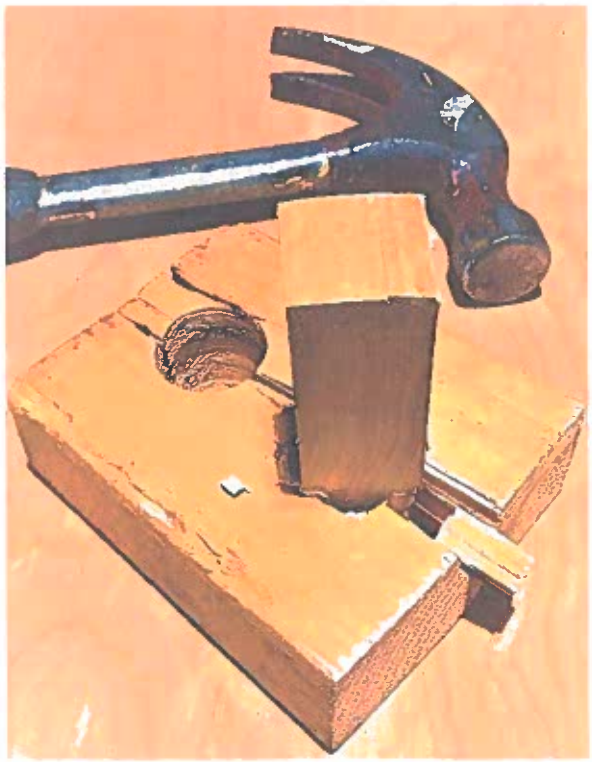


Using design-thinking to address escalating commitment risks in decision-making

Tim Cooke | Radford University |
Department of Design | January 26, 2022

A thesis submitted to the faculty of Radford University in partial fulfilment of the requirements for the degree of Master of Fine Arts in Design Thinking

---

Joan Dickinson 1/27/22
Dr. Joan Dickinson, Thesis Advisor — Date

Bruce Parsons 1/27/22
Dr. Bruce Parsons, Committee Member — Date

Kathleen Sullivan 1/27/22
Kathleen Sullivan, Committee Member — Date

Holly Cline 1/27/22
Dr. Holly Cline, Committee Member — Date

Abstract

The purpose of this study was to apply design-thinking methods to better understand decision-making that can lead to plan-continuation bias (PCB) and escalation of commitment (EoC) in a management setting. In this paper, we discuss decision-making, EoC toward a failing course of action, and common psychological causes that lead to it, especially PCB. Design-thinking (DT) is employed to study the topic in-depth and to develop a set of proactive and reactive risk responses to address the various causes associated with EoC. A sample of ten (10) human subjects participated in two workshops and one email critique to discuss their personal thoughts on changing minds, and their thoughts on building a culture that allows for pivoting.

The DT techniques were employed across six phases. Phase One included the student researcher completing a Problem Tree Analysis, which is a technique for brainstorming and analyzing causes and effects of EoC, and a Stakeholder Map, which is a method of brainstorming and analyzing stakeholders and how their relationships might affect decisions. Phase Two consisted of Interviewing the ten subjects and engaging them with a What's on Your RADAR exercise where they simultaneously brainstormed ideas and mapped them on a board by importance and context. Phase Three comprised of an Affinity Clustering exercise to organize the various ideas expressed in Phases One and Two by clustering similar ideas together to look for commonalities. For Phase Four, subjects were briefed on the results up to that point and filled out a Creative Matrix, which is a brainstorming exercise utilizing a matrix of stakeholders and contexts to help inspire ideas. Phase Five consisted of the student researcher generating a Quick Reference Guide (QRG), a short document explaining a set of ideas, featuring the research and results up to that point. Finally, Phase Six gave subjects the opportunity to critique the QRG over email based on a provided template.

The various causes of EoC in the literature are expanded upon from the study and the QRG potentially provides a simple, easy-to-read document for new managers to refer to upon beginning their roles as leaders. EoC is redefined to incorporate certain contexts such as whether the original path is followed or not, whether a risk is known or not, whether a path of action or inaction is taken, and whether the result is considered successful or not. The authors recommend further research into possible causes and contexts of EoC to better understand its impact on decision-making processes.

Acknowledgements

To all those who came before and contributed towards our good fortune in ways big or small, seen or unseen, you have my thanks.

I would like to thank you, dear reader, for taking the time to explore this document.

I would like to thank my committee members, Drs. Joan Dickinson, Holly Cline, Bruce Parsons, and Prof. Sullivan for their patience, insight, and support. Without them this thesis would fall far short of its potential.

Thank you to all the study participants for their valuable time and for taking a risk. I hope you had a little fun while doing it too.

Thank you to all the professors I had at Radford who stretched my mental muscles.

Thank you to all the family and friends who helped in whatever way they could.

Thank you to all the researchers who explored this fascinating topic before.

I am also indebted to the support of Gordon, Gabby, and other former colleagues at TSA Inc. who put up with me and my wacky ideas on design-thinking. I am grateful for their feedback and willingness to participate in numerous thought experiments and practice workshops, and for politely listening to my inexhaustive ramblings on this subject.

To Mom and Dad, whose faithful support has never waned. This study would not be the same without your help or your stories.

To Evie, who brings much-needed levity and joy to the world.

Finally, I would like to thank my wife, Megan. May we forever remain curious about the world together and continue to change each other's minds.

Table of Contents

List of Figures

List of Tables

Introduction

"You've got to know when to hold 'em, know when to fold 'em, know when to walk away, know when to run…"

--Excerpt from "The Gambler," famously performed by Kenny Rogers (Schlitz, 1976)

Plan-continuation bias (PCB), or plan-continuation error, is the cognitive tendency of an individual to continue with an existing plan, even if one or more numerous factors threaten the plan or indicate it is no longer viable (*Plan-Continuation Bias – APA Dictionary of Psychology*, 2020). In aviation, this bias is colloquially known as "get-there-itis" and has caused pilots to make bad decisions that get people killed (Chao et al., 2020). In the early days of the National Aeronautics and Space Administration (NASA), the term "launch fever" or "GO fever" was coined in witness of this very phenomenon and was attributed to the catastrophic deadly fire of Apollo 1 and the *Challenger* Space Shuttle disaster (DiLisi & McLean, 2019; Reiser, 2019). In these instances, PCB was not limited to a single decision-maker but evolved into a toxic culture. Clearly, the results of PCB have the potential to be greater than mere project failure in certain industries as catastrophic accidents can lead to significant property loss and death. PCB is noted to become stronger as the destination approaches, making it more difficult to resist as time passes. However, PCB can just as easily come into play in longer timeframes where a decision point is not moments away from a pivotal risk, but weeks or even months.

Studies into PCB have been rather limited, mostly focused on catastrophic aviation accidents, which are often attention-grabbing or culturally impactful. Research has been done into other cognitive biases regarding project management and decision-making. Optimism bias is the tendency to be hopeful and believe that a plan will come together (*Optimism – APA Dictionary of Psychology*, 2020). Optimism bias is important for all sorts of examples of human progress, including development of the airplane, vaccines, and countless tales of triumph. Optimism bias is closely related to PCB as a pessimistic person would likely alter plans in the face of adversity. Clearly, there is a point where optimism bias turns toxic and helps blind a person to their current course that is no longer viable.

Escalation of Commitment (EoC) or "escalating commitment" is the act of continuing with a plan that is no longer working (*Escalating Commitment – APA Dictionary of Psychology*, 2020). It has typically been described as actively doubling down on a failing course of action, although it is possible that EoC is somewhat neutral, and the end result retroactively defines the quality of the original choice. EoC and PCB are closely connected but differ in a critical way. PCB is the cognitive tendency or desire to stick to an existing plan in the face of adverse information. EoC is the actual result of continuing with a plan, so PCB can only precede EoC. EoC can also occur without the involvement of PCB in situations where threats are unrecognized. It is easy to dismiss sticking with a bad plan and EoC behavior as stupid or foolish, but the research suggests that most people are at risk of falling into the trap under the right circumstances. The complex nature of EoC is explored at length in the Literature Review of this paper.

Escalating commitment, sunk-cost, and their impact on project management have been studied extensively, and yet there is no universally accepted model of EoC nor its hypothesized numerous causes (Meyer, 2014; Rice, 2010). Meyer documented 34 determinants associated with EoC (2014), although PCB is notably not one of them. PCB, which is potentially one of the first steps towards escalating commitment, has very limited research. Most scholarly articles relating to PCB are in fact from the transportation accident-investigation field, and the most cited study was completed over 15 years ago in 2006 (Berman & Dismukes, 2006). This does not mean PCB has by any means been resolved in transportation or any other field. Numerous national leaders around the world learned of COVID-19 in late December of 2019 and continued with business-as-usual—a likely example of PCB. The primary step cited for dealing with PCB is promoting awareness. While this is probably helpful, there is likely more that can be done.

Design-thinking (DT) is the practice of applying principles and methods of design to problems typically outside of the design fields (Brown & Kātz, 2009). This includes, but is not limited to, using empathy to understand stakeholders and approaching problem-solving from a creative standpoint to break through cognitive barriers (i.e., "writer's block"). Design-thinking has been used by many businesses and industries over the last several decades with marked success in numerous difficult scenarios. While design-thinking has been applied to decision-analysis and decision-making steps in general, this researcher could find no instances of using design-thinking to address the specific cognitive bias of PCB or escalating commitment. For this reason, the purpose of

this study was to apply design-thinking methods to better understand decision-making that can lead to PCB and escalating commitment in a management setting.

DEFINITION OF TERMS

Affinity Clustering: LUMA DT technique that organizes disparate ideas and items by similarity, resulting in clusters of ideas that can be labelled and organized further (Luma Institute, 2012).

Creative Matrix: LUMA DT technique involving a grid with stakeholders labelled on one axis and situations labelled on the other axis, allowing participants to brainstorm ideas based on the intersections of those concepts (Luma Institute, 2012).

Critique: LUMA DT technique that invites participants to point out the pros and cons of a particular idea (i.e., constructive criticism; Luma Institute, 2012).

De-escalation: Changing course to avoid a threat. This is the result of a decision to no longer continue with an existing plan. See also: Escalation of Commitment.

Design-Thinking: The practice of applying principles and methods of design to problems typically outside of the design fields (Brown & Kātz, 2009).

Erroneous Abandonment: De-escalating from a plan that is working but requires further escalation to ultimately succeed. This is giving up too early (Drummond, 2014).

Escalation of Commitment (EoC): The result of the decision to continue with an existing plan or course. This is often short for Escalation of Commitment towards a Failing Course of Action. Most literature on the topic abbreviates escalation of commitment to EoC and specifically refers to doubling down on known paths to failure (*Escalating Commitment – APA Dictionary of Psychology*, 2020). However, in this paper we explore the concept from a more complex, neutral position and propose a three-letter code to denote different variations of EoC (e.g., EoC-KCF; see Table 2 for details).

Get-there-itis: See Plan-Continuation Bias. The suffix “itis” is used like the suffix of a disease (e.g., bronchitis).

GO fever: Coined at NASA following the Apollo 1 fire, it is the term for a person's insistence on continuing with a process or project despite warning signs or increased risk (Reiser, 2019). This is notable for impacting numerous team members, creating a culture of ignoring risks. See also Plan-Continuation Bias.

Interviewing: LUMA DT technique involving direct, interactive communication with a subject. Typically consists of a set of questions being asked of the subject and recording their responses (Luma Institute, 2012).

Launch Fever: See GO fever.

Moral Hazard: A situation that offers little or no incentive for a person to avoid risk due to the cost of the risk being assumed by someone else (e.g., insurance).

Phase Gate: Also known as kill point, or decision point, it is the "review at the end of a phase in which a decision is made to continue to the next phase, continue with modification, or end the phase or project" (Project Management Institute, 2017, p. 713).

Plan-Continuation Bias (PCB): Also known as plan-continuation error, it is a cognitive bias where an individual desires to maintain an existing plan despite factors indicating that the plan may no longer be viable. This is called "Get-there-itis" in the field of aviation (e.g., a pilot who continues with a flight plan that is no longer viable due to worsening weather, compromised aircraft, or other major risks) (*Plan-Continuation Bias – APA Dictionary of Psychology*, 2020). See also GO Fever.

Problem Tree Analysis: LUMA DT technique that involves identifying a problem, and listing various causes below as the "roots" and outcomes above as the "branches" (Luma Institute, 2012).

Project: "A temporary endeavor undertaken to create a unique product, service, or result" (Project Management Institute, 2017, p. 715).

Project Management: "The application of knowledge, skills, tools and techniques to project activities to meet project requirements" (Project Management Institute, 2017, p. 716).

Quick Reference Guide: LUMA DT technique involving the creation of a simple reference guide to quickly communicate the basic aspects of a possible solution (Luma Institute, 2012).

Risk: "An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives" (Project Management Institute, 2017, p. 720).

Risk Management: "The process of identifying and managing risks that are not addressed by other project management processes" (Project Management Institute, 2017, p. 395).

Self-justification: The human tendency to make excuses, blame others, paint past choices in a positive light, and otherwise refuse to admit any wrongdoing by the individual self-justifying (Tavris & Aronson, 2020).

Stakeholder Mapping: LUMA DT technique whereby all stakeholders in a problem are sorted and organized in a visual map that includes their relationship to the problem as well as other stakeholders (Luma Institute, 2012).

Visualize the Vote: LUMA DT technique that allows participants to vote for a certain idea with tokens—one overall vote and two detail votes (Luma Institute, 2012).

What's On Your RADAR?: LUMA DT technique involving a board with an outline of a RADAR screen that is divided into a series of labelled wedge sections (Luma Institute, 2012). Participants brainstorm and organize their thoughts on the screen by wedge section and level of importance.

Literature Review

"The second we stepped outside onto the street with the other agency, it was kind of a quick exchange of like---[exhales sharply] 'This is crazy.' Like, and both of us were like, 'This can't happen'. Like, 'This will never work.' Saying it out loud on the street just—and being like, 'Well, let's, uh—let's just do it. It'll probably be fine.' Like, 'We're, you know—We're both pros at what we do. What could go wrong?'"

--Oren Aks, Marketing Team, Fyre Festival: Recounting the initial meeting with the Fyre Festival team and their plan to execute the large festival on a short timeline (Furst & Nason, 2019, sec. 00:35:15).

"At the very last minute, after we showed the picture for the last time for the studio, as [the director] was leaving for London to score the picture we were faced with reinstituting the prologue, and that also meant re-cutting the prologue and adding in some new visual effects. This is in June--very little time to do all this incredible amount of work. However, said now--as always, the motto was 'OK, we all know this is impossible, so let's just get on with it.' And that's what we did."

--Barrie M Osborne, Producer, The Lord of the Rings Trilogy: Recalling the challenge of adding a difficult sequence to The Fellowship of the Ring late in the schedule (Pellerin, 2002, sec. 00:08:30).

These two quotes come from two large projects with very different outcomes. The Fyre Festival fell well short of its ambitious scope and resulted in numerous lawsuits and convictions of fraud. The *Lord of the Rings Trilogy (LOTR)* of films would go on to receive rave reviews, numerous accolades, and billions of dollars in revenue. What both these quotes demonstrate, however, is a pivotal moment of Plan-Continuation Bias (PCB) and subsequent Escalation of Commitment (EoC). Both quotes acknowledge the perceived impossibility of the task ahead, but also the decision to continue forward anyway. Why did they decide to go forward despite the "impossible" challenge? In this paper, we will seek to answer this question, among others, on the nature of PCB and EoC.

One obvious question is: Why did one project succeed while the other failed? While there were probably several factors, their respective work cultures and experience may provide an important clue. *LOTR* was well-documented to have been a fun, collaborative, and trusting environment where everyone enjoyed the work and "there was always the will to make it better"

(Pellerin, 2002, sec. 00:09:30). Fyre Festival was the exact opposite. CEO Billy McFarland, and the rest of Fyre leadership, were noted to be partyers and cockeyed optimists with no festival experience, and the festival itself was mired in contract breaches, stressed out employees, and "chaos and anarchy" (Furst & Nason, 2019, sec. 01:03:15). The *LOTR* team consisted of numerous experienced Hollywood filmmakers. The Fyre team had only been involved in a novelty credit card business—which was also accused of being a scam. There is also a pivotal difference between "impossible" and extremely difficult. After all, the *LOTR* team had planned and worked for years by the time they attempted reinstituting the prologue—which they did successfully with a lot of hard work. The entire planning and execution of the Fyre Festival was attempted in less than 6 months, well short of the typical industry practice of 12-18. In short, the *LOTR* leaders knew what they were doing while the Fyre Festival leaders did not. It is also worth noting that both these quotes came from retrospective interviews, rather than captured at the actual moment of the decision point. Catching PCB in the heat of the moment, as well as the effects of experience, leaders, and work culture, will be discussed in greater detail later in this Literature Review.

A HISTORY AND KEY FACTORS OF PLAN-CONTINUATION BIAS AND ESCALATION OF COMMITMENT

Plan-continuation bias has only been recognized formally as a threat to plans for the last several decades, the most notable work being from 2006, which looked into the causes of certain airplane crashes (Berman & Dismukes, 2006). Some other small studies from the field of aviation were also discovered (Kanki et al., 2010), but the student researcher could find no formal studies by psychologists into the phenomenon, though there is a definition available from the American Psychological Association (*Plan-Continuation Bias – APA Dictionary of Psychology*, 2020). PCB can be thought of as the voice in a person's head telling them to stick with their plan—even as information rolls in indicating problems.

Informally, PCB is known as "get-there-itis" among aviation pilots, but the phenomenon has been recognized as a general human failing long before that. Sun Tzu, believed to have lived around the 5th century BC, wrote, "According as circumstances are favorable, one should modify one's plans" (Sun et al., n.d., p. 117). The Greek myth of Cassandra tells of a cursed prophet, doomed to know the future but whose premonitions will never be believed. Ed Catmull, founder of Pixar Animation Studios, noted the missed lesson of the story: It was not Cassandra who was truly cursed, but everyone else, who failed to listen to her warnings (Catmull & Wallace, 2014).

While it has been long understood that failing to change plans can be disastrous, the precise nature of the psychology of decision-making has only been studied extensively since the 1970s. Daniel Kahneman and Amos Tversky collaborated on numerous studies into human decision-making, eventually leading to a Nobel Prize in Economics (Kahneman, 2011). Their studies inspired the field of behavioral economics and led to numerous other investigations into decision-making and human thought processes.

Escalation of Commitment has considerably more literature of study, particularly in the field of project management. EoC is the costly result of sticking with a plan in the face of adverse information. Barry M. Staw is noted to be the pioneer in researching EoC and its implications in project management, noting numerous causes throughout his lengthy career (Staw, 1976). While many other researchers have picked up the topic from time to time, one of the more prominent researchers into EoC in recent years has been Werner G. Meyer. In 2014, he compiled a meta-list of different determinants associated with EoC, based on the work of Staw, and several others (Meyer, 2014). These 34 determinants are divided into five groups:

1. Project Determinants – Aspects of the project itself that have contributed to EoC. These include cost structure, feasibility, and cost of changing course.
2. Psychological Determinants – Aspects of a decision-maker's state of mind or thought process that contributed to EoC. These include cognitive biases, personal paradigms, and perceptions of effort to complete the project.
3. Social Determinants – Aspects of the social structure or social expectations that contributed to EoC. These include social norms, avoiding embarrassment, and communication.
4. Organizational Determinants – Aspects of the organization's structure, rules, or culture that contributed to EoC. These include expectations by powerful stakeholders, organization rules and "best practices," and legal implications.
5. Contextual Determinants – Aspects of context that contributed to EoC. This includes government intervention.

Table 1 - Determinants associated with EoC (Meyer, 2014). This table is taken directly from Meyer.

#	DETERMINANT GROUP – INDIVIDUAL DETERMINANT	ORIGINAL AUTHOR
	PROJECT DETERMINANTS	
1	Temporary versus permanent losses	(Staw, 1997)
2	Efficacy of further investment actions	(Staw, 1997)
3	Size of project goal and eventual payoff	(Staw, 1997)
4	Availability of feasible alternatives	(Staw, 1997)
5	Long-term investments	(Staw & Ross, 1987)
6	Salvage value and closure cost	(Staw & Ross, 1987)
7	Economic merits	(Staw, 1981)
8	Future investment required to achieve payoff	(Staw, 1997)
9	Sequencing of costs and rewards	(Ross & Staw, 1993)
	PSYCHOLOGICAL DETERMINANTS	
10	Optimism and Illusion of Control	(Bazerman & Samuelson, 1983; Lovallo & Kahneman, 2003)
11	Reinforcement traps	(Platt, 1973)
12	Self-justification	(Staw, 1976)
13	Expectancy theory	(Bhattacharya, 2010; Vroom, 1964)
14	Reactance effect	(Staw & Ross, 1978)
15	Learned helplessness effect	(Abramson et al., 1978)
16	Invulnerability effect	(Staw & Ross, 1978)
17	Self-inference	(Salancik, 1977)
18	Information processing	(Staw & Ross, 1987)
19	Framing	(Kahneman & Tversky, 1979)
20	Sunk cost effect	(Arkes & Blumer, 1985; Coleman, 2010; Cunha & Caldieraro, 2009)
21	Project completion (goal distance)	(Conlon & Garland, 1993; Ting, 2009)
	SOCIAL DETERMINANTS	
22	Job insecurity and policy resistance	(Fox & Staw, 1979)
23	Norms for consistency	(Staw, 1981)
24	Saving face (external justification)	(Brockner et al., 1981)
25	External binding	(Staw, 1981)
26	Competition	(Rubin et al., 1980)
27	Modelling	(Brockner et al., 1984)
	ORGANIZATIONAL DETERMINANTS	
28	Economic and technical side bets	(March, 1978)
29	Political support	(Staw & Ross, 1987)

30	Administrative inertia	(Staw & Ross, 1987)
31	Institutionalization	(Staw, 1997)
32	Legal implications	(Staw & Ross, 1987)
33	Compliance projects	(Northcraft & Wolf, 1984)
	CONTEXTUAL DETERMINANTS	
34	Government intervention	(Staw, 1997)

In this paper, we mainly focus on the psychological and social determinants, since decisions are ultimately made by humans, though the other determinants are relevant and can potentially impact a person's psychological state. Sometimes trouble comes from following the rules, but someone wrote the rules once.

Another possible source of knowledge into PCB and EoC is fraud. While some people may indeed set out with an immoral intention of defrauding others, there is substantial evidence that ethically bound folk can be lured easily to commit fraud under certain circumstances. Dr. Muel Kaptein wrote extensively on research into different aspects of fraud, laying out 52 observed circumstances that can lead to unethical behavior at work (Kaptein, 2012). There is substantial overlap in Kaptein's observations on unethical behavior and Meyer's list of 34 items associated with EoC. Kaptein's meta-analysis of unethical behavior studies are divided into eight groups (Kaptein, 2012):

1. Context – Human behavior is generally empathic, and thus "good" at an early age, but this can be altered by different incentives and treatment of others and by others.
2. Clarity – The clearer the expectations are of every person and role within an organization, the better those expectations are understood, and thus are more likely to be followed.
3. Role-modeling – Employees will follow role models for better or worse. If leaders set a good example of how to behave, the more likely employees are to follow suit. If leaders set a bad example, employees will follow that too.
4. Achievability – Having the necessary tools to achieve goals, and setting realistic goals, allow employees to achieve what is expected of them. Unrealistic goals send an implicit message of disrespect to employees who are doing their best but still falling short.

5. Commitment – The more leaders show respect to and attempt to include all internal stakeholders, the more likely these people will attempt to support the organization right back. Fixing a problem often means approaching it at multiple levels at once.
6. Transparency – People who can observe the behaviors of others are more likely to consider their own behavior and recognize an expectation of control and responsibility.
7. Openness – A work culture that can discuss its inner workings openly is more likely to discover issues and address them responsibly. Leaders must show a willingness to hear bad news as well as good to maintain a culture of integrity and accountability.
8. Enforcement – Successes should be rewarded, and errors should be punished—within reason. Simple mistakes should not be punished but instead, learned from. Genuine unethical behavior, however, should be punished decisively and swiftly.

Kaptein's list is not the same as Meyer's, but there are striking similarities. Both these documents, along with *Crew Resource Management* (Kanki et al., 2010), *Think Again* (Grant, 2021), *Creativity Inc.* (2014), and the rest of the EoC Eleven, discussed later in this chapter, provide the largest basis of this Literature Review, along with a handful of case studies.

Adam Grant writes in *Think Again* (2021) that 30 different concepts can be used to change minds that can be understood in three tiers:

1. Individual Rethinking – Understanding your own personal biases and how to set yourself up for rethinking preconceived notions.
2. Interpersonal Rethinking – Understanding how other people think and how to convince others to rethink their own preconceptions.
3. Collective Rethinking – Understanding how to build an environment and culture that values rethinking.

Adam Grant proposes in his book, *Think Again* (2021), that processes and outcomes are not always connected the way we think they are. Figure 1 demonstrates his matrix of outcome versus process and how deep processes, meaning well-understood and analyzed, should be praised and continued. Shallow processes should be understood better because there is a decent chance that success was due to luck and not the process itself. This also applies to PCB and EoC. If a decision point resulted in maintaining the plan, success could mean it was a good plan, but it could also mean

it succeeded by dumb luck. Failures could be equally misread as it stands to reason that a plan could have failed due to circumstances beyond control—bad luck.

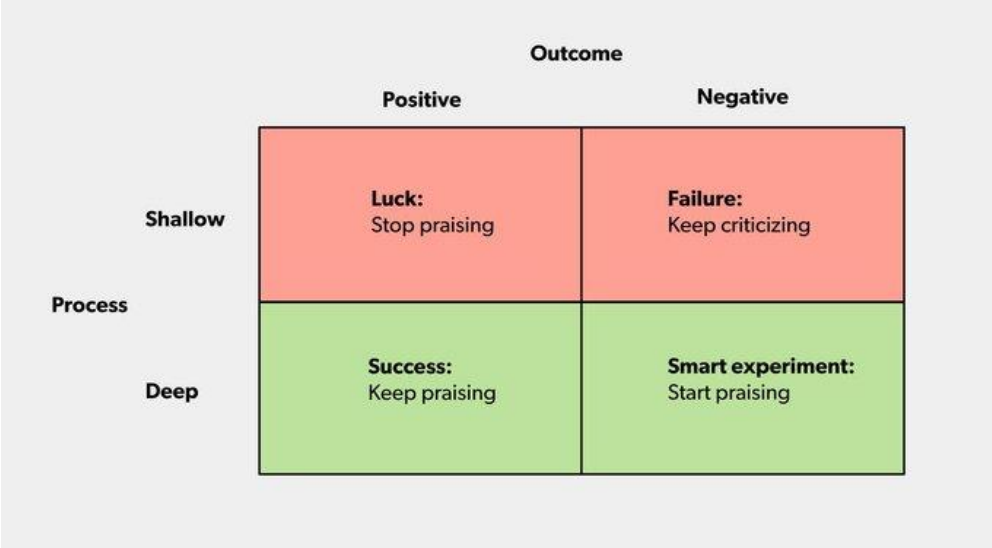


Figure 1. Adam Grant's Outcome vs. Process Matrix (Grant, 2018)

Crew Resource Management (Kanki et al., 2010) offers the most extensive list of circumstances associated with PCB with an exhaustive list of 55 causes and 27 possible solutions. The book serves as a manual for those wishing to practice crew resource management—a method of getting the most out of the flight crew of an airplane. The PCB causes and solutions range from technical minutia to larger cultural factors and can be divided into several categories:

1. Faulty Situation Assessment – Understanding a situation to be different than it is. This includes misjudgment or misunderstanding of information.
2. Faulty Selection of Action – Taking the wrong action to address a threat appropriately either by falling back on faulty information, misapplying information, or failing to think of the appropriate response.
3. Faulty Risk Assessment – Understanding a threat only at surface level by either not assessing it at all, or to the extent necessary to properly address it.
4. Faulty Execution – Executing a maneuver poorly due to physical or mental limitations. This could still happen even if the situation and risk were properly assessed, and the

appropriate action was selected. Slamming on the brake pedal is useless if the brake pads are no longer functional or if they accidentally hit the accelerator pedal instead.

