benin mentioned the importance of listening to a spouse’s input on how to use income. Further, many individuals indicated that cultural norms hold that money should be spent as their family or community expects. In accordance with the information gleaned from the contextualizing questions, vignettes were also revised to be more salient to participants’ perspectives on decision-making, which overall held that money should be spent for the good of the household and/or on necessities.

### **Entrepreneurial mindset**

Individuals responded to a selection of statements from Frese & Gielnik's (2014) scale using a 5-point Likert scale (ranging from “strongly disagree” to “strongly agree”) in the entrepreneurial mindset module. In both countries, response errors emerged as participants were unable to differentiate between response options “agree” and “strongly agree,” as well as between “disagree” and “strongly disagree.” Therefore, we reduced the responses to a 3-point Likert scale (i.e., disagree, neither agree nor disagree, agree).

In testing each attitudinal item for comprehension, between six and 47 respondents in Malawi and between 14 and 35 respondents in Benin understood each item well. In Malawi, generally women had more difficulty understanding the items than men in 16 of the 21 items. In Benin, the opposite was true; women more readily understood more of the items than men.

In both countries, participants seldom articulated the specific nuances of each statement when asked to repeat the items in their own words. As such, respondents perceived many of the statements to be repetitive. For example, a woman from Benin responded similarly for three different attitudinal statements, as shown in *Table 5*. Given that her explanations were vague, they suggest that she did not understand the items well, or at least not well enough to differentiate among them. Interviewers in Malawi also indicated that several participants complained of the module being repetitive and too long. Additionally, some attitudinal items were perceived negatively instead of as a positive attribute of entrepreneurial spirit as intended, particularly in Benin. For instance, the survey item “I find satisfaction

in having influence over others” was perceived negatively among several respondents, who understood the statement to mean “lack of humility” (woman, Benin) and liking “to dominate others” (man, Benin).

Nine attitudinal items in the entrepreneurial mindset were dropped to reduce length, avoid redundancy, and prevent respondent fatigue, given both the comprehension errors we found and the complaints about the repetitiveness of this module, as described in *Table 6*.

**Table 5: Interpretations of entrepreneurial mindset survey items from a woman in Donga, Benin**

<b>Attitudinal item</b>	<b>Interpretation of attitudinal item</b>
In uncertain times I usually expect the best	“Always be positive despite negative situations”
I'm always optimistic about my future	“Dreaming of a better future”
Overall, I expect more good things to happen to me than bad	“Being positive”

**Table 6: Items eliminated from the entrepreneurial mindset module**

<b>Survey item eliminated</b>	<b>Rationale for elimination</b>
I save regularly	Most respondents who disagreed with this statement said they do not have money to save; this item detects ability to save, not attitudes about saving.
I continue to work on hard projects even when others oppose me	Comprehension of this item overlapped with understanding of another item, “I can think of many times when I persisted with work when others quit.”
I like to juggle several activities at the same time	Comprehension of this item overlapped with understanding of another item, “I believe it is best to complete one task before beginning another.” Also, some respondents thought this item meant doing several activities in one day rather than at the same time, as intended.
I try harder when I'm in competition with other people	Comprehension of this item overlapped with understanding of another item, “It is important to me to perform better than others on a task.”
I enjoy planning things and deciding what other people should do	Comprehension error emerged; this statement was interpreted to be about budgeting, not planning.
I find satisfaction in having influence over others	This item was perceived negatively, e.g., “lack of humility” (woman, Benin) and liking “to dominate others” (man, Benin).
The most important thing that happens in life involves work	Comprehension of this item overlapped with understanding of another item, “I look forward to my work.”
I'm always optimistic about my future	Comprehension of this item overlapped with understanding of another item, “In uncertain times I usually expect the best.”
Overall, I expect more good things to happen to me than bad	Comprehension of this item overlapped with understanding of another item, “In uncertain times I usually expect the best.”

