

Creating, interpreting, and negotiating risk and crisis messages: Strategies for increasing awareness and comprehension of communication designed to ensure public health

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Following the 2001 attacks on the World Trade Center and the Pentagon, the persistent threat of terrorism on American soil became the “new normal” for United States citizens (Sellnow, Seeger, & Ulmer, 2005). To combat this ongoing threat of a terrorist attack, the Department of Homeland Security, itself founded after 9/11, sponsors six centers of excellence situated in the academic community. Relevant to this study is the National Center for Food Protection and Defense (NCFPD). The mission of the NCFPD is to advance the security and safety of the nation's food supply through research, education, and outreach. The national center is housed at the University of Minnesota and is composed of “researchers from 19 other universities plus personnel from independent research facilities, state health and agriculture agencies, and professional organizations; private sector consultants; and industry advisors from agriculture and food industry companies” (National Center for Food Protection and Defense, n.d.). The authors of this paper are affiliated with the NCFPD.

One of the primary responsibilities of the NCFPD is to develop a comprehensive risk and crisis communication strategy for responding to terrorist attacks on the nation's food supply. The relevance of communication to counterterrorist activities is articulated clearly by O'Hair and Heath (2005): “Communication serves as the lens through which responses to terrorisms are identified and strategized, and communication becomes the

primary tool for counterterrorism activities” (p. 4). The goal of the NCFPD risk communication group is to develop “best practices for active engagement of multiple audiences in effective risk communications prior to, during and after potentially catastrophic food bioterrorism incidents” (National Center for Food Protection and Defense, n.d.).

At present, the NCFPD has achieved its goal of developing a series of best practices for effective risk and crisis communication. The current challenge is to test these best practices and to translate them into pragmatic message strategies that can effectively reach the multiple audiences identified by the center. This paper provides a preliminary description of the NCFPD communication group’s efforts to test the effectiveness of the best practices with multiple audiences and to develop the most effective means for communicating risk and crisis messages to a diverse public.

Essentially, this essay describes two exploratory studies, one sponsored by the NCFPD and one cooperative venture, that are designed to assess the degree to which risk and crisis messages can best be communicated to multiple audiences. The theoretical lens uniting these studies is adapted from the perspective of experiential learning theory, as described by Kolb (1971, 1984). More specifically, we ground our needs assessment and message testing in Kolb’s conceptualization of learning styles and the learning cycle model. In the following pages, we, first, offer a rationale for using learning styles as an indicator of audience diversity and review the learning style literature. Second, we provide some preliminary findings to our research in Study I and Study II. Finally, we summarize our activity to date and speculate about future applications of this research.

Learning Styles and Crisis Communication

Monumental crises such as Three Mile Island, Bhopal, and 9/11, underscore the importance of audience-centered risk and crisis communication. Yet, communicating in a manner that meets audience needs is complicated by the fact that audiences are complex. For example, Kreps et al. (2005) found that “one of the biggest challenges to effective biodefense communication is making relevant information accessible and understandable to highly varied subgroups in society” (p. 196). They identify “crafting effective messages for diverse audiences” as one of the “primary principles” for effective biodefense communication (p. 192).

One global means by which to analyze audiences in crisis situations is to show empathy. James Lee Witt, director of the Federal Emergency Management Agency under the Clinton administration, and his coauthor James Morgan explain that “empathy is one of the most important roles for a leader helping others respond to crisis” (Witt & Morgan, 2002, p. 147). Seeger, Sellnow, and Ulmer agree (2003) when they argue that the ethics of humanism and care should prevail in crisis communication. To do so, organizations and agencies must assess the needs of their publics and share information accordingly. Similarly, Borda and Mackey-Kallis (2004) contend that “by tapping into what the public is thinking and feeling, a company can avoid basing their actions solely on what the media is saying, and concentrate on what people really perceive as the problem” (p. 127). An empathetic communication style can account for the varying needs of the complex audiences. For example, Becker and Thompson (2005) found that, “compared to those with a problem-solving active coping style, individuals with a ruminative, passive coping

style are at greater risk for deteriorated health” (p. 61). Effective risk and crisis messages, then, would address these varying emotional and physical needs of a diverse audience.

The temptation, however, is for organizations and government agencies to establish a crisis management plan and then rely solely on that plan as the crisis evolves. Doing so, however, can lead to communication patterns that are insensitive to varying audience needs. For example, Marra (2004) argues that, although crisis management plans are important in managing crises, “their value appears to be overrated” (p. 312). Rather than simply acting on a series of checklists, Marra encourages organizations to operate from a communication culture that recognizes and addresses the complex needs of their publics.

