

# Risk Literacy: What Can Adult Literacy Education Learn from the Decision Sciences?

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Choices, like which health/car insurance plan best meets both needs and budget, whether to evacuate for a hurricane or shelter in place, whether to participate in a protest during a global pandemic, or even which politician serves their communities' interests in an upcoming election, all require adults to determine the risks and/or rewards associated with alternative outcomes of these multifaceted, socially, and culturally embedded real-world problems (Gresch et al., 2013; Saal, 2015; Saal et al., 2020). Adults bring prior experiences, knowledge, and existing skills of inductive reasoning and evaluation to “not only effectively tackle these situations at an individual level but also to take part in public debates and make fair judgments on how the authorities deal with these issues at a local or global level” (Fang et al., 2019, p. 427).

According to the Workforce Innovation and Opportunities Act of 2014, literacy refers to “an individual’s ability to read, write, and speak in English, compute, *and solve problems* [emphasis added], at levels of proficiency necessary to function on the job, in the family of the individual, and in society” (Title 2, §203). Yet, according to the Programme for the International Assessment of Adult Competencies (2017), over half of American adults are ill prepared to solve problems that include: two or more steps or

processes, interpret simple statistics and data, integrate two or more pieces of information, or use reasoning to compare and contrast information across print and digital texts. Because adults navigate their literate world with their own experiences, solving novel complex problems where background knowledge may be limited or inaccurate/biased (like many risk literacy frameworks/domains) is a particular challenge (Greenberg & Feinberg, 2018).

Yet, in adult literacy education, how often do we consider explicitly teaching problem solving in risk domains? This kind of problem-solving skill is also referred to as risk literacy, or “the ability to evaluate and understand risk” (Cokely et al., 2018, p. 481) in the context of literacy events (Purcell-Gates et al., 2011)? This research digest focuses on using an interdisciplinary approach to teaching risk literacy in adult literacy education settings by applying findings and recommendations from decision science research.

## **Risk Literacy – Utilizing Structured Decision-Making Processes**

Health, natural hazard, consumer/financial, and civic literacy frameworks/domains permeated with authentically complex literacy and numeracy context and content are all ripe opportunities to

teach and practice problem solving (or risk literacy skills) in adult literacy educational spaces (Purcell-Gates et al., 2002). All adults can improve their risk literacy. Yet, improving skilled decisions (or problem solving) in high-stakes circumstances requires a structured approach to decision making. This three-step approach typically involves: first, activating and questioning prior knowledge including formulating the decision-making space; second, advancing and implementing a decision-making strategy which utilizes probabilistic or inductive reasoning; and third, metacognitively evaluating the decision making process (Arvai et al., 2004; Fang et al., 2019).

Skilled decision makers are able to consider and integrate multiple perspectives and utilize tradeoffs where appropriate (Fang et al., 2019; Gresch et al., 2013). Those with high-risk literacy are similarly able to use critical literacy skills to identify bias, power dynamics, inequities, and injustices embedded in both the problem/question and potential solutions/options (Yacoubian, 2018).

An example of a risk literacy framework/domain that has received more attention in research and practice is health literacy. Health literacy is an evolving concept but traditionally defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Institute of Medicine, 2004, p. 2). However, the construct of health literacy is evolving to additionally include the socially and culturally embedded skills and practices needed to act with agency for yourself or your community using health-related information (Rudd, 2015). Adults with high health literacy are able to formulate questions, seek valid information for their decision making, and critically read and analyze health related information (Feinberg et al., 2019). In short, those with high risk literacy in

the framework/domain of health literacy are able to implement a structured approach to decision making which limits risk and uncertainty in their personal health management and associated care.

### **Traps and Roadblocks of Risk Literacy**

Nevertheless, when adults make complex, risk-laden decisions in health, natural hazard, consumer/financial, and civic frameworks/domains, there are many traps and roadblocks. In addition to the complexity of risk domain texts themselves (Saal, 2016), common barriers are framing effects, heuristics, and a lack of statistical numeracy skill.