5. Information Quality — Information that is poorly communicated or ambiguous will not likely be taken in and understood.
6. Organizational Pressure – Organizations may explicitly or implicitly send mixed messages about priorities that can lead employees to feel pressured to make risky decisions—even if they run counter to safety expectations.
7. Environmental Threats and Stressors – Various factors such as weather, traffic, noise, and other discomforts can lead to crews feeling stressed. Stress is well-documented to contribute to cognitive load and to limited decision-making skills.
8. Schema-Based Decisions – Failing to execute a prescribed action for a familiar situation or executing a familiar action for an unprecedented situation. Failure to think on their feet in a new situation can lead people to follow recipes that worked in the past even if they are inappropriate for a novel problem. People may also do the minimum amount of work to complete a task instead of the amount of work for the task to be completed optimally.
9. Lack of Knowledge – Novices do not have the experience for the necessary explicit or tacit knowledge to handle certain situations. Experts can encounter unfamiliar situations but have the knowledge to handle them skillfully.
10. Social Factors – Misplaced trust in people can lead to cooperation when there should be some resistance, cultural norms, and peer pressure can lead to decision processes that would not occur without social influence.
11. Personal Stress – Family matters, personal health, and other personal matters unrelated to the task at hand can all distract a crew member from executing their duties.

The limited literature on PCB describes it in similar terms as EoC, but they are not the same. PCB is the cognitive tendency or desire to stick to an existing plan in the face of adverse information. EoC is the result of continuing with a plan. EoC is typically described as an act of commission: a conscious choice to continue with a plan, or adding more resources to a plan, that will ultimately fail (*Escalating Commitment – APA Dictionary of Psychology*, 2020). However, it seems reasonable to assume that EoC can also be an act of omission—failing to act on something already in motion. As was demonstrated to tragic effect in 2020, failing to address the COVID-19 pandemic as early as possible is almost certainly EoC at its most deadly since contagious disease, like wildfire, grows

exponentially (Ma, 2020). An omissive act of EoC is arguably the more dangerous as this version fails to address issues at all—known or unknown. Numerous hard lessons throughout history were surely learned due to this error, including, but not limited to, ensuring ships have enough lifeboats only after one sank from striking an iceberg, limiting blimps to helium gas only after a hydrogen dirigible explodes, and only addressing crumbling bridges or buildings after a deadly collapse. How many other important systems are already on the path toward failure and are not being addressed?

This then further begs the question: Can someone commit EoC unknowingly? Consider the following scenario: Mike plans to cross a road to retrieve an errant baseball. Mike recognizes no threats as a course is mentally charted to retrieve the item. Little does Mike know there is a hidden landmine buried beneath the intended path. Is Mike escalating his commitment towards a failing course of action with each step toward the landmine? It would seem Mike is purely based on the qualifying language "failing course of action." Consider then that Mike is suddenly warned of the trap by a bystander. PCB would be the little voice in Mike's head saying to press on and get the baseball. EoC would only occur if Mike did in fact continue. If, however, Mike decided to abandon the plan and turn around, it would be de-escalating the commitment, assuming the new course did not turn towards another trap. These distinctions are important as it naturally follows that there is a theoretical escalation of commitment towards a successful course of action. Though most literature uses the term and abbreviation EoC only for commissive failing courses of action (Meyer, 2013), in this paper we will make the distinction that there are eight different versions, explored in Table 2.

At minimum, EoC as a concept acknowledges risk—there is no guarantee of success. This also means that to a certain extent, all EoC is a gamble (Staw, 1976). Indeed, the gambler's fallacy—the belief that a losing situation must turn around due to statistical likelihoods, is a classic error associated with EoC. By contrast, the term de-escalation is used to refer to situations where a plan is changed—whether or not it is ultimately the best choice (Kasingku, 2020). In essence, EoC is to say "yes," and de-escalation is to say "no." Similarly, PCB is only considered a bad thing when it contributes to failures. Like EoC, PCB is referred to in the literature only in a negative context, namely aviation accidents, but it is ultimately a neutral desire to stick with an existing plan. PCB is a double-edged sword, that can help or hinder depending on the circumstances.

Before the world's leaders and the world at large became aware of COVID-19, were they already on a path to failure? There were warnings of an inevitable pandemic in the years leading up to

2020, but much of the world remained unprepared (The Independent Panel for Pandemic Preparedness & Response, 2021). Every day that passed where they failed to proactively address the threat, were they committing EoC little by little? In some cases, did PCB play a role in the decision to do nothing or willfully ignore the warnings? While the individual mindsets of leaders, or indeed

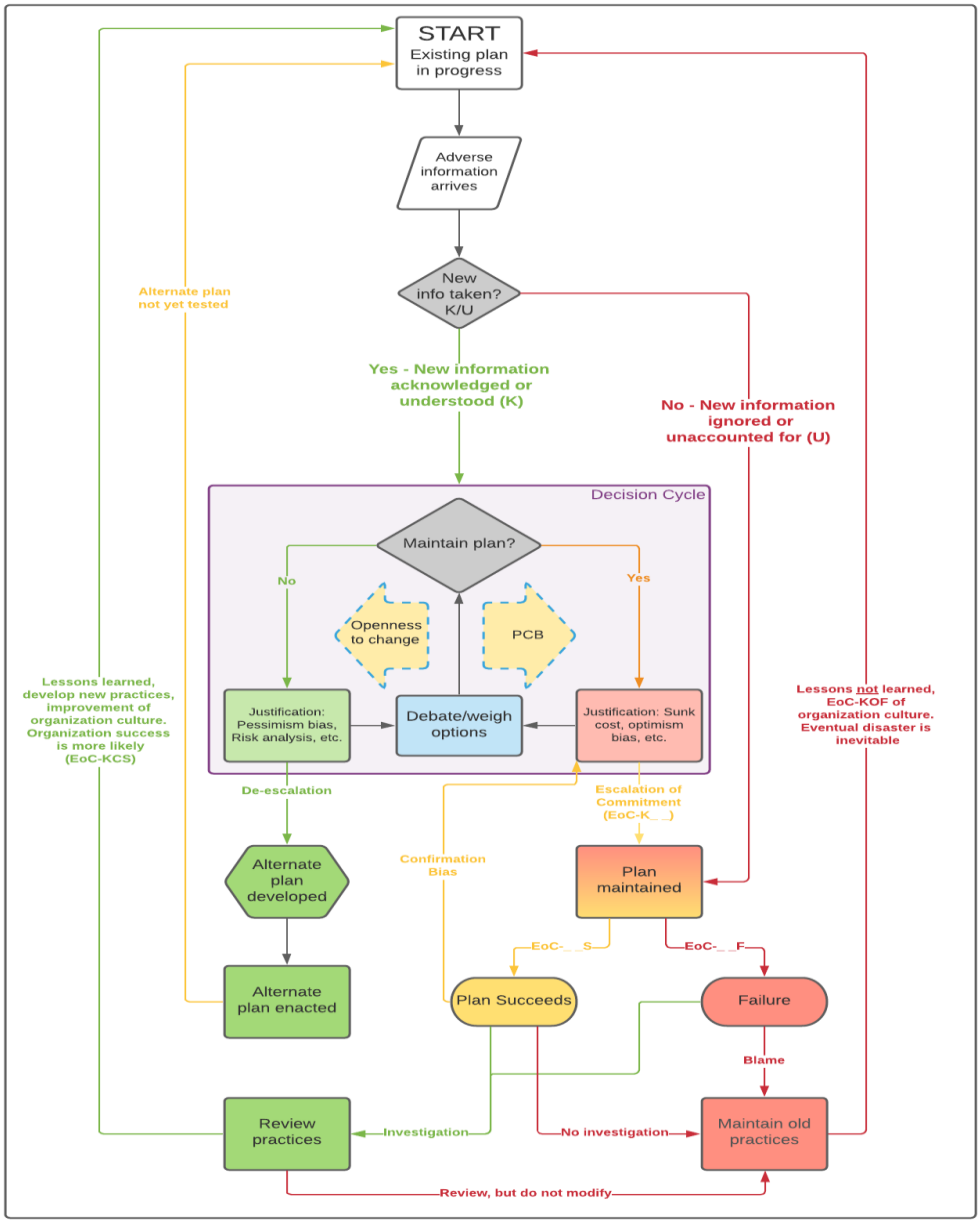


Figure 2. Flowchart of decision process and influence of PCB--This chart is not definitive but was developed by the author based on research into examples of PCB.

anyone, during the early days of COVID-19 can only be speculated on, it would seem the answer to

all these questions is: Yes. Yes—the pandemic itself set several nations and leaders on the path to failure since they had little to no mitigation plans in place. Yes—every day that passed without proactively addressing the pandemic was effectively allowing the pandemic to grow. And yes—PCB is generally understood as applicable to any situation in which someone becomes aware of a problem and willfully decides to continue with business as usual anyway. Clearly, the potential impacts of PCB and EoC can be enormous.

Returning to the scenario of Mike retrieving the baseball for a moment. If Mike succeeded in retrieving the ball and left unscathed, while aware of the landmine, the commitment was still escalated to retrieve the ball—Mike just got lucky. If, however, Mike implemented a risk mitigation strategy upon learning of the threat, then the plan was smartly changed and de-escalated. PCB would be the mental pressure to stick with the plan upon learning of the threat.

A few things logically must happen for PCB, and subsequent EoC, to occur:

1. There must be an existing plan in place – Fit a peg into a hole.
2. New information must come in to indicate the plan will not work – The peg is square, but the hole is round.
3. There must be a decision point that can be influenced by PCB – Continue with the original plan, or not?
4. PCB influences decision – There was a plan in place; you should see it through.
5. EoC occurs – Hammer that square peg in to make it fit!

It would seem then that PCB, or another cognitive process that causes PCB, is one of the first things to occur once new information arrives. As demonstrated in Figure 2, PCB probably occurs, or at least comes into play, before justifications do and may act like a constant mental “pressure” influencing the whole decision-making process. This pressure may be overcome by other mental forces so that an alternate plan is made but might never be fully relieved if the decision maker, then continues to second-guess their choice. PCB always precedes EoC, but can EoC occur without PCB? Since PCB only becomes relevant when new information arrives, and since EoC has been demonstrated to be possible without knowledge, EoC can indeed occur without PCB. It would seem then that PCB and EoC can and do occur independently and thus, should be considered somewhat independently. However, since the same conditions that are associated with PCB are also associated with EoC, they can both be tackled at once.

Three different variables are considered for refining EoC. The different possible versions of EoC are expressed in Table 2. Each EoC code includes the prefix "EoC" followed by three letters (e.g., EoC-KCF). In situations throughout this paper where a variable is unknown or irrelevant, it will be represented by a blank space (e.g., EoC-K_F). The three variables are as follows:

1. First letter: Whether a risk is known or unknown (K/U _ _). This is somewhat simplified so "known" refers to any risk that is acknowledged or recognized at a meaningful level—whether or not it is fully understood. Only known risks can become decision points as decisions cannot be made directly on unknown risks. PCB only comes into play on "known" risks since it involves a decision point. Known risks have clear warning signs; unknown risks do not.
2. Second letter: Whether or not the EoC action is commissive or omissive (_C/O_). If an action is taken, the EoC is commissive. If no action is taken, the EoC is omissive. This may or may not be based on a decision—omissive acts in particular can occur without knowledge.
3. Third letter: Whether or not the EoC resulted in success or failure (_ _S/F). In this definition, "success" refers to a satisfactory result while failure refers to an unsatisfactory result. While each situation could be nuanced or subjective, having elements of failure and success, this label at least allows for general understanding of the classification.

These are simplified for clarity and only represent a single theoretical decision point. Most projects likely involve numerous decision points, and multiple disparate bits of information. Each decision point is theoretically a new opportunity to change the course of EoC, but PCB can influence each decision. Ultimately, due to multiple decision points, a project can experience multiple versions of EoC over its lifecycle, potentially jumping between them with each new decision or indecision. There is also a transition point from one to another, particularly when new information arrives. Additionally, a project could be assessed incorrectly and judged to be on a successful course when it is in fact headed for failure, or vice-versa. Poor execution can also complicate matters as an excellent plan could be carried out poorly and still miss all its goals. Generally, the ultimate success or failure is often judged by the result, which can also be complicated and nuanced. For example, an outdoor wedding that experiences a muddy rain delay and catering that gives everyone food-sickness might be considered a failure by the guests except that the bridal couple still successfully got married and lived

happily ever after. As demonstrated below, the impact of luck and chance, good or bad, has significant implications on the judgement of results as well as procedures. All examples in Table 2 are a play on situations from the movie *Jaws* (1975) or a pandemic. Some of these examples occur in the movie, or occurred in the pandemic, while some are invented to reflect the form of EoC being explained.

Table 2 - Possible varieties of EoC. This table was created by the author to explain proposed varieties of EoC the author developed.

EoC CODE	MEANING/LESSON	EXAMPLE 1 - JAWS	EXAMPLE 2 - PANDEMIC
EoC-KCS	Escalation of Commitment towards a Known Commissive Success - deliberate choice to continue with plan despite the risk. Hard work paid off but investigate further to determine if this practice is worth continuing or if you just got lucky this time.	Sheriff and rag-tag team barely, but successfully, kill the deadly shark. Risky venture, but hard work paid off.	A vaccine is produced in unprecedented time and successfully inoculates against target virus. Hard work paid off.
EoC-UCS	Escalation of Commitment towards an Unknown Commissive Success – Unintentional benefit. Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.	The very act of hunting the shark conveniently draws it out to sea and away from the beaches it was attacking. Unintended, but beneficial.	The vaccine not only protects against the target virus, but also protects against other viruses by chance.
EoC-KOS	Escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.	Deciding to not hunt the shark or close the beaches and hope it goes away on its own. It conveniently does go away. Very lucky.	Deciding not to develop a vaccine in the face of a virus and hope the problem goes away. It miraculously does by chance.
EoC-UOS	Escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any	Continuing through daily life oblivious to a shark that approached many swimmers, but	Continuing with business-as-usual unaware that a virus is circulating and infecting people, but

	actions taken whatsoever. Sheer dumb luck.	never attacked anyone. Extremely lucky.	fortunately not harming anyone.
EoC-KCF	Escalation of Commitment towards a Known Commissive Failure - Classic EoC. Deliberate action that resulted in a predictably poor outcome – Foolish. Bad process that should be modified in the future.	Insisting on reopening the beaches for the 4th of July following their closing due to shark attack. More attacks occur.	Insisting on using unsubstantiated anti-viral measures like ineffective medicines even after experts warn that they do not work. Many die from the virus while others die from the bad medicine itself.
EoC-UCF	Escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.	Hiring fishermen to hunt the shark who then overfish and unintentionally endanger the larger ecosystem.	Administering a vaccine that protects from the target virus but also yields debilitating side effects.
EoC-KOF	Escalation of Commitment towards a Known Omissive Failure - Deliberate inaction that resulted in poor outcome - failure was inevitable.	Refusing to hire shark hunter to hunt the shark until after there are more attacks on 4th of July.	Doing nothing to mitigate the virus and hoping it goes away on its own. It does not go away and kills thousands.
EoC-UOF	Escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late.	A swimmer is killed by a shark everyone was oblivious to.	A novel virus emerges and begins infecting and killing.

Consider the following scenario: Susan is driving a car home from work. While driving, an image lights up on the dashboard that Susan does not recognize. What Susan does not realize is the light indicates imminent failure—the car will be unable to get home without maintenance. Does Susan do anything about this new information? In this case, the plan to drive home is already in motion and the new information is ambiguous: an unrecognized hieroglyph on the dashboard. Susan might just ignore the light and continue home without a second thought (EoC-KOF). On the other hand, Susan might ponder the newly illuminated symbol. In this case, Susan might enter a mental

debate phase, a decision cycle, weighing the new information against available options. Does Susan pull over (de-escalation)? Does Susan accelerate to get home faster to race the mysterious problem (EoC-KCF)? Does Susan attempt to fumble through the owner's manual at the next stoplight (investigation for new information)? In a decision cycle, Susan has a chance of catching a potential problem by attempting to analyze and justify each choice. This would also be where typical rationalizations associated with EoC, such as sunk cost, project completion, optimism bias, and others, would influence the decision (Meyer, 2014). If, however, Susan decides immediately that the car should be pulled over, the justification stage is skipped entirely—it was decided to de-escalate without a second thought. This would be an example of "fast thinking" afforded by what psychologists call System 1, as opposed to the slower System 2, thinking of working through the problem in detail (Kahneman, 2011). While it is probably more likely that Susan will enter the decision cycle, it is theoretically possible to head PCB off at the pass. Since PCB is a cognitive process, each decision-maker must go through it at their own pace. All these thought processes could occur very quickly or very slowly.

Consider a different scenario where a team is working on a large project. One team member, John, becomes aware of some new information, which, upon analysis, presents a problem—they are on track for failure if they do nothing (EoC-KOF). The failure is not so imminent that it qualifies as an emergency, but it is inevitable. John might go through a personal decision cycle before concluding that the plan must change (de-escalation). However, since John is on a larger team, John must convince other teammates who might go through their own decision cycle as they learn of this new issue. One team member might understand the problem immediately while another might be confused by it. Still another might understand the problem perfectly well but remain resistant to change (EoC-KOF) or even insist on adding more resources (EoC-KCF). A large project might not require the same split-second decisions that a troubled moving vehicle demands, but it could still fall prey to a slower, more socially or culturally based form of PCB and EoC. Ultimately, a commissive or omissive choice is made to either continue with the project or modify or cancel it based on any number of factors. If they decide to proceed with the plan without recognizing and researching the new information (EoC-UOF), they better hope the mysterious dashboard light does not accurately indicate "Low Oil—engine will fail imminently without intervention."

There seems to be a fine line between EoC-KCS and EoC-KCF. As noted earlier, the *LOTR* team engaged in EoC-KCS when they planned to take on the difficult prologue sequence (Pellerin,

2002). They added more resources, worked hard, and got the job done. Fyre Festival, on the other hand, clearly committed EoC-KCF, pouring more and more resources into a project that nearly everyone could tell from the start would never work (Furst & Nason, 2019). It is possible that Billy McFarland's unbridled optimism blinded him from the truth that execution was not on track, but his employees and vendors could clearly see the writing on the wall. Billy McFarland was also later convicted of fraud, indicating he knew to some extent that his project was not on track, and he took desperate measures to right the ship. Hard work cannot be the difference between EoC-KCS and EoC-KCF as both involve spending resources and energy. Spending them in the right places is a probable difference, as is monitoring and controlling progress (Project Management Institute, 2017). Building phase gates into a schedule, along with other quality control measures, can ensure that a project plan itself is prepared for the possibility of EoC-F risks. Phase gates are milestones that can be built into a project schedule that demand decisions be made, preferably after a thorough audit. For a phase gate to work, a project must effectively halt until it is approved to proceed. Phase gates offer the possibility of flipping an EoC-UOF decision to a EoC-KCS one, but ultimately will fail if PCB is strong enough to overcome it. EoC-UOF type failures are arguably somewhat excusable as they are very difficult to see. However, diligent inspection and research may reveal that these were still preventable if anyone bothered to look.

PCB and EoC, from the perspective of decision-making, would normally fall under the umbrella of the term "human error." It should be noted that Sidney Dekker, a safety expert who literally wrote the book on "human error" (2014), points out that the term itself is not especially helpful in determining the cause of an incident. In fact, in many accident investigations, human error is the final word and no further exploration into which processes, like PCB for example, might have contributed. Dekker notes that the "old way of thinking" about human errors is the bad apple model—this system would run perfectly if it was not for a few bad apples making mistakes and messing it up. The bad apple model allows for the quick convenience of blame but does not get to the root of a problem, which may be repeated by someone else in similar circumstances. The "new way of thinking" is to recognize that human error, often judged as such in hindsight, is usually a symptom of the system itself. The assumption should be that most people try to do a good job most of the time. Dekker points out that using the terms error, failure, and mistake all imply that there was a theoretical "right thing to do" and that the operator blew it by not doing that thing. The "right thing to do" may only be obvious in hindsight. Dekker's new way of thinking squares with the litany of determinants

associated with EoC and PCB. While many determinants are psychological, none of them are only attributed to a specific parson. In this paper, we use the terms success and failure not to imply or assume that there was a "right thing to do" or a "wrong thing to do," only that any given result might be deemed a success or failure based on whether it was ultimately satisfactory.

At its most basic, addressing PCB is to address the question "When, and how, should one change their mind?" It is always worth remembering that PCB can contribute to successful endeavors as well as bad. PCB is a neutral force that can hinder or help depending on the situation.

CONTRIBUTORS TO EOC AND PCB

The contributors to EoC and PCB are numerous and have been organized into subchapters. Several subchapters feature an asterisk (*) indicating that they were added or expanded upon in this Literature Review after several design-thinking (DT) phases of the study. The student researcher would not necessarily have known to look for or include these topics had it not been for the DT exercises.

SUNK COST

Among their numerous discoveries, "the sunk-cost fallacy" was observed to occur in decisions of all sizes (Kahneman & Tversky, 1979) and "keeps people for too long in poor jobs, unhappy marriages, and unpromising research projects" (Kahneman, 2011, p. 371). Sunk costs are costs that are already spent on a project or situation that are non-recoverable. Sunk costs can refer to literal monetary cost as well as figurative costs such as time or effort spent on something. The sunk-cost fallacy is the tendency to use previous expenditures, often sizable, to justify continuing with a failing investment or plan. This is fallacious of course; since the costs are non-recoverable, it is usually best to alter plans or cut their losses entirely and move on. There is no use crying over spilt milk. PCB differs from the sunk-cost fallacy as PCB is the desire to stick to a plan and sunk-cost is used to justify that choice. Sunk cost is one of the most commonly studied aspects of EoC (Meyer, 2013; Rice, 2010; Ting, 2009), but it is only a small part of a much more complex puzzle.

MENTAL MODELS

Mental models are mental representations of something and often a touchstone for individuals considering something new. In the case of a project plan, the mental model of the plan is likely to be stronger the more fleshed out and detailed the plan is. The availability heuristic is the tendency to cling to mental models that are more readily imagined or recalled (*Availability Heuristic – APA*

Dictionary of Psychology, 2020). People are more likely to react to a situation they can easily imagine, like a horrible car accident, instead of a less-readily imagined idea like a mysterious virus affecting a far-off land. Therefore, an existing, detailed plan is easier to recall and thus, easier to stick with. By comparison, altering the plan or replacing it outright is much more mentally taxing, possibly falling victim to the pull of PCB. The squeaky wheel gets the grease, but more people are killed by bees than by the more readily imagined shark attack. It is easy to ignore or to miss problems that are not readily pictured in the mind. I cannot imagine why this plan will not work…

FRAMING

Framing is the way in which a concept is framed in a person's mind. Another discovery of Kahneman and Tversky, framing is shown to substantially impact the way people think about and respond to information. Consider the following question: *Would you rather have a 100% chance of losing $50 or a 50% chance of losing $100?* Statistically, these are considered the same. Expected monetary value is calculated as probability x impact so (1.0 x 50 = 0.5 x 100). The expected monetary value of both options is $50, the only difference is how it is framed. In this case, the question is framed in the negative, both options involve losing money. Prospect theory, sometimes called loss-prevention theory, was proposed when it was discovered that people responded more strongly to questions framed in the negative than questions framed in the positive. Put simply, the research into framing and prospect theory revealed that people seem to be willing to put in equal effort to gain $100 as they would avoiding the loss of $50. This outsized weighting of loss prevention seems to indicate that EoC behavior makes no sense. Even if the preference to avoid losses is irrational, why would anyone continue with a plan that is increasingly evident to incur losses? The answer again is in the framing. Optimism bias, confirmation bias, and others cause questions and statements to be framed in the positive, like "Think about how good this will feel when it is done!" Questions framed in the negative might be more likely to lead to de-escalation, but the other cognitive biases block out those negative thoughts. You do not want to be the group's pessimist, do you?

OPTIMISM BIAS

Optimism bias is the tendency to lean towards a hopeful outcome rather than considering the pessimistic perspective (*Optimism – APA Dictionary of Psychology*, 2020). Optimism bias is important for all sorts of examples of human progress, including development of the airplane, vaccines, and countless tales of triumph. Optimism bias can feed into PCB as a pessimistic person would likely alter or abandon plans in the face of adversity rather than continue with them. Clearly,

optimism bias is generally a good thing, but only up to a point. Over-optimism can be toxic and blind a person to their obsolete plans. Much like the ancient Greek myth of Icarus, sometimes projects fly too close to the sun. Optimism bias has just begun to be researched from a project management perspective and has been shown to be a major contributor to EoC (Meyer, 2014). We can accomplish anything we put our minds to, right?

ILLUSION OF CONTROL

Optimism bias dovetails with the illusion of control, which is a decision-maker's belief that they have more control over a situation than they do. Individuals are shown to prefer to select lottery numbers themselves over accepting a random ticket because it creates the illusion of being in control, though statistically, it makes no improvement on the chances of winning (Langer, 1975). The illusion of control can lead a decision-maker to believe they are actively managing risk and become more comfortable taking on more risk. In actuality, the situation begins to rely on luck alone.

ANCHORING BIAS*

Anchoring bias can lead a person to fall in love with an idea even if it is not realistic because they are comparing it to other quantified information (Tversky & Kahneman, 1974). Retail salespeople use anchoring bias regularly to sell merchandise by marking something like a sweater with a price tag with a dramatic slash mark through the "original price" of $50 and instead have it "marked down" to $35. A buyer will look at this as a good deal when the total cost to the manufacturer might be less than $10. Anchoring bias has also been shown to take effect even in situations not involving numbers or quantitative information at all (Jain et al., 2021). This can lead to EoC behavior if a person erroneously believes they are getting a bargain, whether the "anchor" is monetary, or something completely irrelevant. The British idiom "pennywise and pound foolish" refers to a person who haggles over items of little value, like arguing over 25 cents on lunch, but willingly hands over hundreds of dollars to upgrade their new car. Would you like to upgrade your $4 soda for only 25 cents? You can also upgrade your new $35,000 car for only $500. This phenomenon is not well studied but is shown to have a neurological component (Rustichini et al., 2017). Neuron firing rates in the orbital frontal cortex of rhesus monkeys are shown to adjust based on the enormity of a decision. Since our brains cannot think thousands of times faster to accommodate a decision that is thousands of times more important or expensive, our brain adjusts by discounting lower-value numbers to keep things easy to calculate. Our brains are literally hardwired to scale our thinking to the size of a decision—everyone is pennywise and pound foolish given the proper framing.

CRITICAL POINT THEORY AND BLIND SPOTS*

Critical point theory argues that there is a point in a project's progress when a decision-maker realizes that it is doomed to failure (Meyer, 2013). Since a decision-maker depends on feedback information to indicate the status of progress, subtle hints of failure will not necessarily lead to the conclusion that total failure is guaranteed. It may take a fair amount of evidence to convince a decision-maker that the negative trend is irreversible—the critical point. This inevitably leads to a gap between the time the project started failing to the time the failure was recognized. Unfortunately, even when the critical point is reached, some decision-makers continue to commit EoC-K_F, likely due to optimism bias and other relevant biases. Eliminating the gap between the initial point of failure and the critical point is practically impossible, but efforts to shorten the gap are still worthwhile. A problem that grows exponentially, such as a contagious virus that doubles infections every few days, might not cross a person's critical point until it is well beyond control. It is also possible, due to attention blindness, that the critical point will never be reached if the adverse information never quite pushes past it. Attention blindness is a phenomenon that involves changes being missed due to inattention, or lack of awareness that a situation is dynamic (*Attentional Blindness – APA Dictionary of Psychology*, 2020). Very slow, inconspicuous changes can go unnoticed because they never quite reach the critical point. This is similar to shifting baseline syndrome (SBS), which is a kind of generation-level attention blindness—when a newcomer arrives, they assume a situation is normal when in fact it has been shifting for a long time before the newcomer arrived (Dayton et al., 1998). Say a glacier is receding at a pace of a few feet per year. A newcomer might see the glacier and assume it is the same size it always was while photos from decades before will reveal the truth of its recession. SBS indicates that attention blindness is not just limited to an individual, but a whole group of stakeholders if critical knowledge is lost with turnover in the ranks, or very slow changes in seemingly innocuous things. Whatever the case, the sooner a problem is recognized, the sooner it can be addressed.

Information that is initially perceived as insignificant is not strong enough to cross the critical point. Such "small" evidence would need to build up for a while before it was noticed. As it turns out, information on the other end of the spectrum is also at risk of being ignored—information that sounds too outlandish to be true (Drummond, 2012). This makes sense to an extent as claims like Chicken Little's "the sky is falling" sounds too hyperbolic to be believed (Kellogg, 1985). The trouble is, Chicken Little would be dismissed and ignored, even if the sky was truly, and disastrously, falling.

