The Planning Fallacy and its Effect on Realistic Project Schedules

Jeffrey A. Valdahl
Shannon A. Katt
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Something you don’t know about me:
I often question my faith in “proper” planning & scheduling.
BIO of Shannon Katt

BS Aeronautical Engineering

Non-Profit Board Member

22 Years Experience
THE PLANNING FALLACY
Is There Something Wrong With This Plan?

How many of you have had a project with an As-Built schedule that looked like this?
• The Planning Fallacy Defined

• Recognizing the Planning Fallacy
  – Often driven by planning technique
  – Often depends on “who’s in the room”

• Combating the Planning Fallacy
  – Techniques to offset
  – End result: project schedule that has solid input and basis for its durations
The Planning Fallacy Defined
A Definition

The Planning Fallacy concept:

- First proposed by Kahneman and Tversky in 1977

We underestimate the time required to complete a task even when we have relevant past experience telling us otherwise.

The Classic Example

- How long does it take to write a textbook?
Predictions of current tasks are more optimistic than perceptions of past performance

And, in fact,

1. Predictions of current tasks are more optimistic than what actually occurs
2. Studies show that even when asked to predict worst case scenarios, we don’t foresee enough impact
• The Planning Fallacy is recognized as a *psychological phenomena*
  
  Most of our research found studies published in psychological journals

• Studies prove that the Planning Fallacy exists but are inconclusive on why it happens
  – We are unable to accurately recall task durations
  – Biased memory equals biased predictions – but we don’t know why

So in a planning environment, how do we recognize when it’s happening and head it off?
Recognizing the Planning Fallacy

What are the situations that often lead to increased Planning Fallacy effects in a project schedule?
1 - The Project Planning Environment
The Project Planning Environment

• The typical schedule development session tends to bring a group of stakeholders together to develop the plan for the project.

• Unfortunately this collaborative environment itself fosters many of the situations that cause the Planning Fallacy.

• “Sheep have a strong tendency to follow - and a leader may simply be the first individual to move”. (wikipedia: sheep)
  – Is that true in planning meetings you’ve attended?

• Don’t come out until you have a schedule that everyone buys into - measure of planning success.
Recognizing the Planning Fallacy

2 - Project Team Optimism Bias
The YYZ Expansion Project

“Two years is more than enough time to design and construct the expansion project.”

Project Director

“Absolutely. If you get me the design and major deliveries by the beginning of the year, we’ll have it up and running by the holidays.”

Construction Manager

“Remember we ran into some problems when the previous unit was started up.”

Operations Manager

“Yeah, but those were caused by our equipment vendors, not us. We’ll just source our equipment from another vendor.”

Project Manager
• Optimism rules our thinking when looking at our own tasks and group tasks but *not* tasks of others
  – We see our own failures as impacted by one-off occurrences; we are victims of circumstance.
  – We see fault when reviewing the past progress of activities performed by others

• Loyalty to the project team can also have an effect
  – Team members may share a more optimistic opinion in order to show commitment and loyalty to the project and team.
3 – Team Member Egos
The YYZ Expansion Project

“Some of the higher-ups are saying there’s no way the plant expansion construction can be done in a year.”

“We’ll make it happen. I’ve never missed a deadline on one of my projects and I’m not going to start now.”

“I just want to make sure we don’t promise to meet the end of the year deadline and then don’t deliver.”

“Look, I’m not going to have somebody from the corporate office telling me how long it will take to get my construction done.”
• How many times have you been told your plan is wrong by someone who has no idea what it takes to execute it?

• How often has a team member reacted by saying they wouldn’t be told what to do?

• Protecting egos and self-esteem is a common occurrence in business and in a high-pressure project environment.

• All of the optimistic team members must deliver on ego-driven promises for the project schedule to stay on track.
4 – Schedule Anchors
“So our current engineering schedule shows that all detailed drawings will be issued by the end of April.”

