The Impact of Cognitive Biases on Test and Project Teams

September 16, 2015
What Is Cognitive Bias

- Cognitive bias reflects a pattern of behavior in which a person acts differently than would seem normal in certain situations based on inaccurate judgment or illogical interpretation.
- Cognitive biases work by causing an individual to perceive the world around them in a manner that is outside of what normally would be considered logical.
- Cognitive biases are neither good nor bad if we are aware of them.

No man is an island, Entire of itself, Every man is a piece of the continent, A part of the main.

John Donne
Why Is Cognitive Bias Important?

- Biases are a part of nearly every human interaction.
- Cognitive biases are an inescapable part of basic human nature.
- Project team members make decisions on continuous basis.
- All biases can create blind spots.
Where do Biases Come From

• Biases develop as shortcuts that help us perceive information and help us make decisions quickly.

• Pattern recognition bias helped early humans stay alive by recognizing situations where you’d likely run into predators. The resulting decisions kept our ancestors alive, even if there were false positives (you could have lots of false positives, but only one false negative).

• Project teams (Agile or not) use or fall prey to a wide range of biases that affect perceptions and impact decisions.
### Three Categories of Cognitive Biases

<table>
<thead>
<tr>
<th>Perception Biases</th>
<th>Behavior Biases</th>
<th>Motivational Biases</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Perception biases are filters and / or shortcuts that help us perceive information quickly in a manner that turns out to be a generally beneficial to a decision process. Perception biases affect how project teams see information and the types of decisions that can be made.</td>
<td>• Behavior biases effect how we behave or how we tend to group together (which then affects how we perceive the world around us. Behavior biases create a feedback loop to help us to successfully interact with the environment (at least our perception of our own world).</td>
<td>• Motivational biases (also known as social biases and attribution biases) reflect errors make when evaluating the rational for your own behavior as well as others. Misperceptions of what is driving behavior can cause team communication problems and erode team trust.</td>
</tr>
</tbody>
</table>
**Perception: Anchor Bias**

- **Anchor bias** refers to the tendency to rely heavily on one piece of information when making decisions. This bias is often seen when early estimates for a project or tasks are made. The instant they are placed on the table they become a reference point to which all changes will be compared.

Impact Example(s)
1. Can you test this project in two weeks?
2. If I know it is -12°F I am going to feel cold no matter what it says on the thermostat.
Perception: Clustering Illusion

- **Clustering illusion** (or clustering bias) is the tendency to see patterns in clusters or streaks in a smaller sample of data inside larger data sets.

Impact Example(s):

1. Does a rash of .net coding errors mean programmers need to be retrained?
2. If one project had 1000 regression test errors and another 100, which one had better performance?
3. Based on the fish in the picture are black carp rare?
Perception: Knowledge Bias

- The **curse of knowledge bias** generates a filter that blocks the ability to think about a topic from a different and generally less informed perspective.

Impact Example(s)
1. Your laptop got an update this morning and now it is slow. Updates have been known to cause trouble before . . .
2. The cable cars typically takes 15 minutes to reach the top of Sugarloaf, you have not seen a car in 30 minutes is the cable car broken?
Perception: Availability Cascade

- An **availability cascade** is when a concept becomes more and more plausible the more it is repeated publicly. It is a self-reinforcing feedback loop.

Impact Example(s)

1. Does the constant publicity on the topic of Agile entice more organizations to try Agile?
2. Remember December 21\textsuperscript{st} and the Mayan Calendar.
Example . . .

• Team Problem . . .
  – The metrics team analyzes and presents information to users based on organizational performance. The team “sees” several patterns but can’t explain why they are occurring.

• Analysis of Behavior . . .
  – Is identify groups based on gut feel and then driving a regression line through the data. – Pattern Matching Bias

Action(s) . . .
Developed an analysis framework:
  1. Statistical framework for identification of potential groups of data.
  2. Added group sessions to identify rational for group
  3. Tasking to gather demographic analysis.
Behavior: Zero-Risk Bias

A zero-risk bias reflects a preference for mitigating (mitigating means finding a way to make the risk go away) a small risk down to zero, rather than mitigating a larger risk that you can’t drive to zero.

