Appendix B
Final Design Report

MEASURING VOICE IN THE WORKPLACE: MSHA

DESIGN REPORT
METHODOLOGY FOR MEASURE
AND PILOT DATA COLLECTION

Draft

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Department of Labor

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1.0 INTRODUCTION

Secretary of Labor Hilda L. Solis has made *Good Jobs for Everyone* the strategic vision for the U.S. Department of Labor (DOL), characterizing a good job as one that "…is safe and secure and gives people a voice in the workplace."[1] This strategic vision is paired with an emphasis on developing performance measures to track DOL's progress toward achieving its strategic goals; specifically, DOL is conducting a study to develop measures of voice in the workplace. The purpose of this project is to develop a measure of voice in the workplace and to pilot test methods for collecting data on voice from miners. DOL recognizes that measuring voice in the mining industry, compared to other sectors, will require a special approach due to factors that set this industry apart from most others:

- *Nature of mining work.* Underground mining is among the most dangerous occupations in the United States, and mines are heavily regulated and frequently inspected. This situation forges close bonds between miners, who rely on each other for safety and productivity; these bonds extend to the full community and involve complex interactions between the miners, the mine operators, and regulators.

- *Complex relations between miners, operators, and regulators.* In many communities, mine operations provide the best paid, albeit the most dangerous, jobs. While miners rely on regulators to enforce safety standards, they also know that such enforcement can have personal economic consequences.

- *Close-knit nature of mining communities.* These communities tend to be reluctant to communicate with outside organizations due in part to concern that such communication could result in new laws, policies, or enforcement actions that interfere with their community.

DOL awarded a task order to Eastern Research Group, Inc. (ERG) and its subcontractor, the National Opinion Research Center at the University of Chicago (NORC), to conduct this study to identify meaningful measures of *Voice in the Workplace* in the coal mining industry.[2,3] As part of this study, ERG will pilot test data collection methods to determine how best to ask coal miners about voice in mining workplaces. The primary research question for this study is:

What measures of voice and perceived non-compliance, combined with what modes of data collection could be best used to track MSHA's worker protection outreach activity?

Figure 1 depicts the current status of this study including steps that have been completed, elements of the study that required feedback from DOL and the Technical Working Group (TWG), and anticipated next steps. After defining the scope decisions, conducting a targeted literature review and having discussions with DOL staff, ERG developed a conceptual model of voice in mining workplaces that highlights the core relationships between the concepts that influence voice. Using this model as a foundation, ERG developed – in parallel – measures of voice in mining workplaces and a set of potential

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[1] Testimony of Secretary of Labor Hilda L. Solis before the Subcommittee on Labor, Health and Human Services, Education and Related Agencies Committee on Appropriations, U.S. House of Representatives, March 10, 2010. http://www.dol.gov/_sec/media/congress/20100310_appropriations.htm

[2] A parallel study focuses on workplaces protected by regulations enforced by the Wage and Hour Division (WHD) and the Occupational Safety and Health Administration (OSHA).

[3] DOL and ERG agreed to limit the scope of the study to coal mining, rather than also including the metal/non-metal sectors.

data collection modes. From the voice measures, ERG developed a draft survey instrument that will provide the data needed to develop the measures; from the set of potential data collection modes, ERG identified a feasible subset of modes to pilot test. As illustrated in **Figure 1**, ERG developed a data analysis approach that will synthesize the information collected through the pilot test.
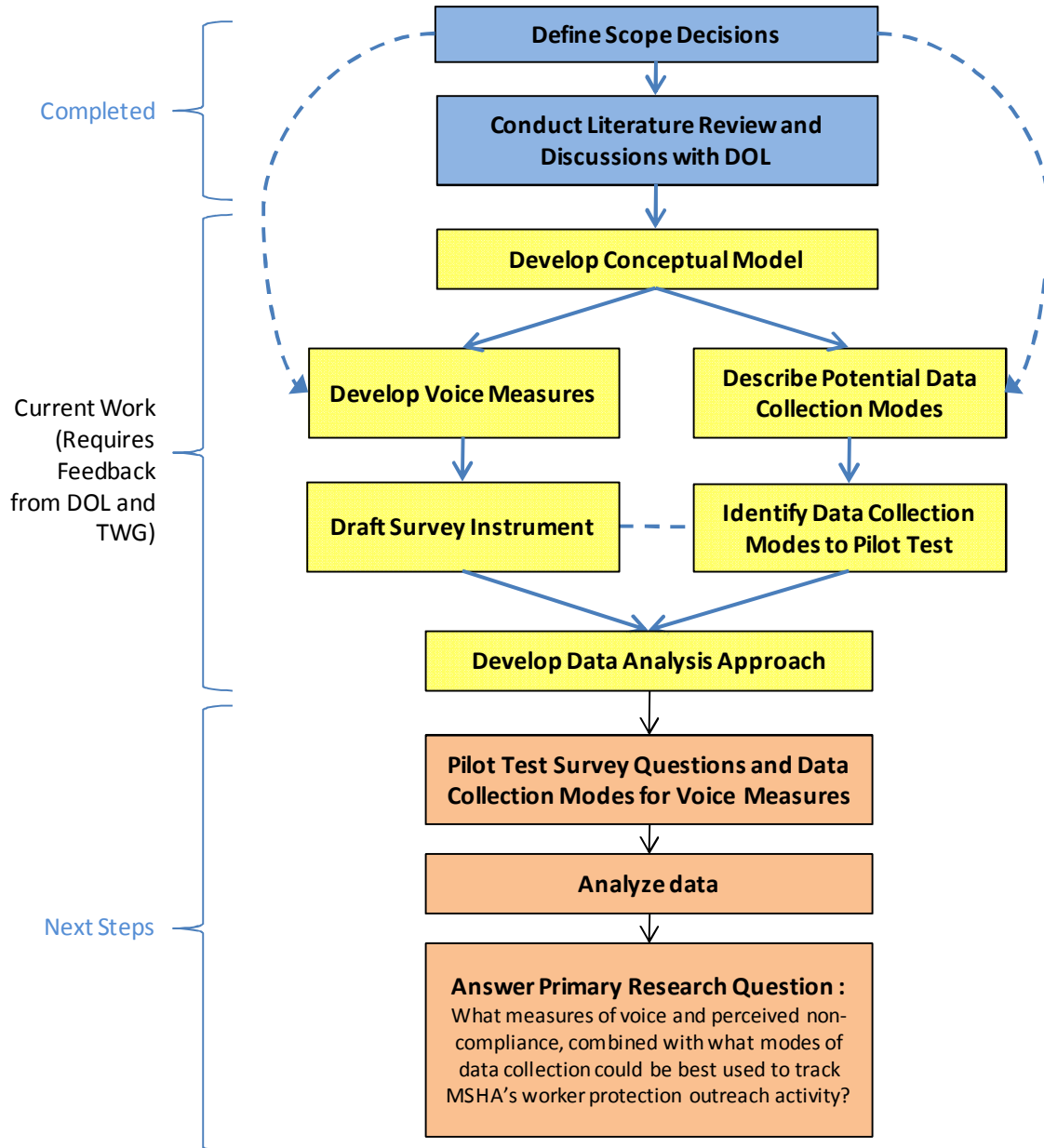

Figure 1 - Current Status of Measuring Voice in Mining Workplaces Study

As part of the project design, ERG assembled a Technical Working Group (TWG). Thus far, we have held one TWG meeting to review the project methodology (this document). ERG sought comments from the TWG on the key components of the methodology: the conceptual model, voice measures, draft survey instrument, data collection modes, and data analysis approach. To facilitate this review, ERG compiled a set of feedback topics for the TWG to consider (see **Table 1**). This document reflects ERG's consideration of the TWG's comments.

The remainder of Section 1.0 sets out the scope and definitions and the results of the targeted literature review. Section **Error! Reference source not found.** describes the conceptual model. Section 3.0 details the draft survey instrument for collecting the data and the measures of voice based on the survey questions reflecting the conceptual model. Section 4.0 describes a set of potential data collection modes and Section 5.0 describes the analytical approach to processing the data collected and answering the primary research question.

