Examining college students’ reasoning with messages of risk and causation

Luke Tunstall
Michigan State University
Joint Math Meetings 2018
Quantitative and Statistical Literacy

- Confidence with numbers
- Data interpretation
- Communication skills
- Benefits and limitations of mathematics

Steen et al.’s (2001) QL
Quantitative and Statistical Literacy

Gal (2002)
Taking These Common Drugs Can Quadruple Your Risk Of Skin Cancer

The longer you’ve been on them, the greater your chances may be

BY CHRISTA SGOBBA DECEMBER 11, 2017

3 to 4 cups of coffee can do more good than bad for your body, study suggests

How long will YOU live for? New interactive map calculates your life expectancy depending on where you live

The tool, provided by the Office for National Statistics, tells you an estimate of how long you could live for within seconds
Red wine gets healthy green light

Facebook Could Be Associated With a Longer Life, Study Finds
Problem
# Logic of Inquiry

<table>
<thead>
<tr>
<th><strong>Question</strong></th>
<th><strong>Data Source</strong></th>
<th><strong>Data Analysis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>In what ways do college students enrolled in an introductory mathematics course reason with media messages about risk in relation to one’s health as they evaluate the quality of evidence presented?</td>
<td>Open-ended questions given to roughly 200 students</td>
<td>Compile individual question responses, then analyze nature of reasoning using Toulmin’s (1958) framework</td>
</tr>
</tbody>
</table>
Something is going to kill you. Life is about what happens before that

JC Johnson

Maybe bacon causes cancer. So does sunshine. Everything that might possibly sustain us and bring joy to our lives only hastens our inevitable deaths.
Task Questions

1. Consider the following claim of the article: we should not worry about the daily influx of studies about health, as if we did, we would become overwhelmed and lose out on the joys of life. Instead, we should live life without regrets and enjoy various things in moderation. Do you believe the author had sufficient evidence to support this claim? Explain.
Task Questions

1. Consider the following claim of the article: we should not worry about the daily influx of studies about health, as if we did, we would become overwhelmed and lose out on the joys of life. Instead, we should live life without regrets and enjoy various things in moderation. Do you believe the author had sufficient evidence to support this claim? Explain.

2. Do you agree with the message above? Why or why not?
Task Questions

1. **Consider the following claim of the article:** we should not worry about the daily influx of studies about health, as if we did, we would become overwhelmed and lose out on the joys of life. Instead, we should live life without regrets and enjoy various things in moderation. **Do you believe the author had sufficient evidence to support this claim? Explain.**

2. **Do you agree with the message above? Why or why not?**

3. **What did you take away from the article? Is there anything in addition to the claim above that you noted or believe warrants discussion?**
Analysis Process

Random sample of 20 responses → Develop codes → Apply codes to rest of sample, refining as needed
Salient Themes

- Prior agreement matters
- Statistics and studies are trustworthy
- Multiple literacies are at play
Processed meats are bad for you and lots of other things in life put you at risk but you can’t live your life being afraid of those things. The author cites the World Health Organization, and much of the other evidence is common knowledge. I believe this evidence is sufficient.
To me, no evidence is provided from this article. The article simply talked about bacon and how meats like this one can cause cancer, but there is no actual proven evidence provided in the article. In order to have an effect on the audience and for there to be actual have evidence there needs to be proven statistics or real life stories of some sort.
There was no concrete evidence concluding the points written above. It is assumed the risks [of processed meats] are the same as other lifestyle risks, such as sun tanning.