These audience needs should also be considered in terms of the larger narrative surrounding the crisis situation. Heath, McKinney, and Palenchar (2005) observe that “cooperative and competing narratives” surrounding terrorist events have the potential for “bringing people together and putting them at odds with one another” regardless of whether the narrative content is “scientific or mythical” (p. 149). Thus, the messages surrounding a crisis or high risk situation, such as terrorism, must consider the uncertainty and vulnerability that confound the situation. Ideally, risk communication invites the public to participate as an active partner in the risk mitigation process. In fact, Heath et al. (2005) suggest risk communication is likely to fail if it does not “increase residents’ control in the decision-making process” (p. 159).

The NCFPD advocates a communication strategy that empowers consumers to protect themselves during crisis situations. This philosophy reflects the best practices of self-efficacy, a partnership in crisis resolution, empathy or compassion, and showing

relevance to the varying perceptions of complex audience. With this philosophy and these best practices in mind, a segment of the NCFPD communication team recommended exploring the possible heuristic benefits of testing messages that address multiple learning styles. More specifically, we explain a rationale for creating and testing messages that round Kolb's (1984) four-stage cycle of learning.

Learning Style Theory

For many academics, the mention of learning styles and learning style theory conjures more negative than positive connotations. A number of identifiable circumstances have given rise to this unfortunate reaction. Two of the most noteworthy reasons are (1) the plethora of disparate learning style models that each propose different terminology and (2) the inappropriate application of learning style research to stereotype learners. Consequently, this section offers an historical account of learning style theory as a means by which to address these concerns and to make a case for grounding our work in experiential learning theory and the learning cycle model as conceptualized by David Kolb (1984) for audience analysis and message formation regarding risk and crisis communication.

One major strike against learning style theories is rooted in the fact that so many different models exist, each of which uses different terminology. In other words, no one universally accepted theory and set of terms exist. To clarify, a good number of scholars have published models for understanding the role preferred learning styles play in increasing learner comprehension, retention, and application of theoretical concepts. For example, Witkin and his colleagues (1962, 1977, 1978) conceptualized the notion of cognitive styles as they relate to the learning style preferences of individuals. They

conclude that effective learning experiences must address the cognitive styles of both field dependent (FD) and field independent (FI) learners. Canfield and Lafferty (1974) posit that certain affective dimensions influence individuals to prefer one of six different learning styles or combinations of them. Similarly, Dunn and Dunn (1978) present five dimensions that mark various learning style preferences. Although these and other learning styles models differ in certain ways, they all contend that traditional, one-way, lecture-dominated message dissemination simultaneously privileges some individuals and places at-risk for failure other individuals. This conclusion alone makes learning style theory valuable to the purposes of message formation and assessment related to risk and crisis communication.

The other primary flaw in many learning style theories concerns their tendency to stereotype learners by placing them into categories and then assuming they learn best in one particular way. In other words, those who are labeled as visual learners or tactile learners or aural learners are characterized as able to comprehend, retain, and apply material best in ways that address only that one preferred style. David Kolb's (1984) model of experiential learning, however, overcomes this weakness by professing that, regardless of one's preferred learning style, true learning embodies comprehension, retention, and application and "involves the integrated functioning of the total organism—thinking, feeling, perceiving, and behaving" (p. 31). Hence, Kolb purports that effective learning rounds an entire cycle that addresses each of four preferred learning styles (see Figure 1). Although individuals tend to possess a learning style preference, all people learn best when given an opportunity to round the entire learning cycle.