Table 1 - Feedback Requested From the TWG

Element of Methodology	Feedback Requested
Conceptual Model (Section **Error! Reference source not found.**)	• Does the conceptual model capture the core concepts that contribute to voice and the relationships between the concepts and voice?
Voice Measures and Survey Questions (Section 3.0)	• Do the draft survey questions adequately capture each of the voice concepts? • For draft survey questions providing non-scaled response options, are the sets of response options appropriate and complete? • Do the draft survey questions employ appropriate tone and wording for the target population?
Data Collection Methods (Section 4.0)	• What are the TWG members' thoughts on the proposed data collection modes? • Are there other modes that ERG should consider?
Analytical Methods (Section 5.0)	• Are the analytical methods described in this section sufficient to answer the primary research question? • Can the TWG members recommend other analytical approaches for consideration?

1.1 Scope and Definitions

In its Statement of Work (SOW) for this project, DOL established the preliminary project scope and key definitions. During a Technical Meeting between ERG and DOL on November 18, 2010, DOL refined and clarified certain aspects of the project scope and definitions:

- *DOL definition of "Voice in the Workplace."* DOL's working definition is: *Workers' ability to access information on their rights in the workplace, their understanding of those rights, and their ability to exercise these rights without fear of discrimination or retaliation.* This definition narrows the traditional academic interpretations of voice down from action on any workplace issue (e.g., "speaking up") to focus specifically on action related to exercising key workplace rights, such as filing a hazardous condition complaint. The TWG suggested using a different term for this definition of voice, such as "rights engagement", to further differentiate it from the literature.

- *Focus on coal miners*. This study will focus on workers in coal mining operations (i.e., excluding metal/non-metal mining operations). DOL and ERG agree that lessons learned from studying voice among coal miners will be applicable to metal/non-metal miners.

- *Focus on safety and health.* This study will focus on coal miners' voice in the workplace with respect to safety and health regulations under the jurisdiction of the Mine Safety and Health Administration (MSHA). It will not consider coal miners' voice on issues under the jurisdiction of other government departments and agencies.

- *Pilot nature of the study*. This study will pilot test feasible approaches to measuring voice in coal mining workplaces. Thus, it represents a first step toward the ability to collect nationally representative data. As a pilot test, this study will not generate nationally representative data or sufficient data to permit statistically valid stratification (e.g., by type of mine, operator, or workplace).

1.2 Literature Review and Discussions with DOL

ERG's literature review focused on studies that are directly relevant to developing a measure of voice in the mining industry for this study. That is, our focus was on studies that would contribute to helping us develop a measure of voice relevant to DOL's definition. In discussions between DOL and ERG, the Chief Evaluator identified behaviors and characteristics that worker voice likely comprises: worker awareness, access to information, knowledge, empowerment, action, and outcome. DOL also suggested that this study might require exploration of more innovative voice measures and data collection approaches than are commonly implemented. To conduct the literature review, therefore, ERG identified studies from academic, peer-reviewed sources that:

- Provide a concise overview of key conceptualizations of voice.

- Focus on voice in the mining industry.

- Demonstrate or suggest an approach to measuring employee voice behaviors.

- Examine the role of various voice mechanisms in the workplace.

- Assess the importance of factors that influence the exercise of voice by employees.

Much of the research that is relevant to DOL's definition of voice derives from Albert O. Hirschman's 1970 book *Exit, Voice, and Loyalty: Responses to decline in firms, organizations, and states*,[4] which establishes a general framework for understanding people's varied responses to a deteriorating situation in a group to which they belong. The framework has been used to explain consumer responses to declining product quality, employee behavior in difficult workplaces, and even political participation in national politics. In the area of worker behaviors, Hirschman and other later researchers theorize that workers respond to workplace problems in four ways:

- *Exit* – leave the organization.

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[4] Hirschman, Albert O. 1970. Exit, Voice, and Loyalty: Responses to decline in firms, organizations, and states. Harvard University Press, Cambridge, Massachusetts.

- *Voice* – speak up or voice concerns to individuals in the organization with the authority to resolve the problem.

- *Loyalty* – remain loyal to the organization in the hope that the problem will be resolved. Loyalty is not a separate action; rather, it moderates the individual's choice between exit and voice.

- *Neglect* (Rusbult et al., 1982)[5] – passively allow the situation to continue to deteriorate; like loyalty, neglect influences the individual's choice of if/when to use exit or voice.

Although very little published literature pertains directly to voice in the mining industry, four key findings from ERG's literature review and discussions with DOL do help support development of a conceptual model and measures of voice for mining workplaces (see **Error! Reference source not found.**). Appendix A provides a discussion of each study that ERG reviewed.

Table 2. Key Findings from Literature Review and Discussions with DOL.

Key Finding	Implications for Conceptual Model / Measures of Voice
Most researchers use one of four approaches to measure voice in the workplace: • **Track formal complaints filed by workers.** • **Observe the presence or absence of specific voice mechanisms.** • **Qualitatively analyze interviewee responses to questions on voice behaviors.** • **Develop and implement scales for measuring voice through a survey questionnaire.**	Each of these approaches has advantages and disadvantages. For example: • Data on formal complaints are readily available from regulatory agencies, but complaints do not correlate well with underlying worker protection violations nor with informal voice mechanisms. • Voice mechanisms can be defined and measured in a questionnaire, but the presence of voice mechanisms does not guarantee their use by workers. • Interviews produce nuanced information on the context behind voice behaviors, but performing in-person interviews is time- and resource-intensive and does not necessarily produce statistically representative data. • Scales produce consistent data that can be tracked over time; development of a good scale requires thorough pre-testing and validation. ERG believes that a rigorous approach to measuring voice in the workplace can be developed by crafting scales relating to voice behaviors to address a broad set of voice mechanisms ranging from informal (e.g., speaking to a coworker) to formal (e.g., union-sponsored dispute resolution, formal complaints about violations). Administering a survey instrument during in-person interviews might generate good information about voice; pilot testing such an approach might assist in refinement of voice measures and instruments for larger scale measurement.

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[5] In 1982, Rusbult et al. added neglect to Hirschman's framework to explain responses to decline in romantic relationships. Neglect has been treated as an integral part of the framework since then.

Key Finding	Implications for Conceptual Model / Measures of Voice
In many industries, unions function as a key voice mechanism because they act as a direct conduit for grievance resolution and support the development of other voice mechanisms in the workplace. **In the studies that ERG reviewed, unionization and the number of voice mechanisms appear to be correlated with employer size.**	In the mining industry, worker voice might also be correlated with unionization and size of operation. As a result, any method of measuring worker voice in the mining industry should be representative of (and/or stratified by) union status and operation size when implemented at full scale.
Factors that tend to discourage miners from exercising voice include • **High exit costs, as employment alternatives in mining towns tend to be limited.** • **A perceived or real risk of retaliation, including termination.**	The classic model of voice in the workplace predicts that workers will choose voice when loyalty is high and exit is costly. In the mining industry, however, the risk of retaliation (including termination) can make exercise of voice risky, even when loyalty is high. As a result, some miners choose neglect instead. A strong method for measuring voice in mining workplaces should track miners' beliefs about the likely outcomes of exercising voice (e.g., positive change, no change, retaliation). This will help DOL determine whether a mine has few complaints because there are few issues to complain about or because miners fear the consequences of exercising voice.
Factors that tend to encourage miners to exercise voice include: • **Worker knowledge and understanding of rights.** • **Quality of organizational leadership.** • **Perceived top management openness.** • **Perceived supervisor receptivity.** • **Worker trust in supervisor.** • **Worker self-monitoring.** • **Severity of workplace problem.**	ERG's conceptual model should illustrate the role these factors play in supporting voice (or, if absent, discouraging voice). Any approach to collecting data from miners should take into account that these workers will likely be more comfortable responding to questions if they are confident that the risk of participation is low.

2.0   CONCEPTUAL MODEL OF VOICE

To characterize conditions that lead to voice, as well as to help guide development of survey questions, ERG developed a simplified conceptual model for voice in mining workplaces (see **Error! Reference source not found.**. ERG developed this model based on:

- DOL's definition of voice: *Workers' ability to access information on their rights in the workplace, their understanding of those rights, and their ability to exercise these rights without fear of discrimination or retaliation.*

- The results of our literature review (see Section **Error! Reference source not found.**).

- Discussions with DOL yielding a list of behaviors and characteristics that worker voice likely comprises: worker awareness, access to information, knowledge, empowerment, action, and outcome.