#### ***Framing Effects***

Decisions are framed by how an adult defines a problem as well as the prior knowledge, values, and habits they bring to the decision (Tversky & Kahneman, 1981). Framing is when people make a choice, a decision based on two or more options, grounded on whether options are presented with positive or negative orientations (Tversky & Kahneman, 1981). Specifically, people tend to avoid risk when positive frames are presented. Conversely, adults make riskier decisions when negative frames are presented. For example, hypothetically, adult learners are more likely to register for education programs early when a late registration charge (penalty) is emphasized when compared to when early registration is presented as a discount (benefit). These kinds of framing biases are common, particularly in political, health, and financial contexts and their impact increases with age (Thomas & Millar, 2012; Tversky & Kahneman, 1981).

#### ***Heuristics and Biases***

Across decisions (high and low risk), adults rely heavily on a series of heuristic principles (and frequently accompanying biases) that

reduce complex judgments to simpler tasks for efficiency and coherence (Kahneman et al., 1982). Four common heuristics include: availability, representativeness, anchoring with insufficient adjustment, and overreliance on affective judgement. However, when adults are making risk laden (high risk) decisions around complex topics, simplification strategies for making decisions like how easily they can recall previous instances of the problem (availability) or how closely a problem resembles another (representativeness) invite significant biases into the decision-making process (Arvai et al., 2004). How/if adults adapt decisions based on initial information (anchoring) or allow the feelings they have about a topic or decision (affective) to influence decision making correspondingly showcase how adults' heuristic principles can become an impediment to effective decision-making (Arvai et al., 2004). Relatedly, strongly polarized beliefs, especially morally relevant biases, can endure even among expertly skilled decision makers (Schulz et al., 2011).

In a risk literacy context, the consequences of biases associated with these heuristics can be dire. Take, for example, an adult deciding not to evacuate during a hurricane because, in their personal experience, hurricanes have not been life-threatening events. The adult does not necessarily take into consideration the differences in hurricane categories and their impact or how their current physical location may raise (or lower) their associated risk of injury or death. Many of these exact heuristics and biases detailed above, coupled with inaccurate risk communication by public officials and institutional racism and associated poverty, led to the untimely death of many during Hurricane Katrina (Cole & Fellows, 2008).

### ***Low Statistical Numeracy Skills***

A final significant barrier for adults in effective

decision making in high-risk situations is insufficient statistical numeracy skills (Cokely et al., 2018). Statistical numeracy is strongly related to skilled decision making across risk literacy frameworks/domains since both tasks involve practical probabilistic reasoning and skillful metacognition (Coakley et al., 2018). In today's hazardous and ambiguous world, practiced inductive logic, or rigorous analysis which moves from principles to inferences including probability of uncertainty, can provide better chances of positive outcomes.

Yet, to employ these decision-making strategies, adults must possess a working understanding of probability. Unfortunately, 63% of U.S. adults have low numeracy skills (U.S. Department of Education, n.d.). Even expert decision makers, like surgeons, have been shown to lack adequate statistical numeracy skills to achieve high levels of risk literacy (Garcia-Retamero et al., 2016).

### **Risk Literacy in the Adult Literacy Classroom – Decision Making Supports**

Any situation in which some individuals prevent others from engaging in the process of inquiry is one of violence. The means used are not important; to alienate human beings from their own decision making is to change them into objects (Freire, 2018, p. 85).

The decision sciences offer three types of decision-making supports which adult literacy educators could utilize to better scaffold inferential decision making more generally and risk literacy skill specifically. The first possible instructional support is teaching learners the three strategies (or procedures) most commonly used to make studied decisions. Second, instructional support in decision making should include specific inferencing strategies. Finally, instructional support in assisting adult's risk literacy development involves scaffolding statistical

numeracy skills in probability and graph literacy. Taken together, all three instructional supports could significantly improve learners' comprehension of complex, real-world problems and potential solutions.

### ***Teaching Three Common Decision-Making Strategies***

One of the biggest obstacles to skilled decisions is step two of the structured approach to decision making - advancing and implementing a decision-making strategy which utilizes probabilistic or inductive reasoning (Arvai et al., 2004; Fang et al., 2019; Sadler & Zeidler, 2005). Adult literacy education professionals should begin by asking adult learners to describe and detail their current strategies for decision making. Then, following corresponding group discussion, adult literacy educators may decide to supplement adult learners' knowledge of decision making with one or more of the three typical options/strategies for decision making: compensatory, non-compensatory, and/or combined.