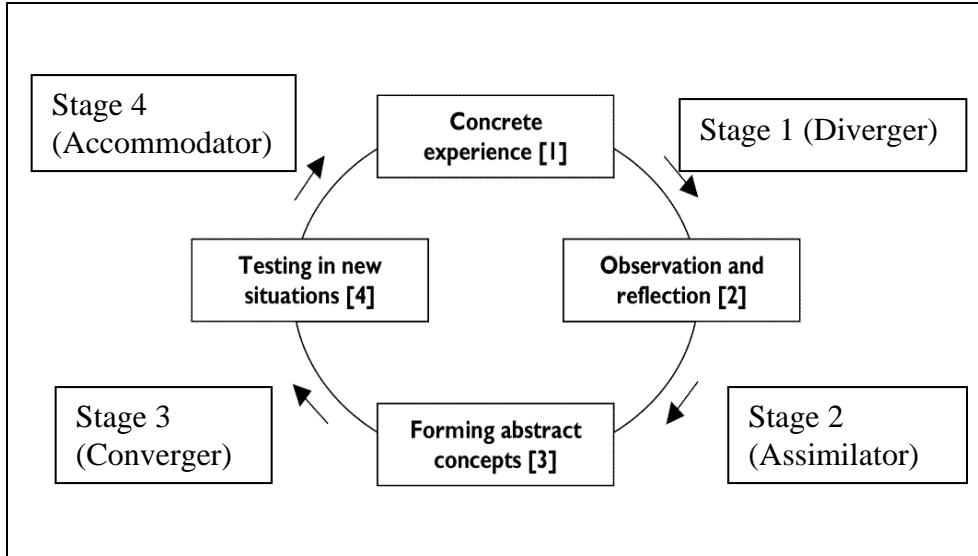


Figure 1. The four stage model of experiential learning

Kolb's (1984) theory of experiential learning and learning cycle model are actually grounded in Dewey's (1938) "philosophy of education based upon a philosophy of experience" (p. 29) that claims effective learning must somehow connect *knowing* with *doing*. For Kolb, effective learning occurs by rounding the learning cycle comprised of concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing).

Each of the four learning style preferences adheres to one of the four stages of learning defined by Kolb. Learners who have a stage one preference prefer a combination of concrete experience and reflective observation (divergers). That is, they tend to be motivated by lots of concrete examples and multiple perspectives. Learners who have a stage two preference prefer a combination of reflective observation and abstract conceptualization (assimilators). These learners tend to prefer logically ordered facts, definitions, and explanations. Learners who have a stage three preference prefer a

combination of abstract conceptualization and active experimentation (convergers). That is, they tend to prefer solving real world problems through practical applications.

Learners who have a stage four preference prefer a combination of active experimentation and concrete experience (accommodators). These learners tend to enjoy creative problem-solving strategies, teamwork, and thinking outside the box. No one preference is better than the others. In fact, the natural learning cycle is one where we move through each of the four stages (or learning style preferences).

Based on Kolb's (1984) theory, we argue that knowing the learning style preference of target audience members is important not to pigeonhole messages in ways that focus only on one style but, rather, to determine the optimum point of entry for rounding the learning cycle. We contend that point of entry may be important because starting with the stage that encompasses the primary learning style preference of audience members might initially motivate people to listen because doing so demonstrates empathy (Witt & Morgan, 2002) and taps into "what the public is thinking and feeling" (Borda & Mackey-Kallis, 2004, p. 127). Regardless of entry point, however, is the necessary goal to round all four stages of the cycle of thinking, doing, reflecting, and sharing (Kolb, 1984).

We argue the rounding of the learning cycle can be operationalized in risk and crisis messages by formulating messages that address not only traditional information dissemination, but also discussions and activities. Doing so helps learners internalize ideas by conceptualizing a rationale for learning the material, becoming familiar with key concepts, envisioning a breadth of examples, and actively applying skills to real life problems.

In study I, we collected descriptive data about learning style preferences in a general population and determined potential correlations to the best practices for effective risk and crisis communication. In study II, we assessed via pre- and post-test data the degree to which a series of five safe food handling messages presented in ways that round the entire cycle of learning were understood and retained by participants.

Study I

Participants

Participants (N = 249) were recruited by graduate students at a medium sized research university located in the Midwest. A snowball sampling technique was applied to reach a variety of individuals who were outside the university.

Procedures

Graduate students mailed the survey instrument to friends and family. For each survey mailed, the graduate students were paid a small honorarium. Graduate students were instructed to send the survey to people outside the region. This request was made in hopes of collecting a data set from a broad geographic area. Respondents returned their survey instruments through standard mail. Confidentiality for all respondents was maintained. The university's internal review board approved the survey instrument.

Survey Instrument

The survey instrument was designed assess crisis communication from several angles. The section of the survey relevant to this study sought to determine the extent to which the best practices established by the NCFPD (see Table 1) correlate with the four preferred learning styles described above.