- Our conceptualization of voice that encompasses DOL's definition and related behaviors and characteristics: workers' sense of empowerment to express concerns about rights violations to either mine management or to MSHA. (That is, an empowered worker feels comfortable to use his/her voice.)

- Feedback and suggestions from the first TWG meeting.

The model shows linkages between core concepts that influence voice and voice action – that is, concepts that can serve as a foundation for voice measures. The model could be made more complex (e.g., by showing more linkages) or more comprehensive (e.g., by adding sub-concepts and details), but that would not further our goal of developing meaningful voice measures and associated data collection tools.

At a high level, the model posits that **knowledge** leads to employee **voice,** which in turn leads to **action** and ultimately an **outcome;** this process is influenced by contextual factors. We decomposed **knowledge** into two discrete concepts:

- *Awareness, access, and use* [of materials]—the extent to which workers are aware of and have access to materials that contain information related to their rights, and the extent to which workers use the materials that contain information on their rights.

- *Understanding*—the extent to which workers understand their rights.

In short, knowledge develops initially through workers being aware, having access to and using materials with information on their rights; ideally leading to an understanding of the rights. With this knowledge, workers feel a sense of empowerment to exercise voice, which leads to action. We decomposed **action** into two concepts:

- *Willingness to act*—the extent to which workers are willing to take action.

- *Acting*—the actual actions that a worker takes.

The result of the action is an **outcome**:

- *Positive outcome*—such as the correction of a safety and health hazard or management recognition of safety behavior.

- *Negative outcome*—such as reassigning the worker to a less desirable position or shift or loss of a productivity bonus.

As noted by TWG members, miners are aware of the potential positive and negative outcomes of exercising voice and this will play an important role in when and how voice is used. The outcomes feedback into workers' sense of empowerment, with positive outcomes having a positive influence on empowerment, and negative outcomes having a negative influence. The entire process is influenced by **context**:

- *Work environment*—characteristics of the miners' work environment that influence voice (e.g., supervisor receptivity to voice).

- *Community*—characteristics of the miner's community that influence knowledge, voice, or action (e.g., availability of local support organizations).

- *Regulatory*—MSHA outreach initiatives (e.g., MSHA's Guide to Miners' Rights and Responsibilities, the Rights "Small Card"), inspections, and enforcement activities that influence knowledge, voice, or action.

- *Miners' personality characteristics*—personality traits and demographic characteristics that influence knowledge, voice, or action (e.g., trust, loyalty, union membership status, length of tenure in mining).

In this conceptual model, voice is a "latent variable": it cannot be directly observed, but can be inferred through the other concepts in the model. Those concepts can be operationalized into survey questions.

Section **Error! Reference source not found.** will discuss survey questions to measure voice concepts and a method of processing survey data to generate values for each voice concept. Section 4.0 provides a discussion of data collection modes that are being considered to pilot test the voice concepts and survey questions.
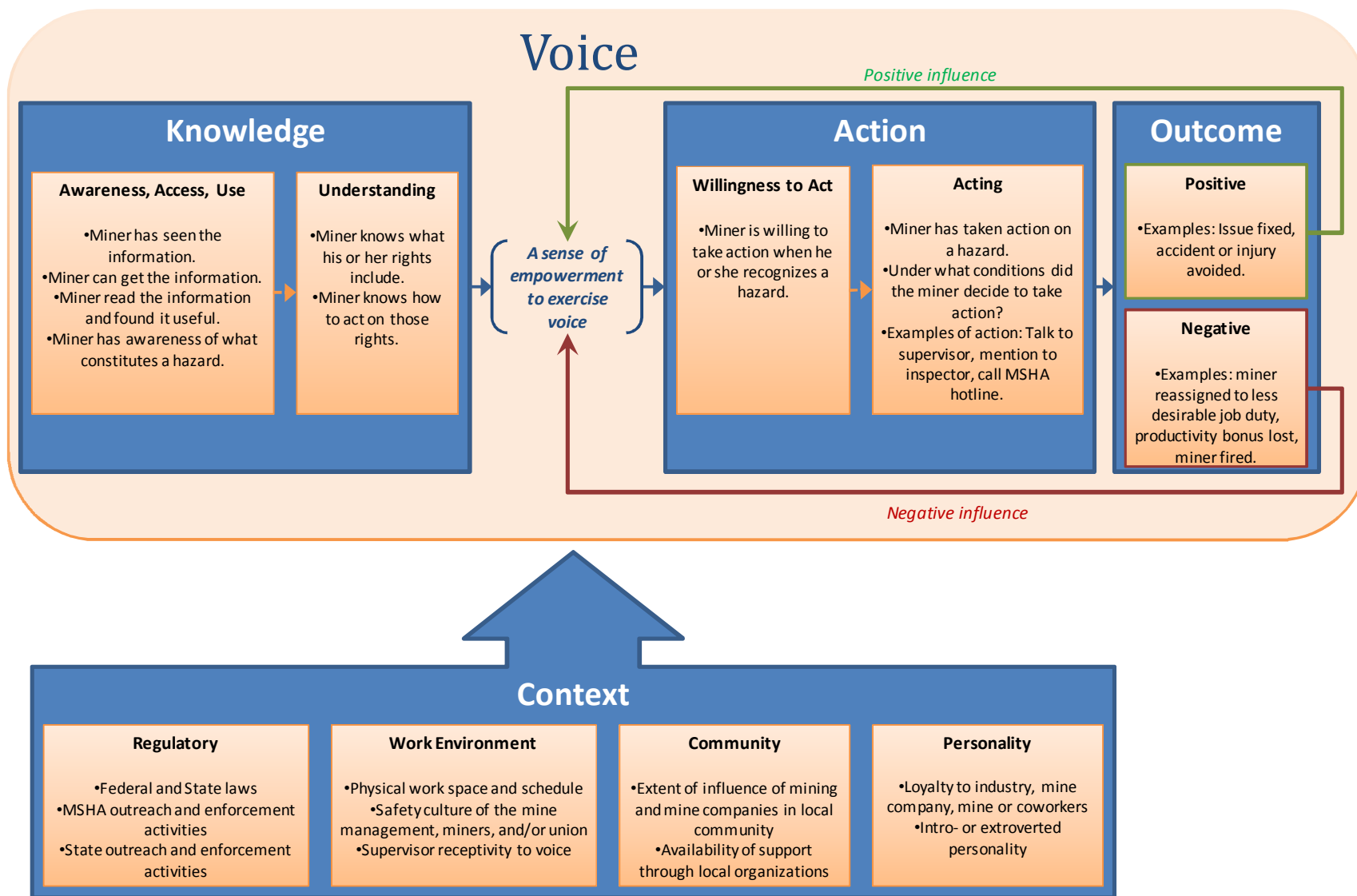
Voice

Positive influence

Knowledge

Awareness, Access, Use

- Miner has seen the information.
- Miner can get the information.
- Miner read the information and found it useful.
- Miner has awareness of what constitutes a hazard.

Understanding

- Miner knows what his or her rights include.
- Miner knows how to act on those rights.

A sense of empowerment to exercise voice

Action

Willingness to Act

- Miner is willing to take action when he or she recognizes a hazard.

Acting

- Miner has taken action on a hazard.
- Under what conditions did the miner decide to take action?
- Examples of action: Talk to supervisor, mention to inspector, call MSHA hotline.

Outcome

Positive

- Examples: Issue fixed, accident or injury avoided.

Negative

- Examples: miner reassigned to less desirable job duty, productivity bonus lost, miner fired.

Negative influence

Context

Regulatory

- Federal and State laws
- MSHA outreach and enforcement activities
- State outreach and enforcement activities

Work Environment

- Physical work space and schedule
- Safety culture of the mine management, miners, and/or union
- Supervisor receptivity to voice

Community

- Extent of influence of mining and mine companies in local community
- Availability of support through local organizations

Personality

- Loyalty to industry, mine company, mine or coworkers
- Intro- or extroverted personality

Figure 2. Conceptual Model of Voice in the Workplace.

3.0   MEASURING VOICE IN MINING WORKPLACES: SURVEY QUESTIONS AND MEASURES

This section provides information on how ERG plans to develop data for the voice concepts discussed in Section **Error! Reference source not found.** using a survey. We then discuss our approach to cognitive testing of the survey instrument.

