A Research Mindset

Lori Pollock (U of Delaware)

Amanda Stent
About Lori Pollock

Alumni Distinguished Professor, University of Delaware
• PhD U of Pittsburgh 1986
• Rice U 1986-1989
• U of Delaware 1990-present
• Sabbaticals: ABB Inc & Army Research Lab

Research in Software Engineering, CS Education
Service
• CRA-WP, CRA-E
• Partner4CS K-12 Teacher professional development
• Computational Thinking in University Gen Ed

For Fun
• Outdoor activities, handcrafts, traveling
About Amanda Stent

**Director,** Davis Institute for AI, Colby College (and Professor, CS)

- PhD U of Rochester 2001
- Post-doc AT&T Research
- Academia: Stony Brook University (02-09), Colby (2021-)
- Industry Research: AT&T (07-13); Yahoo Labs (13-16)
- Industry Not Research: Bloomberg (16-21)
- Have not (yet!) worked at a startup, a government lab or agency, a nonprofit

**Research** in NLP, with divergences into speech, video, assistive technology

**Service**

- CRA-WP, ABET, ACL

**For Fun**

- EMT, walking, music, bird watching, finding things funny
“It’s not what happens to you, but how you react to it that matters.”
— Epictetus
Our Mindset & Strategies

Optimistic
- Always (almost)

Mindset with paper/proposal rejections
- Initially, disappointed; maybe angry at the reviewers; sad;
- Later, reread reviews with an open mind and improve

Stress strategies
- Daily exercise (hiking!), organization, family time, hobbies

Research strategies
- Paper reading, weekly conversations, regular writing, learn broadly
Our Mindset & Strategies

For bias in problem/solution decisions
- Don’t be where everyone else is
- Classic problems never go out of style; they just have new contexts

For research setbacks
- Limit feeling sad to X days, then consciously channel sad to response
- Synthesize feedback to adjust strategy
- Strategize with collaborators, ask advice more broadly
- Have 2-4 things in progress

For managing emotions
- Daily exercise, sleep, fruits & veggies, hobbies, family & friends time

For creativity
- Read a lot and critically; what did they forget? logical next 4 steps/papers?
- Create unscheduled work time
Defining Your Research Mindset
A Research Mindset

I will

1. Examine and counter my biases
2. Learn from failures
3. Learn emotional resilience
4. Learn & innovate technically
What’s Next?

Concepts

• Cognitive bias and creativity
• Flexible optimism for perseverance
• Growth Mindset
Bias

• A **cognitive bias** is a pattern judgment, which humans need to function and *at the same time* leads to illogical conclusions

• Bias arises from various processes and are difficult to distinguish
  • use of information-processing shortcuts (heuristics, generalizations)
  • mental noise
  • the mind's limited information processing capacity
  • emotional and moral motivations
  • social influence
Example Biases

- Stereotypes
- Survivor
- Anchoring: 1st info
- Confirm prior beliefs
- Exposure & Recency
- Attention (repetition)
- Conservative (Bayesian)
- Gamblers’ fallacy

- Listen to authority
- Join the bandwagon
- Dunning-Kruger effect: newbies overestimate their knowledge, experts underestimate
- Framing/presentation
- Von Restorff effect: we remember the unusual
- Curse of Knowledge
- Congruence (one hypothesis)
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“OUTSIDE THE BIAS BOX”
Example Biases

• Stereotypes
• Survivor

CREATIVE THINKING
“OUTSIDE THE BIAS BOX”

Slow Down

Examine your Biases

• Gamblers' fallacy
• Listen to authority
• Join the bandwagon
• Dunning-Kruger effect: newbies overestimate their knowledge, experts underestimate
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Life Happens
Real Life is Unpredictable

- World events
- Local events
- Family & Friends
- Relationships
- Health
  - good / bad
<table>
<thead>
<tr>
<th>Event</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have ideas</td>
<td>good / bad</td>
</tr>
<tr>
<td>Work on ideas</td>
<td>succeed / fail</td>
</tr>
<tr>
<td>Discuss ideas informally</td>
<td>well / poorly</td>
</tr>
<tr>
<td>Write up ideas</td>
<td>well / poorly</td>
</tr>
<tr>
<td>Submit paper</td>
<td>accept / reject</td>
</tr>
<tr>
<td>Give talk / teach class</td>
<td>well / poorly</td>
</tr>
<tr>
<td>Receive feedback</td>
<td>positive / negative</td>
</tr>
<tr>
<td>Receive structured feedback</td>
<td>positive / negative</td>
</tr>
</tbody>
</table>
How you interpret and react to good & bad life events is under your control
Keeping Positive

I will

• learn and execute strategies to overcome failures and obstacles

• learn and execute emotional resiliency strategies to manage myself in times of stress and failures
Pessimism vs Optimism

• What is optimism?
• What is pessimism?

• Can optimism be learned?

• Is optimism a biased view of reality?
• Is optimism always the better choice than pessimism?
Benefits of Optimism

• Improved Health

• Higher motivation and performance

• Elevated career success
Explanatory Style (The 3 P’s)

1. Permanence (time)

2. Pervasiveness (space)

3. Personalization (you or not you)
Permanence (Time)

• Optimistic
  • Good events have permanent causes
  • Bad events have temporary causes / specific to situation

• Pessimistic
  • Good events have temporary causes
  • Bad events have permanent causes / specific to situation
Pervasiveness (Space)

- Optimistic
  - Good events caused by general / universal factors
  - Bad events caused by specific factors

- Pessimistic
  - Good events caused by specific factors
  - Bad events caused by general / universal factors
Personalization

• Optimistic
  • Good events caused by me & other factors
  • Bad events caused by circumstances, luck, others

• Pessimistic
  • Good events by circumstances, luck, others
  • Bad events caused by me
Pessimists

Believe bad events / misfortune

1. will last a long time
2. will undermine everything they do
3. are their own fault

Pessimistic explanatory style produces passiveness
... as they believe action is futile
Optimists

Believe bad events / misfortune

1. is a temporary set back
2. is limited to this one event
3. is not their fault

Optimistic explanatory style produces action ... optimists will even try harder after a defeat
Delusions

- It is never your fault
- Optimism is desired in all situations
- Optimistic people face less failures
- Optimism is a character trait and cannot be learned
- Success favors the most talented
Explain to Yourself

1. Permanence (time)
2. Pervasiveness (space)
3. Personalization (you or not you)

• Your paper gets accepted
• Your paper gets rejected
The Next Layer
Fixed vs Growth Mindset

• Fixed Mindset
  • I am smart or not
  • I am athletic or not
  • I am empathetic or not ... etc.
  • Success is because I am X
  • Failure is because I am not X or I am not X enough

• Growth Mindset
  • If I work hard, I can learn X
Research Mindset for Research Life

Events

I will
1. Counter my biases
2. Learn from failures
3. Learn emotional resilience
4. Learn & innovate technically

As I
• Have ideas
• Work on ideas
• Discuss ideas informally
• Write up ideas
• Submit paper
• Give talk / teach class
• Receive verbal feedback
• Receive formal evaluation
Resources & Exercises
Acknowledgements

• Inspired by Professor Samuel Kounev’s course notes
• Professor Lori Pollock

Resources

• Carol Dwick, “Mindset: The New Psychology of Success”
• Martin Seligman, Learned Optimism, Questionaire
• Daniel Kahneman, “Fast versus Slow Thinking”
• Implicit Bias Testing, https://implicit.harvard.edu/
• Olivia Goldhill, “The World is Relying on a Flawed Psychological test to Fight Racism”
Discussion & Questions

Thank You