Table 1

National Center for Food Protections and Defense 10 Best Practices in Risk and Crisis Communication

1. Communication specialists should participate in the decision-making process and in policy development when responding to a terrorist threat.
 2. Pre-event planning is essential to effective risk and crisis communication. Plans should be updated constantly based on experience and new information.
 3. Agencies should create a dialogue with and form partnerships with the public in planning for and managing terrorist events.
 4. Agency leaders should listen to the public's concerns, regardless of perceived accuracy, and respond to them.
 5. Agency spokespersons should communicate with honest, candor, and openness.
 6. Agencies should make strategic plans to collaborate and coordinate with credible sources (e.g. subject matter experts, first responders) prior to a terrorist event.
 7. Agency spokespersons should, to the best of their ability, meet the needs of the media and remain accessible.
 8. Agency spokespersons should communicate with compassion, concern, and empathy.
 9. Agencies should accept uncertainty and ambiguity as an inherent part of terrorism and avoid over-reassuring the public.
 10. Agencies should provide some level of self-efficacy to the public.
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Preliminary Results

As we stated at the outset, this project is currently in the exploratory phase. Our overall objective is to assess the degree to which message preferences vary among multiple audiences. Our first step was to determine the range of learning styles in our sample. Table 2 reveals the distribution of our sample among the four preferred learning styles.

Table 2

Distribution of Learning Styles

Learning Style	Frequency	Percentage
Divergers	113	45.4
Assimilators	32	12.9
Convergers	34	13.7
Accommodators	70	28.1
Total	249	100

Our second step toward completing this objective was to determine whether or not preferences for the best practices correlated with the preferred learning styles of respondents. To date, we have identified two best practices and several demographic characteristics where the variance among the learning styles is significantly correlated. The best practices with significant correlations are self efficacy

($r [248] = -.186, p = .005$): Agencies should provide some level of self-efficacy to the public; and updating plans ($r [248] = .191, p = .004$): Pre-event planning is essential to effective risk and crisis communication. Plans should be updated constantly based on experience and new information.

Self-Efficacy

For self-efficacy, participants responded to the following statement on a Likert scale: “During a crisis, I want to know what the government will do to fix the problem rather than being told what I can do to protect myself and my loved ones.” Divergers and assimilators tended to agree with this statement, while convergers and accommodators tended to disagree. As such, divergers and assimilators wanted government agencies to address the problem and to protect them from any threats. Convergers and accommodators were more likely to desire information about what they could do to protect themselves during the crisis.

Updating Plans

The second best practice that showed a significant correlation with learning styles involved the best practice number two, updating plans. “The government should carefully assess its responses to crises so that new policies or laws can be based on what is learned.” Overall, divergers and assimilators are less concerned about updated plans than convergers and accommodators. This finding suggests that divergers and assimilators are less likely to embrace messages changes and modifications than are convergers and accommodators. This pattern was also evident in a related question from the survey: “After a crisis, the government should try to forget what happened. Leaders should not dwell on mistakes that were made.” Divergers and assimilators tended to agree with this

statement, while convergers and accommodators disagreed. ($r [248] = -.223, p = .001$)

Thus, divergers and assimilators are less likely to respond favorably to post-crisis messages related to fault finding and organizational learning.

Discussion

Although this research is quite preliminary, patterns of message preference based on preferred learning styles are becoming apparent. Messages of self-efficacy, for example, are important to some members of the public and rather unimportant to others. To assure that participants perceive themselves as being understood (Witt & Morgan, 2002), crisis communicators must develop messages that attend to these varying preferences. When messages of self-efficacy are provided, the message should also reassure the audience that the government is doing all that is reasonable to offer protection and a resolution to the problem.

These results suggest that messages of organizational learning and crisis plan revisions resonate well with convergers and accommodators. Hearing about them is likely to stimulate these individuals who tend to enjoy active involvement in problem solving (Kolb, 1984). Conversely, divergers and assimilators may be uncomfortable hearing messages about learning from failure and updating crisis management plans because doing so calls into question the security of a logical plan (Kolb, 1984). This, in turn, may heighten a perception of incompetent leadership, which may essentially provoke fear. To avoid such a reaction among divergers and assimilators, messages about organizational learning and about crisis plan updates should be communicated in a manner that reassures stability and order, and promises progress. For example, a message of a plan update could be communicated in a manner emphasizing that such updates are actually a *normal* part

of the ongoing planning process. In doing so, divergers and assimilators might be reassured that the overall plan remains stable in that updates are essentially part of the preconceived plan.