This would indicate then that the "critical point" is really two points: a minimum and a maximum. Information needs to hit the window between the points to be noticed and addressed and anything outside the window is at risk of being ignored, allowing the problem to continue unmitigated.

A person's critical point is not necessarily fixed in place either. A person can notice changes, but not quite become skeptical or concerned about them, instead getting used to them or priming them to accept something bigger. The foot-in-the-door technique is a compliance technique that operates by assuming that a person will agree to a big request if they first agree to a smaller request. This process can result naturally from a process called habituation—the tendency for a person to respond briefly to a stimulus but quickly becoming used to it and eventually ignoring it over time. A small change is made, the person reacts at first then habituates to it, then the cycle repeats with another small change. After a while though, all the small changes compound to something big. This phenomenon has been described with a metaphorical fable about a frog in boiling water (Isobel et al., 2020). As the fable goes: a frog placed directly into boiling water will immediately jump out, but a frog dropped in tepid water that is slowly heated to a boil will not upset the frog as it complacently boils alive. Zoologists have argued that real frogs will attempt to escape both scenarios when the temperature becomes uncomfortable (Fast Company, 1995). Still, there is wisdom in the metaphor: lots of systems do not collapse overnight but are chipped away at, little by little, and even when the changes are noticed, no one bothers to respond adequately until it is too late.

ENTRAPMENT

Changing circumstances are inevitable in all projects and situations. PCB is the resistance to altering plans in the face of those changing circumstances. The effects of the initial decision to "stay the course," ushered by PCB, is not always immediately evident. Often, the changing circumstances make a situation more challenging or difficult to navigate as it develops, meaning that sticking with the plan requires more effort than was originally estimated. Committing to dealing with the primary issue can lead to dealing with secondary and tertiary issues brought on by the first. For example, it is much more difficult to avoid being caught in a hurricane once the storm has arrived—proactive measures are necessary to avoid the worst. All of this leads to a situation of EoC where the effort required to maintain the plan grows uncontrollably. EoC has a way of leading to psychological entrapment—a situation where an individual sees no way out of the mess they have gotten themselves into. This feeling of entrapment often feeds right back into PCB as the individual sees the only course of action as the one they originally planned for (*Entrapment – APA Dictionary of Psychology*, 2020).

Not to be confused with legal entrapment, which is when law enforcement coerces someone into committing a crime, psychological entrapment creates teleopathy, or tunnel-vision, blocking someone from seeing plans or options outside of the existing one (Kaptein, 2012). Psychological entrapment can also go unrecognized if cognitive load is so high that the person is overwhelmed (Kanki et al., 2010). PCB feeds into EoC, which in turn feeds into entrapment, which feeds right back into EoC. This positive feedback loop creates a death spiral for a situation that becomes difficult or impossible to escape if it is not recognized and addressed. Meanwhile, circumstances often continue to deteriorate, ultimately threatening the entire project or situation. In project management terms, this is an example of scope creep—uncontrolled project scope growth. This scope creep can lead to a more figurative entrapment that is not psychological, but a result of the uncontrolled growth itself. Nipping a problem in the bud can prevent it from spiraling out of control, but it must be recognized in time.

COMPULSION AND ADDICTION*

A compulsion is defined as a behavior that a person engages in to relieve anxiety or distress (*Compulsion – APA Dictionary of Psychology*, 2020). A person who is obsessively concerned with contamination may compulsively wash their hands to the point of skin damage and cracking—thus increasing the risk of infection. An addiction is the psychological or physical dependence on a substance, often drugs or alcohol, although modern descriptions include internet use, gambling, and other behavioral disorders (*Addiction – APA Dictionary of Psychology*, 2020). Addiction is essentially a compulsion taken to an extreme. While a compulsion is a strong urge to do something, an addiction is an outright need (Heather, 2017). Both are typically viewed as being damaging in some way—eating food every day, for example, is not considered addiction since a person's life is usually positively impacted by eating. Addiction and compulsion might not fit the traditional model of EoC, but they certainly can fit the definition. Highly addictive opioids are well documented to cause consumers to develop a tolerance to the ingredients and thus require larger and stronger doses over time to achieve the desired results (Christie, 2008). The larger and stronger doses over time eventually begin to damage the person's life as they focus more and more energy on acquisition or consumption of the substance, and some substances cause permanent bodily damage all the while. Gambling absolutely fits the bill for EoC behavior and many studies into EoC have specifically used gambling scenarios to tease out findings. Whatever the viewpoint, continuing to feed a destructive compulsion or addiction more than meets the criteria to qualify as escalation of commitment towards a failing course of action.

REACTANCE EFFECT*

The reactance effect is the tendency for an individual who perceives a loss of behavioral freedom to experience anxiety and distress, thus motivating them to restore the lost freedom (*Reactance Theory – APA Dictionary of Psychology*, 2020). In other words, a person will resist coercion by continuing with a behavior that is intended to be stopped or even increasing the undesired behavior. Convincing a teenager to stop smoking, or any other undesired behavior, can be quite challenging for this reason. Insisting they not smoke may just lead them to reactance and smoking more out of spite. You cannot tell me what I cannot do!

CONFIRMATION BIAS

Confirmation bias is the tendency to seek out or place more value on information that confirms one's existing beliefs (*Confirmation Bias – APA Dictionary of Psychology*, 2020). Individuals who have found themselves in a sticky situation have occasionally been able to get themselves back out again without having to drastically alter their existing plans. When another difficult situation arrives, they can look back on their past with confidence, knowing they have eluded disaster before. Platt called these "reinforcement traps" (Platt, 1973). While they may indeed be a type of skilled "escape artist," it is equally plausible that they averted their catastrophe by accident or due to actions different from what they attribute their success (EoC-UOS, or EoC-UCS). Either way, this is likely to affirm or even encourage risky behavior because their confirmation bias will buttress the erroneous belief that they can evade disaster again because they have managed to do so before. Confirmation bias coupled with optimism bias can serve as powerful psychological blinders to unmanaged risks. Figure 2 demonstrates a model of how information is processed and influenced by PCB. In this flowchart model, PCB and other cognitive biases behave like a "mental force" pulling a decision point in one direction or another. PCB pushes a decision in the comfortable direction of maintaining an existing plan, which can lead to this positive feedback loop in risky situations. If this model is representative of reality, the trick is to counteract PCB before it leads down a path of entrapment.

EXPECTANCY BIAS

Expectancy theory is the theory that people will only see the information they are expecting to see (Bhattacharya, 2010; Vroom, 1964). This is normally associated with researchers who unconsciously seek out information that confirms their hypothesis and leads them to unconsciously "massage" the data to show such the expected result. This same phenomenon can likely happen to

people following a plan. They only see the information they would expect to see, specifically, information that confirms the general success of the ongoing plan. This can couple with confirmation bias, so a person is only seeing the information they want to see and over-valuing that same information over anything adverse.

SELF JUSTIFICATION

Self-justification is another oft-cited aspect of EoC-K_F, which involves a decision-maker retroactively justifying an old, bad decision by casting it in good light (Meyer, 2013; Staw, 1976). Self-justification involves distorting history to make a decision or decision-maker appear better than they are in reality, which makes it a type of self-deception. Cognitive dissonance, the discomfort a person feels due to the inconsistency of conflicting cognitive elements, is theorized to be a major driver behind self-justification (Tavris & Aronson, 2020). In other words, avoiding embarrassment and shame are behind self-justification and can lead to a very damaging cycle by refusing to admit any wrongdoing. This is a path to entrapment, however, as the effort to avoid embarrassment only leaves one option: to stay the course and hope it somehow turns around. While the embarrassment of a small discretion may have been staved off for a while, a much greater humiliation is inevitably around the corner when the truth is ultimately revealed. Put simply, self-justification means not admitting you were wrong, and doubling down on the original choice to save face (Brockner, 1992). Brockner argues that the research demonstrates self-justification to be one of the most important factors in EoC-KCF and that decision-makers will mainly consider their own previous choices when deciding whether to proceed further. Pride goes before the fall.

SELF-LICENSING*

A unique flavor of self-justification is self-licensing. Self-licensing is the tendency for a person to mentally reward themselves for something by using it to justify something less commendable (Prinsen et al., 2019). For example, a person attempting to lose weight might feel good about themselves for sticking to their diet when they eat salad for lunch and then reason that they have somehow earned junk food by being good. This phenomenon is suspected to be behind why diet soda consumption does not actually correlate with real weight loss. People drink a diet soda and reason that they are being good and have earned a candy bar. Self-licensing isn't limited to New Years' resolutions either; many studies have looked at a particular subset associated with personal ethics: moral licensing. Studies have shown that some, though not all, people who do a good deed are less likely to do another good deed shortly thereafter because they have somehow earned it and have

already done their good deed for the day (Sachdeva et al., 2009). There is even evidence that moral licensing can occur vicariously—leaders can be tempted into moral licensing if they feel their followers are behaving morally (Ahmad et al., 2021). Self-licensing is likely to be a force behind de-escalation because a person is allowing themselves to cheat, slightly changing the plan, while thinking they are maintaining a path of EoC towards losing weight or whatever laudable goal they hope to achieve. Self-licensing generally works against a person since it seems to authorize bad behavior. So what if you cheated a little? You work hard—you earned it.

IDENTITY*

Self-justification is also closely associated with identity (Tavris & Aronson, 2020). People are shown to be more protective, and thus more likely to engage in self-justification, if they feel their identity is threatened. For example, a person will generally respond more defensively to a claim like "You are a screw-up" than "You screwed up on that one." Neither are good news, but the latter phrase only attacks the behavior while the former attacks the identity. Certain identifiers can be cleaved to more closely, like personal appearance, religion, or political party, but theoretically any feature in which a person identifies with can become a part of their personal concept of their identity. The more closely a person considers something a part of their identity, the more closely they will guard it with every tactic they have, including self-justification. This is a part of why "Flat-Earthers," individuals who prescribe to a belief that planet earth is flat, have gained traction in recent years (Loxton, 2019). A large portion of the movement is around the social identity of being a flat-earther, and the self-justification allows for explaining away the inconvenient evidence indicating that Earth is in fact spherical. Anyone who attacks this belief is, by extension, attacking your identity as a flat-earther. A kind of tribalism can result where the debate no longer centers around the evidence for or against a flat Earth, but around an Us versus Them argument focused on identity.

Tradition is a practice that is carried out regularly, although the original meaning of the tradition can fade from view over time. Traditions are partially rooted in mental models, such as "this is how this has always been done," and partially rooted in institutionalization (Staw, 1997), but closely connected to identity. Unlike "best practices," which are followed because no one has thought of anything better yet, tradition is also followed because of an emotional or cultural connection that can be tied to identity. Sentiments like "This is how mom always made it" or "this is how we do it around here" echo the connection to identity. Many harmful traditions exist throughout the world that are closely connected, for better or worse, with the region's cultural identity. Some of these harmful

traditions include early childhood marriages, female genital mutilation, and honor killings (Efferson et al., 2020). A person or group may continue to practice a tradition because they feel it is a part of their identity and may resist change for the same reason. This entanglement can make it difficult to change a harmful or obsolete practice because the practitioner may cling to it with all the same tenacity as their identity. Try not to take it personally.

BLAME*

In addition to identity preservation, self-justification is closely associated with blame (Tavris & Aronson, 2020). Blame is a convenient method of relieving cognitive dissonance by placing responsibility, especially of a bad choice, at the feet of someone else. Blame your sibling. Blame the economy. Blame another country. Whatever it takes to avoid the discomfort of the awful truth that you are, in some way, responsible yourself. Blame also preserves a comfortable and convenient philosophy of determinism (Chislenko, 2021). Determinism, or causation, is the belief that everything that happens can be explained by the simple paradigm of cause and effect. While this is largely true from a grand-scale astrophysics perspective, from the scale of daily human life, it is not always practical. The comfort of determinism likely stems from the predictability of it—we know that a given set of circumstances will yield the same result every time. Unfortunately, not all events that occur in a person's lifetime, or any given project, are conveniently predictable. It is true that if you search long enough, you can forensically find someone or something to pin a particular problem on. However, seeking out parties to blame when something goes wrong fails to acknowledge that every aspect of life involves at least some luck, good or bad. What is worse, energy spent on the blame game is taking away critical resources from the real problem at hand: you suffered a set-back and now you need to pick up the pieces to carry on. While on a road trip, if the vehicle suffered a flat tire on the highway, it might be tempting to blame your spouse, the mechanic, or the tire company for this awful situation. It might make you feel better in the short run, but it will not solve the problem of needing to pull over and deal with the flat tire. Who is the guilty party here? I want names!

GOAL DISTANCE

Goal distance, or project completion theory, is an aspect of EoC that dovetails with sunk-cost (Ting, 2009). While sunk cost focuses on energy or money spent in the past, goal distance focuses on energy or money to be spent in the future. The theory goes that people are more likely to commit EoC if they are closer to their goal. This possibly adds to PCB as goal distance is used as justification for continuing with a plan. This is important in understanding motivation for all types of EoC, as EoC-

KCS is generally laudable, so long as it remains successful. Proximity to the goal can motivate people to work a little harder, but it can also lead them to make costly decisions they would not have made at the start because they are so close to finishing.

STATISTICAL BIASES

Statistical selection biases are important factors for addressing PCB and EoC because they affect the availability of information. PCB only comes into play if there is information to respond to, but statistical biases can lead to skewed data, or misleading information. Statistical biases are aspects of sampling that increase the likelihood that the information will not accurately reflect the reality of a situation. Certain circumstances may favor certain types of information being available. For instance, a manager who goes into a rage at any bad news is less likely to be told bad news by his employees. The bad news is still there, but everyone refuses to bring it up for fear of reprisal (Catmull & Wallace, 2014). Perhaps no statistical bias is more impactful to PCB than survivorship bias. While most statistical biases favor certain information over others leading to distorted data, survivorship bias is more absolute: the only information available is the information that survived some filter (Mangel & Samaniego, 1984). This is especially relevant to EoC variants that include an unknown risk. The risk could be lurking quietly in the background and silencing certain messages so only a few get through. For example, World War II mathematician Abraham Wald was presented with a problem of bomber aircraft having a low survival rate, and where to provide selective armor to bring more planes home. He created a dot plot of the airplane and observed airplanes around an airbase that had returned from the dangerous missions. Once his survey was finished, he could see obvious patterns of bullet hole locations. The initial response was to armor the areas of the plane with the most bullet holes but Wald argued, correctly, that the areas with the fewest bullet holes should be armored instead (Symanowitz, 2013). Wald recognized that a significant portion of the problem were the planes that did not survive the trip back and thus, were unavailable for his survey. Wald saved countless lives by recognizing the nature of survivorship bias. Recognizing the potential impact of survivorship bias is important to avoid drawing wholly incorrect conclusions and plans due to limited information. It is always worth asking what information might be missing?

MORAL HAZARDS*

Moral hazards are a possible contributor to EoC-F, though it has not been extensively researched (Ryou-Ellison & Gold, 2020). Moral hazard is an economic term for a situation in which a person has little-to-no incentive to avoid risk because the costs of that risk are transferred to someone

else. An example might involve driving recklessly due to the assumption that insurance will foot the bill in the case of an accident. Moral hazards were cited as a major contributor to the 2008 Great Recession as complex financial instruments were used to create unregulated insurance policies in the form of credit default swaps (Okamoto, 2009). The assumption that someone else will deal with the consequences of your actions could easily contribute to unbridled EoC. This can also be associated with shifting baseline syndrome—in a culture with high turnover, or a very slow-moving situation, people may establish precedents or norms knowing full-well that they are problematic in the long-run, but do not care about the consequences since that will be the next generation's problem (Drummond, 2012).

COMPETITION

Competition is another possible contributor to EoC-F (Rubin et al., 1980). An individual might abandon plans of acting on their own but escalate commitment if they feel they are in competition with someone else. Competitive spirit on its own is not destructive, but has the potential of developing teleopathy, competitive irrationality (Arnett & Hunt, 2002), and positional bias (Hill & Buss, 2006). These psychological factors mean that competitors can wind up losing sight of their real values, and merely become satisfied with beating out the competition. In simple terms, each side can wind up in a game of chicken with an escalating threat and ultimately fail in the name of competition (Hafenbrädl & Woike, 2018). Some of the poor responses to COVID-19 can be attributed to competition, particularly between nations and political opponents, while some of the successes can be accredited to cooperation during the crisis (Erica, 2020). A twist on this situation is a phenomenon known as the tragedy of the commons in which multiple, non-cooperating parties who are vying for a common resource act independently according to their own self-interest, which turns out to be contrary to the common good of all (Frischmann et al., 2019). For example, fisherman who do not coordinate activities could overfish the resource out of existence. When the problem is discovered, the parties might cooperate to find a solution to the scarcity issue, but it could also inspire them to double down on the competition and try and outpace each other to secure what little is left of the rapidly diminishing resource, thus depleting it even faster. Consideration of multiple stakeholders and decision-makers is important to understand EoC as two warring nations are likely committing EoC-KCF as they send in multiple waves of soldiers to die. While one nation may ultimately beat out the other for resources, it is possible that both suffer heavy losses. EoC is not observed in all competitive environments (Rice, 2010), but remains a particularly dangerous contributor to EoC-F as it can be

linked to the nuclear arms race (Neuneck, 2019). The satisfaction of competitive victory over the original goals and values can be seen as a form of goal substitution. I do not care if I lost, so long as the competition did not win.

TIME PRESSURE AND SCARCITY*

Time pressure is well-noted to be associated with stress and seemingly irrational behavior. Time pressure is not specifically called out by Meyer (2014), but it is related to several determinants listed, such as the availability of feasible alternatives, information processing, and external binding (Staw, 1997). Ultimately, perceived time pressure refers to limitation of time, and it is noted to be a common element in PCB (Berman & Dismukes, 2006; Kanki et al., 2010). Time pressure might be related to a broader category of scarcity. Market runs and panic buying are herd behaviors that involve consumers buying or hoarding unusually large quantities of a resource due to anticipation of a market shortage (Yuen et al., 2020). Regardless of whether the shortage is real, the perceived scarcity leads to panic buying, which quickly outpaces the supply line, creating a self-fulfilling prophecy. This behavior can strike any market but is well-documented for being a part of the bank runs of the Great Depression (in the form of panic selling) and toilet paper shortages, among other supply shortages in the early weeks of the COVID-19 pandemic. The incentive to follow the herd can be beneficial if the crowd is escaping some danger, but following them into panic buying is another example of the tragedy of the commons leading to rapid depletion of whatever the resource is. Much like time, the perception that a resource is scarce and becoming scarcer is a strong motivator for EoC. Supplies are limited—act now and do not miss out!

GOAL SUBSTITUTION

Goal substitution is the tendency to adhere less and less to original goals as a troublesome project progresses and the subsequent tendency to become comfortable with calling the project finished, regardless of whether it met any of its original goals (Conlon & Garland, 1993; Fox & Hoffman, 2002). Goal substitution often happens late in a project, and it allows team members to mentally reduce project scope, even if they have not officially done so. As the situation worsens, the focus on the original project goals diminishes and is replaced with the simple goal of “getting the bloody thing done and behind us” (Drummond, 1996, p. 160). People become sick of a troublesome project and can begin to focus only on the frustrating problems instead of the benefits of a successful execution. This can lead to a project being escalated to being finished, but effectively hollow. The motivation to do a good job diminishes and people simply go through the motions to technically meet

the requirements. Meanwhile, the overall quality suffers because they do not have their hearts in it anymore.

In a more general sense, however, goal substitution occurs any time a person or team consciously or unconsciously forgets about the goal or shifts priorities to a new goal for any reason outside of the merits of the project itself. A distracted driver has shifted their attention, and thus their goal, towards whatever is happening on their phone instead of the road ahead of them. This is a hazard as the dangers of the road almost certainly outweigh any other risks in that moment. Goal substitution can occur at any point but is more common when a project becomes problematic or disengaging. It is important to note and address behaviors indicating that goal substitution is happening. People will usually not state explicitly that they have substituted their goals, but it can become apparent when they focus their attention elsewhere or start "phoning it in."

PERVERSE INCENTIVES*

In the field of economics, incentives are defined broadly as anything that motivates behavior (Lazear & Oyer, 2007). Incentives can range from the extrinsic: financial reward or punishment; to intrinsic motivations like feeling good after an altruistic act. Incentives are often cited as the primary means of motivating people to engage or disengage any given behavior. Perverse incentives are incentives that unfortunately motivate people to work against a given goal. An oft-cited example of perverse incentives is the Cobra effect (Siebert, 2003), so named following a program in British-controlled India that was designed to incentivize the public to kill the dangerous cobras by offering a reward for every dead cobra brought in. The program was successful at getting the public to kill cobras—too successful in fact. Shortly into the program, it was discovered that some members of the public were purposely breeding and raising cobras expressly for the profit upon their slaughter. When the British Empire learned of this cheating method, they ended the program. This unfortunately exacerbated the initial cobra problem as the breeders, who now had worthless stock, released the cobras into the wild. The result of the whole program was a net gain in cobras for the region. Perverse incentives can take many forms and are usually specific to a given problem and proposed solution. On a grander scale, the business practice of maximizing shareholder value is arguably a perverse incentive or perhaps an outright perverse philosophy as it leads business leaders to focus on quarterly profits at all costs instead of the betterment of the world (Denning, 2017). This philosophy has led to numerous societal problems like stagnant wages for line workers, the opioid crisis, and the Great Recession. Ultimately, perverse incentives are setting the wrong goal or going about it in the wrong

way and are the result of shortsightedness, failing to think through a problem, and failing to consider all stakeholders. If there is a way to cut corners or cheat the system, someone will figure it out and attempt to exploit it.

REVENGE AND SPITE*

Seeking retribution for a perceived wrong is a possible motivator for EoC behavior. Psychologists note that not all persons are motivated to exact revenge on others but those that are drawn to it are usually driven by anger, envy, and shame (Wiegman, 2019). Revenge would not normally be seen as fitting the model for EoC, but it does fit the definition as a person exacting revenge is not doing it for a traditional success. Malicious erections such as spite houses or spite fences are unique pieces of architecture built with the express purpose of irritating someone—usually the neighbors (Leedy, 2019). Since a spite house is not meant to be occupied, it is unlikely to pay for itself through rent or a mortgage. Studies have also shown that the satisfaction of sweet revenge is short-lived, and the lasting effects tend to be a return to a bitter, and unjust, state of mind. Whomever seeks revenge should dig two graves.

COSTS OF QUITTING

This entrapment can extend to the cost of de-escalation (Drummond, 2012). A person may realize that a situation needs to be stopped but the cost of quitting can sometimes be close to the cost of continuing. Certain projects can be stopped in their tracks without much repercussion, but others require someone to clean up the mess. Whether it is legal fees, making the worksite safe again, or returning something back to a blank slate, cleaning up the mess left by the activity of a project can be costly and this money can be harder to come by if the budget is already running thin. Due to the EoC tendencies and biases of other stakeholders, it can be easier to convince them to fork over more money to finish the project rather than having to pay for no result at all. After all, the product might still be salvageable. Ultimately, it is usually easier to get into a mess than it is to get out of it. In aviation terms, “Takeoffs are optional, landings are mandatory” (*Takeoffs Are Optional, Landings Are Mandatory*, 1998).

DE-ESCALATION AND ERRONEOUS ABANDONMENT*

Perhaps one of the strangest contributors to EoC-Fs is erroneous abandonment (Drummond, 2014). Erroneous abandonment is essentially the opposite of EoC—giving up too early on a successful course of action. Drummond argues that some complex or difficult projects may appear to

be on a course to failure, when in fact they could succeed with a little more work and resources. While EoC is driven by optimism, sunk costs, self-justification, project completion, and denial, erroneous abandonment is based in loss aversion, opportunity costs, risk aversion, and failure-intolerance. Before Apple introduced the iPad, several other companies had tablet computers on the market. Could they have maintained market dominance by reinvesting in the tablet market before Apple swept in? Could a gambler win big by sticking it out just a little longer? Stick-to-it-iveness and grit are often cited as important qualities in entrepreneurs (Schimschal & Lomas, 2019), but they could easily be retroactively blamed in the aftermath of an EoC failure. Ironically, a fear of committing erroneous abandonment is also a potential cause of EoC—a fear of missing out on risky success. Several causes of erroneous abandonment can also bizarrely contribute to EoC, such as failure-intolerance leading to EoC-F by incentivizing efforts to cover up mistakes. Clearly, EoC is no simple matter and success can mean walking a tightrope between stopping too early and giving up too late. Do not go quitting early on me now.

HOW THE RULES ARE WRITTEN

In this paper, we largely focus on the psychological and sociological contributors to EoC since human beings ultimately make decisions on projects; projects do not make decisions for themselves. That said, it is still worth noting that there are other notable contributors to EoC that can be systemic. A project contract might contain certain incentives and rewards if certain benchmarks are met, say hitting milestones ahead of schedule or under budget (Ross & Staw, 1993). This reward structure, however, can create a perverse incentive for team members to focus solely on achieving reward-based metrics and ignoring all others—another form of goal substitution. Eyes on the prize.

CHOICE ARCHITECTURE*

The way in which choices are presented to a person is known to have an influence on how they are likely to react to said choices. For example, people are well-documented to often select the default option in a set of choices because it is easiest and requires less thinking. The architecture of a choice, if designed carefully, can gently persuade, or dissuade, certain responses. Thaler and Sunstein (2021) called persuasive techniques “nudges” and dissuasive techniques “sludges.” These techniques can be applied several ways on a variety of situations and choices, but in general, nudges would be tools for promoting escalation and sludges would be tools for instilling de-escalation. For example, an online subscription service might nudge people to subscribe with deals for new customers and streamlining the sign-up process to be easily accomplished in a few minutes. By contrast,

unsubscribing, which the service wants to discourage, is mired in sludge, and requires phoning customer service directly during inconvenient hours and suffering a lengthy wait on hold. Nudges and sludges are generally simple aspects of the design that are not meant to be thought about but only felt by introducing or removing pain points for a person. Nudges and sludges are not good or bad on their own, but their application can be deemed as such depending on the designer and the intended behavior. The painted lines on driving roads are opportunities for nudging behavior as lines painted far apart give the impression of a wide-open road that can be navigated at high speed, while lines that are closer together feel claustrophobic and drivers respond by slowing down. The concepts of nudges, sludges, and the overarching concept of choice architecture indicates that people will generally prefer the path of least resistance, which can easily lead them to escalate or de-escalate in ways that are not beneficial to them. This puts a certain amount of responsibility on the designer, or choice architect, who should utilize the tools ethically to benefit the end-user. It also demonstrates the impact of context on decision making. Not all choices are the result of careful thought and consideration on perfect information, but instead, are the result of not thinking at all. Look before you leap.

POLITICAL INFLUENCE*

Political influence, both at the project organization level and government level, can drive projects forward, even if the project is no longer valuable (Staw & Ross, 1987). This can be for someone to gain political points by claiming their victorious leadership over a project that looks good from the outside but is hollow and useless on the inside. This same kind of political posturing can also erroneously kill valuable projects in hopes of earning political points. This can possibly be associated with the goal substitution due to competition discussed earlier. In short, political personalities can shift their goals from the common good to personal advancement via political points.

MEGAPROJECTS*

Megaprojects, such as major infrastructure projects, are almost solely the purview of governments since they are often the only entity with budgets large enough to fund them (Drummond, 2017). These projects often undergo years' worth of planning, selling to the voting public and political influence. While the actual work being performed is often a private company, contracted to do the work by the government, the complex web of stakeholders in high and low places can make it difficult for the private company to run the project as efficiently as they might be used to. Politicians promise jobs and whole communities might be employed, directly or indirectly, by a megaproject.

Major alterations to the project, or cancelling it outright, might have severe implications on the local economy, the voting public, and the business owners. This is an example of "side bets" (March, 1978) in which a team may become focused on not disturbing anyone instead of handling the project on its own merits. Do not upset the apple cart.