3.1 Survey Instrument and Questions

A draft version of the survey instrument (not yet formatted for implementation) appears in Appendix B of this report. To develop this draft survey instrument, ERG began by reviewing instruments that have been drafted for measuring voice related to OSHA and WHD regulations—to ensure that our survey instrument is as consistent with those as possible. We then developed questions that reflect the concepts depicted in our conceptual model. Aside from screening and demographic questions, the three main types of questions are:

- Agreement scale questions—ask the respondent to rate the degree to which they agree with a statement, using a five-point scale:
    - o Strongly agree
    - o Agree
    - o Neutral
    - o Disagree
    - o Strongly disagree

- Yes/no questions—ask the respondent to answer yes or no (or, where appropriate, "not sure/don't know").

- List questions—ask the respondents to choose one or more options from a list of choices.

Additionally, in response to TWG comments during the working group meeting we have added a short set of questions about miner experience with and reporting of mining-related injury or illness.

3.2 Using Survey Questions to Define and Measure the Voice Concepts

Error! Reference source not found. provides a cross-walk between ERG's draft survey questions and the voice concepts from our conceptual model; each voice concept is associated with several survey questions. ERG plans to analyze responses to the set of questions for a particular voice concept in order to generate a measure for that concept. To do so, we plan to assign numeric values to response options and sum the responses for the set of questions representing a voice concept or measure (see the last two columns of **Error! Reference source not found.**).

In assigning numeric values to response options, we made the following decisions:

- Response options should be quantified using both positive and negative values.

- The largest possible value should be $+3$ and the smallest possible value should be -3.

- The endpoints of the response scales (e.g., strongly agree and strongly disagree on the agreement scale) should be weighted slightly more than the middle points.[6]

Thus, the value generated for a voice concept (measure) could be anything in the range of:

3× [number of questions in the measure] to −3× [number of questions in the scale]

For example, a measures represented by seven survey questions could take on values between −21 and +21 for any given respondent. A negative value reflects a poor assessment for the measure, while a positive value reflects a positive assessment. For the **Acting** measure, however, use only a binary scale (yes/no translated to one or zero, respectively).

The TWG commented on the weighting approach above, observing that it is unusual to see the scales weighted more heavily on the endpoints. This approach is a diversion from the classic voice literature and uses an approach that is commonly applied in studies of customer satisfaction in order to analytically capture the importance of strong ratings by respondents.

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[6] For example, on the agreement scale, endpoints are scored as +3 (strongly agree) and -3 (strongly disagree) and middle points are scored as +1 (agree), 0 (neutral), and -1 (disagree). Thus, a "significantly agree" response is worth two more than an "agree" response, but an "agree" is worth only one more than a "neutral" response.

Table 3 - Cross Walk Between Voice Concepts and Survey Questions

Voice Concept/Survey Question	Type of Question	Method for Translating Responses to Values
Awareness, access, and use: the extent to which workers are aware of, have access to, and use materials that contain information related to their rights		
5. To help workers to notify mine management about a problem, my mine has (check all that apply): *[Response options]*	List	One point for each option selected, up to a maximum of +3; an absence of selections is scored as −2.
6. To give workers information on their mine safety and health rights, my mine management (check all that apply): *[Response options]*	List	As above.
7a. I know where to get information about my mine safety and health rights.	Agreement	[a]
7b. I know enough about the Mine Act to recognize a violation of a mandatory health of safety standard when it occurs.	Agreement	[a]
8a. If I wanted to learn more about my mine safety and health rights, I would: Ask a coworker.	Agreement	[a]
8b If I wanted to learn more about my mine safety and health rights, I would: Ask your supervisor.	Agreement	[a]
8c If I wanted to learn more about my mine safety and health rights, I would: Ask someone in mine management.	Agreement	[a]
8d. If I wanted to learn more about my mine safety and health rights, I would: Ask a miners' representative.	Agreement	[a]
8e. If I wanted to learn more about my mine safety and health rights, I would: Ask a union representative.	Agreement	[a]
8f If I wanted to learn more about my mine safety and health rights, I would: Read brochures, pamphlets, or posters available at your workplace.	Agreement	[a]
8g. If I wanted to learn more about my mine safety and health rights, I would: Visit the Mine Safety and Health Administration (MSHA) website.	Agreement	[a]
9a1. Have you ever seen this material: A guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure).	Yes/No	[b]
9a2. Have you ever seen this material: Miners' Rights (trifold brochure)	Yes/No	[b]
9a3. Have you ever seen this material: Miners' Rights (small card)	Yes/No	[b]
9a4. Have you ever seen this material: Miners' Rights under the Mine Act (poster)	Yes/No	[b]
9a5. Have you ever seen this material: "One Call Does it All" hotline	Yes/No	[b]
9a6. Have you ever seen this material: MSHA.gov website	Yes/No	[b]

	Voice Concept/Survey Question	Type of Question	Method for Translating Responses to Values
9b1.	Have you read it: A guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure).	Yes/No	[b]
9b2.	Have you read it: Miners' Rights (trifold brochure)	Yes/No	[b]
9b3.	Have you read it: Miners' Rights (small card)	Yes/No	[b]
9b4.	Have you read it: Miners' Rights under the Mine Act (poster)	Yes/No	[b]
9b5.	Have you read it: "One Call Does it All" hotline	Yes/No	[b]
9b6.	Have you read it: MSHA.gov website	Yes/No	[b]
9c1.	Would you recommend it to someone interested in learning about their rights: A guide to Miners' Rights and Responsibilities under the Federal Mine Safety and Health Act of 1977 (brochure).	Yes/No	[b]
9c2.	Would you recommend it to someone interested in learning about their rights: Miners' Rights (trifold brochure)	Yes/No	[b]
9c3.	Would you recommend it to someone interested in learning about their rights: Miners' Rights (small card)	Yes/No	[b]
9c4.	Would you recommend it to someone interested in learning about their rights: Miners' Rights under the Mine Act (poster)	Yes/No	[b]
9c5.	Would you recommend it to someone interested in learning about their rights: "One Call Does it All" hotline	Yes/No	[b]
9c6.	Would you recommend it to someone interested in learning about their rights: MSHA.gov website	Yes/No	[b]
Understanding: the extent to which workers understand their rights.			
7b.	I know enough about the Mine Act to recognize a safety and health violation when it occurs.	Agreement	[a]
10a.	Under the Mine Safety and Health Act, I have the right to: Make a complaint about a possible danger or safety or health violation -- to my mine management.	Yes/no	[b]
10b.	Under the Mine Safety and Health Act, I have the right to: File a complaint about a possible violation -- with MSHA or a state agency.	Yes/no	[b]
10c.	Under the Mine Safety and Health Act, I have the right to: Participate in an inspection related to a possible violation.	Yes/no	[b]
10d.	Under the Mine Safety and Health Act, I have the right to: File a discrimination complaint – with MSHA or the Federal Mine Safety and Health Review Commission.	Yes/no	[b]

Voice Concept/Survey Question	Type of Question	Method for Translating Responses to Values
10e. Under the Mine Safety and Health Act, I have the right to: Have a doctor examine me for signs of Black Lung disease or other illness that could be caused by working in a mine.	Yes/no	[b]
10f. Under the Mine Safety and Health Act, I have the right to: Use a doctor's diagnosis to ask for a transfer to a less hazardous job location.	Yes/no	[b]
10g. Under the Mine Safety and Health Act, I have the right to: Alert my supervisor and leave a mine site because I do not have the safety and health training for the task I was given.	Yes/no	[b]
10h. Under the Mine Safety and Health Act, I have the right to: Refuse to work in unsafe or unhealthy conditions.	Yes/no	[b]
10i. Under the Mine Safety and Health Act, I have the right to: Get protection from retaliation for exercising my rights under the Miner Act.	Yes/no	[b]
Willingness to act: the extent to which workers are willing to take action.		
11a. At my mine, I would feel comfortable: Making a complaint about a possible violation -- to my mine management.	Agreement	[a]
11b. At my mine, I would feel comfortable: Filing a complaint about a possible violation -- with MSHA or a state agency.	Agreement	[a]
11c. At my mine, I would feel comfortable: Participating in an inspection related to a possible violation.	Agreement	[a]
11d. At my mine, I would feel comfortable: Filing a discrimination complaint with the MSHA or the Federal Mine Safety and Health Review Commission.	Agreement	[a]
11e. At my mine, I would feel comfortable: Having a doctor examine me for signs of Black Lung disease or other illness that could be caused by working in a mine.	Agreement	[a]
11f. At my mine, I would feel comfortable: Using a doctor's diagnosis to ask for a transfer to a less hazardous job location.	Agreement	[a]
11g. At my mine, I would feel comfortable: Alerting my supervisor and leaving a mine site because I do not have the safety and health training for the task I was assigned.	Agreement	[a]
11h. At my mine, I would feel comfortable: Refusing to work in unsafe or unhealthy conditions.	Agreement	[a]
11i. At my mine, I would feel comfortable: Exercising my right to be protected from retaliation from my employer.	Agreement	[a]
12a. If I see a safety and health hazard, I would: Not speak up about it.	Agreement	[a]
12b. If I see a safety and health hazard, I would: Correct the hazard myself.	Agreement	[a]