### **Experiences with sexual harassment when traveling**

To understand respondents’ experiences of sexual harassment when moving around in either their community or beyond, the items asked if participants ever experienced specific examples of sexual harassment or avoided going places because of concerns about being sexually harassed. Respondents’ comprehension of “avoid going somewhere” due to anticipated sexual harassment was low in both countries. Only 12 women and ten men in Malawi and five men in Benin explained the question as avoiding or failing to visit a location due to perceived risk of sexual harassment. Meanwhile, 12 women

and six men in Malawi and 19 women and seven men in Benin did not mention avoiding or failing to go somewhere, suggesting a comprehension error.

Response errors also emerged with this same item in Malawi. Six women and two men mentioned going somewhere regardless of perceived risk of sexual harassment. For instance, when asked to restate in her own words “how often you avoid going somewhere or use a different way of getting there when you want to travel there,” a woman said, “When you are travelling and there is someone speaking about sexual stories. You don't have to answer if you have husband.” Thus, she described going places regardless of sexual harassment and her response to the experience, which did not reflect the concept of avoiding going somewhere. Considering the comprehension errors in Malawi and Benin and the response errors in Malawi, it was clear that these items were not well understood by respondents.

Additionally, judgment emerged as a major concern among respondents in Malawi and Benin. Five respondents in Malawi (two women and three men) said that they did not want to answer any items in this module and said the questions were too sensitive; by the end of module, an additional man and woman opted out of answering. When asked whether they thought other women or men in the community would be reluctant to answer these types of questions, many respondents confirmed they would be. As one man from Malawi stated, “Others including me would not want to talk about this.” Others in Malawi gave more ambiguous answers to these judgment questions, stating that it may depend on the person being asked. As a woman from Malawi shared, “Others may be reluctant while others not.” Overall, in Malawi, more men than women outright said others in their community would be reluctant for all survey items, while more women said some may be reluctant for all survey items. In Benin, most respondents gave negative responses, saying the questions were very personal and that others may not feel comfortable answering.<sup>3</sup>

Given the extensive comprehension, response, and extensive judgment errors, as well as the degree of uncomfortableness caused, we dropped the experiences with sexual harassment when traveling module in its entirety.

### **Experiences with sexual harassment in the working environment**

Similar to the previous module, in many ways, we asked respondents about occurrences of sexual harassment in their place of work. Notably, though no cognitive questions about judgment were asked, no respondents refused to answer this module, suggesting that the example experiences used were not perceived as too invasive or sensitive. Overall, comprehension of the different sexual harassment

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<sup>3</sup> The data from the judgment question in this module are missing for Benin; this information about judgment error for this module comes from field notes taken during data collection for the cognitive interviews.

experiences presented was high among respondents in Malawi and Benin. There were, however, a few comprehension errors, which we describe.

When asked about “touch[ing] you in a way that makes you feel uncomfortable,” men and women in both countries generally did not interpret the item to be about touching that would be considered sexual harassment. For instance, a woman in Malawi explained it as “How many times do people touch me when am at the market?” which suggests her interpretation includes a wide range of non-sexual and accidental touching. Fifteen respondents in Malawi did not describe this kind of touching as sexual in any way. Three respondents in Malawi described it as being touched without their permission, while 11 described it as sexual, but not something that was uncomfortable or without their permission. In Benin, most respondents understood this item was about unwanted touching, though overwhelmingly did not explicitly describe it as sexual. For instance, one woman described it as “touch us without our consent.” Nine respondents did describe it as sexual, but among them, only one woman described it as sexual and non-consensual. Since this module intended to capture information on non-consensual, sexual touch, this survey item was revised to specifically ask about non-consensual, sexual experiences.

Two additional items confused respondents in Benin. “Make unwanted attempts to establish a romantic or sexual relationship with you despite your efforts to discourage it” was conflated with non-consensual, and typically sexual, touching by women and men. For instance, respondents gave explanations such as: “They come to touch me to make me uncomfortable” (man); “touch you without your consent” (woman); and “A man comes to touch my intimate parts and it bothered me” (woman). Additionally, “make you afraid you will be treated poorly if you didn’t cooperate sexually” was often ambiguously interpreted in Benin. Given the respondents’ answers, it is unclear if they understood it to mean physical forms of sexual violence or threats of maltreatment in the workplace. In their words, “One or more men threaten to hurt me if I don't accept sex with them” (woman); “A woman comes to scare me from hurting me if I don't have sex with her” (man); and “threatening someone to force them to agree to have sex” (woman).