INDUSTRIAL COMPLEXES*

Sometimes a project requires a future investment to pay off, or losses only appear to be a temporary setback, or feasible alternatives are not available (Staw, 1997). All of these can contribute to EoC, but one of the most difficult and entangled situations that can virtually guarantee EoC behavior is an industrial complex. Not to be confused with a location like an industrial park, an industrial complex is a system in which a business becomes entangled with sociopolitical systems to create a profit economy. President Dwight D. Eisenhower warned of the detrimental effects of the United States' military industrial complex in his farewell speech in 1961 (Staff, 2011). Such complexes are often accused of pursuing profit over the interests of, and sometimes at the expense of, the common good. It is often cited that industrial complexes have a conflict of interest and a perverse incentive to keep things inefficient, which will lead to greater dependence on the complex and thus maximize profits for business shareholders (Klein & Lima, 2021). Private prisons, for example, are incentivized to collect as many prisoners as possible and discourage rehabilitation because they are funded based on the number of people incarcerated, not on the number of successful returns to society (Klein & Lima, 2021). Ultimately, an industrial complex is so entangled in a variety of important systems that it is essentially deemed irreplaceable. Simply pulling the plug on an industrial complex is likely to be very costly and to severely damage many other systems in the process. This makes it a wicked problem that cannot be solved all at once but must be addressed a little bit at a time. Lots of moving parts.

GROUPTHINK*

Groupthink is a psychological or sociological phenomenon that describes a group of people collectively favoring harmony amongst the group over everything else. The term was coined in the 1950s by William H. Whyte, Jr., but the first insightful research on the topic was carried out by Irving Janis in the 1960s and 1970s (Janis, 2010). Peer pressure, sycophants or "yes men," and "don't rock the boat" are all terms that can be closely associated with groupthink. Groupthink can lead to a collective confirmation bias as the group is essentially homogenized around a given issue and dissenting opinions are punished implicitly or explicitly. Groupthink can be thought of as a kind of

unconscious, collective goal-substitution as members of the group may focus more time and energy on wording statements carefully or avoiding controversial topics entirely to avoid upsetting others. This is potentially very dangerous as group members are implicitly discouraged from speaking up if they see a problem, and thus are more likely to allow recognized problems to slip by simply to avoid upsetting the apple cart. If you cannot beat them, you might as well join them, but at what cost?

COMMUNICATION*

Communication is not explicitly listed in Meyer's list of EoC determinants (Meyer, 2014), but it is associated with several social determinants and is a major consideration in crew resource management (Kanki et al., 2010). Malfunctioning communication is often a symptom of a dysfunctional team, but not always. Consider the Abilene paradox (Harvey, 1974): One hot afternoon, the father of a family thinks the kids might like to take a trip for the day and suggests they all drive up to Abilene, Texas from their home in Coleman. It is a rather long drive so going will be a substantial commitment of time. Dad does not especially want to go, but the kids might enjoy it, so he proposes the idea. Mom does not especially want to go, but Dad seems eager, so Mom chimes in that it is a good idea to get out of the house. The kids do not especially want to go, but Mom and Dad seem excited, so they might as well put on a happy face. So, they pile into the car and take the long trip out and back from Abilene. No one has a good time, but no one is willing to admit their feelings for fear of upsetting someone else. This masking of true feelings by everyone can lead an organization to take actions that contradict their intended goals. This band-wagoning effect is similar to groupthink but differs in an important way: Groupthink refers to a majority that overpowers or silences a minority of dissenters. The Abilene paradox, on the other hand, refers to a situation where the majority or all parties are dissenters but do not voice their opinion. Ultimately, these both complement one another and point towards the same problem: Dissenting opinions are pressured, implicitly or explicitly, to remain silent. Do you want to tell the boss this is a bad idea when no one else is speaking up? I did not think so.

NORMS FOR CONSISTENCY

In an experiment where subjects were asked to rate the performance of another administrator, the subjects tended to rate another administrator higher if that administrator behaved consistently (Staw, 1981). In the experiment there were several case descriptions, some of which involved an administrator sticking to their original plan despite negative feedback, while others involved administrators who changed their plans in the face of negative feedback. The case descriptions that

were rated highest were those administrators who stuck to their guns through all the negative feedback but ultimately yielded a success. Interestingly, these cases were rated higher than administrators who changed their plans and still yielded a success. This norm for consistency demonstrates that results are weighted more heavily than process. The preference for consistency was not universal, however, as different subject groups weighted consistency more strongly, indicating that the preference is learned and cultivated through "socialization in business and governmental roles" (Staw, 1981, p. 581).

STORIES AND MYTH*

The norm for consistency is also a common theme in storytelling (Aristotle, 2000). The drama of a protagonist who is consistently losing but snatches victory from the jaws of defeat at the last moment is exciting entertainment, but is also potentially inspiration or confirmation for those already subscribing to norms for consistency. A doubling down on a failing plan for a last-minute victory makes for a great story and may even be highly rated by peers, but it is also a path towards EoC that could backfire if it ultimately results in failure, which was being indicated all along. It is also worth noting that many speeches delivered at graduations, and other milestone moments, center around stories of perseverance and usually include a message to "never give up." These stories and messages can be inspiring, but as evidenced by the various costs of EoC, refusing to give up can be a recipe for disaster. Never say "never."

THOUGHT PROCESSES, PERSONAL COURAGE, AND INTEGRITY*

Kahneman (2011) discussed the concepts of System 1 and System 2 as proposed by Stanovich and West (2000) as two types of thought systems. System 1 is largely automatic and features both intuition and mastery of certain mental tasks. System 2 is slower, but more thoughtful, and is the system that stops to think through a complex problem that System 1 cannot handle. For example, a simple math problem like 2 + 2 = ? is readily tackled by System 1 in most adults, while a complex math problem like (247,564 + 436) / 62,000 = ?, which requires more intense and careful thought, will be handled by System 2. The answer to both math problems is 4. System 2 thought can become System 1 over time with a great deal of practice. This is often colloquially described as "muscle memory." A musician first learning an instrument could be mentally exhausted by all the System 2 thought required to practice and learn a tune, but an accomplished player can depend on System 1 and learn the tune in a few minutes. Thorough decision-making requires leaning on System 2 and parsing through all the available information and options. However, decisions can be made on a

whim with System 1 by someone who either knows the problem well from experience or does not want to take the time to go through a rigorous decision analysis. In this way, System 1 can also be thought of as a force of habit. This simple automatic process could be key to understanding PCB and the subsequent EoC it generates by a person—all without them necessarily realizing they are doing it.

A decision-maker may overcome all their blind spots and still refuse to change course. As noted in the last several subchapters, social and organizational pressures can substantially impact a person's willingness to speak up to others. The more oppressive a social structure is, the more courage an individual must muster to overcome it. Personal integrity also plays a factor. Will the individual self-justify away all the inconvenient truths, or will they have the courage to stand up to themselves and stop to do what is right? There is substantial evidence that numerous psychological, social, and structural pressures can lead people to escalate or de-escalate erroneously (Meyer, 2014; Staw, 1976), but a last line of defense can be personal courage and integrity. A person may recognize that they are influenced by PCB and are rushing through a decision and might still press on anyway, but if their personal integrity or courage are able to intervene, it may allow enough time for System 2 to think through the problem and recognize the consequences. If you see something, say something.

SUMMARY OF EOC CAUSES

In summation, the general prevailing theory on why EoC occurs is that it is too costly to change course (Drummond, 2012). That cost might be monetary, emotional, political, or social, but the cost is considered too high in some way. This is likely the case for many examples, but it is well noted that no single cause is likely to be associated with EoC but instead a combination of several causes. Staw (1997) noted that the determinants associated with EoC are varied and occasionally contradictory. Optimism leads a project to be started, confirmation bias, expectation theory, and critical point theory let critical bad news to slip by until it is too late to avoid a failure. Once the failure is spotted, self-justification bolsters the original mistakes, policy entanglements and economic side bets make it too difficult to quit, and so goal substitution sets in as everyone just does the minimum to get the project finished—no matter what. Or, in a worst-case scenario of an industrial complex, the incentives lie in never truly finishing the project, but always making it appear that work is being done, all to hide the perverse profits derived from perpetuating the project indefinitely. After all, you would not want to work yourself out of a job, would you?

NOTABLE EXAMPLES

PCB was first acknowledged in a study looking at why airplanes attempted to land at a particular airport when conditions were unfavorable—ultimately leading to crashes (Berman & Dismukes, 2006). However, there are other transportation incidents that are noteworthy examples of the power of PCB. The 1967 oil spill of the *SS Torrey Canyon* (Hall, 2007), the 1967 *Apollo 1* fire (*NASA Apollo Mission Apollo-1-- Investigation*, 1967), and the 1986 *Challenger* explosion (Presidential Commission on the Space Shuttle Challenger Accident, 1986) all resulted from decisions influenced by PCB. While the nature of the adverse information in each of those cases varied, it was well-documented that problems were foreseen and foreboding. At NASA, the terms "Go fever" and "launch fever" were coined after the Apollo 1 fire to describe the pervasive and "contagious" nature of PCB that affected the whole organizational culture until tragedy snapped them back to reality (Reiser, 2019).

EoC has many examples throughout history. While EoC is noted to have numerous associated circumstances and outcomes, most studies into EoC focus specifically on runaway costs. Boston's Central Artery/Tunnel Project, known colloquially as the "Big Dig," was a major highway construction project spanning 25 years and involved rerouting major sections of roads in downtown Boston (LeBlanc, 2007). The project was plagued with cost and schedule overruns, design flaws, shoddy construction, criminal charges, and even deaths. Government megaprojects are often associated with EoC (Meyer, 2014), possibly due to politics, and possibly due to the moral hazard of contractors purposely underbidding projects to secure the contract while knowing the final cost will exceed estimates (Kőszegi, 2014).

The U.S. military's F-35 Joint Strike Fighter program has been a source of controversy as it exemplifies EoC of funds. The ambitious program to develop state-of-the-art jet fighter technology has been mired in cost-overruns, schedule delays, and disappointing results (Shalal-Esa, 2012). The multibillion-dollar program disappointed Pentagon officials with numerous issues involving everything from the pilot interface systems to availability of parts. The project leaders admitted that they were in budgetary entrapment due to depleted funds for the project, and yet the project has always found lifelines to continue. Meanwhile, taxpayer money continues to fund a project that has fallen well short of expectations (Greg, 2021). Pushback on declaring the F-35 a failure likely includes examples of self-justification.

A prime example of EoC-KCF is the very reason Staw first looked into it: the U.S. escalating its commitment to the increasingly unpopular Vietnam War (1976). In fact, Staw's seminal 1976 article *Knee-Deep in the Big Muddy: A Study of Escalating Commitment to a Chosen Course of Action* is derived from the Vietnam protest song *Waist Deep in the Big Muddy* (Seeger, 1967) about a platoon that nearly drowns in a river by following orders from a foolish commander who insists on pushing on despite warnings. The Vietnam war ultimately cost thousands of lives, millions of dollars, and essentially ended in a loss for the U.S. (Herring, 2004). It was known for decades in Washington that such a war would be nearly impossible to win, but commitment was escalated anyway to avoid national embarrassment.

Perhaps the most egregious and irresponsible example of EoC was the nuclear arms race of the Cold War in the latter half of the 20th century (Neuneck, 2019). While all out nuclear war never actually triggered, the development of thousands of nuclear weapons and the policy of mutually assured destruction by the U.S. and the U.S.S.R. demonstrated the willingness to threaten the world with annihilation for the sake of national competition. The Cold War ended in 1990 with the collapse of the U.S.S.R., but efforts to disarm nuclear weapons have been slow. Indeed, over the last few years, efforts in the nuclear arms sector have involved updating weapons rather than dismantling them entirely. The tense Cold War rested on a hair trigger for decades—broken arrows, the term for nuclear weapon accidents and close calls that almost triggered nuclear detonation, demonstrate how close humanity came to obliteration due to system malfunctions and simple human error (Niezing, 1980). While nuclear war never occurred, the number of weapons still in existence from EoC during the Cold War still presents a significant threat today (Neuneck, 2019).

THE EOC ELEVEN

While numerous documents were considered and included in preparing for this study, 11 documents proved to be the most important in understanding PCB and EoC: Meyer (2014), Kaptein (2012), Catmull and Wallace (2014), Kanki et al. (2010), A.M. Grant (2021), Berman and Dismukes (2006), the Project Management Institute (2017), Galef (2021), Aaker and Bagdonas (2021), Tavris and Aronson (2020), and Drummond (2012). These 11 documents are henceforth known as the "EoC Eleven" for simplicity, as there is a great deal of overlap among them and most of them are a metanalysis or compilations themselves. Any further references to the EoC Eleven refers to ideas that came from one, some, or all of these.

Meyer (2014) included a metanalysis of determinants associated with EoC in his document, citing 34 determinants explored by various authors. Meyer also explored the role of optimism bias on decision-making and its surprisingly high level of importance compared to other studies.

Kaptein (2012) completed a metanalysis of common causes of fraud and unethical behavior. Contrary to popular belief, the evidence indicates that crime is not only the purview of "bad people" but can occur because average citizens are incentivized to do it. Some of these behaviors have to do with getting a leg up on others, but most are associated in some way with desperation or frustration. Many of his 52 items overlap neatly with points made by the other authors in the EoC Eleven.

Catmull and Wallace (2014) recounted the experiences of Ed Catmull and the founding of Pixar. Among his numerous lessons in the book, he explored the importance of work culture on business, and the unexpected results, good or bad, of seemingly innocuous choices. He also recognized early in his career that many of his peers started companies that ultimately failed due to obviously poor decisions. While he and the other founders made every effort to ensure Pixar would not follow the same path, it was a rocky road with many hard lessons learned along the way. While PCB and EoC are not directly mentioned by name, he cited numerous examples of them either occurring or being narrowly avoided. The business philosophy Catmull and Pixar came to settle on is very similar to design-thinking, which is also an absent term in the book.

Kanki et al. (2010) literally wrote the book on crew resource management, which are the methods of maximizing the value of an airplane's crew. While the bulk of the book is focused on specific technical mechanics and training of the subject of crew resource management, chapter five takes a specific look at decision-making, PCB, and its associated circumstances in aviation accidents. The chapter delves deeply into the many nuanced "human error" causes of transportation accidents from high-level business practices to moment-by-moment decisions made during crises. Communication and coordination are discussed in-depth.

Grant (2021) wrote a book including a metanalysis of studies on rethinking. This book gleans lessons from numerous stories about people rethinking their own assumptions, getting others to rethink theirs, and creating a culture that understands and promotes the values of rethinking. EoC is specifically mentioned, along with other associated psychological and statistical biases. Since addressing PCB hinges on deciding when it is best to change one's mind, this book is particularly relevant.

Berman and Dismukes (2006) wrote the seminal work on PCB while looking at the causes of several aviation accidents, particularly during landing and landing approaches. This contains the first mention of plan-continuation bias the student researcher could find and delves into some of the causes. It recommends promoting awareness of PCB as a countermeasure, as well as openly questioning choices with a healthy level of doubt. It also explores "snowballing workload," which was discussed earlier as psychological entrapment and scope creep.

Project Management Institute's *PMBOK Guide* (2017) is a textbook resulting from the compilation of knowledge from numerous experienced project managers. It also serves as an operator's manual and reference document for project managers working in the field. The 49 processes are divided amongst five process groups and 10 knowledge areas focusing on specific actions to take to plan and execute a project. Tenets include advice on structuring project plans around expected and unexpected challenges and building in methods of tracking progress and course-correction. While all chapters are valuable, the Risk Management Knowledge area is especially relevant to EoC and decision-making.

Galef (2021) proposed two models of thinking to describe the overall mindsets that result from the summation of various cognitive biases, circumstances, and behaviors that commonly effect thought processes: soldier mindset and scout mindset. Soldier mindset is a mindset that can often accomplish things efficiently but is often subject to typical cognitive biases like optimism bias, confirmation bias, and others. PCB is not listed by name, but based on the description of soldier mindset, it would likely fall prey to PCB as well as other biases. Scout mindset, on the other hand, seeks to "see things as they are, not as you wish they were" (Galef, 2021, p. iv). Galef described scout mindset as seeking out the objective, if uncomfortable, truth over more comfortable mistruths. Galef also proposed techniques and methods for improving an individual's ability to get into scout mindset and to recognize when best to use it. Scout mindset is not valuable in all situations and some situations do indeed call for the unflinching tenacity of soldier mindset.

Aaker and Bagdonas (2021) wrote a book that is a metanalysis of humor, and its effects on thinking. They argued that humor and levity are one of the most powerful tools in business negotiation, communication, and breaking mental blocks. Among the various studies are examples of humor helping subjects to solve puzzles faster and to think more quickly through certain problems, having more effective communication with others and improved work relationships, and making

ideas more impactful and memorable. The authors noted that outright joking is not appropriate for all situations, but levity can often be worked into most situations without offense or harm. Indeed, some very difficult and serious topics can only be handled safely through a lens of humor or levity.

Tavris and Aronson (2020) wrote a book that is a metanalysis of self-deception and self-justification. The book does a deep dive into studies of self-justification, case studies, and the effects of self-justification on various industries and career fields. The authors noted that self-justification is theorized to derive directly from the unique discomfort called cognitive dissonance. It is often easier to double down on a claim that is demonstrably false than admit that you were wrong all along.

Drummond (2012) wrote a book on decision-making in partnership with *The Economist* news magazine. Drummond, the emeritus Professor of Decision Sciences at the University of Liverpool, writes extensively on the various phenomena known to impact decision making. This covers a lot of the same ground as Meyer (2014), but more in-depth. The book features a lengthy chapter on escalation of commitment and explores case studies, common contexts, and potential solutions for recognizing toxic EoC behavior and stopping it before losing control. She also noted, however, that not all EoC behavior is bad, and it could be equally costly to erroneously abandon a good project or worse: indecisiveness and putting off a decision indefinitely. As noted in the title of her book, decision-making is not about getting it 100% right, it is about *Getting it Right more than Wrong.*

The design-thinking practice of affinity clustering was used by the student researcher to sort through the various ideas expressed in the EoC Eleven and to determine themes. The affinity clustering exercise only featured six of the EoC Eleven, when it was constructed. These original six documents are Meyer (2014), Kaptein (2012), Catmull and Wallace (2014), Kanki et al. (2010), Grant (2021), and Berman and Dismukes (2006). The knowledge and insight of the remaining five was incorporated into the lists in the Proposed Solutions section of this chapter. Several of the original six documents featured convenient lists of causes or solutions related to EoC that were copied onto individual sticky notes using Lucidchart and organized using the DT exercise affinity clustering. The sticky notes were color-coded per their original document for tracking purposes, and since there were so many notes, connecting lines were drawn between similar ideas as they were organized. Figure 3 shows the affinity clustering exercise in progress.

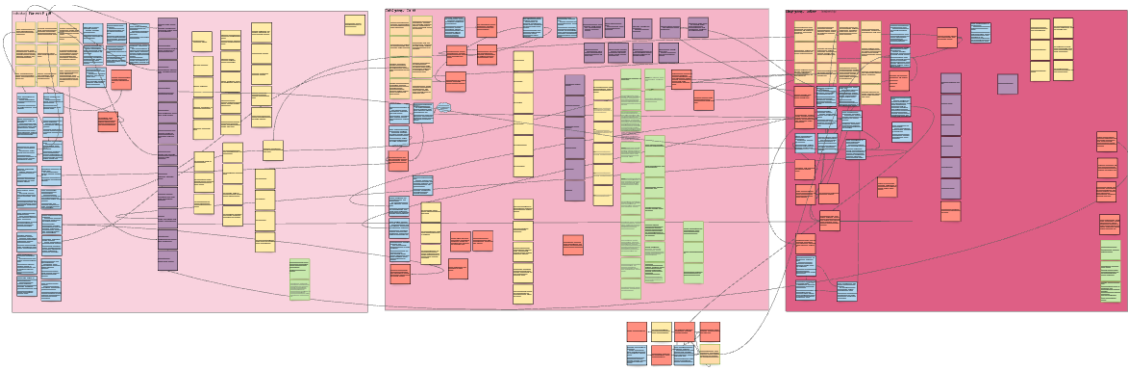


Figure 3. Affinity Clustering was used to organize thoughts from the EoC Eleven by the author.

Affinity clustering, like many DT techniques, is a bit messy and can look disorganized on the surface. Ultimately, the point of this and all DT exercises is not to do the technique perfectly, but to provide a basic framework and guidelines to organize thoughts.

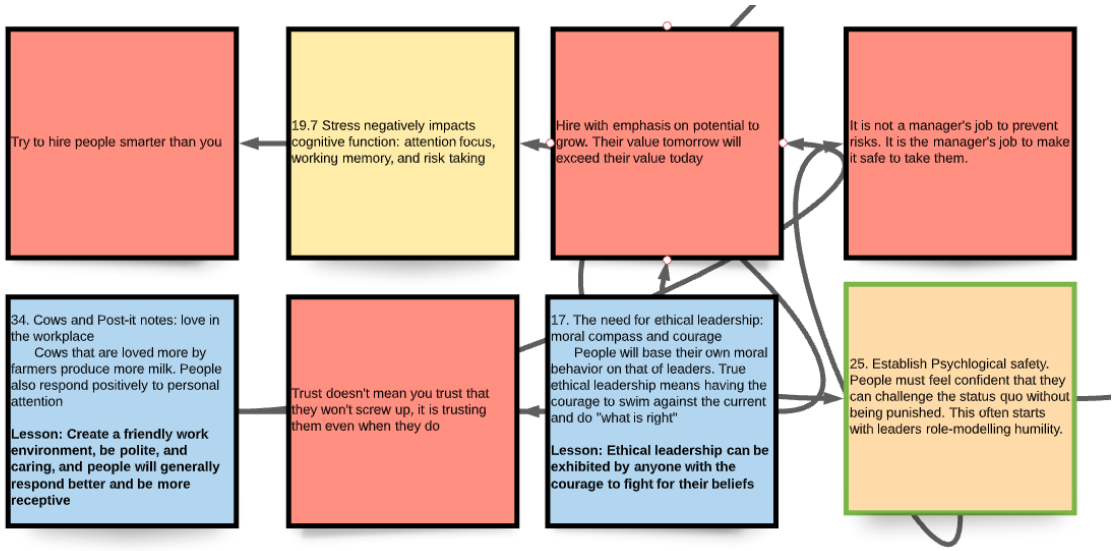


Figure 4. These ideas from Catmull and Wallace (2014) in red, Kaptein (2012) in blue, Kanki et al. (2010) in yellow, and Grant (2021) in orange were linked thematically and helped to inform the Proposed Solutions section.

Figure 4 demonstrates some of the ideas clustered together. Many of these were summarized, paraphrased, or combined with other EoC Eleven ideas and informed the Proposed Solutions section.

PROPOSED SOLUTIONS

It has been suggested that the solution to PCB and EoC-F risks is mainly to recognize them, dig deeper into them when spotted, and raise awareness to others (Drummond, 2012). While this is likely beneficial, it is also wholly inadequate due to the complexity of EoC (Rice, 2010). Addressing EoC is to tackle a multi-headed hydra—it is probably not sufficient to deal with one determinant or association at a time. Instead, it is more valuable to establish a framework of habits and best practices that allow for proactive measures to prevent EoC-Fs, but also to catch them in action before they spiral out of control.

Careful review of the EoC Eleven revealed valuable insights into the causes and proposed solutions to dealing with PCB and EoC. Since EoC-F risks are generally unfavorable, and EoC-S risks are generally favorable, the theoretical ideal responses are to avoid EoC-F risks and to exploit EoC-S risks per PMI (Project Management Institute, 2017). However, the EoC-U_S risks involve a great deal of luck and may not be best practices. Similarly, EoC-U_F risks are also heavily influenced by luck, and not necessarily an indicator of poor procedures, but a need for more investigation. All these documents acknowledge that there is no "silver-bullet" solution to EoC problems, but there must be many different solutions that compound.

THE EOC ELEVEN PROPOSED SOLUTIONS

First, the EoC Eleven overlapping theories on EoC, PCB, fraud, and management were compiled, and common themes expressed by one or more authors include:

1. Communication – Communication between leaders and employees is paramount. Employees will struggle to follow instructions if they do not know what is expected of them, and leaders will fail to respond to threats they are blind to themselves if employees do not communicate their own observations back to their leaders.
    a. Communication should be as clear and concise as possible, but expecting true candor requires understanding that sometimes people will struggle with the words.
    b. Communication should be as objective and polite as possible, as messages that are perceived as rude, insulting, or hurtful will distract the recipient from fully understanding the message.

c. Communication should be calm at first but become more forceful as failure becomes more imminent. A sender can and should request the recipient look them in the eye and request messages be repeated back to them in some cases. Sometimes a person needs to be "snapped out of it" to realize the trouble they are getting into.
d. People are more receptive to ideas when they are primed for it. If there is time, statements like "I have a question…" or "I have a concern…" can pique the curiosity of the recipient and afford them the opportunity to ask in response "What is it?" indicating they are paying attention, at which point you can state your case.
e. Messages are best understood when there is both feeling and justification behind them. "I have a bad feeling about this" is not especially effective, nor is "There is a storm ahead." "I have a bad feeling about that storm ahead—it looks pretty nasty" communicates much more effectively.
f. Euphemisms can dilute or confuse a message. Be direct and specific whenever possible, especially in stressful situations. People can be confused or misled by "There is trouble brewing" as opposed to "That storm cloud up ahead looks like trouble."
g. Sounding the alarm is good, adding potential solutions is better, and finishing with a question is best as it engages a debate and shows respect for the agency of others. "I don't like the look of that storm in our path. I think we should go around to the South. What do you think?"
h. Keep the lines of communication open and do your best to remain calm. Stress is a major distraction for people, and they will often focus some effort to reduce their stress instead of dealing with the task at hand.
i. Humor and levity can drastically improve communication between all kinds of stakeholders as it can bind them in laughter. The humor must be appropriate and respectful though—do not tell jokes about demographics you do not belong to or attack a person's identity. These actions are more likely to sever bonds than build them.
j. Clear goals make it easy to measure progress. The fuzzier goal details are, the harder it is to see when the situation is getting out of control.

2. Openness to Change and Improvement – Leaders should make it abundantly clear that they are open to suggestions to improve either themselves, or the general business practices.
    a. Openness means being willing to hear bad news or even messages that feel personal or hurtful.
    b. Openness means taking suggestions into account and enacting changes when the suggestion is beneficial.
    c. Openness means a willingness to discuss processes and results, both good and bad, and scheduling time to do such reviews.
    d. Openness means fostering a culture of curiosity and encouraging others to question authority, preconceptions, and even themselves.
    e. Openness means a willingness to admit when you did something wrong.
    f. Encourage questioning if current practices are indeed "best practices." Often something that works is never reviewed and becomes obsolete over time. Practices do not need to be changed for the sake of promoting change, however—they may indeed be as good as possible. Often, only failures are investigated—usually after failure has already occurred. Proactive investigation of successes can help prevent future disasters.
    g. A little chaos is often necessary to change practices, but do not add chaos to an already chaotic situation. Changing habits takes time and can slow people down as they figure them out. Changing procedures in the middle of a crisis can cause more unintended problems due to confusion. Sometimes people would rather "power through" a problem the old way because it is familiar to them.
    h. It is common for people to only present "good" news or "polished" information in formal meetings, partially due to the formal setting, and partially to present their best selves professionally. Bad news or incomplete news still lurks in the background but is more likely to be whispered in the hallways. Encouraging others to express all news in meetings, good or bad, can help alleviate some of this, but having ears in the hallways is also important. Be careful—any employee who comes across as a "spy" or "tattle-tale" will be shut out of information loops and will further contribute to a culture of distrust.

   i. It can be easy to dismiss certain messages that seem too insignificant. They may be an ominous sign of things to come.
   j. Similarly, astoundingly bad information can seem too outlandish to be believed. It can be tempting to think that since some news is too good to be true, it can also be too bad to be true. Do not make this fatal mistake; it could mean you are already in big trouble. The more bizarre the information is, the more you should pay attention to it—it might be false, but what if it is indeed true?

3. Leadership – Leaders can generally expect employees to follow by example, for better or worse.
   a. Leaders should lead by example and demonstrate they are willing to practice what they preach.
   b. Leaders should hold themselves accountable, not just their employees.
   c. Leaders should behave with integrity and expect the same from others.
   d. Leaders should be willing to make difficult decisions and have difficult conversations.
   e. Foster an environment of teamwork. People who feel they are part of a team will often try to cooperate, even in difficult situations.
   f. Do not tell someone else how they should do their job unless you know what you are talking about. A carpenter does not want advice from a boss who has never swung a hammer. Asking them about how they do their job from a place of curiosity can help you learn and help them learn as well, as they may spot flaws while they describe their own processes.
   g. Do your best to remain calm in stressful situations. Panicking can waste energy at a critical moment and remaining calm will help others remain calm.
   h. Make sure goals communicated to employees are aligned with higher-level goals. Stating that safety is a priority while implicitly encouraging cutting corners to save money sends a mixed message that confuses employees and creates a recipe for perverse incentives and ultimate failure.
   i. People are often most protective of things they associate with their identity. They can become easily offended if something they feel is a part of their identity is attacked or criticized. Leaders should recognize their own identity markers and should recognize what might trigger them or their employees. At the same time,

leaders should be mindful not to attack things that others closely identify with. This is the broader lesson behind the idiom "No politics or religion talk when first meeting someone."

j. Admitting errors and genuinely apologizing for them is critical to maintaining trust and respect. It is often easier to justify errors, especially big ones, with all manner of rationalizations than to own up to failures. However, employees who are irritated by the original error can become irate when they feel they are being lied to.

