Write an outline/framework to make sure that when I meet with Ellen Peters, what can I find out on my own, and what else specific questions can we try to answer and address in the literature?

* Try to make sure it’s not too long! 2 to 3 questions MAX??
* It might not even be there in general, but she can try her best!

What question do we want to address?

* How to communicate/convince low numeracy individuals
* Do low numeracy individuals follow a different mental process?
  + If so… what is it, why is it, and what can we do about it (is it good or bad?)

We saw that numeracy moderated the effect of the intervention!

Innumeracy in the Wild

Ch 15: Evidence-based information presentation matters!

* Forms and types of information presentation are critical and useful
  + We could create a simplified abstraction (that doesn’t directly reflect truth as closely) that is more useful as a model?
  + Baruch Fischhoff – What is the goal of the communicator?
    - Here, our goal is to ingrain an understanding of the necessary trade-offs in UHC, and by illustrating this, hopefully improve comprehensibility and perceptions of fairness.
    - We might be able to improve this by somehow ‘reducing cognitive effort’… Is there an important balance between ‘realism’ in simulation for our model, and applicability in terms of human use, engagement, and understanding?
    - Although the effort in and of itself might be part of what’s generating value??
* “We can make the Hurdle shorter, or the Runner stronger”
  + Implies that there isn’t a categorically different approach that may work better?
  + Note: We can’t make people numerically ‘stronger’ here.
  + Hurdle Shorter : Improve ‘information’ architecture. Similar to choice architecture in the JDM literature.

Reflections on Innumeracy in the Wild

* The less numerate rely more on compelling concrete stories, images, and emotions, to make their decisions.
* Numbers often neglected by less numerate or those using superficial heuristics (which heuristics would be used in our case here?)
* Subjective numeracy research indicates that low confidence in subjective numeracy tends to lead to less math ability being used, even if objective math skill is good
  + In our example, subjective numeracy had no effect, but objective numeracy had a large moderating effect!
* “Relying on a simple mental shortcut once is efficient and often produces a decision that is good enough. However, when employed again and again, heuristic use seems to be a risk factor that accumulates over time and causes worse outcomes.”
  + Really unsure if we agree with this quote, but could look into more about what Ellen actually means when we chat about it. Is time sensitivity one of the critical criteria? If so, heuristics improving decision making overall under time constraints could be a net positive, instead of just making a choice regardless without any time to choose.

Summary Table

* Choose information presentation formats strategically – Test communications
  + Implies that perhaps same material, presented in alternative fashion, would do well?
  + Look into literature about presenting numerical information, perhaps an alternative to trying a non-numeric method (as that doesn’t directly address our potential mediating factors)
* Reduce Cognitive Effort
  + Provide fewer options, less information. This means a simplified version of the exercise?
    - Perhaps reach out to original designers to see what we can do here.
  + Do the math for them.
    - In-built calculator not enough? Perhaps some example plans?
  + Use appropriate visuals.
    - Unsure, but perhaps designing different structure for the game or presentation itself?
* Perhaps add a column/exercise indicating how much individuals actually used the given health options in a year, and whether or not they would be happy if the plan selected was what they had?

Ch 16: Provide Numbers but Reduce Cognitive Effort

* Can correct people who have wrong facts
  + Is there a subset of people who don’t support UHC due to incorrect factual reasons?
  + If the ‘scope’ of facts is very large, providing information can be like drinking from a fire-hose, not particularly plausible.
* Can correct inappropriate interpretations: Not really sure how this applies here?
* Can help people avoid being surprised by an unexpected event and possible regret and anger that can follow
  + Perhaps adding in information about base rate of occurrence of various categories of harm, in ADDITION (or alternatively?) to information on what is covered.
  + Emotion can divert attention from unlikelihood of an event if numeric likelihood is not emphasized
    - Here would be the effect of affect on choices and priority setting in medical care
  + Perceived as more useful - ??? Unsure

Perhaps we can add a table translating meanings for probability (look at the IPCC 6 climate change report on how they used various terminologies)

* If so, would the ‘colloquial’ labels be more useful than hard numeric ones, if provided with an additional table?
  + Data shows that people CANNOT use the IPCC table to translate meaning, and estimate risk improperly.
  + Straight numeric information prevents this from occurring however.
* The less numeric can still make use of this provided numerical information
  + But not as well as those who are highly numerate
  + This may NOT be a categorical type issue regarding communication?