Impact Example(s)
1. I can’t stop my customers from wanting to release before we are fully tested but I can make sure I am fully staffed.
2. I might be able to know what is happening but if I can’t do anything about it, am I mitigating the right problem?
Behavior: Bandwagon Effect

- The **bandwagon effect** occurs when there is a tendency to adopt an idea because the crowd does. For example, when an idea is shown on the cover of all the industry journals, teams tend to take it up with gusto.

Impact Example(s)

1. The media (classic and new media) amplify ideas making them seem like everyone is doing them (e.g. Agile, Lean, CMMI, Six Sigma).

2. My mother always used to ask if my friends jumped off the roof would I follow them?
Behavior: Illusion of Control

• This bias is called the **illusion of control**, which is defined as the tendency to overestimate one’s (or a team’s) degree of influence over external events.

Impact Example(s)
1. Many test managers believe they can make up for getting code from the developers late.
2. Do you ever turn off a football game so your team will win?
Behavior: Social Desirability Bias

- The **social desirability bias** is the tendency to over report desirable behaviors while under reporting undesirable behaviors.

Impact Example(s)
1. Why are projects green status today and then red tomorrow?
2. Why do people happy to live in large cities despite horrible pollution?
Behavior: Comparison Bias

- When a team is assembled by a leader with a **social comparison bias**, membership decisions are made so that those who are on the team don’t compete with the leader’s strengths.

Impact Example(s)
1. Team diversity leads to innovative solutions, homogenous teams tend to be weaker.
2. Bull elephants drive other males away that can compete.
Example . . .

- Team Problem . . .
  - A team had adopted and replaced Trello, JIRA, LeanKit and were considering Rally . . . because everyone else were using those tools.

- Analysis of Behavior . . .
  - The team was highly influenced by the new tools the other teams were using. They were perpetually learning new tools. – Band Wagon Effect

Action(s) . . .
- Held a facilitated retrospective to discuss the behavior.
- Team agreed to stop playing tool roulette by defining a set of criteria for tool selection and measures of success.
Motivation: Halo Effect

• The **halo effect** is when our impression of a person influences how we interpret their specific traits.

Impact Example(s)
1. Until late in his career very few people were able to “perceive” the changes in Barry Bonds.
2. Mark C. Bojeun, author of Program Management Leadership, suggests that leaders create a bubble around teams that can empower high performance teams.
Motivation: Illusion of Transparency

- **Illusion of transparency** is a bias in which an individual overestimates another individual’s ability to know them, and/or overestimate their own ability to understand what is driving someone else.

Impact Example(s)

1. Johari Window indicates that there is always part of a team that we do not understand.
2. Teams, like dance partners, only think they know how their partner will react.
Motivation: Intergroup Bias

- Hardening of team boundaries can lead to intergroup bias. Intergroup bias motivates members of a group to give preferential treatment to others members of the group.

Impact Example(s)
1. The Stockholm effect is a type of intergroup bias.
2. Teams resist ideas that are outside the teams norms, consider the difficulty integrating testers into Agile development teams from independent testing teams.
Motivation: Fundamental Attribution Error

- **Fundamental attribution error** refers to a scenario in which an individual overemphasizes personality-based explanations for behaviors (e.g. they are lazy, they aren’t very smart) in others while underemphasizing the influence the situation had on driving the behavior.

Impact Example(s)
1. How many times have you heard, “developers never give us enough time to test because they don’t understand testing?” The real issue may be that their schedule is just as crunched as the test team.
Example . . .

• Team Problem . . .
  – A project manager had recently delivered a successful data warehouse project and based on that success she had been assigned to lead a large network project. Hijinks ensued!

• Analysis of Behavior . . .
  – The selection process was driven by generalization from the perception of one outstanding personality trait which was assumed to transfer to every scenario. – Halo Effect

Action(s) . . .
  – The PMO (in a large organization) generated a set of criteria to profile project managers.
  – Developed a panel of senior project managers to make and review assignments.
Summary

• Biases are everywhere.
• Everyone is effected by cognitive biases.
• Not all biases are bad.
• Just like our actions, we are responsible for our biases.
Questions . . .

Tom Cagley, CFPS, CSM
VP of Consulting
The David Consulting Group
t.cagley@davidconsultinggroup.com
(440) 668-5717

Software Process and Measurement Podcast
http://www.spamcast.net (or iTunes)

Software Process and Measurement Blog
http://tcagley.wordpress.com