4. Enforcement – Rules should be enforced, and all stakeholders should be held accountable for their actions.
    a. Holding people to account means rewards as well as punishment. Rewards and punishments should scale to fit the deed. Simple mistakes should not be punished but should be reviewed and dissected. Actual crimes should be punished decisively both as an example to other would-be offenders as well as to demonstrate to the well-behaved that their good deeds matter. Similarly, rewards for major victories should not be paltry and should be made as personal as possible. A smile and a handshake go a long way, but not if someone else is getting an outsized bonus.
    b. Often large frauds or problems started very small and grew one small step at a time. One misstep can lead to another and another in a cycle. Break the "foot-in-the-door" escalation cycle by introducing scheduled auditing and investigation measures to catch problems early and nip them in the bud. Frauds, or even honest-but-bad practices, thrive in the dark.
    c. Mild punishments are most effective at changing behaviors. Strict punishments should be reserved for egregious offenses. If there is no plan or hope to change a person's mind or behavior, there is no point in pursuing the communication further and the relationship should be terminated.
    d. Rewards that are only connected with results can create a perverse incentive to achieve goals by any means necessary. Be sure to reward approved practices and behaviors, even if results are a little disappointing, or people will start cutting corners and cheating because the end seemingly justifies the means.

e. Too many rules or protocols are just as bad as too few. Giving people freedom to think for themselves demonstrates respect and trust. This also applies to checklists; they can be helpful in ensuring multi-step processes are completed, but if they are unnecessarily long, people will start looking for workarounds.
f. Mistakes come in at least two forms: choosing the wrong action for the task and choosing the correct action for a task, but executing it poorly. Ensure that training and reviews account for this difference. Knowing what to do is not the same as being able to do it and vice versa.
g. Do not shoot the messenger. Avoiding embarrassment and shame are shown to be powerful motivators for hiding actions or staying under the radar. Do not punish whistleblowing or speaking out—these come from a benevolent intention of improvement and accountability. Honest mistakes happen; take the opportunity to learn from them whenever possible.

5. Individual expectations versus interpersonal relationships – It should be everyone's responsibility to attempt to better themselves and encourage it in others.
    a. Become more comfortable seeking out information indicating you are wrong. Encourage others to do the same.
    b. Frame "being wrong" as "learning opportunities." Being wrong is not a warm feeling, but learning can be an enjoyable experience.
    c. Foster curiosity in yourself and others. Withhold judgement until evidence stacks up one way or another. Things are not always as they seem at first.
    d. Share incomplete or silly ideas as soon as possible. They may not go anywhere, but they might inspire better ideas. Encourage others to express silly ideas early too. Often the first idea is not the best but is still a critical steppingstone to better ideas. Failing early and failing often hurts much less than failing big late.
    e. Anyone, from any level within the organization, might have good ideas or see something no one else sees. Everyone should be able to communicate with anyone about anything. Strict communication channels can lead to lots of valuable messages being lost in the game of "telephone."
    f. Give everyone some freedom and agency to think and act for themselves. A strict chain of command can be demoralizing and is often slow to respond to crises.

g. Trust employees to do their best and most of them will. A culture of distrust wastes energy, and every problem, big or small, becomes much more complicated than necessary. Distrustful cultures are more likely to put people on edge, contribute to job turnover, and ironically promote unethical behavior.
h. It can often be difficult for people to see their own failings, but they can see the failings of others clear as day. Promoting interaction and peer-review processes can keep this blindness in check.
i. Self-justification is a very powerful force behind continuing with or defending bad ideas or behavior. While self-justification, and people who regularly defend themselves with it, should be rooted out, it usually comes from a place of self-preservation. Self-justification is essentially self-deception that can morph into external deception. These deceptions are not hostile in nature, but an effort to protect some strongly held belief. If you suspect someone is self-justifying a bad mistake, build a rapport and approach them with empathy and curiosity to understand where they are coming from. The person committing self-justification might not realize they are doing it and may hold tighter and tighter to it if they feel attacked. If they feel understood, however, they are more likely to notice and own up to their flaws themselves.

6. Be Realistic – People are often willing to work very hard on something difficult if properly motivated. However, they will give up early on something truly impossible.
    a. Determining how something will be accomplished is as important as figuring out what to accomplish. Unpacking or decomposing problems and solutions will help determine the level of difficulty to address them.
    b. Encourage others to unpack or decompose their ideas. They will often spot the holes in their argument themselves and will either abandon it or improve upon it.
    c. Set goals that seem within reach or only slightly beyond reach. People may surprise you with their skill but will give up early if goals are way beyond reach. Monitor progress and modify goals, as necessary. If progress is slow, either the goal needs to be scaled back or more resources are needed. Failing to address this could lead to burnout and compromising of morals and quality.

d. Once goals are accomplished, set new goals—but only after taking a moment to celebrate. Morale will swiftly drop if it feels like the goal posts are constantly moved beyond reach.
e. Employees are people, not robots. They have complex thoughts, feelings, and lives outside of work. Take the time to build a rapport, and they will be more likely to support you and trust you.
f. It is important to track progress towards goals, but do not let tracking accidentally become the goal. There is a risk that people could wind up spending more time tracking their work than doing their work—which is demoralizing and wasteful.
g. Time-pressure is a hallmark of EoC-F and bad decisions. Sometimes a stressed person will perceive time pressure that is not actually there. Do not apply unnecessary time pressure and offer to help those experiencing it. Often, they feel overwhelmed because they do not have the help they need or want. Much like goals, a little time pressure is motivating; outrageous time pressure is defeating.
h. Encourage stress-relief practices like box breathing, meditation, and taking breaks. Often, just a few moments away from the work can do wonders in getting a person focused and motivated again.
i. If a stressful situation is not a true emergency, it is often best to give people some time away from the problem to decompress and clear their minds. Whether it is five minutes or a long holiday, taking a break can effectively calm a team down.
j. If a project is over budget or behind schedule, it does not necessarily mean it is a failure. The original cost or time estimates could have been insufficient for the project to begin with. Assess the project on its own merits—if it is over budget, behind schedule, AND progress is not evident, then it may be time to pull the plug.
k. Progress on certain projects is obvious, like building construction. Some project progress is less visible, like information technology. Make sure you have a reliable way of measuring progress on whatever your project is.

7. Learn – Learning from past errors and successes will improve the odds of more successes.

a. Success can be due to good practices or due to dumb luck. Take the time to investigate the true nature of success before resting on your laurels.
b. Failures can also be due to bad practices or bad luck. Investigate these carefully too to avoid drawing the wrong conclusions.
c. Learning from someone else's mistakes is best, but learning from your own is a virtue. Learning from neither will likely doom you to repeat errors forever.
d. Learn about other people's jobs, lives, and experiences through direct interaction and reading. One of the greatest successes of learning is making connections between disparate concepts. Someone in another department or role might have the solution to one of your problems, and you might have the solution to theirs. You will never know until you share.
e. A willingness to investigate and learn makes you nimbler. Addressing EoC means knowing when to change direction and when to stay the course. Potential decision points could slip by unnoticed if you are not willing to look for them.
f. Always ask: "What assumptions are being made?", "Are we solving the right problem?" and "In what ways might this go sideways?" These questions can root out a lot of foreseeable problems.
g. Some problems were unforeseeable and completely beyond your control. Do not waste time or energy lamenting things you had no power over.
h. People have an easier time learning if they are having fun. Try and bring some levity to meetings and conversations on lessons learned. Even if the general sentiment is negative, a little appropriate levity can help people feel better and move on.

The EoC Eleven demonstrate a complex, but understandable web of themes on management. While some of the EoC Eleven are derived directly from research studies, others are "lessons-learned" from years of professional experience. Clearly, EoC and PCB have a profound impact on projects and management in general.

RISK MANAGEMENT

Risk management is a knowledge area concerned with recognizing and addressing risks within a project or organization (Project Management Institute, 2017). Risks are often understood to be bad, but they are best understood as anything that is not guaranteed to occur, but instead might

occur. These risks could be good (opportunities) or bad (threats). First, risks must be identified, then analyzed, then addressed and monitored. Risks are often described by two factors: their likelihood of happening (probability) and their effect on a situation (impact). Risks can be thought of and analyzed on a probability/impact matrix with low likelihood/low impact risks considered acceptable, and high likelihood/high impact risks being managed very closely.

Risks can be approached several ways. PMI offers five options each for handling threats and opportunities. The options are similar, but of course differ in that threats are purposefully minimized while opportunities are maximized (Project Management Institute, 2017).

THREATS	**OPPORTUNITIES**
Escalate – pass the situation to a higher authority and ask them to make the decision	Escalate – pass the situation to a higher authority and ask them to make the decision
Avoid – Alter a plan to ensure the threat does not occur and avoids the risk entirely	Exploit – Alter a plan to ensure the opportunity occurs
Transfer – Shift the cost of a risk to another party, like insurance or a warranty	Share – Shift some of the cost of the opportunity to another party so they share in the spoils, like a joint venture or team
Mitigate – Alter the plan to reduce the likelihood of a risk, or its impact	Enhance – Alter the plan to increase the likelihood of a risk, or its impact
Accept – Do nothing about the risk because nothing can be done, or it is not impactful enough to bother	Accept – Do nothing about the risk because nothing can be done, or it is not impactful enough to bother

James Reason is best known for his writings on accident causation, specifically, the Swiss cheese model (Reason, 1990). The model casts any given threat as an archery arrow travelling towards a target. In order to mitigate the threat, a shield is erected to block the path. The only problem is that the shield has weaknesses or holes in it, like a slice of Swiss cheese. For this reason, more shields have to be erected, which are also perforated. The idea is that the more slices of Swiss cheese shields are used, the lower the likelihood that a threat will be able to pass them all. For example, modern automobiles have several, layered safety features to protect a driver:

1. Layer 1 – A crumple zone: The car will purposely crumple strategically to absorb much of the impact of a collision so that the harmful energy does not pass through the driver.
2. Layer 2 – Seatbelts: The driver wears a restrictive seatbelt which keeps them firmly in the seat in a collision and prevents them from soaring through the windshield.
3. Layer 3 – Airbags: Airbags rapidly explode into relatively soft cushions to protect the driver from serious injury from slamming their head into the steering wheel.
4. Layer 4 – Responsible driving: Driving responsibly and carefully can avoid accidents entirely and drastically reduce the need to depend on the other layers.

This list is not comprehensive, just an example of the Swiss cheese shields protecting a driver. They overlap and cover each other's weaknesses—to a certain extent. It can be tempting to remove one or several shields or omit them from a system design because it is costly or difficult to build and manage. This might be acceptable, but it is always important to remember that the shields are not truly redundant, because those holes mean that at some point a threat might find a loophole through all the layers of Swiss cheese to hit that target.

A design factor, or a factor of safety, is a mathematical redundancy designed to ensure that some engineered system can withstand a much greater stress than it is intended to ever hold. For example, a building that uses a design factor of 2.0 means that if the building is planned to house 100 people, then it will be designed and constructed in a manner that ensures it will not fail, or collapse, until 200 people are inside. The actual yield and ultimate strengths of materials and structures is too complex a topic to delve into here, but the overall idea of a design factor can still be understood—systems should be designed with a level of redundancy to ensure that they do not fail when operated within expected limits, or even slightly beyond those limits. A shock load or surge load is a sudden and rapid increase in the load on a system due to unusual circumstances. A piece of furniture may be able to hold the weight of four people, but it may buckle under the shock load of all four people jumping on the furniture at once. A storm drain system may be designed for heavy rains but may struggle to drain away torrents of water from a hurricane leading to backups and flooding. Design factors build in extra breathing room for a system so that it can handle some shock loads, but everything has a limit. It can be comforting to know that a building can actually hold more than its capacity for an emergency, but it could be easy to self-justify any design factor away completely, especially with habituation and the foot-in-the-door technique. Getting just one more person inside will not collapse the building… right? Ultimately a design factor affords some piece of mind, but it is

usually not an exact science. The math says the building will fail at 200 people, but person 198 or 199 might be the actual last straw.

Risk management is a substantial subject unto itself, which can involve complex qualitative and quantitative analysis of numerous factors. However, the most important lessons can be learned in broad strokes. Building in systemic redundancies, even if they are flawed and have holes like Swiss cheese, is an effective mitigation strategy. Perhaps more important than building in the redundancies is recognizing why they are necessary: that human brains and thought processes are fallible and may not always think of everything. The expression "I just don't see that happening" seems like an explicit comment on how likely the event in question is, but it is also an implicit comment on the failure of imagination. It is always important to seek out as much information as possible to address risks, but it is also important to recognize that there is always information missing, and to make some effort to address it when and if it presents itself.

Justification for the Study

The EoC Eleven cover a lot of bases, so why is any more research needed? As they indicate themselves, introspection and analysis are key to combatting bad decisions. So really the question is: What other causes of PCB or EoC are there, and what other valuable solutions are lurking in the shadows? Without researching the matter further, we may never know.

DESIGN-THINKING

As of this writing, the student researcher could find no examples of applying Design-Thinking to PCB or any other studies of using DT to address EoC. DT is a method of using techniques typically utilized by artists and designers and applying them to industries that would not traditionally use such techniques. Key tenets of DT include empathy, creative play, and failing small early to learn and succeed big later (Brown & Kātz, 2009). DT has been applied to numerous fields in recent years and has proven helpful in teasing out lessons from complex problems.

DT is an excellent approach to study and address a less understood concept such as PCB and EoC. Since addressing PCB means understanding when and how to change minds, the DT philosophy itself is helpful due to its familiarity and comfort with pivoting based on changing information. Not

all forms of PCB or EoC are bad and therefore the empathic approach of DT is valuable in teasing out the thoughts and feelings of managers and decision-makers in a work environment.

Human beings make decisions all the time—for themselves, for others, and sometimes even without realizing it (Kahneman, 2011). Theoretically, all humans could be valuable test subjects for exploring PCB and EoC, but this study will focus on people who currently hold or recently held management or decision-maker positions in their profession. This is because their roles as managers often affect other stakeholders, such as subordinates or clients, and they have a higher likelihood of being aware of their responsibilities and potential consequences of their decisions.

Methods

PURPOSE

The purpose of this study was to apply design-thinking methods to better understand decision-making that can lead to plan-continuation bias and escalating commitment in a management setting.

SAMPLE

Of a potential sample of 20 managers and decision-makers from various backgrounds and experience levels, 10 were recruited from a convenience sample of persons known to the student researcher, as well as a secondary network of people known to the original group of contacts. The student researcher reached out to friends and family who were known to fit the sample and asked them if they, or anyone they knew, may be interested. Individuals who had retired or transitioned from their role within the last 7 years were also included based on their significant level of experience.

Recruitment occurred over email and consisted of an initial recruitment message to gauge interest. Those who expressed interest were sent formal consent documents to sign and agree to participate.

The sequence of activities that involved participant contact was as follows:

1. Appendix A – Initial Recruitment email. This email reached out to individuals in management or decision-maker positions for initial recruitment and included stock language that was emailed out to other parties within the secondary network. Those who responded with interest were added to a spreadsheet to track their appropriate progress.
2. Appendix B – Recruitment Follow-up email and Appendix C – Consent form. This email included the consent document as an attachment. The consent document required subjects to sign their approval to engage in the study.
    a. Those who declined to sign or return the consent form were not engaged further and were dropped from any further contact.
3. Appendix F – Workshop One Email and Appendix G – Workshop One Explanation. Participants were emailed a welcome letter and an explanation of Workshop One.
4. Appendix I – Workshop One thank you email
5. Appendix J– Workshop Two Brief and Doodle poll and Appendix K – Workshop Two Explanation
6. Appendix L – Quick Reference Guide and Appendix M – Critique Template

INSTRUMENT AND PROCEDURE

This study consisted of six distinct phases. Three of the phases were completed by the student researcher and three involved study participants. All DT activities were drawn from the LUMA Institute (2012). Figure 5 demonstrates the sequence of activities, and the phases are described in greater detail in the following sections.

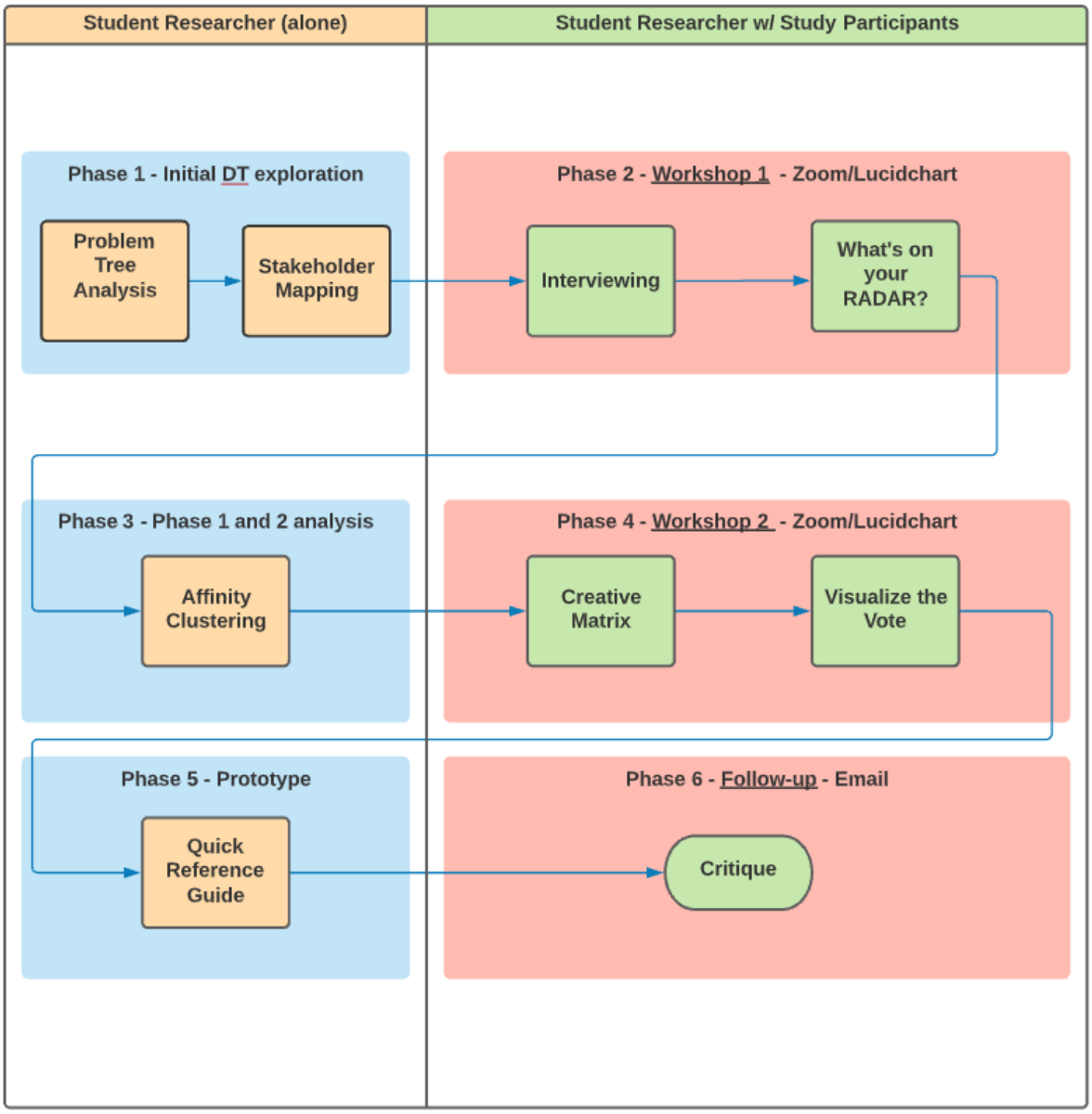


Figure 5. Flowchart of DT activities

PHASE ONE – INITIAL EXPLORATION

Phase One consisted of two design-thinking activities that involved the student researcher analyzing information gleaned from the Literature Review. This took three weeks. Problem Tree Analysis is a DT activity designed to help see patterns in the causes and effects of a problem. It typically involves drawing a box in the center of a page and writing the problem within the box. This represents the tree "trunk." Causes of the problem are added to the bottom of the graph and spread out

for easy reading. These represent the "roots" of the tree. Similarly, the effects of the problem are written in boxes above the problem and represent "leaves" (see Figure 6).

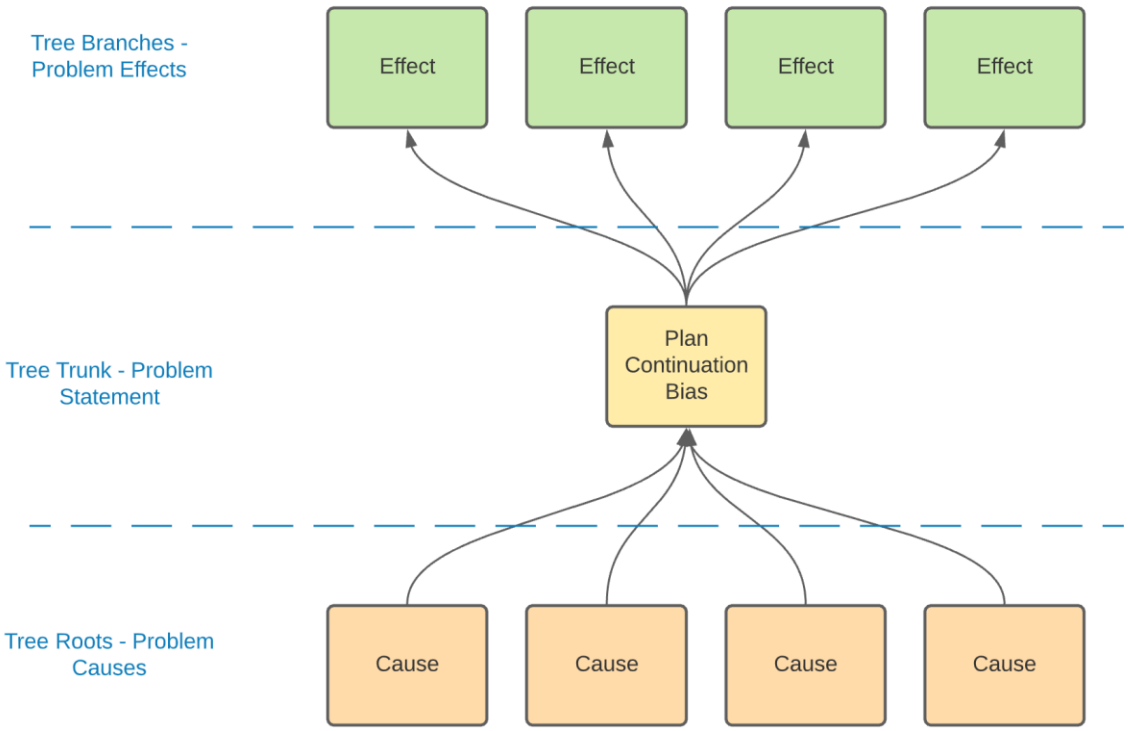


Figure 6. Problem Tree Analysis diagram

Lines are then drawn between connected concepts on the page. The most obvious connections are the cause-problem-effect, but occasionally, the effects can be connected back to causes. This is representative of a feedback loop. For this exercise, all eight examples of EoC discussed were explored to look for connections between them and any other patterns that can emerge. Meyer's list of 34 determinants were added first and expanded upon from there using the Tree as both a brainstorming tool and an analysis tool. The output of this exercise was an exhaustive diagram of the interconnections of causes and effects of the different forms of EoC.

This was followed by another DT activity—Stakeholder Mapping. Stakeholder mapping involves drawing stakeholders of a given problem or project on a board and drawing connections between them with labels (see Appendix E – Stakeholder Map Template). The purpose of this is to spot patterns and connections between people that are not always obvious on the surface, with the benefit of understanding relationships between stakeholders better. For this exercise, the eight

examples of EoC and Problem Tree analysis were explored to understand what kind of stakeholder networks may be more or less likely to produce each form of EoC, based on the information derived from the EoC Eleven. The output of this exercise was an exhaustive diagram of the interconnections of stakeholders in given EoC situations.

PHASE TWO – WORKSHOP ONE

Phase Two consisted of two DT activities involving subject participation, accomplished over Zoom and Lucidchart. These activities were recorded over Zoom for further analysis by the student researcher. This workshop took approximately 45 minutes of each subject's time, though some participants opted to stay for up to an hour. After determining schedule availability, subjects were paired off by the student researcher to interact with each other. The student researcher emailed a Zoom link to each pair of subjects. During Phase Two, the student researcher recorded the DT session and was present to facilitate the interview and What's on Your RADAR activity. First, the subjects interviewed each other per the template provided (see Appendix G – Workshop One Explanation). This consisted of 13 questions asking the subjects about aspects of changing their minds at work, and when they know it is best to change their minds.

All interviews were conducted over Zoom and the first two (2) interview questions were about simple demographics (age range and education level). Questions three through seven (3-7) focused on their current roles as decision-makers/managers and what kinds of stakeholders are affected by those decisions. Questions eight through 13 (8-13) focused on different scenarios involved in changing their own minds and changing the minds of others.

Upon completion of all interviews, the video recordings were transcribed by the student researcher. All interview transcripts were edited and paraphrased for clarity and to protect identifiable information that may have come out in the interviews.

Following the interview, they then completed a What's on Your RADAR exercise. This is a DT activity involving a board that resembles a RADAR screen and writing things on sticky notes that are then arranged on the RADAR screen by importance—the most important things at the center of the screen and the least important things at the edge of the screen. The screen is also divided into wedges representing concepts relevant to the problem (see Figure 7). Participants were prompted with the following sentence:

"You are in the middle of executing a plan you and your team have worked on for the last 6 months. A team-member expresses one morning that the plan will no longer work. What kinds of things might affect your next steps?"

The idea here was for participants to write down aspects of their personal thought process and to organize them on the RADAR screen.

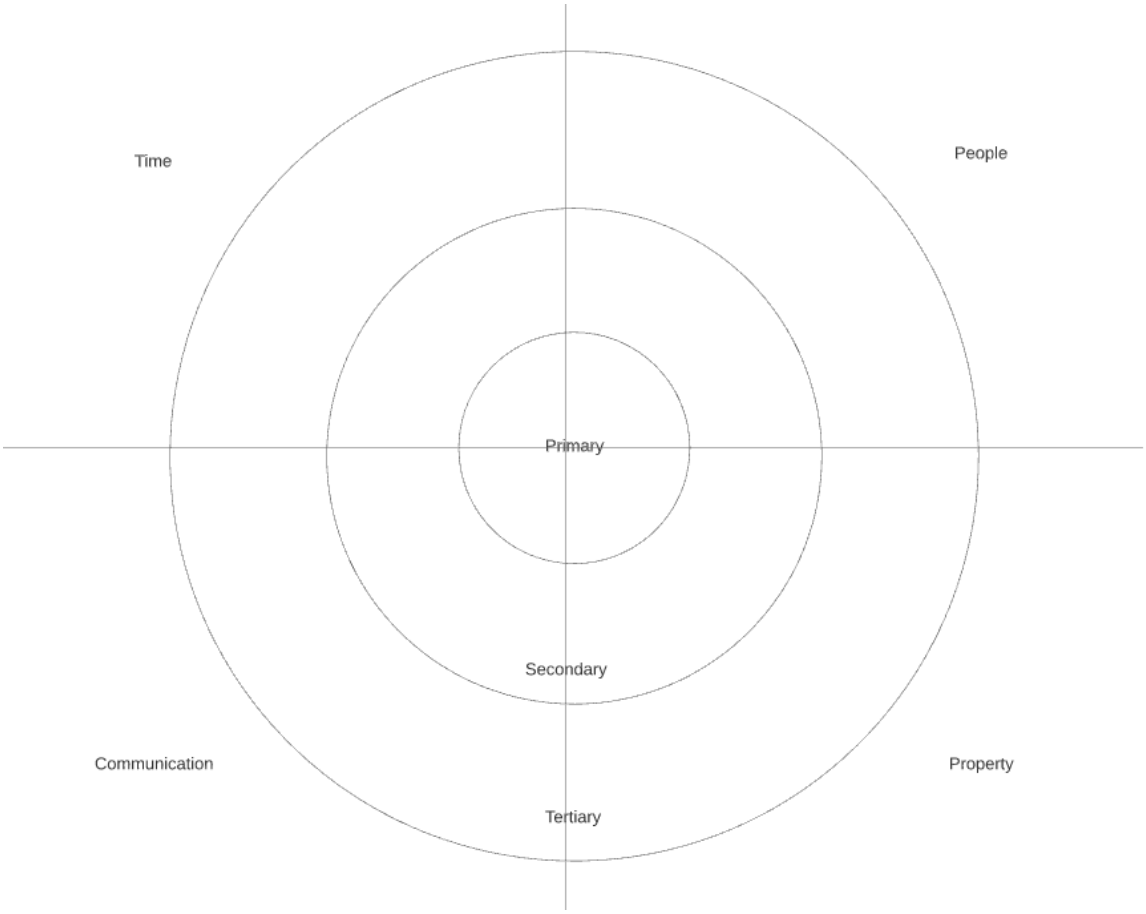


Figure 7. What's on Your RADAR screen the participants saw and interacted with on Lucidchart.