Voice Concept/Survey Question		Type of Question	Method for Translating Responses to Values
12c.	If I see a safety and health hazard, I would: Talk to a family member or friend outside the mine.	Agreement	[a]
12d.	If I see a safety and health hazard, I would: Talk to a coworker.	Agreement	[a]
12e.	If I see a safety and health hazard, I would: Talk to a union representative.	Agreement	[a]
12f.	If I see a safety and health hazard, I would: Talk to a miners' representative.	Agreement	[a]
12g.	If I see a safety and health hazard, I would: Notify my supervisor.	Agreement	[a]
12h.	If I see a safety and health hazard, I would: Notify my mine management.	Agreement	[a]
12i.	If I see a safety and health hazard, I would: Talk to the mine inspector next time they are at the mine.	Agreement	[a]
12j.	If I see a safety and health hazard, I would: Call MSHA's "One Call Does it All" hotline.	Agreement	[a]
12k.	If I see a safety and health hazard, I would: Call MSHA's field or district office.	Agreement	[a]
12l.	If I see a safety and health hazard, I would: Report it to a state agency.	Agreement	[a]
12m.	If I see a safety and health hazard, I would: Quit my job.	Agreement	[a]
12n.	If I see a safety and health hazard, I would: Do something else *(please specify)*:	Open	Not applicable. This question provides context.
Acting: the actual actions that a worker takes.			
13.	In the past six months, I have seen at least one safety and health hazard.	Yes/no	Treat as binary response (Yes = 1; No = 0)
14.	Thinking of the last safety or health hazard I saw, I notified someone who works at my mine or a Federal or state agency:	Yes/no	Treat as binary response (Yes = 1; No = 0)
15.	I notified *(please check all that apply)*: *(Response options)*	List	Not applicable. This question provides context.
21.	I did not report the safety and health hazard because: *(Response options)*	List	Not applicable. This question provides context.
22.	In the past six months, have you experienced retaliation for reporting a safety and health hazard?	Yes/no	Treat as binary response (Yes = 1; No = 0)
23.	In the past six months, have you seen a safety and health hazard that you did not report?	Yes/no	Treat as binary response (Yes = 1; No = 0)
24.	In the past two years, I had at least one mining-related injury or illness that needed medical attention beyond first aid?	Yes/no	Treat as binary response (Yes = 1; No = 0)

Voice Concept/Survey Question		Type of Question	Method for Translating Responses to Values
25.	Thinking of the last injury or illness, I reported it to mine management.	Yes/no	Treat as binary response (Yes = 1; No = 0)
26.	I did not report the injury or illness because I did not want to: *(Response options)*	List	Not applicable. This question provides context.
Outcome: The outcome of taking action.			
16.	After I reported this hazard *(please check all that apply)*: *(Response options)*	List	Not applicable. This question provides context.
17.	I experienced some negative reaction from my coworkers.	Yes/no	Treat as binary response (Yes = 1; No = 0)
18.	After I reported the hazard, I: *(Response options)*	List	Not applicable. This question provides context.
19.	I experienced retaliation from management or supervisors.	Yes/no	Treat as binary response (Yes = 1; No = 0)
20.	After I reported the hazard, I: *(Response options)*	List	Not applicable. This question provides context.
Work environment: characteristics of the miner's work environment and community that influence knowledge, voice, or action (e.g., supervisor receptivity to voice).			
1.	I belong to a mine workers union.	Yes/no	[b]
2.	At a previous job, I was a member of a mine workers union.	Yes/no	[b]
3.	My mine has at least one miners' representative selected by miners.	Yes/no	[b]
4a.	I trust my mine management to provide a safe and healthful workplace.	Agreement	[a]
4b.	My mine is a safe mine.	Agreement	[a]
4c.	I feel loyal to my mine.	Agreement	[a]
4d.	My mine management takes workers' safety and health suggestions seriously.	Agreement	[a]
4e.	If I see a safety or health hazard in my mine, I bring it to the attention of my supervisor or mine management..	Agreement	[a]
4f.	If I raise a concern about a safety or health hazard, my supervisor or mine management takes action to address the issue.	Agreement	[a]

	Voice Concept/Survey Question	Type of Question	Method for Translating Responses to Values
4g.	I can raise a concern about a safety or health hazard without worrying about the consequences.	Agreement	[a]
4h.	If I had the opportunity, I would leave my job to work at a different mine.	Agreement	[a]
27.	Please tell us how much voice you feel you have in your workplace.	Low/high	
Regulatory: MSHA outreach initiatives, inspections, and enforcement activities.			
9.	Various questions about MSHA outreach materials.	Yes/no	Depends on question type.
Demographics: demographic characteristics that influence knowledge, voice, or action.			
28-39	Various demographic questions.	Various	Depends on question type.

[a]   +3 for strongly agree   [b]   +3 for yes   [c]   [d]   +3 for yes
      +1 for agree   0 for not sure/don't know   -1 for not sure/don't know
      0 for neutral   -3 for no   -2 for no
      -1 for disagree   -3 if question was skipped due to skip patterns
      -3 for strongly agree

3.3 Cognitive Testing and Refinement of Survey Questions for Pilot Testing

ERG plans to use our draft survey instrument in a pilot test of our voice measures and data collection modes (see Section 4.0). Before doing so, we will conduct cognitive testing[7] to obtain feedback on the instrument from miners (and inspectors). Cognitive testing generates qualitative information on the extent to which survey questions make sense to potential respondents and enable respondents to provide accurate, meaningful responses. Based on this feedback, we can identify potential sources of response error and misinterpretation and refine the survey instrument accordingly prior to pilot testing.

ERG will recruit nine subjects (recommended by local MSHA personnel) to participate in cognitive testing of the survey instrument; each will receive a $50 incentive. Although statistical significance is not a goal of cognitive testing, we will attempt to include miners of various ages, union status, and employer size, as well as geographic location in order to capture a broad range of perspectives. Currently, cognitive testing interviews are planned for MSHA districts in western Pennsylvania, Kentucky, and/or West Virginia.

In conducting the cognitive testing, we will assure subjects of their privacy, explain the purpose of the survey, and conduct the interview. The cognitive testing team will use a script that was approved by NORC's Institutional Review Board (IRB) to ask subjects for their reactions to the survey. In general, interview questions will address the extent to which the subject:

- Feels comfortable answering the questions as written.

- Believes the questions are easy to understand (using language and concepts that "feel right" to miners).

- Believes the response options are easy to understand, meaningful, appropriate, and complete.

As appropriate, the cognitive testing team will ask subjects for suggestions for better wording or more meaningful response options.

For example, at the suggestion of the TWG we have added an alternate format for the sets of questions on knowledge and demographics. During the cognitive testing we will seek feedback from the subject on the extent to which one alternate format is easier to understand and respond to without discomfort.

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[7] Cognitive testing involves interviewing potential respondents to elicit their reactions to the draft survey instrument. These "cognitive interviews" should not be confused with face-to-face, interview-style implementation of a survey (an implementation mode that we evaluate later in this document).

4.0   DATA COLLECTION MODES

This section discusses potential modes for collecting data for measures of voice in mining workplaces (Section 4.1) and ERG's recommendations for which modes to pilot test (Section 4.2).

4.1 Potential Data Collection Modes

ERG explored eight potential data collection modes:

- *Phone Survey*. Implement survey instrument through telephone interviews with miners.

- *Paper Survey: Mail Implementation*. Deliver survey instrument in paper format to miners through the mail.

- *Online Survey*. Administer survey instrument to coal miners via a password-protected website.