“Wait. In the approved funding document we said that we would have engineering done four months earlier in December.”

“Yeah, but we added more equipment scope and are still waiting on vendor drawings, so that’s adding time to engineering.”

“Well, we originally told the Board the end of December for engineering completion. Unless you two want to stand in front of them and explain why we can’t make it, we need to make it happen.”
• Anchoring is the phenomenon where the initial value given tends to anchor the value
  – Future values tend toward the initial value regardless of the validity of how that value was developed

When does this occur?

UNCONSCIOUSLY
  – When a duration is given before the estimate is developed, the estimated duration tends toward the provided answer – even when there is no basis for the initial value

CONSCIOUSLY
  – When high-level stakeholders set a date for completion there’s an incentive to hold to that date
5 - Power Bias
The YYZ Expansion Project

“After we receive all the vendor information, it will take our modeling department eight weeks to complete the model before we can have a review.”

“Eight weeks???”

“Yes. This is a pretty complex model, especially for the new expansion pipe routing. It’ll take a solid eight weeks to resolve clashes and finalize the model.”

“Well, we don’t have eight weeks. Let’s put four in the schedule. Are you OK with that?”

“Um, I guess so.”
Power Bias

• We’ve all worked with a domineering know-it-all, or a boss who dictates what is going to happen.

• Powerful individuals can dominate discussions during group planning sessions causing the plan to be overly optimistic.

• People in positions of power focus on different aspects and outcomes which often leads them to underestimate:
  – Oriented more on achieving reward than avoiding threats
  – Focused narrowly on the outcome; neglecting additional information
  – Greater motivation to accomplish goal aligns with greater bias
  – Not simply a matter of being more optimistic
6 – Short Memory
The YYZ Expansion Project

“We have three months in our schedule to construct the foundations for the new expansion equipment.”

“Three months seems pretty short. When we did the foundations for the previous expansion project during the winter months, it took a pretty long time.”

“I remember, but there’s no way it was much longer than what we’re showing.”

“Can you pull up the schedule from the last expansion project and look up how long it took?”

“Here it is. Wow! It took us about five and a half months until we were done with the foundations.”
Short Memory

• We do not accurately recall durations for past tasks

  And

• We consistently underestimate how long it took to complete the task

  However

• We tend to overestimate durations for tasks for which we have no experience or memory

This is the hallmark of the Planning Fallacy—*in the face of past knowledge of a task*—we still fail to account for reality.
Recognizing the Planning Fallacy

7 - Task Unpacking
The YYZ Expansion Project

Project Manager

“Let’s put two months in the planned schedule for reviews and approvals before full-funding approval.”

“I’m not sure the standard two-month rule-of-thumb is enough anymore.”

Project Planner

“Do we know all the required stage gate reviews and approvals that we need to go through under the new project execution process?”

Controls Manager

“I know we’re supposed to have external reviews for both cost and schedule. I think there’s going to be an internal project audit too, but I’m not sure if it’s been finalized yet.”

Project Director
The YYZ Expansion Project

“Well, if they really want this project to meet the end of the year deadline, we can’t take more than two months to get funding.”

“Let’s try and lay out all the required steps once we find out everything we need to do.”

3 weeks later...

“I came up with a timeline for the eight separate reviews and approvals we need to get. With the holidays falling right in the middle, it looks like it’s going to take at least four months from start to finish -- and that’s if all the external reviewers are available when we need them.”

“That’s unbelievable! Looks like I need to put in for some advanced funding to keep this project moving forward.”
Task unpacking refers to increasing the level of detail for tasks

- As level of detail increases creating more discrete, specific tasks, durations tend to increase such that the sum of the unpacked tasks is greater than the original packed task.

- This effect is more pronounced for near-term tasks than for later tasks.