The outputs of Workshop One consisted of a video recording of the two participants interviewing each other over Zoom, as well as any discussion they may have had as they completed their RADAR screen together. The Lucidchart board was only available to the participants for a limited amount of time and became inaccessible after Workshop One had ended.

PHASE THREE – ANALYSIS OF PHASE ONE AND TWO

Following all subjects' completion of Workshop One, the student researcher analyzed the interviews and RADAR screens with another DT exercise: Affinity Clustering. Affinity Clustering consists of writing down ideas or concepts onto sticky notes and organizing them on a large board. Over time, similar concepts and ideas can be grouped together and labelled as a theme. The purpose of this exercise is to see patterns and overlapping ideas.

Individual sentences, ideas, or concepts from the interview transcripts were transferred to digital sticky notes for this exercise. The sticky notes were color-coded to correspond to the question that prompted them. The sticky notes from the RADAR screens were also color-coded, but this time to track which ring they were placed in rather than which participant wrote the note. Finally, the transcribed sticky notes from the interviews were clustered together, but separately, from the clustered notes from the RADAR screens. The output of this exercise was clustered concepts in neatly labelled groups. These clusters then informed Phase Four.

PHASE FOUR – WORKSHOP TWO

Phase Four consisted of two DT activities involving subject participation, accomplished over Zoom and Lucidchart. These activities were not video recorded and only the Lucidchart portion was retained for analysis. This activity took approximately 45 minutes of each subject's time, although some subjects opted to continue discussing for another 25 minutes. Following a survey of the subjects and their availability, all available subjects met for a single workshop over Zoom and Lucidchart. The student researcher emailed the participants the link to the Zoom meeting.

Workshop Two started with a slide show presentation of the findings from Phases One through Three, which took about 20 minutes. This slide show can be found in Appendix T - Slide show Presentation to Participants on Workshop Two. Following the presentation, the subjects participated in a DT activity called Creative Matrix. This engaged participants by allowing them to brainstorm ideas through a semi-rigid structure. A matrix is drawn that is five by five, or less, with various stakeholders listed at the top, and scenarios listed on the side. At each intersection, people write ideas on sticky notes that pertain to both axes (see Appendix K – Workshop Two Explanation). The axes were labelled before this workshop by the student researcher and were based on the revelations and patterns from Phases One through Three. The output of this was numerous ideas for dealing with different aspects of PCB and EoC as defined by the subjects. This activity took about 25

minutes. The row and column labels were generated by the student researcher based on the existing literature, and the results from Phases One through Three.

The stakeholders listed along the top row were:

1. Individual level
2. Group team level
3. Company level

The areas of interest listed along the side column were:

1. Discussions
2. Collaboration and trust
3. Facts, evidence, and data
4. Open-mindedness
5. Dealing with consequences

The final DT activity was Visualize the Vote—a simple voting system that only takes a few minutes. Dots were pre-made for the subjects. This consisted of a single primary vote and two "detail votes," which allowed participants to point out ideas they liked but were somehow inferior to their primary vote. They voted on the ideas they liked best on the creative matrix to follow up on. With the Vote complete, Workshop Two concluded, and the subjects were thanked and released until Phase Six.

PHASE FIVE – PROTOTYPE

Following the completion of Workshop Two, the ideas in the creative matrix were incorporated into a Quick Reference Guide (QRG) by the student researcher, along with other relevant information form the Literature Review. QRG is a DT technique that involves creating a short document and including key steps and concepts to cover a complex topic. This took two weeks to develop. The QRG prototype resulted in a graphically presentable quick reference guide to addressing PCB and EoC.

PHASE SIX – FOLLOW UP

The final step of this study involved presenting the completed QRG to the study subjects for their Critique. They were emailed a secure link to the QRG and asked for their notes or opinion on the

document. Any responses were considered and incorporated into a revised draft of the QRG. This took two weeks to collect all responses.

DATA ANALYSIS

The data from this study was almost entirely qualitative and thus was not analyzed using quantitative or statistical means. The data analysis technique varied by activity, but much of it involved drawing connections between ideas expressed.

The completed problem tree analysis demonstrated numerous connections that were clustered together based on the student researcher's judgement. These clusters improved readability of the document, but were not labelled, as the various causes, or determinants, and were not thematically connected other than both being causes associated with a particular variety of EoC.

The stakeholder map did not require affinity clustering as the results could be determined by each stakeholder relationship depicted, and the relationships were not necessarily thematically connected.

The interview responses and the notes from the RADAR screens were clustered together based on the student researcher's judgement with the labels for each cluster generated by the student researcher.

The various ideas expressed in the creative matrix of Workshop Two and the associated votes were incorporated into the QRG as best judged by the student researcher. Since development of the ORG involved developing a prototype from the ground up, the ideas from the creative matrix were compared to the existing studies from the literature review and incorporated. Due to the length constraint of a QRG, 10 to 12 pages as recommended by LUMA, some ideas were inevitably left out.

Results

RESULTS OF PHASE ONE – INITIAL EXPLORATION

Phase One consisted of two design-thinking exercises that were carried out by the student researcher: Problem Tree Analysis and Stakeholder Mapping.

PROBLEM TREE ANALYSIS

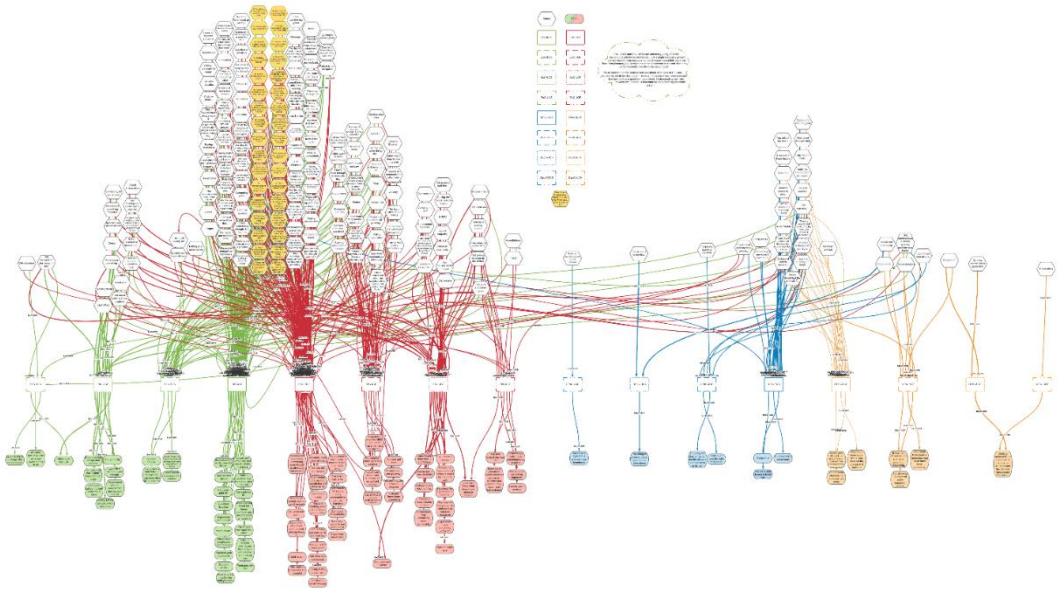


Figure 8. Problem Tree Analysis. Note: Causes are at the top and effects are at the bottom.

The problem tree analysis occurred across 10, roughly one-hour sessions, spread out across a period of three weeks. The varieties of EoC are color-coded and feature line types depending on the EoC variety. EoC-__Fs are red; EoC-__Ss are green. During this brainstorming process, it became clear that de-escalation should also be considered, so eight DEoC varieties, counterparts to the EOC varieties, were added with orange DEoC-__Fs and blue DEoC-Ss. Numerous causes and effects beyond Meyer's list were added and connected to the EoC variety as appropriate. Many of the bubbles were quotes or situations that led to existing relevant research. For example, "You can't tell me what to do" and "Inability to communicate effectively," both EoC-KOF varieties, connect to Reactance and the Abilene paradox respectively. Reactance is the belligerent response by an individual to a perceived loss of freedom and the Abilene paradox is the failure for all stakeholders to speak up, even when they are privately resistant to a plan. Nearly all causes could be connected to multiple EoC varieties, but the most common divergence was to either success or failures. After including the DEoC varieties, the total EoC spectrum includes 16 different total EoC varieties based on this model. The full analysis can be found in Appendix Q - Problem Tree Analysis.

The next substantial revelation of the Problem Tree Analysis was that certain decisions can affect things differently on different levels. This can also be thought of as short-term versus long-term successes or failures. A decision that initially appears to be an EoC-KCS may also be contributing to

an EoC-UCF at a higher level or longer timescale. The obvious example of this is that industrialization and complex mechanical technology greatly improved the lives of billions of people around the world for centuries but at a higher level, and longer timescale, contributed to global warming and climate change, which now threatens many of those same people who benefited so greatly from the same technology that created problems on a whole new scale. The design-thinking technique of abstraction laddering (Luma Institute, 2012) addresses this very concept and could be helpful for those who wish to consider how their decisions will affect different levels and timescales. Decisions can also seem to morph over time or be outright misunderstood at the time. For example, the ideal situation for a subscription service, in terms of profits, is to convince a customer to believe that they are committing EoC-KCS and paying for a service they will enjoy and get full use out of. On another level or timescale, the customer is committing EoC-UCF because they will never find the time to actually enjoy their subscription to the fullest. The road to hell is paved with good intentions. What is worse, over time and if they have opted for automatic payments, the subscription will be forgotten about and slip into EoC-UOF territory where the customer no longer must commissively hand over their money; it is done for them on a subscription they are no longer using or enjoying but is still costing them money. Storage units and the storage industry in general are likely an example of this: People rent the storage unit to store things they either do not need or do not want to deal with. This can be helpful for some who just need to store some treasured items for a little while, but it is likely that many people are simply committing EoC-KCF by paying month after month for what amounts to a storage unit-shaped trash can for refuse they cannot bring themselves to throw out once and for all. Storage units are just one example of this—other subscription services like continuing to pay for premium cable TV that no one watches, piano lessons no one is practicing for, and gym memberships no one is using are all examples of EoC-Fs related to an initial misunderstanding or incorrect assumptions over a longer timescale. It seemed like a good idea at the time…These examples are monetarily costly, but other examples may be more personally costly over the span of a lifetime, especially DEoC-KOFs. In his song, *"Cat's in the Cradle"* (1974), Harry Chapin described a man missing out on a meaningful relationship with his son because he is too busy when the boy is growing up. In Bronnie Ware's study of hospice patients and their regrets, *Regrets of the Dying* (2007), four of the top five regrets could all be classified as either EoC-KOFs, or DEoC-KOFs: regretting the things that were not done, instead of the commissive mistakes that were.

STAKEHOLDER MAPPING

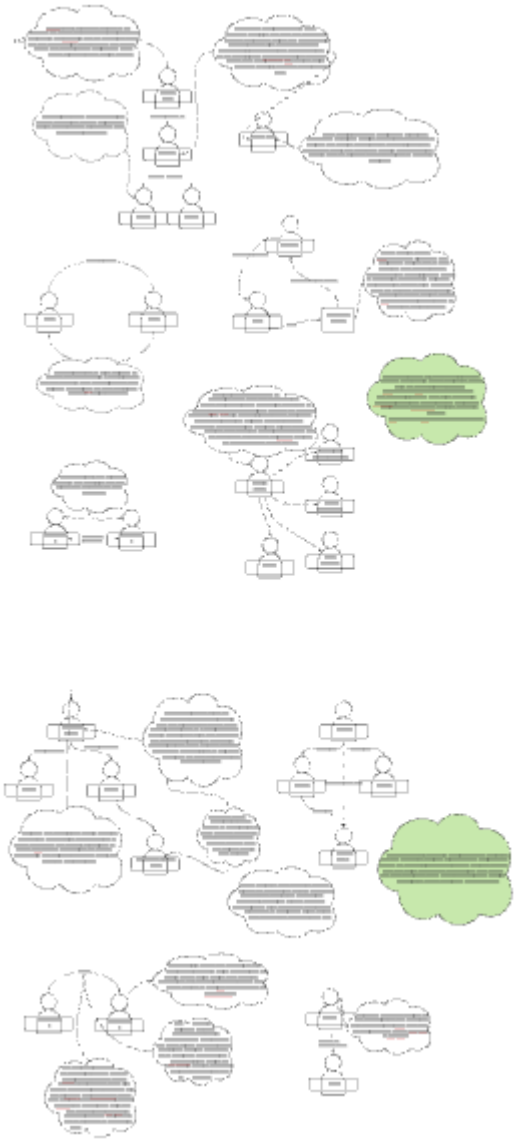


Figure 9. Stakeholder map

The stakeholder map took two hours and was a much quicker process than the Problem Tree Analysis because it was informed by the problem tree. The Stakeholder Map was meant to be somewhat generic as any given business, industry, or its component divisions could have varying types of complex work relationships. The map provided a clearer view of the kinds of relationships and communication models that can exist within a system. Communication was a common theme as well as the relationship structure between stakeholders. The map also demonstrates that

communication is a function of the relationship between stakeholders. Stakeholders on good terms will converse effectively and are more likely to catch growing issues, while dysfunctional stakeholder relationships are unlikely to connect effectively and therefore allow issues to grow unchecked. A team is more likely to catch problems since two brains are better than one, but a solo operator is also more agile since they are not inhibited by any social constraints of a team. A seller-buyer relationship is possibly tenuous because a seller's goal is to get the buyer to commit EoC and hand over money. Until the payment or commitment is received, the seller is holding all the risk, but upon receipt of payment, the buyer then obtains the risk.

Communication proved to be a common theme in the Problem Tree Analysis. This informed the Stakeholder Map as well. The communication structure of an environment can have a strong impact on the likelihood of different EoC variants. Communication strength is ultimately a function of the relationship of the stakeholders. A dysfunctional relationship between stakeholders will often mean limited communication and thus more opportunities for problems to slip through the cracks. This emphasizes the importance of both open-mindedness and transparency. If either one is limited, it is likely that someone is explicitly or implicitly allowing problems to grow unchecked. Whatever the relationship between stakeholders, it will have an impact on communication of information as well as the final decision-making process. In simple terms, a dysfunctional relationship between stakeholders means that bad decisions are more likely to be made for one reason or another. The full results of the stakeholder mapping can be found in Appendix S – Stakeholder map.

RESULTS OF PHASE TWO – WORKSHOP ONE

Workshop One consisted of two activities: Interview and What's on Your RADAR. All available participants took part in both activities. All workshop activities were attended, facilitated, and overseen by the student researcher.

INTERVIEW

Ten (10) participants took part in the Interview activity. All participants did their interview over Zoom conferencing, which was video recorded by the student researcher. Participants were paired off based on their schedule availability, but those that could not be paired off due to schedule conflicts were interviewed directly by the student researcher. All participants are listed and discussed in this paper by their job title to protect their identities. The pairings are described in Table 3.

*Table 3 - Pairings for Workshop One – Interview (*indicates participant was interviewed by student researcher)*

PARTICIPANT	SESSION	Q.1 AGE	Q.2 EDUCATION LEVEL	INTERVIEW PARTNER	Q.3 BRIEFLY DESCRIBE ROLE
Design/Tech Manager	1	60-69	Graduate degree	Assoc. Director of Special Events	Production coordinator at an educational institution for 25+ years.
Assoc. Director of Special Events	1	30-39	Bachelor's degree	Design/Tech Manager	Plans and executes events with foundation.
CEO Consulting Firm, Former County Manager	2	60-69	Graduate degree	Retired Business Owner	Currently a consultant, previously retired from being a county manager.
Retired Business Owner	2	60-69	Bachelor's degree	CEO, consulting firm	Ran a company building scenery for events, TV, and theatre for 30+ years.
Nonprofit Executive*	3	60-69	Graduate degree	*Interviewed by student researcher	Executive VP and chief of staff for a non-profit.
Library Director*	4	60-69	2 graduate degrees	*Interviewed by student researcher	Chief manager for county-wide library system.
Electrical Construction Foreman	5	50-59	Highschool + 5-year trade apprenticeship	Systems Engineer	Union electrician foreman working on industrial construction projects.

Systems Engineer	5	50-59	Bachelor's degree	Electrical Construction Foreman	Systems engineer for 10+ years involved in managing imaging systems.
Superintendent*	6	40-49	Some college + 2-year trade school	*Interviewed by student researcher	Superintendent of a commercial construction company.
Human Resources Manager*	7	50-59	Bachelor's degree	*Interviewed by student researcher	Human resources manager for 20+ years.

Table 4 - Workshop One Interview Answers

PARTICIPANT	Q.4 PEOPLE/ PROJECTS AFFECTED BY YOU?	Q.5 PEOPLE WORKING FOR YOU?	Q.6 SUPERVISOR AFFECTED BY YOU?	Q.7 ARE CUSTOMERS AFFECTED?
Design/Tech Manager	Communication between emerging artists and professionals	Seven professionals and 30-35 students.	Seven supervisors affected by me	Yes, people outside are always affected
Assoc. Director of Special Events	Immediate team of event planners and donor base	1 direct report, numerous vendors	Seven managers within my team and others on up to the president of the company	Yes, many
CEO, Consulting Firm, Former County Manager	All county operations from trash and snow removal to health services and parks	5000 employees plus residents	I reported to five board members of the county	Yes, both employees and county residents. Communication was the most important thing.
Retired Business Owner	Small crew and clients	8-10 for most projects	I had a partner for 27 years I had to	Yes, both customers and workers who would

			convince of a lot of things	assemble your work with no prior knowledge of it
Nonprofit Executive*	Decisions can affect the whole enterprise	50-60 direct reports to me and the teams they manage	Just the CEO	Network of volunteers, paid staff, and our millions of customers across the nation
Library Director*	Immediate staff and library users	130 full-time staff + volunteers	My supervisor is not affected by my decisions	Anyone who uses the library, 50-60k resident users
Electrical Construction Foreman	Several apprentices, other tradespeople, and customer	Depends on the project but 1-5 electricians most days	The company owner	Yes, customers, architects, or engineers
Systems Engineer	Technicians, engineers, managers, and anyone else who uses imaging to do their jobs	No direct reports but numerous stakeholders depend on the imaging I provide	I work with a team of 24 for a chief engineer	Yes, media outlets use our imaging as well as the engineers
Superintendent*	Construction Subcontractors	Varies, but 5-15 is typical each day	My supervisor is not affected by my decisions	Yes, architects or end-user customers
Human Resources Manager*	All employees at this location	1 assistant	My supervisor works at another site and is not generally affected by me	I advise 30 managers who oversee 220 line workers—I consider them all my customers

Questions 8 through 13 asked the participants about their experiences in decision-making and how they work through problems. Their answers varied wildly depending on the question and the participant, but several themes emerged across the questions, especially pertaining to relationships between stakeholders, time constraints, and having quality, reliable data.

The full list of themes can be found in the upcoming Results subchapter on Affinity Clustering. The following quotes have been paraphrased for conciseness and to remove any identifying information pertaining to the participants.

Question Eight: Tell me about a time you changed your mind on a decision you made at work. Please explain.

"Unfortunately, I sometimes have to make a quick decision to keep the jobsite moving… I have occasionally made the call on a 'small decision' to discover a few days later that it was not a small decision, and I have to consult with more people, sometimes someone has to backtrack a bit."

--Superintendent

"We recently had a situation where an employee was missing a lot of work to the point we were considering termination. But he reached out to me directly with all of his personal reasons…so we decided to give him another shot."

--HR Manager

"I read the science, listened to colleagues and consulted with my manager and decided to restore the mask mandate. I got the sense from the staff that I owed it to them to be responsible and reinstate the mask mandate."

--Public Library Director

"The hardest part about that [project] was accepting the change in plan that was based on new information. I had staff who had been working on this project for decades and they poured their heart and soul into it for years. It was probably one of the toughest things I ever had to do was see the disappointment on their faces."

--CEO Consulting Firm, Former County Manager

"Deciding when to re-enter the office [during COVID] has been a challenge. …some people were annoyed or upset [that we did not return to the office] but we want to make sure we are not a super-spreader organization."

--Nonprofit Executive

Question Nine: Tell me about a time you changed someone else's mind on a decision they made at work. Please explain.

"I often had to change my partner's mind. I would have to get him enthused and drag him along. He was content to wait for a 'better job' to come along but I always argued that you never know if or when a better job will come along. …My partner did not originally see the value of an

expensive [piece of equipment], but I saw the value and that it would pay off in a big way over time. That machine worked for 25 years and more than paid for itself."

--Retired Business Owner

"My manager did not want to pay back the loan, but I talked to a board member who had a connection to the project. …We can pay back the loan tomorrow for three million dollars or wait until it comes due and pay twelve million. …As a young kid in my 20s it felt good to make a real impact because I am not sure if I did not press the issue, it would not have just come due and cost millions more."

--CEO Consulting Firm, Former County Manager

Question Ten: What would you need from someone else to convince you to change your mind on a decision you made at work? Please explain.

"I try to be open minded always, but I need a thorough explanation. If someone comes to me and says they have a better way, I want to hear them out. …If I disagree, I hate to do it, but I pull rank and say this is how it must be, but I always try to be open minded and look into alternate ways."

--Electrical Construction Foreman

"Data sometimes persuades me but I am not a numbers person. I am more moved by issues of fairness and social justice. What is going to help the users of our system the most?... I am much more persuaded on helping the most disadvantaged, the most vulnerable, and the most impacted by our decisions. I really do believe in people having what they need to be successful and having a quality of life that they deserve."

--Public Library Director

"I would say [to a colleague] 'start it your way, lets reach a milestone and see where we are.' Sometimes I would insist on doing it my way, but only take it so far and then review. It was important in a creative environment to give the person some control over their project so long as they would check in with me occasionally."

--Retired Business Owner

"It would take a discussion. I want to talk to someone live on the phone, in person, or whatever. I do not react well to an email with bullet points unless those points are super clear. Even so, I want a discussion to hear your thought process."

--Special Events Associate Director

Question Eleven: How do you know when it is best to change your mind on a decision you have made in a work context, and when to stick to your original plan? Please explain.

"If someone comes to me with a change, if it is not beneficial or they cannot explain it well enough then we are going down the original path. If the reasons are good, I have no problem changing this or that to make it better. I [prefer] not to make a decision right away, I will step away from it and chew on [the problem] for a little while. …Particularly if it affects a lot of people or a lot of money, it is nice to have a break to go over things in your head."

--Systems Engineer

"I like people to push back and politely debate. If you have another way of looking at things, I am interested in hearing your points."

--Public Library Director

"I like to think I am reasonable. I have worked on both sides of it, I have been a worker and a manager, and I think that helps me a lot to understand their thought processes."

--Superintendent

"I am a big believer in clear goals and metrics. That should drive it, not personal feelings or emotions."

--Nonprofit Executive

"I always try to be thinking a few days ahead of items. I am always planning ahead for that reason, to give me some time to think about new info as it comes."

--Electrical Construction Foreman

Question Twelve: If you were told by a colleague or supervisor that a plan you came up with will not work, how would you convince them to change their mind? How would you follow up on the plan once you convinced them? Please explain.

"Full court press. I have a lot of confidence in my ideas. That can work against me, but I am serious about what I do. I have been at it a long time."

--Public Library Director

"We would often build prototypes. Prototypes would tell you in miniature or whatever whether or not the scaled project would work. Lots of thought and discussion went into prototypes. All sorts of stakeholders could be involved …Once you got people on board with changes you could figure out what is most important and do the less-important things more cheaply."

--Retired Business Owner

"Sometimes delaying a project automatically means it costs more money due to inflation and other things. The time-value of money is interesting. In a theatre business, they have already published the titles and schedules. They can't just postpone a show because it is not done."

--CEO Consulting Firm, Former County Manager

"Regardless of who is trying to convince who to change their mind I like to have a good discussion on good data. Make sure that you come up with a good plan. In general, with two people keeping open minds you can come up with something better together."

--Systems Engineer

Question Thirteen: Suppose you were in the middle of executing a plan at work and a team member expresses that the plan will no longer work. How would you handle this situation? What type of information would lead you to change the plan? What type of information would lead you to keep the existing plan?

"I would simply ask 'why?' I will listen to them, take in their facts and if their points are valid, we can often divert in construction. …It doesn't matter that I had this plan in place, [if] it is causing problems and it has to change."

--Superintendent

"I have definitely had to learn to adapt with this company. If you cannot handle change, you would probably not succeed here. I have learned to roll with it and not lose my mind over changes. I am big on problem-solving. I enjoy that challenge."

--HR Manager

"The first step is to stop what you are doing and try to evaluate what they are saying. Try to work it out and come up with a conclusion and go with what makes the most sense."

--Electrical Construction Manager

"A change in one of the elements that changed the plan often forces you to change the plan. We cannot keep the existing plan; a change is being made for you."

--Special Events Associate Director

"I think the most important thing if you are looking for factors is to have the conversation with the person who is coming and bringing it to you. Try to understand it from their viewpoint and have them explain it to you. It is always important to try and understand another person's perspective so you can either convince them otherwise or better understand the impact of what they are saying."

--CEO Consulting Firm, Former County Manager

Several, though not all, participants mentioned the COVID-19 pandemic in their interviews. They admitted that this was partially due to the continuing prevalence of the pandemic at the time of the interview, but also as something that shaped or altered their thoughts on bending or breaking longstanding rules or precedents.

"Ever since COVID there have been a lot of extenuating circumstances, so I have had to be not so stringent. …I am a rule follower."

--HR Manager

"As we have come back online from COVID, we have had to figure out how many hours we can be open. We are not able to return to the previous levels of pre-March 2020."

--Public Library Director

"Since we have offices in all 50 states plus Washington D.C. and hands in lots of programs all over the nation, the various rules and guidelines vary greatly state to state. …As much as I understand wanting people back in the office, you have to deal with the realities of the day."

--Nonprofit Executive

"After talking through different options for [an event during COVID] we determined it was best as all-virtual as opposed to hybrid virtual and in-person to avoid stakeholders dressing up and driving to an event that would occur mostly on a TV monitor anyway."

--Special Events Associate Director

Several themes and commonalities appeared in the interviews that were organized and expressed in the Affinity Clustering section.

WHAT'S ON YOUR RADAR?

The notes from the RADAR screen generally clustered into categories that are already noted elements within the business world, but especially project management. Four of the categories neatly formed four of the knowledge areas described by PMI (Project Management Institute, 2017): Schedule Management, Cost Management, Communications Management, and Stakeholder Engagement. The other four clusters focused on the nature of the problem: *What exactly is the problem? What do we need to do now and what other considerations are there? What resources do we need to fix the problem? And collaborate to discuss the problem.* These eight categories are representative of known aspects of project management and are not especially insightful, but they do serve to confirm that the subjects are knowledgeable of important considerations for handling a major change, even if only tacitly. The RADAR screens and their clusters can be found in Appendix O - Completed 'What's on your radar' screens and Appendix P - Completed Affinity Cluster of RADAR screens.

RESULTS OF PHASE THREE – ANALYSIS OF PHASE ONE AND TWO

AFFINITY CLUSTERING

Affinity clustering involves picking a note and placing it on a whiteboard and then picking up another note and deciding if the new note is like the first note. If it is similar, it gets placed beside it and if they are dissimilar, it is placed some distance away. This process repeats for every note, and over time, clusters of information start to form. Once all the notes have been sorted, the clusters can be given an umbrella title that encompasses all the ideas.