Provide uncertainty in data

* Unsure how to use this regarding the numerical information provided in the study

Reduce cognitive effort

* What choices are relatively important? Would a simplified version of the exercise make sense, with less options and less choices (commonly chosen items could be pre-selected as the ‘default’ for the majority of people?)
* Options can be presented sequentially?
  + This doesn’t work when doing a choose n problem, because each step requires trading-off and optimization, you can’t choose A over B if it affects your choices of C over D, unless you know about the 2nd choice.
* How to determine which elements here are ‘critical elements’?
  + Perhaps get some feedback from clinicians?
* Provide absolute risk
  + If we were going to add relative likelihood of risk of various occurrences under the chart, we need to do it in an absolute risks framework.
* Use a ‘fixed’ denominator when looking at risks – This plays into our absolute risk, 1 in 1000, 10 in 1000, 30 in 1000, etc.
* Use numbers in a direction consistent with people’s expectations

DO the math for them

* When presenting cumulative risk, communicate the cumulative amount outright
* Use graphs or some type of visual
  + Perhaps a moving scale or bar showing how relative expenditures are used, or how many resources are left?
  + Maybe simple icon arrays indicating how much something would ‘cost’ in resources?
* How to ‘experience’ hypothetical risk?
  + Could show various images of dealing with medical problems as part of the exercise?
  + Didn’t replicate for Ellen Peters… how and why, what elements? (ref 125)

Ch 17: Provide Evaluative Meaning and Direct Attention

* In unfamiliar domains, we must be able to identify correctly what a number is without having clues to what it means for your decision
  + ????
* Difference b/w comprehension and comprehendability = decision maker cannot map a numeric value onto good/bad scale.
  + Providing evaluability means data = meaningful information to make choices
* Can either ask individual to estimate a number, and then show them the real value, or just directly show them the real value
  + The contrast has some benefit, mainly active comparison changes how people process information (especially if they tend to over or underestimate the true value)
* Attributes that are difficult to evaluate (fertilization clinic distance vs success rate) without context, subjects might overvalue the thing that is at least somewhat comprehensible.
  + Highly numerate people SOMETIMES use comparative information more, but the research is mixed.
  + E.g. Graphical presentation of risk is useful for highly numerate, but not the less numerate (insensitivity to risk levels) (ref 34,35)
    - Unless it’s a highly simplified graphic? (ref 30, 36)
* Providing more risk information affects the perception of the numeric risk level
  + This ‘unpacking’ of risk factors affects only the less numerate, a potential alternative to increase perceived relevance and elaboration of numeric risk (or we can use narratives?) (ref 38)
* Numeracy effects are less likely to emerge when motivation is HIGH and when concrete, easy to evaluate comparisions are provided.
  + MORE likely to emerge when numbers are seen as less trusted, are complex, or require math calculation.

Carefully use evaluative labels/symbols

* Evaluative labels improves risk comprehension (high, low, med, instead of 15, 10, 5% which can be hard to contextualize)
  + It seems to do so by changing participant affect.
* But people can over-react to evaluative labels as well, which is likewise a problem.
  + Decreases understanding of specific information; can lead to value-inconsistent choices and risk perceptions.

Frequency vs Percentage formats

* Less numerate finds that medicine is less risky when side effect info presented using percentage instead of frequency.
  + Perhaps b/c frequency formats = greater emotional feelings vs percentage formats?

Use other more Imagineable data formats

* Instead of presenting disease risk change, perhaps present life expectancy change? This is more comprehensible to average person and directly relevant as well.
* Analogies are very useful because they are very comprehendible for most people if well formed.
  + Lead to improved understanding of medical problems

Leverage Emotion to get attention, information, and motivation.

* Emotion has value! Emotion is information, informing perceptions of risk quickly and efficiently
  + Spotlight in 2 stage process, emotion highlights information, then information affects decisions.
* Order information such that the most IMPORTANT item is FIRST or LAST
  + Effect MAY be greater amongst the less numerate?
  + For very complex information, ordering plans lead to greater comprehension only for the more subjectively numerate (e.g. ordering medicare plans by benefit and generosity)
* ONLY highlight the most IMPORTANT information using symbols
  + If you highlight everything, even the unimportant stuff, the less numerate do worse.
* Summaries can provide an overview
  + BUT it harms comprehension of outside of framework information
  + Summary evaluation can work instead?
    - Summary of each hospitals evaluation helps make choices for the less numerate, when looking and comparing multiple hospitals along many axis.
* Improve visual salience (UI stuff)
  + Greater contrast, larger font, etc.

OVERALL

* Use presentation approaches for things that people SHOULD care about more (quality of health insurance for example)
* Use graded performance standards
  + But this requires expert judgement / consensus