“All these little minutes add up”
Studies conflict on why this happens

**Content**: The process of developing the additional detail uncovers steps that were not included in the original duration

**Process**: If it is difficult to develop a detailed plan, the project is perceived with less optimism

**And**: If an optimistic plan is difficult to develop, the project is also perceived with less optimism
• Incentives (motivation) to complete early can cause discussion to focus on the current task ignoring previous performance.

• Uncharted territory – task durations tend to be over-estimated for unfamiliar or novel tasks

• Similarly, the more difficult the plan, the more likely to have pessimistic durations.
  – Easy to plan = Easy to do
HOFSTADTER’S LAW

It always takes longer than you expect, even when you take into account Hofstadter’s Law.

VIERORDT’S LAW

Overestimate short periods, underestimate long periods.

PARKINSON’S LAW

Expand to the deadline.

ANECDOTE

Your Estimate * 2.
Then increase the unit. 1 week → 2 months
Combating the Planning Fallacy

What can we do to minimize the effects?
Combating the Planning Fallacy

Inside vs. Outside View
There are two perspectives from which we can view a task.

**INSIDE**

*Your piece of the puzzle*

- The view of the individual participant looking at their role, and the task for which they are responsible.
- Narrow focus on specifics rather than the whole.
Inside vs. Outside View

OUTSIDE
The whole puzzle

• The view of the whole project including outside impacts

Using the OUTSIDE VIEW will provide a better estimate of the time that will be required if:

• Historical data is referenced
• Don’t get lost in the detail
• Include external influences
Outside Sources of Schedule Data

Historical Data

As-Planned vs As-Built Progress

- Plan Early
- Plan Late
- Plan Avg.
- Actual
Outside Sources of Schedule Data

Historical Data

Graph showing the relationship between Labor Hours (x1000) and Construction Duration (months) for different project categories: Domestic Projects, North American Projects, Other Projects, with lower, upper, and best fit curves.
• Use of historical data from similar projects can have a significant effect on the accuracy of duration development
  – High level metrics from similar projects
  – Actual data from previous projects

• RP 32R-04 – Determining Activity Durations
  – Use of past performance data combined with judgement of anticipated future performance

• Use of actual data rather then relying on recollection alone increases the accuracy of predicting durations
Combating the Planning Fallacy

Ordinal Dates
“That’s scheduled for September. We won’t have any weather issues”

1. We often find teams focus too closely on the anticipated dates an activity is planned for and they lose sight of what will happen if something delays predecessor activities.

2. To combat the instinct to force activities into desired time frames
   - Don’t let them see the dates during initial planning sessions.
   - Use of Ordinal Date calendars eliminates the “what month is that” mentality. Weather and holidays should be dealt with independently of the actual scope duration.
The Pre-Mortem
What Happened?

That’s the fundamental question in a Pre-Mortem

• A risk identification exercise that assumes the project is complete and HAS FAILED

• Open discussion of what the likely causes were so they can be taken into account when developing the project schedule and determining realistic durations for tasks
The Pre-Mortem

Not what **could** go wrong, but what **did** go wrong

- What’s the difference? Back to psychology –

  Staying quiet in fear of appearing disloyal  
  or  
  A competition for who can come up with the most convincing failure

The goal is to think **outside the box** so potential impacts can be mitigated before they happen.
Combating the Planning Fallacy

Resource Awareness
Have resources been considered in activity durations?
Plans are often developed with little consideration to the actual resource requirements of a task

- Can engineering maintain a pace that will keep up with construction
  - Will multiple work centers be required?
- How many craft workers will be required?
  - Can the market bear the demand?
  - Will the workspace allow it without density issues?
- Has the cost estimate (and estimated manhours) been considered when determining durations?
- If resource leveling is required (desired) how will that effect the task durations, particularly for non-critical sequences?
The Coach’s Challenge
The Coach’s Challenge

SITUATION:

- You are facilitating an interactive planning session
- After discussing the difficulties of completing a particular task the team ignores the discussion and sets an unreasonably short duration

**QUICK - THROW THE FLAG!**

Just like in the NFL, if a call is made that is questionable (or flat-out unrealistic), bring attention to it and open it up for further review and discussion.