The ultimate goal, then, is to develop concise crisis messages that round the cycle of learning. The snowball sample assessment suggests further that the optimal point of entry on the cycle may, in fact, be stage one, since the largest number of respondents fell into that learning style preference (divergers). Hence, the messages ought to begin by offering a variety of examples both from previous research and from the multiple perspectives of the participants. Doing so might motivate participants in that it invites them to be “active participants in the . . . process” (Heath, et al., 2005, p. 159). From there, the other stages (i.e., information dissemination including key terms and concepts practical applications in real life setting, and creative problem-solving) can follow.

Study II: Helping Teens Serve Food Safely

The communication group of the NCFPD is working in cooperation with the Extension Service and the Great Plains Institute for Food Safety at North Dakota State University to assess the utility of rounding the cycle of learning in food safety messages. As such, the NCFPD received access to data from an ongoing project designed to train teens to serve food safely. The NCFPD intends to cooperate with the investigators to expand this project to include training to help prevent intentional contamination. The current project was sponsored in part by the Cooperative State Research, Education and Extension Service of the U.S. Department of Agriculture, under Agreement No. 2002-51110-01512.

The relevance of this study to food safety is clear. The U. S. Department of Labor reports that 22% of the workers in food service establishments are teens. Overall, 26% of teens with jobs are employed by restaurants or fast food franchises (Teen Workers Face Dismal Summer, 2004). Next, we discuss the objectives of the teen training project.

Study Objectives

The project has three objectives:

1. To improve food handling practices among teenage food handlers.
2. To increase food safety knowledge among participating students and teachers.
3. To increase use of thermometers at home and in community settings.

Each of these objectives is linked directly to the training and evaluation procedures.

Participants

The project provides training at no cost to teenage students in North Dakota. Since 2001, 4000 North Dakota teens have been trained using this program. Those who complete the program with a score of 75% or higher receive completion certificates. Of the 4000 students who have received training, 1,155 completed a pretest and 1,203 completed a post-test designed to measure knowledge and retention.

Procedures

The 4000 teens who have received the food safety training were taught the material by their high school instructors. Using a train-the-trainer approach, the investigators recruited and trained instructors throughout the state. Extension also participated in training educators to share the material. A training kit for each student was provided to the instructors free of charge. These kits included key information (stage 2), a magnet reminding the student of minimum cooking temperatures for a variety of meat

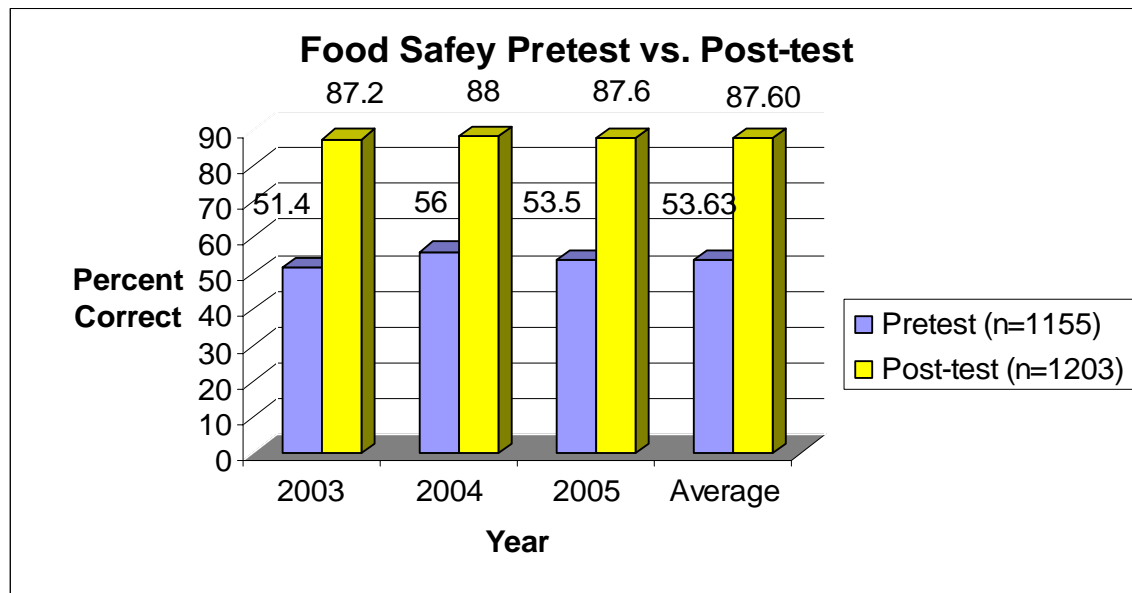
products (stage 1), a meat thermometer (stage 3), and a refrigerator thermometer (stage 3).