Following Workshop One the recorded interviews were transcribed by the student researcher—paraphrasing to remove any identifying information about the subjects. The transcript was then transcribed a second time, this time summarizing sentences or thoughts onto digital post-it notes in Lucidchart, which were then organized in an Affinity Clustering exercise.

Also following Workshop One, the RADAR screens were copied and compiled together. Notes were color coded to represent their importance level on the RADAR rings. They were then clustered together per the Affinity Cluster guidelines.

The resulting clusters derived from the interviews were:

1. I need data, and valid reasons from reliable sources.
2. Some issues are already in place and some issues are due to choices you made already.
3. Often, changing the plan affects a lot of different things. Asking the right questions before taking action can spare you a lot of headaches.
4. The way and time you think about changing your mind, or others' minds is important.
5. Convincing others.
6. Sometimes the plan isn't working out. Make changes now if you can and remember to change the plan next time.
7. Sometimes you have to pull rank to get things moving again.
8. It can be rewarding to change another person's mind, but it might be hard work.
9. Sometimes you cannot get everything you want but clever value-engineering can help you get most of it and to prioritize what is important.

10. Sometimes a decision has to be made quickly and sunk cost and goal distance can come into mind.
11. The consequences of a decision, right or wrong, can be painful. Sometimes the end result is for the best, but still upsetting.
12. Convincing evidence can take many forms, but it is usually best to catch problems early and alter the plan before you go too far down a costly direction with no real progress.
13. Build time into the schedule to deal with issues and work through problems. Give yourself a break to clear your head.
14. Trust and collaboration can yield better ideas and results for everyone.
15. Discussions.
16. Keep an open mind.
17. I need an explanation and some alternatives.

The resulting clusters derived from the RADAR screens were:

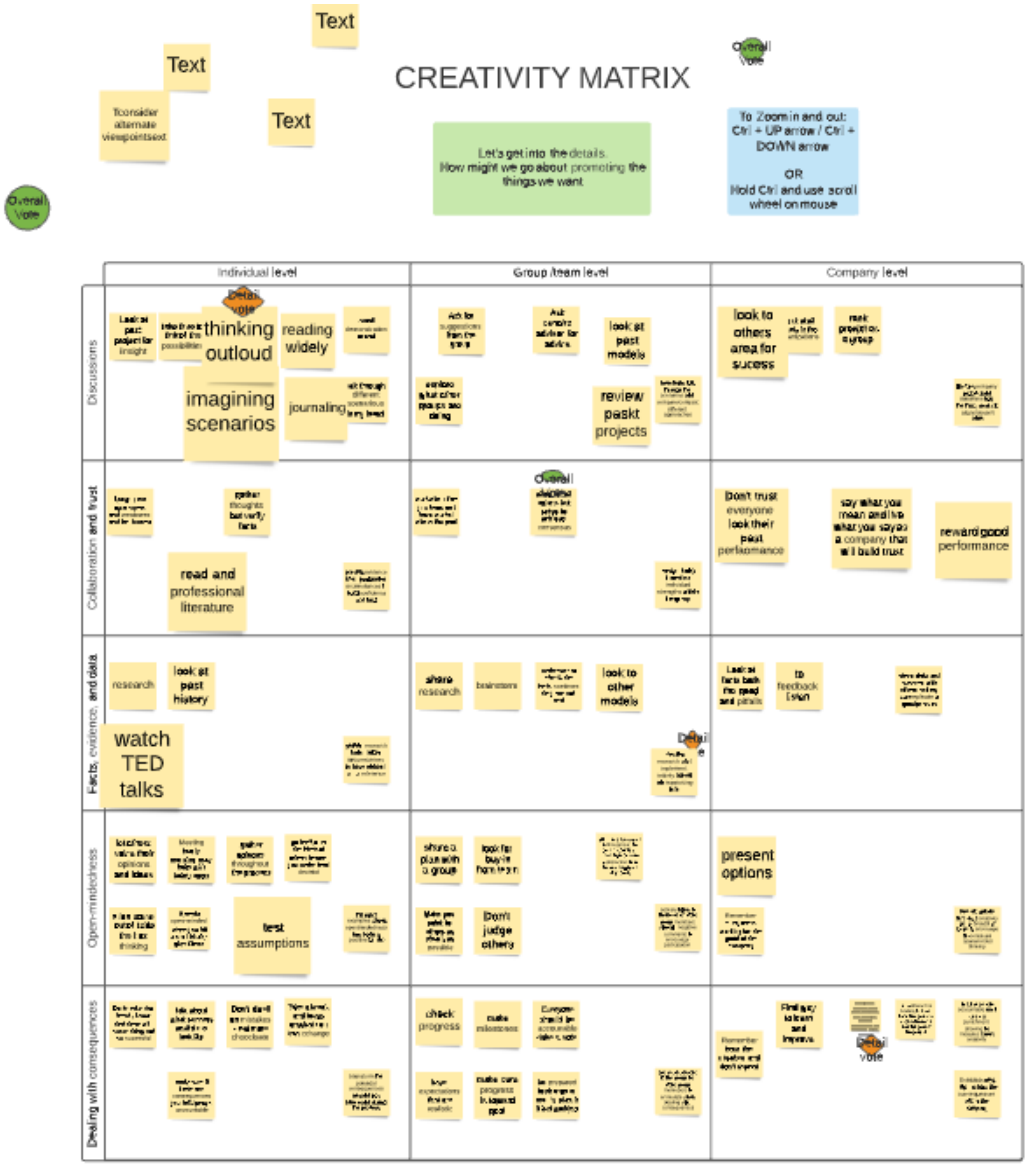
1. What exactly is the problem?
2. Collaborate to discuss problem.
3. What do we do now, and what other considerations are there?
4. What resources do we need to fix the problem?
5. Schedule impacts? (PMI Knowledge area [Project Management Institute, 2017])
6. Cost impacts? (PMI Knowledge area)
7. Communications. (PMI Knowledge area)
8. Stakeholders. (PMI Knowledge area)

RESULTS OF PHASE FOUR – WORKSHOP TWO

Six participants were able to take part in Workshop Two. One had technical difficulties and was unable to access the Lucidchart board directly. To accommodate this participant, and others who complained of visibility difficulties, the student researcher used the “Share Screen” tool in Zoom to allow the board to be seen by all participants. The student researcher then offered to interface help for anyone who had difficulties. A few notes were input this way.

CREATIVE MATRIX

After some initial technical difficulties of participants signing on and accessing the board, the student researcher fielded a few questions regarding user interface. After a few minutes of participants getting their bearings by playing around with the user interface, they quickly and effectively switched to addressing the proposed problem. Since they were on a shared Zoom call, they were able to inform each other of tips and tricks as they worked. This activity was very productive, and the participants engaged with it for approximately 25 minutes. Participants were encouraged not to worry about spelling so they could focus on continuing to produce notes.



Some ideas that emerged in the Creative Matrix were:

1. Thinking out loud
2. Present options that show creativity and a breadth of ideas to encourage the continued open-minded thinking
3. Actively listen to the ideas of other group members without negative comments to encourage participation
4. Talk about what success and failure look like
5. Do an after-action briefing to learn from the process—often the most helpful part of the project
6. Holding people accountable is not always punishment—allowing for mistakes brings creativity
7. Say what you mean and live what you say as a company that will build trust
8. Have the team talk through scenarios and compare/contrast different approaches

VISUALIZE THE VOTE

Three participants left by the time that voting was called. The three remaining participants were able to stick around for another 25 minutes to discuss their thoughts on voting, and the study topic of decision-making. All three agreed that they liked all the ideas on the board and had a difficult time judging which notes should receive their vote. Still, some placed vote dots on certain notes. Specifically, the only green *overall vote* was placed on "allow for all opinions but strive to achieve consensus." The three orange *detail votes* were placed on:

- "Thinking out loud"
- "Review research and implement activity based on supporting info."
- "Know where mistakes were made and make sure there are learning opportunities for everyone in the process."

POST-WORKSHOP DISCUSSION

The discussion afterward was beneficial, and the three participants reminisced on projects and situations from their past that were relevant to the topic. One pointed out that After-Action Reports were commonly done after projects, but pointed out that while every industry probably has a slightly different term for post-project meetings and reports, they often only happen after failures.

When a project is a success, everyone moves on and if the post-mortem meeting is mandated, it is usually not helpful or productive after a success.

RESULTS OF PHASE FIVE – PROTOTYPE

QUICK REFERENCE GUIDE

The Quick Reference Guide (QRG) was developed by the student researcher following the conclusion of Workshop Two. Since this QRG is meant to serve as a reference for anyone in the field of management, not just participants to the study, it was based on the information gathered from the Literature Review of this paper as well as the insights learned during the first four phases of this study. The QRG was established through the bullet points derived from the EoC Eleven in the Proposed Solutions subchapter of the Literature Review. From there, the Creative Matrix notes from Workshop Two were organized and re-transcribed by the student researcher into bullet points, which were then sorted and incorporated into the QRG where appropriate. Some of the participant ideas were already noted by the EoC Eleven, while some were not. Finally, the QRG was organized into simple chapters. It was deemed important to include sections on various cognitive biases and organizational environments associated with EoC as these are likely only understood tacitly by most experienced managers unless they are familiar with the specific research. The QRG is divided into five chapters after an overview on EoC and PCB:

A. How we acquire information
B. How information is presented
C. How information is processed
D. How we view and justify past and future choices
E. Possible tactics and strategies

The QRG was developed over a period of roughly one week by the student researcher who then sent the draft out to the thesis committee for notes. Since the QRG was being emailed to participants, who might save a copy in one way or another, it was preferable to ensure that the QRG be vetted beforehand. Once the thesis committee had returned their notes, the student researcher made the edits and sent the participants the document in the form of a PDF. The full draft document found in Appendix V - Draft Quick Reference Guide sent out to participants for critique.

RESULTS OF PHASE SIX – FOLLOW-UP

CRITIQUE

Once participants received the ORG via email, they were prompted with questions to critique the document. Some participants responded directly to the questions while some responded indirectly with a brief paragraph. Their paraphrased answers (unless directly quoted) are included below each question. Several participants separately expressed the same sentiment and so the number of participants who agreed with each statement are shown within brackets [x].

1. **What do you like in this Guide?**
    - *The sections are clear, organized, and easy to follow*. [2], Superintendent, and Special Events Associate Director
    - *The guide does not assume too much knowledge on the part of the reader*. [1], Special Events Associate Director
    - *"I like it. I think it might be very helpful to someone new to this type of position. I think the length of it is what stands out to me as the best part. It's not too wordy, or too much info to take at once. And I like the use of examples for reference."* [1], Superintendent
    - *"-Tactics and Strategies-very helpful, easy to read with bullets, practical tips that would be great for a new manager!* [1], HR Manager
    - *-Opening quote from the Gambler is clever!* [1], HR Manager
    - *-Open-mindedness is so important and making people feel comfortable that they can come to you.* [1], HR Manager
    - *-Suggestion box is good (we use an email box and an anonymous survey to get feedback)* [1], HR Manager
    - *-Framing is critical...it's How you say something vs What you say that can make the difference and get results.* [1], HR Manager
    - *-Analogies are good and relatable!* [1], HR Manager
    - *-Use of examples of how to say things is helpful."* [1], HR Manager

2. **What do you not like in this Guide?**
    - *It is a little long* [1], Special Events Associate Director

- *The guide feels more appropriate for academia and is not easily usable by management or line workers.* [2], Consultant and Non-profit Executive
- *"-Plan-Continuation Plan and Escalation of Commitment-the paragraph format is a bit wordy for a quick reference guide (perhaps break down the paragraphs more, use bullets, etc.).* [1], HR Manager
- *EOC classification-what will the codes be used for?* [1], HR Manager
- *-print is light, a little hard to see (use darker print, maybe larger font)."* [1], HR Manager

3. **What suggestions might you have for improving on this guide?**
   - *Illustrations or graphics could add visual interest and help make it more memorable* [1], Special Events Associate Director
4. **Finally, do you feel like this guide might be helpful to someone starting out in a management or decision-maker position like yours?**
   - *The guide would be helpful to someone starting out in management by providing a helpful framework for approaching certain situations.* [1], Special Events Associate Director
   - *"Definitely helpful for a new manager!!"* [1], HR Manager

Discussion

This study applied design-thinking methods to better understand decision-making that can lead to PCB and escalating commitment in a management setting. Numerous specific concepts presented themselves that are worth considering further as possible causes or determinants to EoC behavior. Since we proposed a more nuanced definition of EoC, several of the ideas might not fit the traditional model of EoC as originally discussed by Staw (1976), Meyer (2014), and Drummond (2012). However, whether they fit the original model, they are still valuable and important for managers, leaders, and decision-makers to be aware of. Numerous psychological and sociological traps lurk around every corner.

The concept of coded variations of EoC, or its de-escalation counterpart, DEoC, are new as presented in this paper. Because researchers have explored EoC in one manner or another since the mid-1970s (Fox & Staw, 1979; Staw, 1976; Staw & Ross, 1978), it would be understandable for this new paradigm to cause some stir or be outright rejected. On the other hand, EoC has been looked at and updated a number of times since its inception (Drummond, 2017; Staw, 1997), and Drummond acknowledged along with Staw and others that a more nuanced definition of EoC is needed (Drummond, 2014; Staw, 1997). EoC has historically been described as money pit situations, where a manager would continue to push for achieving a goal that seems to be continually out of reach. Looking at EoC from a slightly broader lens to include known or unknown risks, commissive or omissive acts, and its ultimate success or failure is a significant paradigm shift. The prevailing theme on why EoC typically persists is some cost in quitting or changing plans (Drummond, 2017; Staw, 1997). These costs could be financial, but also more figurative or personal.

The subchapters in the Literature Review section that feature an asterisk (*) by them were chapters that were either retroactively added to the Literature Review or expanded upon based on revelations from the various DT activities. The Problem Tree Analysis was especially fruitful, but all the DT activities yielded valuable information. Some of those added sections include:

- Anchoring Bias
- Critical Point Theory and Blind Spots
- Compulsion and Addiction
- Reactance Effect
- Self-Licensing
- Identity
- Blame
- Moral Hazards
- Time Pressure and Scarcity
- Perverse Incentives
- Revenge and Spite
- De-escalation and Erroneous Abandonment
- Choice Architecture
- Political Influence

- Megaprojects
- Industrial Complexes
- Groupthink
- Communication
- Stories and Myth
- Thought Processes, Personal Courage, and Integrity

All these elements had existing studies and literature describing them in detail, although many were either not associated with EoC at all or were associated but described in a slightly different way.

PCB was only touched on briefly in the study by the participants. Many expressed that they would generally stick with the existing plan unless they were convinced that it would not work. Based on the original seminal study into PCB (Berman & Dismukes, 2006), further in-depth studies into PCB will likely require genuine psychological tests involving deception in order to draw out the true nature of the thought process and behavior.

PHASE ONE – PROBLEM TREE ANALYSIS

One of the most substantial revelations of this exercise had to do with the recognition that since escalation of commitment is to continue with an existing plan and de-escalation is to discontinue the plan, all eight EoC variants must have DEoC counterparts. This brings the coding model to 16 possible variants: 8 EoC variants and 8 DEoC variants, demonstrated in Table 5. As with Table 2, the examples refer to the film *Jaws* and a pandemic. These examples are not necessarily realistic, merely examples to describe the DEoC code.

Table 5 - De-escalation of Commitment Variants (DEoC) in addition to original eight EoC variants from the literature review

EoC CODE	MEANING/LESSON	EXAMPLE 1 - JAWS	EXAMPLE 2 - PANDEMIC
DEoC-KCS	De-escalation of Commitment towards a Known Commissive Success - deliberate choice to	Sheriff deliberately decides to immediately close	Instead of developing a vaccine, everyone is forced to socially

	discontinue the plan despite the risk. Investigate further to determine if this practice is worth continuing or if you just got lucky this time.	the beaches for the summer. Better safe than sorry.	distance themselves from others to starve the virus of hosts. It takes longer but was arguably less work than developing a vaccine in a matter of months.
DEoC-UCS	De-escalation of Commitment towards an Unknown Commissive Success - Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.	The very act of closing the beaches starves the shark. By luck, it is unable to find any other food source and it leaves the area on its own.	The social distancing efforts not only prevent much of the population from being infected with the target virus, but also helps them avoid all manner of other contagious ailments.
DEoC-KOS	De-escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.	Deciding to not hire shark-hunters or close the beaches pays off when independently motivated shark-hunters come looking for the shark on their own.	Deciding not to fight the virus knowing that the seasonal temperature will kill it off on its own.
DEoC-UOS	De-escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck. (This is practically identical to EoC-UOS.)	Continuing through daily life oblivious to a shark that approached many swimmers, but never attacked anyone. Extremely lucky.	Continuing with business-as-usual unaware that a virus is circulating and infecting people, but fortunately not harming anyone.
DEoC-KCF	De-escalation of Commitment towards a Known Commissive Failure – Erroneous abandonment. Taking deliberate action to end a situation, but not providing adequate resources to accomplish it—half measure.	Only closing some of the beaches the shark is attacking, leading it to attack the open beaches.	Agreeing to vaccine development but only providing a meager budget to accomplish it. The virus outpaces development.
DEoC-UCF	De-escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.	Deciding to close the beaches leads smaller prey animals, normally afraid of humans to move in—thus providing a steady diet for the shark to stay for years to come.	Cancelling the vaccine leads anti-vaxxers, a relatively small subset of the population to gain political momentum and ultimately driving down vaccination rates of numerous diseases—leading to many unnecessary deaths from

			previously controllable diseases.
DEoC-KOF	De-escalation of Commitment towards a Known Omissive Failure – Procrastination. Understanding the problem but refusing to address it.	Recognizing that something must be done but stalling and allowing the shark to operate unimpeded.	Recognizing the need for a vaccine but keep putting it off to deal with other matters instead.
DEoC-UOF	De-escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late. (This is practically identical to EoC-UOF.)	A swimmer is killed by a shark everyone was oblivious to.	A novel virus emerges and begins infecting and killing.
EoC-KCS	Escalation of Commitment towards a Known Commissive Success - deliberate choice to continue with plan despite the risk. Hard work paid off but investigate further to determine if this practice is worth continuing or if you just got lucky this time.	Sheriff and rag-tag team barely, but successfully, kill the deadly shark. Risky venture, but hard work paid off.	A vaccine is produced in unprecedented time and successfully inoculates against target virus. Hard work paid off.
EoC-UCS	Escalation of Commitment towards an Unknown Commissive Success – Unintentional benefit. Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.	The very act of hunting the shark conveniently draws it out to sea and away from the beaches it was attacking. Unintended, but beneficial.	The vaccine not only protects against the target virus, but also protects against other viruses by chance.
EoC-KOS	Escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.	Deciding to not hunt the shark or close the beaches and hope it goes away on its own. It conveniently does go away. Very lucky.	Deciding not to develop a vaccine in the face of a virus and hope the problem goes away. It miraculously does by chance.

EoC-UOS	Escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck.	Continuing through daily life oblivious to a shark that approached many swimmers, but never attacked anyone. Extremely lucky.	Continuing with business-as-usual unaware that a virus is circulating and infecting people, but fortunately not harming anyone.
EoC-KCF	Escalation of Commitment towards a Known Commissive Failure - Classic EoC. Deliberate action that resulted in a predictably poor outcome – Foolish. Bad process that should be modified in the future.	Insisting on reopening the beaches for the 4th of July following their closing due to shark attack. More attacks occur.	Insisting on using unsubstantiated anti-viral measures like ineffective medicines even after experts warn that they do not work. Many die from the virus while others die from the bad medicine itself.
EoC-UCF	Escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.	Hiring fishermen to hunt the shark who then overfish and unintentionally endanger the larger ecosystem.	Administering a vaccine that protects from the target virus but also yields debilitating side effects.
EoC-KOF	Escalation of Commitment towards a Known Omissive Failure - Deliberate inaction that resulted in poor outcome - failure was inevitable.	Refusing to hire shark hunter to hunt the shark until after there are more attacks on 4th of July.	Doing nothing to mitigate the virus and hoping it goes away on its own. It does not go away and kills thousands.
EoC-UOF	Escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late.	A swimmer is killed by a shark everyone was oblivious to.	A novel virus emerges and begins infecting and killing.

The DEoC variants represent a significant choice by a decision-maker on any given decision. To commit DEoC is to significantly alter or cancel the original plan. However, it is important to recognize that committing DEoC on the existing decision pathway is also to commit EoC onto a new plan pathway. To avoid confusion, however, we will only use EoC in this paper to describe as sticking with the existing plan in one way or another and DEoC for switching to a new plan.

EoC-KOF and DEoC-KOF effectively yield the same result, but there is a key difference: EoC-KOF involves outright ignoring a known risk, while DEoC-KOF is to recognize the need to address the risk but procrastinating implementation of the risk response. While these two yield the

same result, they need to be addressed differently. Addressing EoC-KOF involves convincing the decision-maker to take the threat seriously and dealing with DEoC-KOF requires rallying the decision-maker to do the hard work of addressing the problem they already know they cannot afford to ignore.

Arguably, the EoC-UO_ variants are exactly the same as their DEoC-UO_ counterpart variants since neither are affected at all by the decision. This means that these variants essentially represent pure luck, good or bad, and are constantly operating in the background completely unrecognized until they present themselves or are discovered by looking for them. These EoC-UO_ and DEoC-UO_ variants are, therefore, theoretically always there—waiting to be discovered. It also means that many situations start as EoC-UO_ variants until they are discovered, at which point, they shift to being EoC-KO_ variants. Seeking out this information with inspection, in whatever form that takes, is the only way to root out EoC-UO_ variants unless they start to show warning signs or trigger on their own without warning. Briefly consider the following scenario: Prior to a violent volcano eruption, the volcano might give off warning signs like increased seismic activity, smoke, or dispelling ash. Then again, the volcano could erupt in complete surprise—without any warning at all, or so it may seem. An experienced seismologist or vulcanologist might have caught very subtle warnings with sensitive instruments that no one else would have noticed.

Therefore, the only way to see the hidden warning signs of the surprise volcano, or any other EoC-UOF, is to proactively look for it. As noted by Adam Grant, thinking like a scientist includes numerous benefits outside of the specific benefit of scientific research (Grant, 2018). Grant is likely onto something, but it is worth noting that thinking like a scientist may not be the best mental model for most people. After all, some scientists have been noted for becoming as mentally stuck as the average person and self-justifying their way out of inconvenient adverse information (Tavris & Aronson, 2020). As an alternate model, Galef (2021) proposed her "Scout Mindset," which follows the same principles as Grant's scientist mindset, but is perhaps more accessible. It is worth noting that none of the study subjects mentioned scientists or scouts in any of their brainstorming, although "open-mindedness" came up in multiple exercises.

Ultimately, classifying every type of decision outcome with an EoC code is beside the point. Understanding the codes at a fundamental level to exploit the desired ones and avoid the negative ones is the real value. The value of the full chart and the coding system is in offering a method of

brainstorming and mapping out possible end results of any given decision. For example, on a decision of whether to continue funding a failing project, the sixteen EoC code variants offer possible endpoints to consider what success and failure might look like.

A third substantial revelation came from the Problem Tree Analysis: Nearly all causes could result in either success or failure depending on different factors. It generally stands to reason that most people who make a decision are doing so with the intent of yielding a success, but it could always turn sour and fail. The fact that all decisions could either yield a success or a failure is hardly news-worthy except that this also revealed that certain choices are practically a guarantee of failure, but a decision-maker can delude themselves into thinking that success is possible through self-deception and self-justification. Indeed, based on the problem tree, deception and lying are likely a very fruitful place to investigate EoC behavior, especially EoC-KCF. Deception, even self-deception, requires a certain degree of commissive behavior in the form of making up a story. A liar knows outright they are lying, but in forms of self-deception, the action may be subconscious through self-justification. Further studies into self-justification will likely benefit from deceptive psychological tests to draw out the underlying behaviors and thought processes further. The only unknown factor at the beginning of telling a lie is whether the liar will get away with it and thus if it succeeds or fails. The only way for a lie to succeed is to keep lying and is therefore an excellent place to continue studying EoC behavior.

In the same vein as deception, addiction and compulsory behavior might also be a fruitful place to continue research into EoC behavior. A great deal of research exists on the nature of addiction and its impacts on decision-making (Christie, 2008; Heather, 2017). These research studies have shown that addiction to a substance or habit like gambling can alter the brain and affect the addict's choices outside of matters related to their addiction. However, it is likely worth exploring if the trend can occur in reverse; can a person become addicted to "bad decision-making" simply by having a habit of perpetuating the context that leads toward those bad decisions? In other words, it is well known that addiction leads to bad decision-making, but can bad decision-making lead to a kind of addiction to continued bad decision-making? If a person has become comfortable with being close-minded, self-justifying errors away, and falling back on the rigid cognitive biases that make up Galef's "soldier mindset" (Galef, 2021), can it be viewed like an addiction? More importantly, can it be treated like an addiction? Further studies would be necessary. This study cannot claim to provide

evidence for such a hypothesis, but it can claim that the idea would not have come to the student researcher without the practice of design-thinking.

Procrastination is perhaps, understandably, a major contributor to EoC-KOF, if not the main one. Procrastination does not always yield a failure, though it feels like it often does. There are likely many situations that will not yield desired results unless some effort is put into them. Entropy is ubiquitous and can often make fixing problems harder due to natural scope creep. Some situations cannot be accomplished until the technology has been developed to make it possible—in which case waiting is the only real option. However, plenty of situations can be dealt with adequately today and will only deteriorate if left alone. The semi-annual dental checkup that so many put off scheduling is a classic example of EoC-KOF; it will only get worse until it is addressed. A semi-annual dental cleaning is cheaper than a cavity filling, which is cheaper than a painful root canal. Cheaper still is daily brushing and flossing, though the regular hassle of it is enough for some to procrastinate and procrastinate until it is too late.

Developing personal habits is both a way into and a way out of PCB and automatic EoC behavior. So-called "bad" habits could qualify as both EoC-KCF and EoC-KOF, depending on how automatic the habit is—the person performing the behavior may do so unconsciously. By contrast, "good" habits would be EoC-KCS or EoC-KOS because they depend on the same, automatic System 1 response (Kahneman, 2011; Stanovich & West, 2000), but produce a desirable result. The act of recognizing the original bad habit and making an effort to steer away from it with a new habit would be DEoC-KCS, though it could come with a side of DeoC-KOS or DeoC-KOF. Ultimately though, changing habits involves first the slow and methodical System 2 thinking to overcome the faster System 1 thinking. Since PCB is likely closely connected to System 1 thinking, this also means that overcoming PCB requires the time to stop and think it over. Not all scenarios allow the time for a person to stop and think. After all, PCB was first proposed by researchers studying aviation accidents (Berman & Dismukes, 2006) where airplanes must always keep moving to stay aloft.

Novice pilots are noted to be more prone to entrapment than expert pilots (Kanki et al., 2010). Expert pilots were more likely to know how to handle inclement weather than junior pilots, but more importantly, were more likely to avoid it in the first place. Wiegmann et al. (2002) noted that situational awareness and risk standards might play a role in these choices along with the pilot's experience. Another possible explanation, however, is that the experienced pilots may have shifted

from the System 2 thinking regarding the inclement weather to System 1 and they automatically decided to steer clear of the weather well before it became an issue. A junior pilot who survives inclement weather could potentially learn the wrong lesson and think, via optimism and confirmation bias, that they can handle bad weather better than they truly can if they survived by luck. Changing one's mind is considered essential training by Senders and Moray (1991) who recognized that inexperienced pilots may encounter cognitive "lockup," which Kanki et. al. (2010) noted appears to be an early description of PCB.

Developing good habits instead of bad ones seems like painfully obvious advice. The difficult task is recognizing the difference of good from bad and knowing how to change them. If System 1 processes generally only develop from practice of System 2 processes, this indicates that changing habits, good or bad, almost always involves doing the hard work. The only potential way around this is to create and maintain an environment that helps to nudge (Thaler & Sunstein, 2021) people towards the good habits.

PHASE ONE - STAKEHOLDER MAPPING

"'Forward, the Light Brigade!'
Was there a man dismayed?
Not tho' the soldiers knew
Someone had blundered:
Theirs was not to make reply,
Theirs was not to reason why,
Theirs was but to do and die:
Into the valley of Death
Rode the six hundred."