### **Access to reliable sanitation**

To understand respondents’ access to safe, clean, and reliable sanitation at their place of work, we asked if they felt they had a place in their working environment where they thought it was acceptable to urinate, defecate, or wash their hands without fear of being attacked or exposed. Comprehension of places to urinate, defecate, and wash one’s hands was high in both countries and understood as a place that is private and hidden from view. A woman in Malawi explained, “The place where you are alone. The best is at home in the toilet.” Respondents from Benin interpreted the question similarly, with most describing a toilet or a secluded area adjacent to their agricultural plots. In both countries, women mentioned toilets

more frequently than men, likely because, in addition to urination and defecation, women also desire privacy for changing or cleaning menstrual pads or cloths.

Comprehension errors emerged around the phrase “without fear of being attacked or exposed” in both countries, though to a lesser extent in Benin. In asking respondents to describe places where they can urinate, defecate, or wash their hands without fear of being attacked or exposed, few respondents mentioned safety. In Malawi, only 11 people mentioned safety when describing a place to urinate or defecate “without fear of being attacked or exposed,” and only six people mentioned it when asked to describe a place to wash their hands. In Benin, 13 people mentioned it when describing a place to urinate and six people mentioned it when describing a place to defecate (data around having a safe place to wash one’s hands is missing from the Benin data). Some respondents actually described a place that is explicitly unsafe; for example, a woman from Malawi stated that “a location which is hidden is easy for someone to experience sexual harassment,” is a place to urinate. We revised this module by replacing the phrase “without fear of being attacked or exposed” with “where you think it is safe and acceptable” to reduce potential comprehension errors given these findings.

#### **Agency over menstrual hygiene management**

When women who had menstruated in the past year were asked about access to sanitation facilities where they can manage menstruation, we asked comprehension questions to determine if they understood “sanitation facilities” as intended. This phrase was well understood in both countries. In asking about various places to manage menstruation, we asked about their safety. We again found the phrase “without fear of being attacked or exposed” confused women in Malawi, though women in Benin understood the phrasing well in this module. As in access to reliable sanitation, we revised agency over menstrual hygiene management by replacing the phrase “without fear of being attacked or exposed” with “where you think it is safe and acceptable.” We also asked contextualizing questions about how women manage menstruation. For example, we asked women how they managed menstrual pain. In Malawi, women stated they take medication, ignore the pain, or seek medical help. In Benin, women stated their periods are not painful, and therefore fewer offered such contextualizing information. However, those that did discuss how they manage their periods said they try to rest when menstrual pain was too intense to carry on with their regular workload. The responses to these contextual questions helped reassure us that the response options reflected experiences in the local contexts.

#### **Entrepreneurship and business management**

Only the 25 respondents (15 women and 10 men) in Malawi and 23 respondents (14 women and nine men) in Benin who reported having a non-agricultural business in their household responded to this module. Responses to the comprehension question about defining a business confirmed that participants understood the question as intended in both countries. For instance, respondents (seven women and five

men in Malawi; 12 women and nine men in Benin) described a business as something to make money or generate an income. As a woman from Benin said, a business is “a place where I do an activity that earns me money.” Likewise, a man from Malawi stated that a business is “selling and buying so that you make profit for use.” Five women and four men in Malawi and three women and two men in Benin considered a business to be something where you sell something. In the words of one woman from Malawi, a business is “something that you have purchased at ordering price and sell at retail is business.”

Comprehension errors around the distinction between an owner and a manager emerged elsewhere in the module. Two items asked who owns and who manages the non-agricultural business, with the intention of making distinctions between who owns a business and who is responsible for the day-to-day management of the business. Given our sample, most businesses owned by a respondent, or a member of their household were small, and the owner and manager were likely the same person. In Malawi, of instances in which respondents or one of their household members had non-agricultural businesses, 21 were reported to be owned and managed by the same person. In Benin, this dynamic occurred in 18 of 23 instances. These overlaps between owners and managers may be the source of comprehension observed in this module.