**Compensatory.** Compensatory strategy considers that benefits and drawbacks of each potential decision choice/option could compensate for one another. Therefore, in compensatory strategy, the decision maker should take all criteria into account for each option and consider options as equally legitimate (Jungermann et al., 2005). Further, important criteria can and should impact the decision more than others. To complete this strategy, first, brainstorm the criteria that will apply to every option. Next, rank the criteria in order of importance. Finally, list the criteria in order of importance under each option and identify the information for each criteria – comparing and contrasting the options based on all of the information.

In an example which could be used in the adult

literacy education classroom, the teacher could provide learners with detailed information about two different financing options for the same car. Next, the learners brainstorm the criteria for the two options (length of the loan, interest rate, number of payments, payment types accepted, total cost of the loan, service quality, length of time they expect to keep the car, etc.). The brainstorming of criteria is a key metacognitive skill and should be initially scaffolded and then done with less support over time. Then, have learners use the text (and any necessary research) to provide the data for each criteria for each loan. Finally, have the learners compare choices, identify their choice, and provide a rationale for the decision. Compensatory strategy can be repeated for many choices like insurance selections, whether to recycle, or when to retire.

**Non-compensatory.** In a non-compensatory strategy, the decision maker begins with the premise that options may not be equally legitimate and illegitimate options should be eliminated based on ranked criteria (Jungermann et al., 2005). To complete this strategy, first, brainstorm the criteria that will apply to every option. Next, rank the criteria in order of importance and set minimum standards for each criteria. Finally, for each criteria, starting with the most important, rule out the option(s) that do not meet the minimum benchmark set for effectiveness/appropriateness. Then, move through each criterion, in order of importance, continuing to rule out options until only one is left.

In another example which could be used to further develop adult learners' risk literacy, the teacher could provide learners with a question like, "who should you support for the mayoral election?" Next, the learners brainstorm the qualifications they find important in a local official. Components like years/history of public



service, views on working with the community, views on public services, views on taxes and regulations, and views on working with the business community may be included. Again, brainstorming criteria is a key metacognitive skill and should be initially scaffolded and gradually released. Next, have the learners rank the criteria in order of importance and create the minimum standard for each to meet their or their communities' needs. Subsequently, have learners research the data/information for each candidate. Then, by criteria in order of importance, have the learners rule out (or remove from consideration) candidates who do not meet their or their community's needs until they are left with a single choice. Finally, have the learners identify and justify their choice.

**Combined.** Often, compensatory and non-compensatory strategies are combined. According to Beach (1990), the most common way the two strategies are combined is for the decision maker to first utilize the non-compensatory strategy to remove all objectionable options. Then, if more than one option remains, the compensatory strategy can be used to analyze the choices that are left in order to decide on the best option.

### *Teaching Specific Inferencing Strategies*

Teaching specific inferencing strategies is common in literacy education (Ozgungor & Guthrie, 2004). Nevertheless, adult literacy educators could use the risk literacy frameworks/ domains and corresponding multimodal text types to practice inferencing for collaborative discussion and decision making. Specifically, as adult learners interact with real-world risk literacy texts, like political and consumer ads, educators should provide explicit instruction on

analyzing the framing effects and corresponding heuristics and biases for the literacy events. Learners should be provided time to dialog with their colleagues to learn from/about multiple viewpoints and experiences.

### *Teaching Statistical Numeracy Skills*

Finally, adult literacy educators should evaluate their curriculum to identify when/where the essential skills of risk literacy (inferencing and the numeracies of probability and graph literacies) are taught. According to the College and Career Readiness Standards for Adult Education (2013), components of inferencing and graph literacy are not incorporated into ELA standards until learners have reached Reading Anchor 1 - Level C. Further, the numeracy skills of probability and corresponding graph literacy are not addressed until Level D (U.S. Department of Education, 2013). Considering the print-based literacy and numeracy skills of many adults enrolled in adult literacy education programs fall significantly below these levels, revisiting decisions about where and how these essential skills should be taught in the scope and sequence of curriculum is vital and pressing.

### **Conclusion**

While many adults lack exposure to instruction in risk literacy, almost everyone has the motivation and incentive to make well-informed decisions for themselves, their families, and their communities. By emphasizing risk literacy instruction and corresponding strategies from the decision sciences, adult literacy education can positively impact learners' and communities' health and well-being. The risks involved in shifting our practices and curricula are worth the potential rewards.

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