- *Phone and Online Survey: PSA Recruitment Implementation*. Recruit miners to participate in a phone or online survey through public service announcements (PSAs) on local radio and/or television stations designated to provide mine closing information.

- *Phone and Online Survey: Regulatory Structure Implementation*. The TWG recommended we consider an approach where we deliver information about the survey and how to participate through MSHA inspectors during regular mine inspections.

- *Face-to-Face Survey: Intercept Implementation*. Recruit and train survey administrators to approach potential respondents at an event or location where miners tend to congregate, ask them to participate, and administer the survey instrument in face-to-face interviews.

- *Face-to-Face Survey: Recruitment Implementation*.[8] Recruit and train local residents to administer the survey instrument to miners during face-to-face interviews. Recruit miners to participate and schedule the surveys.

- *Paper Survey*: *State Grantee Training Session Implementation*. Deliver paper survey instrument to miners attending State Grantee organized mine safety training sessions.

Table 4 summarizes key aspects of each data collection method and major issues if implemented at a nationally representative scale.[9] Note that some aspects of implementation are common to all approaches and are not included in the descriptions. For example, any implementation mode would require ERG to:

- Submit an OMB Paperwork Reduction Act Information Collection Request clearance package.

- Develop a suitable database to house the data.

- Review collected data for accuracy and quality.

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[8] The SOW provided by DOL specifically indicated that this approach should be considered.

[9] As a reminder, the scope of this project is a pilot test of the measures, instrument, and modes and is not concerned with obtaining nationally representative data.

For the phone, mail, online, and intercept surveys, ERG would use industry standard methodologies to implement the survey. The face-to-face survey implementations are less common approaches and are therefore described in greater detail.

Table 4. Aspects of six data collection methods for pilot implementation.

Data Collection Method	Description	Source of Respondents	Target Number of Responses
Phone survey	ERG (or a survey contractor) would place calls to potential respondents from a list of coal miner phone numbers to administer the survey instrument.	• Union membership lists. • Joseph A. Homes Safety Association mailing list.	125
Paper Survey: Mail	A paper copy of the survey instrument would be mailed to potential respondents from a list of coal miner addresses.	• Union membership lists. • Joseph A. Homes Safety Association mailing list.	125
Online survey	An email with a web link to a survey questionnaire would be sent to potential respondents on a list of coal miner email addresses.	• Union membership lists. • Joseph A. Homes Safety Association mailing list.	125
Phone and Online Survey: PSA Recruitment Implementation.	Information about the survey would be distributed through PSAs on local radio and television stations designated to provide updates on mine closing. Miners interested in responding would call the phone number or visit the website described in the PSA.	• Miners listening to local television and radio programs running the advertisements.	125
Phone and Online Survey: Regulatory Structure Implementation	Information about the survey would be distributed by MSHA inspectors during regular inspections. Miners interested in participating would call a phone number or visit a website.	• Miners in coals mines inspected by MSHA inspectors distributing information.	125
Face-to-face: Intercept	Trained survey administrators would attend selected events that coal miners are likely to attend and would approach potential respondents for face-to-face administration of the survey.	Coal miners congregating at events such as: • Mine safety and mine rescue events • Black Lung or other mine health related clinics • Mining community events	125
Face-to-face: Recruitment	ERG would recruit local residents in a few locations and train them to administer the survey. Potential respondents would be recruited to participate in scheduled face-to-face survey interviews.	• Recommendations from MSHA personnel • Responses to newspaper advertisements in selected locales. • Recommendations from interviewees.	25 to 50
Paper survey: State grantee training sessions	Instructors of state grantee funded mine safety and health training courses would distribute paper copies of the survey instrument to coal miners attending their courses.	• Miners attending state grantee training sessions.	125

4.1.1 Phone Survey

To implement a phone survey of coal miners, ERG would organize a list of coal miner phone numbers for sampling. Respondents would be selected randomly from the list, possibly stratified by characteristics such as union membership status and geographic location if possible. For example, we might target 50 percent of the sample to be non-union miners or we might try to obtain approximately 50 respondents from each of the three states with high concentrations of coal mining (e.g. West Virginia, Kentucky, and Pennsylvania). The survey would be administered to respondents over a one- to two-week period with the goal of reaching 125 completed surveys.

4.1.2 Paper Survey: Mail Implementation

For this implementation, ERG would use a standard four-stage mail survey process of:

- Sending a pre-notification letter.

- Sending the survey instrument with cover letter and self-addressed stamped envelope (SASE).

- Sending a reminder postcard to those who have not responded up to that point.

- Sending a replacement survey with cover letter and SASE to those who have not responded up to that point.

ERG would also implement a helpdesk (telephone and email) to ensure that respondents have a resource to answer their questions. As the completed surveys are returned, ERG would enter the responses into a database. The survey would take place over a 3-4-month period with the goal of receiving 125 completed surveys.

4.1.3 Online Survey

To implement an online survey, ERG would use a software tool (such as Vovici) to create the online survey. ERG would then use a standard four-step process to conduct the survey:

- Send a prenotification email to respondents.

- Send an email with a link to the survey and a unique login code (to prevent multiple survey submissions).

- Send reminder email (with a link to the survey) about the survey 3-5 days later.

- Send a second reminder email 3-5 days after the first reminder notice.

ERG would also implement a helpdesk (telephone and email) to ensure that respondents have a resource to answer their questions. The survey would take place over a 3-5 week period with the goal of receiving 125 completed surveys.

4.1.4 Phone and Online Survey: PSA Recruitment Implementation

In many mining regions local radio and television stations provide information to miners about mine closings in order to avoid having miners show up to work when the mine is not operating. Many miners are accustomed to listening in to these programs before heading to work. Running PSAs to recruit

and encourage survey participation during these programs provides us with direct access to the target audience for the survey through a trusted, credible source. For this implementation ERG would:

- *Identify two to four local radio and television stations* that provide mine closing information to miners.

- *Develop and produce a PSA* providing information about the survey including: survey purpose, anonymity of survey responses, toll-free phone number to call to participate, and website URL to visit to complete an online version of the survey.

- *Run the PSA* for 2 – 4 weeks.

- *Collect and manage the phone and online surveys* as described above (except that respondents would initiate the contact to participate.)

4.1.5 Phone and Online Survey: Regulatory Structure Implementation

During the first working group meeting, TWG members discussed the possibility of leveraging the regulatory structure to implement the survey; as noted by one member, the inspectors are present in the mines on a regular basis and are viewed as respected, credible sources of information so this may be a good way to recruit participation in the survey. For this implementation mode ERG would:

- *Work with MSHA to identify three to five coal mine inspectors* to distribute information to the mines they are responsible for inspecting.

- *Develop a flyer for miners* with information about the survey including: survey purpose, anonymity of survey responses, toll-free number to call to participate, and website URL to visit to complete an online version of the survey.

- *Develop a pamphlet for mine operators* with information about the survey purpose, the miners' right to participate without interference, the protected nature of survey responses, and contact information for questions about the survey.

- *Collect and manage the phone and online surveys* as described above (except that respondents would initiate the contact to participate.)

4.1.6 Face-to-Face Survey: Intercept Implementation

For this implementation, ERG would have trained survey administrators (see Section 4.1.7 below) approach miners in their communities, ask the miners to participate, and ask the survey questions, documenting miners' responses. Because our target population is a small proportion of the general population, even in coal mining communities, this approach requires identification of sites with high concentrations of miners. Therefore, ERG would target events likely to attract coal miners; such as industry trade or job fairs and coal mining safety, health, and rescue events or fairs; ERG would select two to four events in each of two to five regions. We would attempt to achieve 10-30 completed interviews during each event. The survey would take place over a one month period with the goal of a total of 60 completed surveys.

4.1.7   Face-to-face Survey: Recruitment Implementation

For this implementation, coal miners might feel more comfortable responding to questions asked by someone who is part of the local community, resulting in increased participation and responsiveness. ERG's approach to implementing this mode of data collection would involve:

- *Identifying two to four sites for hosting surveys*. As with an intercept implementation, ERG would need to identify sites where coal miners are concentrated. ERG would recruit and schedule respondents in advance, allowing the surveys to be conducted at a centrally located, neutral location such as a hotel conference room. ERG would focus on locations in areas with a high concentration of coal mining that are easily accessible by potential respondents. The optimal location would be a hotel or training center on a major highway, in a relatively large city in a region known for mining (e.g., Beckley, VA).

