The narrative bias revisited: What drives the biasing influence of narrative information on risk perceptions?

Cornelia Betsch, Niels Haase, Frank Renkewitz & Philipp Schmid (2015)
Narrative bias

• Many examples from Psychology where likelihood estimates deviate from probability theory

• *Narrative bias*: the excessive influence of narrative information, exemplars and testimonies, on…
  • subjective probability estimates
  • perceived risk (value dimension, i.e. severity of outcome)
  • behavior

• *The encounter frequency theory* (Obrecht et al. 2009): each piece of information (statistic or single narrative case) is attributed equal weight when forming a judgment

• *Negativity bias*: information regarding presence of a risk is weighed stronger than information on its absence
Study

• Experiment 1
  • effects of statistical info and narratives on estimated probability and risk
  • symmetry of narrative bias (negative bias)

• Experiment 2
  • narrative bias caused by absolute or relative number of narratives?
  • narrative bias artifact of conversational norms or recency effect
  • do people seek out additional narrative information?

• Content domain of vaccination risks
  • more and more people consult internet for health decisions
  • narrative evidence common feature anti-vaccination websites
Information provided on VAE

- Vaccine-adverse events (VAE) for fictitious disease *dysomeria*
- Statistical probability of VAE provided (% and pictograph)
- Followed by experiences on simulated bulletin board

I had about a week of fever after my dysomeria vaccination. I do not know if that was a side effect but I was confined to the bed for quite a while and could hardly move a muscle. I’m just glad it’s over now and I can get back to normal life.

Bill

My doctor had told me that I should get vaccinated against *dysomeria*. Well I’m not really a fan of needles, but last week I just went and got it over with. Afterwards: no problems at all and I actually went to the gym to do my regular work out right afterwards. No biggie.

Sarah
## Dependent variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>Scale type</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>subjective probability</td>
<td>% estimate</td>
<td>What is the probability of adverse events if you get vaccinated?</td>
</tr>
<tr>
<td></td>
<td>7-point rating scale (&lt;i&gt;1 = almost zero, 7 = almost certain&lt;/i&gt;)</td>
<td></td>
</tr>
<tr>
<td>perceived risk</td>
<td>visual analog scale (&lt;i&gt;0 = not risky at all, 100 = very risky&lt;/i&gt;)</td>
<td>How risky do you judge the vaccination to be?</td>
</tr>
<tr>
<td>perceived severity</td>
<td>7-point rating scale (&lt;i&gt;1 = not severe, 7 = very severe&lt;/i&gt;)</td>
<td>How severe do you judge the possible adverse effects of the vaccination to be?</td>
</tr>
<tr>
<td>intention to get vaccinated</td>
<td>7-point rating scale (&lt;i&gt;1 = def. not vac., 7 = def. vaccinated&lt;/i&gt;)</td>
<td>If you had the possibility to get vaccinated in the next week, what would you do?</td>
</tr>
</tbody>
</table>
Experiment 1

- 2 x 2 x 3 between-subject design (270 students)
  - statistical probability VAE (2): 5% or 40%
  - narratives reporting VAE (2): 5% or 40% (out of 20 narratives)
  - first dependent variable (3): subjective probability (% or rating) or perceived risk

- Subjective Numeracy Scale (Fagerlin et al., 2007)
  - 8 items on 6-point scale, e.g. “How good are you at working with fractions?”

- Results
  - effect statistical information > narrative information for subjective probability, but reverse for perceived risk!
  - for low (but not high) numeracy: % estimate function of # narratives VAE
  - for high numeracy larger effect of statistical rate on 7-point subjective probability
  - carry-over effects: considering risk first makes probability estimates more biased
  - negative bias for risk, but not percent estimates
Experiment 1

subjective probability

perceived risk

A) Percent estimate

B) 7-point rating scale

C) Visual analog scale
Experiment 2

- 2 x 2 x 3 + 4 between-subjects design (464 subjects Amazon Mechanical Turk)
  - first dependent variable (2): subjective probability or perceived risk
  - number of narratives (2): 10 or 20
  - narratives reporting VAE (3): 10%, 20% or 40%
  - optional narrative information (2) and sequence statistical and narrative info (2)
  - statistical probability constant at 20%

- **Objective numeracy assessed**
  - Berlin Numeracy Test (Cokely et al., 2012)
  - 3-item scale (Schwartz et al., 1997)

- Results
  - relative frequency narratives VAE drives narrative bias, not absolute number
  - high numeracy: generally lower risk perception and weaker narrative bias
  - 78% chose to read narratives; effect the same whether or not freely chosen
  - no recency effect
  - perceived risk (but not subjective probability) and behavioral intention correlated
Discussion

- Narrative information biases interpretation of statistical information
  - Effects depend on dependent measure: stronger effects on perceived risk
  - And perceived risk most strongly associated with behavioral intention
  - Affective component: more rule-based, cognitive reasoning with numerical scales vs. more affective, intuitive responses to verbal scales

- Asking for probability estimate before risk increases influence statistical info

- Both subjective and objective numeracy moderate effects
  - higher subjective numeracy associated with less narrative bias and higher sensitivity to statistical information
  - higher objective numeracy also associated with less narrative bias, and generally lower risk perceptions