Although the lack of comprehension was more pronounced in Malawi, comprehension errors were also evident in Benin. In Malawi, 13 respondents (seven women and six men) shared that an owner is someone who makes decisions about the business. Twenty respondents (12 women and eight men) in Malawi defined a manager as someone who makes decisions about the business, a significant overlap with how they describe an owner. As a man from Malawi stated, an owner of a business is, “the one who manages the business” and a manager is, “the one who follows the business progress.” In Benin, 15 respondents (12 women and three men) stated an owner is someone who makes decisions about the business. Twenty-five respondents in Benin (15 women and ten men) defined a manager as someone who makes decisions about the business, revealing a similar overlap to that found in Malawi. In the words of a woman from Benin, an owner is, “the one to whom the company belongs, the person who runs the company, the head of the company” and a manager is, “the first person we see in the company, the one who says what to do.” Overall, owners and managers are not perceived to have distinct roles, a perception that aligns with small businesses with single owner-operators.

In the five cases where the owner and manager were not the same person in Malawi, the two people named for either role were the respondent and their spouse —suggesting the business is jointly owned and operated, to varying degrees (in the five cases in Benin, the responses needed to determine sole or joint ownership are missing). Reviewing the cognitive comprehension questions from the five respondents in Malawi who named different people for owners and managers confirms these roles are not distinct, in line with the overall findings for Malawi and Benin as described above. *Table 7* presents the

distribution of ownership, management, and overlapping understandings of owners and managers among these four individuals.

The comprehension errors evident in the overlapping understandings of “owner” and “manager” suggest that asking about the roles separately was redundant. As such, this module was revised to combine the questions about owners and managers into one.

**Table 7: Interpretations of owner and manager**

<b>Gender of respondent</b>	<b>Location</b>	<b>Intra-couple ownership and management</b>	<b>Interpretation of owner</b>	<b>Interpretation of manager</b>
Man	Chiradzulu, Malawi	Jointly owned; jointly managed	“This is holder of the business”	“This is the one who runs the business”
Woman	Chiradzulu, Malawi	Jointly owned; man manages	“Someone who introduced the business to the household”	“Someone who is operating the business”
Woman	Chitipa, Malawi	Jointly owned; man manages	“The one who sells the product”	“The one who makes an evaluation as to whether the business is progressing or not”
Man	Chiradzulu, Malawi	Man owns; woman manages	“The one who is seen as the holder or manager of the business”	“The person who runs the business to get cash on daily basis”
Woman	Chiradzulu, Malawi	Man owns; woman manages	“Owner of the business”	“This is a leader”

## CONCLUSION

Without assessing whether prospective respondents understand survey items and are able to respond to them accurately, it is possible that any data collected could be of low-quality, yielding misleading insights that ultimately do not facilitate enhanced development outcomes. Ensuring accuracy is essential for any study, but particularly for those that aim to measure complex, multidimensional concepts. Given the complexity of women's empowerment and gender equality along agricultural value chains, conducting cognitive testing on tools aiming to measure it – as we have done in this study – is a critical step in developing robust, accurate measures (Barrientos, Stephanie Dolan & Tallontire, 2003; Maertens et al., 2011; Minten et al., 2009).

The results of this study helped improve the survey questions in the pro-WEAI+MI instrument to ensure comparability across contexts and social groups (Heckert, Malapit, et al., 2020; IFPRI, 2020; Ragasa et al., 2020). This study found comprehension errors in nine modules: time-use agency; freedom of movement; autonomy in decision-making; entrepreneurial mindset; experiences with sexual harassment when traveling; experiences with sexual harassment in the working environment; access to reliable sanitation; agency over menstrual hygiene management; and entrepreneurship and business management. Retrieval errors emerged in the time-use agency and freedom of movement modules. Response errors were found in the entrepreneurial mindset and the experiences with sexual harassment when traveling modules. The freedom of movement and experiences with sexual harassment when traveling modules had judgment errors. Despite the experiences with sexual harassment in the working environment module being relatively sensitive in nature, respondents found it less sensitive than the experiences with sexual harassment when traveling module. Further, the survey items therein are critical to understanding women's empowerment in agricultural value chains. Fieldwork training was modified to ensure enumerators were prepared to address potential sensitivities that could arise during the administration of the experiences with sexual harassment in the working environment module.