- *Recruiting local residents who meet criteria to be a survey administrator*. After identifying the sites for the surveys, ERG would coordinate with MSHA district offices and the United Mine Workers of America (UMWA) to identify two to four individuals per site who would be suitable survey administrators. ERG would then contact these individuals to determine their willingness and availability to participate in the project.

- *Training local residents to administer surveys and document responses consistently.* Prior to beginning any surveys, the local residents would be trained to administer the survey (ask the survey questions and document responses) in a neutral, non-leading, and consistent fashion. ERG project team members would meet with and train each local resident in person and, if possible, would observe a few surveys to provide support and ensure the administrator is comfortable with the task.

- *Recruiting respondents and scheduling surveys*. ERG would work with MSHA district offices and UMWA, and use advertisements, to recruit potential respondents. Another option would be to use the state grantee training sessions (next section) as a sampling frame for recruiting respondents. ERG would try to achieve 12-25 completed surveys per site.

- *Conducting and documenting interviews*. The trained local survey administrators would administer the survey and document responses; ERG would enter the data into a database for analysis.

The survey would take place over a 2-month period with the goal of a total of 25-50 completed surveys.

4.1.8   Paper Survey: State Grantee Training Session Implementation

MSHA administers a grant program that provides funding to state agencies to provide mine safety and health training to mining personnel. In general, these training programs cover the basic miner training required by law (e.g. 30 CFR part 46 requires training for new miners) as well as mine foreman certification programs and other topics of special interest to the mining industry in that state. Training can be provided at the mine site, on a college campus, at the training program's facilities, or other convenient location (such as a hotel conference room).

For this survey implementation, ERG would coordinate with state programs receiving MSHA funding in a few states to distribute the survey instrument in paper format during refresher training sessions with coal miners. One advantage of this approach is that the survey would be delivered to a group of coal miners by reputable figure in the mining community (i.e., the trainer) in an environment that is focused on workplace safety and health, a key theme of the survey questionnaire. ERG's implementation approach includes:

- *Identifying two to four state grantee training programs to participate*. Based on recommendations from MSHA state grantee program coordinators, ERG would approach several state grantee training programs to determine their interest in participating in the study and then select two to four programs from those willing to participate. Ideally, ERG would be able to select programs from states that would provide the most representative group of coal miners attending training sessions; based on TWG feedback, the refresher training courses are likely to provide the best mix of age and experience among the miners attending the course. However, program selection depends on willingness to participate and is therefore not fully under ERG's control.

- *Training the instructors to administer the survey*. Through the state-level program contact, ERG would identify training course instructors who will administer the survey during their refresher training courses and work with the instructors to develop a consistent protocol for handing out the survey, explaining the purpose of the survey and the option not to participate, leaving the room for 10-15 minutes to allow the students to complete surveys, and collecting the surveys. ERG would try to obtain 30 to 65 completed surveys per state program.

- *Providing survey materials and support*. ERG would develop a suitably formatted paper version of the survey instrument and provide the survey package (survey instrument, stamped and addressed return envelope) to training course instructors. ERG would also provide instructors with a script for introducing the survey, providing instructions on how to complete and return the survey, and the miner's right to decline to participate without repercussions. ERG staff would also be available by phone or onsite to respond to questions and concerns from instructors during the process.

- *Collecting completed surveys*. Instructors would ask respondents to place completed surveys (in individual stamped, addressed, sealed envelopes) in a locked collection box; instructors would then put collected surveys in the mail. ERG would document completed surveys in a database. We would also follow up with instructors by phone to discuss any survey administration issues.

The survey would take place over a 2-3 month period with the goal of receiving 125 completed surveys.

4.2 Data Collection Modes for Pilot Testing

Of the eight potential data collection modes just described, ERG must select a subset of two to three modes to pilot test. To facilitate selection, ERG compared the potential data collection modes based on:

- *Availability of a sample frame*. The extent to which a list of coal miners exists and can be accessed by ERG for a pilot test of the data collection mode.

- *Non-response issues*. The likelihood that the data collection mode will present unique issues to the respondent, leading them to refuse to participate in the survey.

- *Relative cost*. A qualitative assessment of the cost of the data collection mode relative to the other modes under consideration, using a scale of one to four dollar signs ("$"). The least costly option is rated as "$" and the most costly option is "$$$$."

- *Logistics, scaling up, and potential for statistical representativeness*. An assessment of the complexity of the steps needed to implement the data collection mode, the feasibility of scaling the pilot test to a national full-scale implementation, and the likelihood that the scaled up version can be designed to provide a random, representative selection of respondents.

4.2.1   Availability of Sample Frame

For the phone, online, and mail surveys, the availability of a list of miners with appropriate contact information is necessary for the mode to be considered feasible.[10] For face-to-face interviews implementation approaches, respondents will be recruited from the general population rather than drawn from a list or formal sample frame.

For the online survey, we were unable to identify any known source of miner email addresses. Additionally, Internet access in mining communities is not consistently available.

For the phone and mail surveys, we were also unable to identify any known lists of miners containing mail or contact information. Organizations that maintain lists of member contact information (e.g., unions and the Holmes Safety Association) generally do not disclose member lists (or mail/telephone information) to outside organizations. For mail (or online) implementation, one possibility would be to ask one or more of these organizations to distribute survey packages to their members for ERG. However, having the organization perform the survey in the short-term may be feasible, but longer term and larger-scale implementation might not be feasible. Additionally, having other organizations implement the survey results in some loss of control of the survey by DOL. If the organizations with contact information are not willing to assist with implementation, the phone and mail survey modes are likely infeasible.

The phone and online survey PSA recruitment and regulatory structure modes avoid this issue by targeting a potential pool of respondents through direct advertising about the survey; however, compared to contacting miners to complete the survey directly, this is a more passive approach to recruiting survey participation.

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[10] A random digit dial (RDD) approach is often used for phone surveys, but this is not feasible for the target audience of miners. Although there are some areas in the United States where miners concentrate, even the largest mining county in the country (Boone County, WV) has less than 20 percent of its workforce in mining. Nationwide, miners would represent a very small amount of total households. Thus, an RDD phone survey that screens out non-miners would be cost-prohibitive, since most of the calls would result in a non-mining household.

4.2.2 Non-Response Issues

Non-response rates have the potential to provide useful information about voice in mining workplaces if a survey can be linked to a specific mine site, company, or geographic area; it would be possible to compare response rates among mines or areas which could provide insights into the influence of company policies or regional culture on voice. For example, if all of the miners in a particular mine were aware of the survey but none chose to participate it would suggest that the environment at that mine is particularly discouraging. In addition, it might be possible to compare mine- or area- specific results with other MSHA data, such as number and severity of violations and injury rates. This, too, could provide insights into the relationship between worker voice, compliance, and injuries and illnesses. Only the paper surveys distributed through state grantee training sessions and the phone and online surveys regulatory structure implementation provide this type of information. The regulatory structure implementation, in particular, would provide mine-specific information because the survey responses could be linked to a mine through a participation code or url.

Among coal miners, privacy and confidentiality concerns have the potential to impact non-response. Data collection modes that can be completed in the privacy of the home (phone, mail, online) might offer advantages in this regard, but might not be feasible due to the absence of a sampling frame; in addition, there are concerns that many miners would be unwilling to give candid responses to sensitive questions about their employers and workplaces over the telephone.

The phone and online survey PSA recruitment and regulatory structure implementation modes provide the option for miners to complete the survey in the privacy of their own home but it relies on the individual to initiate the contact to participate. This might result in lower response, but the miners who seek the survey would likely be more willing to complete it.[11]

Intercept interviews and paper surveys administered during state grantee training sessions would require miners to complete the survey in the presence of other miners and possibly mine foreman and supervisors. Some miners might be reluctant to respond to the survey or might be encouraged not to participate by peers or supervisors. On the other hand, if the training sessions are used to recruit respondents for offsite face-to-face interviews then this issue could be avoided. Additionally, this would make it possible to compare the paper and face-to-face implementation sin terms of response rates, costs, and logistics.

Face-to-face surveys with trained local residents acting as survey administrators are designed to make the respondent feel more comfortable answering questions about their workplace. On the other hand, potential respondents might view the administrator as being too close to the community and thus be reluctant to participate (due to a perceived risk that the administrator will share responses with other members of the community, such as other miners or the mine operator).