Anyone in the session has the power to challenge a call.
Combating the Planning Fallacy

Risked Schedules

Project Schedule Risk Model
AM0020 - Project Complete : Finish Date

Data
Finish Date of:
AM0020 - Project Complete

Analysis
Iterations: 10000

Statistics
Minimum: 14-Oct-17
Maximum: 15-Apr-18
Mean: 07-Jan-18
Bar Width: week

Highlighters
Deterministic (16-Nov-17) 1%
10% 06-Dec-17
50% 06-Jan-18
90% 14-Feb-18
10% - 90% -70
Det - 50% -51
A Schedule Risk Analysis brings most of these mitigation techniques together

- It is becoming increasingly popular to perform risk analyses on project schedules to determine the likelihood of meeting the planned project completion date
  - Assumed durations are challenged; Planned sequences are validated
- In the best case, a 3rd Party reviewer is utilized
  - Pushes team to avoid situations that lend themselves to Planning Fallacy optimism

*Full disclosure – we do a lot of them*
1. The schedule is reviewed for validity both from a technical perspective of the network, but also to verify alignment with the project plan.

2. Key sequences are focused on (Critical / Near-Critical / Risk Sensitive). May include development of a schedule model, but does not have to.

3. Durations of activities on key sequences are RANGED.

4. Monte Carlo type simulation is performed.

It is at this point that the Planning Fallacy impacts in the network can be discovered, challenged and eliminated.
Probabilistic Dates
When is the project most likely to complete

– Useful for setting schedule contingency
  • RP 70R-12 Principles of Schedule Contingency
    Management indicates that schedule contingency should only be established based on an analysis of schedule risk

Statistical Indices

– Criticality, Cruciality, and Sensitivity – what activities have the highest likelihood of impact and/or highest degree of impact to the project schedule.
As useful as the probabilistic analysis results are, we often find that the dialog that takes place during the review sessions is even more valuable to the team.

Risk discussions frequently bring concerns to the table that few team members are aware of.
Combating the Planning Fallacy

Less Collaborative Planning?
Less Collaborative Planning?

• Why are project schedules typically developed as a group - while estimates are often developed independently using historical data?

• Why do team members feel so confident in throwing out activity durations - when they would hesitate to estimate its cost?

• How can working alone lead you to a more feasible plan?
  
  – Not impacted by Group Think dynamic, undue influence of leaders

To minimize the Planning Fallacy, maybe group schedule planning shouldn’t be the preferred approach?
Less Collaborative Planning?

- The collaborative planning environment has too many advantages:
  - The team learnings that occur during group planning sessions are vital to overall planning of the project
  - Schedule interfaces must be vetted between parties
  - Input is needed from multiple sources to determine scope, duration and sequencing

- However, Planning Fallacy effects suggest that external review is needed before establishing baseline schedule

Two-step approach: collaborative planning & validation
Summary

What have we learned about the Planning Fallacy?
1. The Planning Fallacy is a tangible psychological effect that can doom project schedules before they start.

2. The group planning approach can exacerbate Planning Fallacy effects if they are not recognized.

3. Research shows that other factors like memory bias, power influence, egos and group optimism can play a major role.

4. Techniques like ordinal dates, the Coach’s challenge and risk-adjusted schedules can help offset the Planning Fallacy.
5. Is the ultimate solution to offsetting the Planning Fallacy simply to get ultra-conservative on durations and extend project schedules out?

In the project world this approach is simply not viable.

- Projects should be planned to complete in a sensible amount of time, including contingency.

6. Recognizing and overcoming potential Planning Fallacy issues during development will produce better project schedules that are both achievable and reasonable.
QUESTIONS/COMMENTS?
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