Despite the errors we identified, most of the proposed pro-WEAI+MI questions were well understood, and respondents felt comfortable answering them. The errors we did identify informed revisions to the survey items, including: rephrasing questions, combining questions, revising response options, and eliminating questions. Rephrasing items was the most common revision, and we did so in five modules: time-use agency; access to reliable sanitation; agency over menstrual hygiene management; autonomy in decision-making; and experiences with sexual harassment in the working environment. Survey items were only combined in the entrepreneurship and business management module. Response options were revised for the freedom of movement and entrepreneurial mindset management modules. Questions were eliminated in four modules: time-use agency; autonomy in decision-making; entrepreneurial mindset; and experiences with sexual harassment when traveling.

More broadly, the findings from cognitive testing also offer insights into how to best design modules used for monitoring progress toward gender equality in agricultural value chains and development efforts overall. The recommendations herein may be applied to the development of any gender-sensitive instrument, particularly if logistical constraints prevent researchers from conducting a full cognitive test on their proposed instruments.

### **Simple phrasing**

To minimize comprehension and retrieval error, we suggest using simple phrasing that reflects respondents' day-to-day lives. While some comprehension errors observed in this study were due to a genuine disconnect between what researchers intended and what respondents understood, some errors indicate that starting with more simple language could have prevented such errors. For instance, in the *access to sanitation* module, we intended to understand respondents' access to safe sanitation facilities. As such, we asked survey items about places where respondents could urinate, defecate, or wash their hands "without fear of being attacked or exposed," phrasing which confused respondents. Since we intended to assess safety in relation to respondents' access to sanitation, the revised survey item asked about safety directly (e.g., "where you think it is safe and acceptable"). Additionally, considering respondents' context may avoid cognitive errors. For instance, our sample drew largely on agricultural producers living in rural areas, where microenterprises and/or small businesses are the most common form of a business. In the entrepreneurship and business management module, we originally asked who owns and who manages the small businesses owned and/or operated by respondents and their household members. Comprehension error emerged in trying to distinguish between owners and managers, given that in the rural Malawi and Benin contexts, most businesses were microenterprises or small businesses, where the owner and manager is likely the same person. Crafting survey items that reflect the day-to-day practicalities of respondents' lived experiences may prevent cognitive errors.

### **Attitudinal scales**

Attitudinal scales generally include several items to assess a single latent construct, though our study found such repetition to be too burdensome for respondents – sometimes to the point of agitation (DeVellis, 1991). We suggest considering the overall length of the anticipated survey and reducing the number of survey items in attitudinal scales to reduce fatigue and maintain good rapport with respondents, ultimately ensuring data quality. Balancing the number of latent constructs investigated with the realities of survey respondents will enhance data quality.

### **Likert scales**

Likert scales are used to quantify respondents' subjective opinions and perceptions, though there is debate among researchers as to whether Likert scales are ordinal or interval scales (Joshi et al., 2015). This study's findings compound this debate, as respondents largely did not differentiate between strongly

agree and agree, and strongly disagree and disagree response options. While smaller Likert scales do not offer as much variation to explore during analysis as larger ones, larger Likert scales may not be as well understood as smaller ones. As such, we suggest using smaller Likert scales, particularly if they are used as response options in lengthy attitudinal scales, like the entrepreneurship and business management module we cognitively tested for this study.

### **Expansive response options**

In contrast to Likert scales, some survey items benefit from expansive response options. For instance, our freedom of movement module aimed to measure whether respondents are prevented from visiting important places by other people. Respondents' answers to cognitive questions, however, revealed they thought about a variety of reasons they may be prevented from going somewhere; for instance, unexpected bad weather. We revised the response options to account for any reason a respondent may be prevented from going somewhere, allowing us to determine why they had such a constraint to assess empowerment more accurately in analysis. Including expansive response options, including those that do not relate directly to the research objectives, may prevent response error and ultimately facilitate high-quality data collection.

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Fax: +1-202-862-5606

Email: [ifpri@cgiar.org](mailto:ifpri@cgiar.org)