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[11] TWG raised concerns that all of the implementation modes might face challenges recruiting participation from miners employed at the "bad apple" mines; this mode might provide the best opportunity for those miners to participate in the survey.

4.2.3   Relative Cost

Key drivers of pilot test costs are the number of staff needed to coordinate and administer the survey and the amount of time the staff must devote to capturing a sufficient number of completed responses. For example, the online survey is likely the least costly to implement because a small number of staff can run the survey with a fairly small investment of time. Telephone and mail surveys are also relatively low cost to implement if a list of miners (with contact information) is available. Distributing information about the survey through MSHA inspectors does not add cost but may add burden to the inspector's workload. PSA development would add to the cost of implementation (e.g. development, production, airing), but the cost would not be exorbitant on a per-respondent basis. Although more resource-intensive than an online survey, telephone and mail surveys are less resource-intensive than face-to-face approaches (in which ERG must recruit and train people to administer the survey) and on-site approaches (in which ERG must recruit and train instructors to administer paper surveys to event participants). Thus, we estimate that face-to-face surveys conducted by trained local administrators will be the most costly data collection mode to implement, as ERG will need to recruit, screen, and train local residents to administer surveys, travel to each locale to provide on-site support during the surveys, and recruit and schedule potential respondents.

4.2.4   Logistics, Scaling, and Potential for Statistical Representativeness

One goal of this project is to identify, through the pilot testing, the best method(s) for collecting data on voice in mining workplaces on a national scale. As a result, the logistics of scaling a data collection mode up to the national level and the likelihood that the scaled up version can be designed to provide a statistically representative selection of respondents are important to the assessment of the modes. If a sufficiently large list of potential respondents is available, online, phone and mail surveys are the easiest data collection modes to scale up in a way that provides an opportunity for statistical representativeness. In the absence of a list of potential respondents, the PSA recruitment mode is similarly easy to scale up; but, the regulatory structure implementation may face obstacles due to the fairly heavy workload of MSHA inspectors nationally.

Administering a survey through state grantee training programs is more complex to implement logistically because it would require coordinating with several different state programs. Scaling up this approach would require recruiting additional state programs and adding additional training courses within states to increase the sample size. Coordinating with a larger group of independent programs in order to implement the survey will be challenging and time-consuming for the staff responsible for this task – and could be difficult to implement in a way that provides statistical representativeness. Additionally, the type of training differs by state which could impact the representativeness of the design if some or many states perform specialized or selective training that limits the types of miners that would be available. Finally, companies are not required to attend the state grantee training sessions and some companies (larger ones) perform their own training sessions.

Face-to-face surveys are the most complex approaches to implement from a logistical perspective; scaling these approaches up would require selection of additional sites to field the survey, recruitment and training of additional administrators to cover the set of sites, and recruitment and scheduling of respondents for the surveys. Expanding these data collection approaches to obtain a statistically representative sample might be cost prohibitive or practically infeasible.

4.2.5　Conclusion: Data Collection Modes to Pilot Test

Based on our assessment of the seven potential data collection modes, ERG is proposing to implement two that show the most promise for pilot testing (see **Table 5**):

- *Paper survey: State grantee training sessions.* Although miners must complete surveys in the presence of others, the training setting should be a reasonably "safe" one, and this mode is moderate in terms of costs and scaling issues.

- *Phone and Online Survey: PSA Recruitment.* This approach uses trusted local sources (radio programs) to recruit miners to participate in a survey that they can complete in the privacy of their own home; additionally, this mode is low in terms of cost, logistics, and scaling.

ERG believes that phone, mail, and online surveys will be infeasible due to the lack of lists of miners, and we believe face-to-face implementation will be prohibitively expensive and difficult to implement in a way that achieves adequate response rates. Should a list of miners become available, both phone and mail are feasible options. ERG is seeking additional feedback from MSHA on the feasibility of using the regulatory structure to implement the survey.

Table 5. Summary of key implementation issues of the data collection modes.

Data Collection Method	List of Respondents Available?	Relative Risk of Non-response	Relative Cost per Response	Relative Effort for Full Implementation
Online survey	No	Low	$	Low
Face-to-face survey: Intercept	NA	High	$$$	High
Phone survey	No	Moderate	$	Low
Face-to-face survey: Recruitment	NA	Moderate	$$$$	High
Paper Survey: Mail	No	Low	$	Low
Phone and Online Survey: Regulatory Structure	NA	Moderate	$	Moderate
Paper survey: State grantee training sessions	NA	High	$$	Moderate
Phone and Online Survey: PSA Recruitment	NA	Moderate	$	Low

Key:
Green: Selected for pilot testing.
Orange: Seeking feedback from MSHA on feasibility.
Red: Infeasible.

5.0   ANALYSIS OF PILOT TEST DATA

Following data collection, ERG will summarize and analyze the data collected in order to determine which measures of voice, combined with what data collection modes, could be best used to generate meaningful values of voice in mining workplaces. This data analysis will have three key components:

- *Data collection mode feasibility.* ERG will draw on information gathered during implementation of each collection mode – such as response rate, questionnaire completion, labor and resources needed to obtain number of completes – to assess the success of each mode and its feasibility for full-scale national implementation.

- *Survey instrument assessment*. ERG will review data to assess the effectiveness of the survey instrument in terms of format, question order and wording, and overall length in order to identify refinements that could be made prior to full-scale implementation.

- *Voice measure assessment.* ERG will estimate a measure of voice based on the methodology suggested in Section 3.0 for this sample in order to test the effectiveness of the approach and refine our understanding of the measures and the approach to estimating them.

5.1 Data Collection Mode Feasibility

Pilot testing the data collection modes will provide valuable information on the practicality of using these data collection modes for broader implementation. To assess the success of each of the pilot tested data collection modes, ERG will compare the quality of data collected by and resources required for each mode. That is, we will create basic data summaries, tabulations, and cross-tabulations to identify relationships in the data and to spot outliers or other anomalies associated with data collection mode. Simultaneously, we will summarize the resources devoted to each mode and create basic statistics that will allow us to compare the modes. For example, we might calculate the total cost of obtaining one completed survey under each mode by dividing the total cost of implementing the mode by the total number of completed surveys obtained.

Additionally, we would analyze non-response rates to extract insight on the effectiveness of the modes for overcoming miner reluctance to respond and to observe trends in non-response that could be attributed to mine, company, or geographic area level characteristics that discourage voice.

5.2 Survey Instrument Assessment

Before the pilot test, ERG will have performed cognitive testing (see Section **Error! Reference source not found.**) to refine the preliminary draft survey instrument. During analysis of the pilot test data, ERG will also look for patterns in the data that suggest refinements to the survey instrument format, question order or wording, and overall length. We will review the question responses to identify possible problems; for example, a large number of respondents skipping a question suggest that the question wording or skip pattern is problematic. Because respondent reactions to the survey instrument might vary by data collection mode (e.g., a question sequence might be clear during an online or phone survey but difficult to follow on paper), ERG will look at the data across and within data collection modes. As a result of this analysis, ERG will provide suggested revisions and refinements to the survey instrument.

5.3 Voice Measure Assessment

Once the data has been thoroughly reviewed and structured for analysis, ERG will apply the method discussed in Section 3.0 to calculate measures for our voice concepts. The goal of this analysis is two-fold: to generate an estimate of voice in the workplace for this sample, and to test the efficacy of this method for estimating voice.

In generating the estimate of voice, ERG will calculate a value for each of the voice concepts based on the data collected; basically, creating a "dashboard" of values for voice in the workplace. In addition to estimating a value for voice, ERG will analyze the relationship between the values estimated for each of the voice concepts; in the words of the TWG, it is valuable to determine the extent to which the concepts "hang together." In other words, we will look at the concepts to see how if the values move in the same direction (e.g. when access to information increases, does willingness to act also increase) and if some concepts have a stronger influence than others.

In developing the measure of voice, ERG will also be testing the method for generating a value for the concepts that voice comprises, as well as estimating the strength of the relationship between voice and each concept, and within concepts. This is a key step to measuring voice because it will provide a formula for estimating voice from measures that can be tracked directly and it will demonstrate the feasibility of measuring voice using the data collection approaches and analysis described in this document.