The teaching process for the teens was guided by the learning cycle with an extensive *hands-on* approach (stage 4). Prior to the training, the students completed a pretest on food safety practices. During the training, students worked in groups to complete food safety case studies and experiments. For example, the students used Petri dishes to grow a culture from a sample taken from their hands. By doing so, the students were able to observe the microorganisms existing on their hands. Students also completed homework assignments where, for example, they were asked to measure the temperature in their home refrigerators and to quiz their parents and other family members about food preparation. After the training, the students took a post-test again assessing their knowledge of safe food preparation and handling. One month after the training, students were given a follow-up survey to measure retention of key information.

Results

Students showed considerable improvement in their ability to answer food safety related questions following the active training procedures. Table 3 identifies a clear and consistent trend of improvement in each of the three years of the study. Clearly, the active training procedure that addressed all four stages of the learning cycle was effective in teaching the food safety information.

Table 3

Pretest and Post-test Comparison for Teens Receiving Food Safety Training

Perhaps even more encouraging was the retention of some key lessons taught in the training. A one-month follow-up survey noted the following results for participants:

1. 69% were more careful about cleaning and sanitizing
2. 52% had shared their knowledge about food safety with others
3. 83% reported washing their hands more often when preparing food

For ethical reasons, a formal control group was not used in this study. However, these results suggest the learning cycle process of message formation is effective in helping students learn and retain food safety information.

Discussion

The teaching process used in the teen training project thus far rounds the cycle of learning. Moreover, the pre- and post-test data suggests dramatic results in terms of comprehension and retention of food safety information. Follow-up studies would prove helpful in determining whether graduates actually employ what they've learned in real life situations, as well as whether they retain the understanding over time (more than one month after the training sessions).

Moreover, in 2006, the NCFPD and the lead project investigators intend to expand the scope of the teen training program to include intentional contamination. The learning cycle process of message formation and dissemination will again be used. Case studies of actual events of intentional contamination will be described. Issues of vulnerability and the potential for a catastrophic impact will also be discussed. Students will be asked, through a simulation, to maintain a mindful approach to observing the behavior of their co-workers and scrutinizing any unusual appearance or odor in the food they prepare or serve. The same form of pretest and post-test data, as well as two follow up surveys (one a month after the training and another six months after the training) will be used.

Overall Conclusions

The preliminary findings of the two studies summarized in this essay suggest that the public varies in its message preferences. Crisis communicators must understand this variance if they are to gain compliance from the public. Kolb's (1984) notions of preferred learning styles and the learning cycle model appear to be a useful means of understanding the variety of perspectives the general public has to crisis messages. Study I suggests that crisis messages can be designed to address a variety of learning style

preferences. Specifically, messages of self-efficacy and planning updates can be constructed in a manner that simultaneously reassures stability and government protection, while emphasizing progress and self-protection.

Study II offers clear evidence that rounding the cycle of learning with food safety messages increases comprehension and retention on the part of teens. This promising study has potential for teaching teens and others to be mindful of the potential for a terrorist act on the public food supply. Although many programs offer information to the public about food safety, the students in this program performed poorly on the pretest. Future studies should assess the general public's understanding of food safety issues and their ability to retain key information about food safety—including potential terrorist threats. The learning cycle process applied in Study II may have strategic benefits for sharing risk and crisis messages in a variety of settings.

Tailoring risk and crisis communication messages to round the learning cycle would ensure that the learning style preferences of diverse audiences are addressed, thereby making them “accessible and understandable to highly varied subgroups in society” (Kreps, et al., 2005, p. 196). Moreover, doing so could potentially increase people's comprehension, retention, and application of best practices in risk and crisis communication (Kolb, 1984). Further, shaping best practice risk and crisis communication messages to appropriately address potentially counterproductive perceptions rooted in learning style preferences could improve compliance gaining among diverse publics (Seeger, Sellnow, & Ulmer, 2003). Finally, understanding the primary learning style preferences of various audiences may help determine the most effective learning cycle point of entry that will tap into “what people really perceive as

the problem” (Borda & Mackey-Kallis, 2004, p. 127). Doing so is likely to heighten the motivation to learn and ultimately take appropriate action (Kolb, 1984).

Kolb’s (1984) experiential learning theory, learning cycle model, and notions about preferred learning styles appear to be a useful tool for creating and assessing effective risk and crisis communication messages. Though the learning cycle approach is not the only means by which to do so, these studies suggest it is worth pursuing as one potentially valuable method.

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