Alfred, Lord Tennyson, Poet, Excerpt from 1854 poem: *Charge of the Light Brigade* (Tennyson, 2000)

Tennyson's musing on the Light Brigade points out an importance of stakeholder relationships in the possibility of committing EoC. Soldiers are generally expected to do as they are ordered, whether they understand or agree to the action. This has its pros and cons within the chaotic context of a battle, but either way the soldier paradigm of "follow orders-no matter what" removes

the possibility that some stakeholders will speak up if they notice a problem. Scout mindset, on the other hand, will theoretically be less prone to this kind of problem (Galef, 2021).

As noted by Rubin et al. (1980), competitive relationships have a way of leading competitors to overvalue winning, and they can lose sight of the original goal. A friendly relationship or culture is therefore more likely to accomplish its original goals than a tense or hostile one. In addition, seemingly irrelevant matters like furniture layout, and by extension interior design and architecture, can also have a significant impact on communications within an organization (Catmull & Wallace, 2014). Ultimately, communication and decision-making are significantly impacted by context and are not entirely under control of the person making the decision.

An individual can fall prey to delusion or self-deception and self-justification. Another stakeholder, seen as an equal to the original, might be able to call out this malarky and help right the ship. For this reason, more stakeholders are theoretically better than one since it puts more brains and eyeballs on a problem, but this is truly only beneficial if the relationship is functional and has good communication. A dysfunctional group might be at risk of groupthink—everyone following the majority and suppressing dissenters, or the Abilene paradox—everyone failing to speak up and voice concerns, or sycophancy—appeasing the ego of one stakeholder (Harvey, 1974). This may create the illusion of harmony, but in reality, problems will likely go unnoticed and unchecked as they grow in the background: EoC-UOFs.

There is likely a point of diminishing returns on the size of a valuable stakeholder pool. A democratic system gives all stakeholders a voice of equal weight within the democratic system. This is useful for slow-moving problems that can be addressed with ample time to vote. Fast-moving problems, like a contagious virus, are not likely to be addressed efficiently by a democracy and could be at risk of spreading unchecked while the voting public endlessly debates the best course of action. In situations where a problem can grow exponentially, a much smaller group of stakeholders or even a single stakeholder will be more efficient. Balancing this is a challenge and must be tailored to each unique problem (Kanki et al., 2010).

Ultimately, the most important aspect of the stakeholder map is trust. Any lack of trust will take minds and energy off a given problem and focus some portion of them at the distrustful relationship.

A group or company that experiences a lot of turn-over, personnel joining, and leaving the group at a high rate will likely be at risk of EoC-UCFs. Turn-over is likely to contribute to Shifting Baseline Syndrome (Dayton et al., 1998), although it could contribute to something even worse: personnel having a poor grasp of goals, projects in motion, or even their roles within the company. Such confusion and frustration will likely lead to more turnover, but it will certainly lead to important matters or lessons being lost. Lots of things can initially lead to high turnover, especially distrust and dysfunctional communication. Turnover itself can generate an entrapment death spiral—the only way out is to slow the turnover to be able to return energies to projects instead of interpersonal and communication issues.

"There is never enough time to do it right, but there is always enough time to do it over…"

"If you want it bad, you'll get it bad…"

--Expressions from the friend of the author, reflecting on common business practices

De-escalation can be problematic the same as EoC if not handled properly. The quote above acknowledges that there are situations where a project or plan is committed to, but the provided resources are nowhere near sufficient to accomplish it properly. It is one thing if the lack of resources is due to legitimate scarcity; sometimes you only have a small budget or timeline to accomplish things. However, it is quite another situation for resources to be abundant but hoarded to save money or time. In a word: cheapness. Efficiency is always worth considering but not at the expense of achieving the goal. Purchasing cheap materials can seem more cost-effective in the short run, but if they wear out faster and need to be replaced more frequently, they may cost you more in the long run due to replacement costs. This is associated with what PMI calls "cost of quality" (Project Management Institute, 2017). The total cost of quality consists of the combination of quality conformance—the cost of things done right, and quality non-conformance—the cost of things done wrong. Purchasing cheap insurance may save money now, but it may be very costly in the long run if the coverage is insufficient.

Based on the results of this study, we propose that escalation of commitment is the realized manifestation of following through on a plan, regardless of how detailed that plan is or how small the escalation action (or inaction) is. Scholars may fairly argue that this model does not qualify as EoC since historically, it is described as continuing with a course of action already in motion—money or

energy has already been spent. Therefore, EoC cannot describe the first step of initial commitment to a plan—initial commitment occurs, then subsequent escalation. While this is the historical precedent, Meyer (2014) and Rice (2010) argued that there is no universally agreed upon model for how EoC works. Plan-continuation bias seems to indicate that the very act of developing a plan, however small, could be enough mental effort and sunk-cost for a person to cling to it and use to justify their commitment. It could therefore be argued that the initial commitment to a plan was the idea's inception itself.

Addiction and compulsion came out of the problem tree analysis as potentially associated with PCB and EoC. Compulsion and addiction are also defined as continuous behaviors—something a person must do repeatedly to meet their psychological or physiological need. PCB as described by Berman and Dismukes (2006) seems to be a one-off decision, although a pilot who becomes increasingly comfortable making risky landings could be viewed as "addicted." Perhaps PCB could be studied through a lens of comparing or contrasting it to compulsion or addiction. Ultimately, PCB is only understood at a surface level due to limited research. Understanding its differences and similarities to compulsion and addiction could be valuable to decision-makers and managers in general. At minimum, being aware of this could get thinkers to pay a little more attention.

Plan-continuation bias must be studied more extensively in a psychological context. It is possible that PCB, incepted by Berman and Dismukes (2006), has co-existed with EoC research since its proposal by Staw (1976), and the similar concepts never crossed paths due to their independent development in two different industries. However, as noted throughout this paper, PCB and EoC are not the same. Is PCB truly a standalone cognitive bias, or is it a combination of a handful of others? This study was approached from the perspective of a designer. The intent was not just to study known and unknown causes of EoC, but also to provide a list of possible solutions for managers to use. Scholars of EoC may find the Quick Reference Guide too simplistic, but the QRG is not necessarily meant to help scholars. It is intended to help managers of varying experience levels in understanding EoC and possible methods of reducing it. The subjects of this study seemed to indicate that they were mostly aware of EoC tacitly. One of the values of design-thinking is to tease out hidden information and to make it explicit. Perhaps, with a little luck, managers can use this guide to help them manage a little better and commit EoC-Ss a little more often and EoC-Fs a little less.

PHASE TWO - WORKSHOP ONE - INTERVIEW AND WHAT'S ON YOUR RADAR

Six of the participants of Workshop One were available at times that allowed for them to interview each other. Four of the participants were not available at times that coincided with other subjects and were interviewed directly by the student researcher. All subjects were asked the same questions, which were provided by the script, but the interviews with both participants engaging with each other were decidedly livelier. The subjects that interviewed each other also played off each other by sharing stories and comparing situations from their work experiences in addition to answering the interview questions. The student researcher mostly stuck to the interview script except for the occasional follow-up question for clarification, and thus the interaction was a little more rigid. Those that interviewed each other were visibly and audibly more relaxed and were able to build a rapport in a conversational interaction that felt more natural to them and allowed them to open more. All subjects provided valuable information, but those that interviewed each other were increasingly transparent with their answers and more willing to elaborate.

The RADAR exercises were also livelier due to the same comfortable interaction with the other subject. The exercise has potential to cause subjects to quietly brainstorm alone, but it also affords interacting with others when possible. All the interacting subjects continued to converse, albeit sporadically, as they wrote down notes.

PHASE THREE – AFFINITY CLUSTERING

The transcribed notes from the Interviews clustered into 17 unique categories ranging from data collection to considerations for convincing and working with others when changing a plan to techniques for staying ahead of problems. The full affinity cluster can be found in Appendix N - Affinity clustered Interview Notes.

Several participants noted they need to make decisions based on facts and good data and not emotions or feelings a person has. While the need for facts is likely meant in contrast to falsehoods or opinions, it is important to note that emotions are a valuable, even critical, part of decision-making (Bechara et al., 2003). Facts are only a part of the equation: the story that is told with those facts and the emotions that accompany the story are what people respond to. Bechara and colleagues argued that decisions are only possible because emotions are attached to certain choices, meaning that they cannot be divorced from decision-making, but instead should be integrated into it strategically. It is

also worth noting that facts only support a story. A prosecution attorney and a defense attorney can both tell different, but equally plausible stories based on the same facts.

Several participants noted that it is not enough for a team-member or employee to bring up a problem; they ideally will provide a solution as well. This coincides with one of the lessons expressed by the EoC eleven, that the most effective communication about a problem summarizes the problem, expresses a feeling about it, and provides a potential solution. However, this sentiment may implicitly inhibit communication as someone may be reluctant to bring up a problem if they have not, or cannot, think of a potential solution.

Much of the literature is focused on items that can negatively impact decision-making (Meyer, 2014; Staw, 1976). Cognitive biases, social biases, and organizational structure can all nudge and sludge an individual decision maker toward one choice or another. This is generally reinforced by the ideas that came from Phases One through Four. This indicates that decision-making is highly affected by context, meaning that decision-makers have less control over their thought processes than they may think. Interestingly, this also means that individuals also have more influence over the decisions of others than they may think. All of this is important to understand for designing a good environment to encourage better decision-making, but is simultaneously at risk of being abused and used to manipulate others rather than truly encouraging them to make better decisions for themselves and others.

PHASE FOUR – WORKSHOP TWO – CREATIVE MATRIX

Following a presentation by the student researcher for Workshop Two, participants engaged in the Creative Matrix. Some participants struggled initially with reacclimating to Lucidchart, and one was unable to connect to it at all, but most got the hang of it after a few minutes of poking around and asking questions. Everyone who could participate generally started in one area of the matrix and worked their way across each box putting at least one note in as they saw fit. The subject who could not participate was able to see the screen via screen-sharing in Zoom and said they liked all the ideas that were being written down.

Certain techniques expressed on the matrix were notable for being neither standard nor generic. One note, for example, recommended morning meetings as people are more likely to be open in the morning. This might not be exactly true, depending on the industry, but it does acknowledge

that there is probably a preferred time of day for meetings based on psychology (Aaker & Bagdonas, 2021).

PHASE FIVE – QUICK REFERENCE GUIDE PROTOTYPE

The participants of the study were all volunteers from a convenience sample available to the student researcher. It is presumed that all the advice, opinions, and data presented by them is generally representative of "good" management techniques. This is heavily influenced by selection bias and involved little to no vetting of the participants beyond what the student researcher knew about them already. The QRG was developed using a combination of information available in the literature as well as the information that came directly from participants. Since the QRG consists of a combination of aggregate information, it is presumed that the result is generally representative of good management techniques. However, due to subject mortality and the generally small sample size for the study, it would likely be beneficial to conduct an entirely new study with different participants to determine the value of the QRG as a management tool.

One of the critiques of the QRG was that it felt too academic and would therefore be inaccessible to many managers or line-workers. This is valuable and relevant insight as a common complaint about some business consultants and other professions is overuse of jargon (Aaker & Bagdonas, 2021; Catmull & Wallace, 2014). While professional industries often create and cleave to their own nomenclature, which relates to identity, it can also make those industries esoteric and frustrating to outsiders. To address this critique, it may be necessary to create multiple versions of the QRG to cater to different audiences.

PHASE SIX – CRITIQUE

The QRG received generally favorable feedback from the participants who responded. Subject mortality was expected, and most respondents only returned a paragraph or brief answers to the prompt questions. This is understandable as the intent was not to take up too much of their time as volunteers. Ultimately, the QRG would likely benefit from another study dedicated to receiving feedback from real-world managers outside of the original study.

The critiques that were returned were generally positive of the document, though there were drawbacks noted. The document was perceived by two participants as academically oriented and not especially accessible to managers outside of academia and another noted that the purpose of the EoC coding system was not clear. Its inclusion is meant to serve as a reference for creating a decision tree

but does likely need additional work to be more accessible. The bullet point format was generally favored. One participant noted that the document felt long, while others noted that it was nice and short. Overall, the preferred length of any QRG is likely to be subjective, but LUMA recommends a maximum of 12 pages—which this QRG exceeds at 20 pages.

INTERNAL VALIDITY

THREATS TO INTERNAL VALIDITY

This study was potentially at risk of a selection bias threat, as the participants were drawn from a targeted convenience sample. Participants must have agreed to various consent forms and have been willing to commit multiple blocks of their time to the study. As such, the study was also at risk of subject mortality as this design included participation in two workshops and a critique. These threats were mitigated by attempting to recruit a relatively larger group of approximately 20 participants and keeping strict timeboxes on the DT activities to be respectful of participants' time.

LIMITATIONS

The managers that the student researcher could contact and gain commitment from were limited. Some declined to participate while others were unreachable. Subject mortality occurred and impacted both Workshop Two and the Critique. Not all subjects who participated in Workshop One were available for Workshop Two, and not all subjects were able to respond to the QRG with a Critique.

Due to management being such a broad category that is involved in many industries and fields, it is likely that managers with valuable insight were missed in the study due to a limited scope of participants. Because the researcher used a convenience sampling technique (i.e., non-random sampling), the results cannot be generalized to the larger population of managers.

This study approached PCB and EoC from a DT perspective, but the general lack of studies and definitive information on PCB could mean that it is misconstrued or misunderstood in some way.

The subjects of this study experienced a "cold" environment—they had safe, thoughtful conversations about PCB and EoC, which are both known to be impacted by stress. It is likely that subjects may have reacted or responded differently than if subjected to a stressful, deceitful, or otherwise "hot" environment (Hafenbrädl & Woike, 2018). The workshops themselves were designed to be 45 minutes each, which may have added a sense of time-pressure, but this timebox was not strictly enforced, and subjects who were comfortable staying beyond the 45-minute mark were encouraged to do so.

The student researcher was subject to the same psychological pressures and biases as described in this paper, and possibly more. They are not completely objective, and the nature of the

qualitative data processing through DT techniques is particularly prone to these biases. For this reason, the findings and suggestions cannot be considered definitive without peer review and further study.

CONCLUSION

The number of factors that play into decision-making is potentially as large as the entire body of knowledge on human psychology and sociology. While understanding all this would potentially paint the most accurate picture of decision-making, it is far too broad to be used practically by managers just trying to make the best decisions for their teams. Ultimately, good decision-making hinges on the ability to recognize an opportunity to decide and being comfortable changing one's mind regularly.

More research is likely necessary into PCB to better understand it the moment it occurs. The student researcher also considers some of the following as potential jumping off points for future research:

1. The acute stress response, better known as the fight-or-flight response, is likely to be closely associated with PCB as they are both cognitive processes responding to threatening information.
2. Envy, in all its complex forms, likely has a compelling effect on the relationships between stakeholders and their subsequent communication channels.
3. The COVID-19 pandemic tended to attack communities in waves, which can partially be explained by their collective DEoC-KCS/EoC-KOF cycle. Communities would make efforts to suppress the virus for a while until they no longer felt it was a threat and the restrictions loosened enough for the virus to get another foothold—because it was never fully suppressed out of existence. The virus would grow out of control again until the community again felt it necessary to pump the brakes, restarting the cycle.
4. Stories are a potentially excellent resource for exploring more nuanced varieties of EoC, especially situation comedies, which often feature characters stubbornly continuing with plans that are obviously troublesome from the start.

These ideas were not evidenced in this study, but are nonetheless likely to be a fruitful starting point for future studies into PCB and EoC.

Understanding plan continuation bias and escalation, and de-escalation, of commitment means understanding why we stick with bad plans, and why we give up on good ones. Often, the same processes are involved in both. The key seems to be open-mindedness to new information, and understanding the various cognitive, sociological, and environmental biases that can affect how that information is processed. Creating and supporting an environment that is both transparent and encourages transparency among all stakeholders is important for maintaining good decision-making practices. Equally important is actively seeking out information and reacting appropriately to bad news instead of sticking your head in the sand. People are not always basing their decisions on the elements that we think they are, or they should. Decision-makers are human and as such are subject to the same kinds of errors as any other human. Understanding the thought processes of others from an empathic perspective will often help to understand why they behave as they do. These are all tenets of the design-thinking philosophy, meaning that it is not simply a method for understanding PCB and EoC, but potentially a solution.

The authors of this study took care to understand PCB and EoC to the extent that they could with the tools they had available. The initial literature on these topics seemed limited at first but the design-thinking techniques revealed that concepts from other fields of study may be connected after all. Ultimately, this study is meant as a springboard for other psychological and sociological studies into why we, as humans, continue to ignore warnings and make the same mistakes. We think the subjects of EoC and PCB are much broader than the original literature suggests, but we could be wrong. Change our minds.

References

Aaker, J., & Bagdonas, N. (2021). *Humor, seriously: Why humor is a secret weapon in business and life (and how anyone can harness it. Even you.* Crown/Archetype.

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology*, *87*(1), 49–74. https://doi.org/10.1037/0021-843X.87.1.49

Addiction – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/addiction

Ahmad, M. G., Klotz, A. C., & Bolino, M. C. (2021). Can good followers create unethical leaders? How follower citizenship leads to leader moral licensing and unethical behavior. *Journal of Applied Psychology*, *106*(9), 1374–1390. https://doi.org/10.1037/apl0000839

Aristotle. (2000). *Poetics.* Infomotions, Inc. https://public.ebookcentral.proquest.com/choice/publicfullrecord.aspx?p=3314345

Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, *35*(1), 124–140. https://doi.org/10.1016/0749-5978(85)90049-4

Arnett, D., & Hunt, S. (2002). Competitive irrationality: The influence of moral philosophy. *Business Ethics Quarterly*, *12*, 279–303. https://doi.org/10.2307/3858018

Attentional blindness – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/attentional-blindness

Availability heuristic – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/availability-heuristic

Bazerman, M. H., & Samuelson, W. F. (1983). I won the auction but don't want the prize. *Journal of Conflict Resolution*, *27*(4), 618–634. https://doi.org/10.1177/0022002783027004003

Bechara, A., Damasio, H., & Damasio, A. R. (2003). Role of the amygdala in decision-making. *Annals of the New York Academy of Sciences*, *985*, 356–369. https://doi.org/10.1111/j.1749-6632.2003.tb07094.x

Berman, B. A., & Dismukes, R. K. (2006). Pressing the approach. *Aviation Safety World*, *1*(6), 28–33.

Bhattacharya, A. (2010). Expectancy theory. *Nature*, *464*(7287), 456–456. https://doi.org/10.1038/464456a

Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *The Academy of Management Review*, *17*(1), 39–61. https://doi.org/10.2307/258647

Brockner, J., Nathanson, S., Friend, A., Harbeck, J., Samuelson, C., Houser, R., Bazerman, M. H., & Rubin, J. Z. (1984). The role of modeling processes in the "knee deep in the big muddy" phenomenon. *Organizational Behavior and Human Performance*, *33*(1), 77–99. https://doi.org/10.1016/0030-5073(84)90012-6

Brockner, J., Rubin, J. Z., & Lang, E. (1981). Face-saving and entrapment. *Journal of Experimental Social Psychology*, *17*(1), 68–79. https://doi.org/10.1016/0022-1031(81)90007-X

Brown, T., & Kātz, B. (2009). *Change by design: How design thinking transforms organizations and inspires innovation.* (Main Collection - Level 5 HD58.8.B772 2009). Radford WMS.

Catmull, E., & Wallace, A. (2014). *Creativity, inc.: Overcoming the unseen forces that stand in the way of true inspiration*. Random House.

Chao, E. L., Dickson, S., Bahrami, A., Domingo, R., Parson, S. K., Hoffmann, T., Williams, J., Caron, J., Cianciolo, P., & Mitrione, J. (2020). *FAA safety briefing—July August 2020*. 40.

Chapin, H. (1974). *Cat's in the cradle*. Elektra.

Chislenko, E. (2021). Causal blame. *American Philosophical Quarterly*, *58*(4), 347–358.

Christie, M. J. (2008). Cellular neuroadaptations to chronic opioids: Tolerance, withdrawal and addiction. *British Journal of Pharmacology*, *154*(2), 384–396. https://doi.org/10.1038/bjp.2008.100

Coleman, M. D. (2010). Sunk cost and commitment to medical treatment. *Current Psychology*, *29*, 121–134.

Compulsion – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/compulsion

Confirmation bias – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/confirmation-bias

Conlon, D. E., & Garland, H. (1993). The role of project completion information in resource allocations decisions. *Academy of Management Journal*, *32*(2), 402–413.

Cunha, M., Jr., & Caldieraro, F. (2009). Sunk-cost effects on purely behavioral investments. *Cognitive Science*, *33*(1), 105–113. https://doi.org/10.1111/j.1551-6709.2008.01005.x

Dayton, P., Tegner, M., Edwards, P. B., & Riser, K. L. (1998). *Sliding baselines, ghosts, and reduces expectations in kelp forest communities*. https://doi.org/10.1890/1051-0761(1998)008[0309:SBGARE]2.0.CO;2

Dekker, S. (2014). *The field guide to understanding "human error."* CRC press.

Denning, S. (2017). *Making sense of shareholder value: "The world's dumbest idea."* Forbes. https://www.forbes.com/sites/stevedenning/2017/07/17/making-sense-of-shareholder-value-the-worlds-dumbest-idea/

DiLisi, G., & McLean, S. (2019). The apollo 1 fire: A case study in the flammability of fabrics. *The Physics Teacher*, *57*(4), 236–239. https://doi.org/10.1119/1.5095379

Drummond, H. (1996). *Escalation in decision-making: The tragedy of taurus*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198289531.001.0001

Drummond, H. (2012). *Guide to decision making: Getting it more right than wrong*. Wiley. https://learning.oreilly.com/library/view/guide-to-decision/9781118240557/

Drummond, H. (2014). Escalation of commitment: When to stay the course? *Academy of Management Perspectives*, *28*(4), 430–446. https://doi.org/10.5465/amp.2013.0039

Drummond, H. (2017). Megaproject escalation of commitment: An update and appraisal. In B. Flyvbjerg (Ed.), *The Oxford handbook of megaproject management* (pp. 194–216). Oxford University Press. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=eoh&AN=1805921&site=eds-live&scope=site

Efferson, C., Vogt, S., & Fehr, E. (2020). The promise and the peril of using social influence to reverse harmful traditions. *Nature Human Behaviour*, *4*(1), 55–68. https://doi.org/10.1038/s41562-019-0768-2

Entrapment – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/entrapment

Erica, A. (2020). *Co-operation between competitors in the time of covid-19*. https://www.oecd.org/competition/Co-operation-between-competitors-in-the-time-of-COVID-19.pdf

Escalating commitment – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/escalating-commitment

Fast Company. (1995, October 31). *Next time, what say we boil a consultant*. Fast Company. https://www.fastcompany.com/26455/next-time-what-say-we-boil-consultant

Fox, F. V., & Staw, B. M. (1979). The trapped administrator: Effects of job insecurity and policy resistance upon commitment to a course of action. *Administrative Science Quarterly*, *24*(3), 449–471. https://doi.org/10.2307/2989922

Fox, S., & Hoffman, M. (2002). Escalation behavior as a specific case of goal-directed activity: A persistence paradigm. *Basic and Applied Social Psychology*, *24*(4), 273–285. https://doi.org/10.1207/S15324834BASP2404_3

Frischmann, B. M., Marciano, A., & Ramello, G. B. (2019). Retrospectives: Tragedy of the commons after 50 years. *Journal of Economic Perspectives*, *33*(4), 211–228. https://doi.org/10.1257/jep.33.4.211

Furst, J., & Nason, J. W. (2019). *Fyre fraud* [Film]. Hulu.

Galef, J. (2021). *The scout mindset: Why some people see things clearly and others don't*. Penguin.

Grant. (2018, June 5). *To promote creativity, we don't need to celebrate failure, but we do need to normalize it. We can start by encouraging smart experiments: Carefully considered risks that may or may not pan out.* [Twitter].

Grant. (2021). *Think again: The power of knowing what you don't know* (Popular Reading - Level 3 NF-GRANT). Viking [2021].

Greg, A. (2021). Powerful lawmaker calls F-35 fighter jet a 'rathole,' suggests Pentagon should cut its losses. *Washington Post*. https://www.washingtonpost.com/business/2021/03/05/adam-smith-f35/

Hafenbrädl, S., & Woike, J. K. (2018). Competitive escalation and interventions. *Journal of Behavioral Decision Making*, *31*(5), 695–714. https://doi.org/10.1002/bdm.2084

Hall, G. (2007, March 28). Torrey Canyon alerted the world to the dangers that lay ahead. *Professional Mariner*. https://www.professionalmariner.com/torrey-canyon-alerted-the-world-to-the-dangers-that-lay-ahead/

Harvey, J. B. (1974). The abilene paradox: The management of agreement. *Organizational Dynamics*, *3*(1), 63–80. https://doi.org/10.1016/0090-2616(74)90005-9

Heather, N. (2017). Is the concept of compulsion useful in the explanation or description of addictive behaviour and experience? *Addictive Behaviors Reports*, *6*, 15–38. https://doi.org/10.1016/j.abrep.2017.05.002

Herring, G. C. (2004). The cold war and Vietnam. *OAH Magazine of History*, *18*(5), 18–21.

Hill, S. E., & Buss, D. M. (2006). Envy and positional bias in the evolutionary psychology of management. *Managerial and Decision Economics*, *27*(2–3), 131–143. https://doi.org/10.1002/mde.1288

Isobel, S., McCloughen, A., & Foster, K. (2020). A frog in boiling water? A qualitative analysis of psychiatrists' use of metaphor in relation to psychological trauma. *Australasian Psychiatry*, *28*(6), 656–659. https://doi.org/10.1177/1039856220946596

Jain, G., Nayakankuppam, D., & Gaeth, G. J. (2021). Perceptual anchoring and adjustment. *Journal of Behavioral Decision Making*, *34*(4), 581–592. https://doi.org/10.1002/bdm.2231

Janis, I. (2010, April 1). *Groupthink*. Wayback Machine. https://web.archive.org/web/20100401033524/http://apps.olin.wustl.edu/faculty/macdonald/GroupThink.pdf

Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–291. https://doi.org/10.2307/1914185

Kanki, B. G., Helmreich, R. L., & Anca, J. M. (2010). *Crew resource management*. Elsevier.

Kaptein, M. (2012). *Why do good people sometimes do bad things?: 52 reflections on ethics at work* (SSRN Scholarly Paper ID 2117396). Social Science Research Network. https://doi.org/10.2139/ssrn.2117396

Kasingku, F. J. (2020). Improving de-escalation strategy: Monitoring control, bonus incentive and escalation of commitment. *Riset Akuntansi Dan Keuangan Indonesia*, *5*(1), 54–60. https://doi.org/10.23917/reaksi.v5i1.10377

Kellogg, S. (1985). *Chicken little*. William Morrow & Company, Inc.

Klein, D. E., & Lima, J. M. (2021). The prison industrial complex as a commercial determinant of health. *American Journal of Public Health*, *111*(10), 1750–1752.

Kőszegi, B. (2014). Behavioral contract theory. *Journal of Economic Literature*, *52*(4), 1075–1118.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*(2), 311–328. https://doi.org/10.1037/0022-3514.32.2.311

Lazear, E. P., & Oyer, P. (2007). *Personnel Economics*. 58.

LeBlanc, S. (2007, December 26). *On Dec. 31, it's official: Boston's big dig will be done*. https://www.washingtonpost.com/wp-dyn/content/article/2007/12/25/AR2007122500600.html

Leedy, R. L. (2019). Spite fence: A newly created cause of action. *Wyoming Law Journal*, *9*(1), 74–77.

Lovallo, D., & Kahneman, D. (2003). Delusions of success: How optimism undermines executives' decisions. *Harvard Business Review*, *81*(7), 1–10.

Loxton, D. (2019). Understanding flat earthers. *Skeptic (Altadena, CA)*, *24*(4), 10.

Luma Institute. (2012). *Innovating for people: Handbook of human-centered design methods*. Luma Institute.

Ma, J. (2020). *Estimating epidemic exponential growth rate and basic reproduction number | Elsevier Enhanced Reader*. https://doi.org/10.1016/j.idm.2019.12.009

Mangel, M., & Samaniego, F. J. (1984). Abraham Wald's work on aircraft survivability. *Journal of the American Statistical Association*, *79*(386), 259–267. https://doi.org/10.2307/2288257

March, J. G. (1978). Bounded rationality, ambiguity, and the engineering of choice. *The Bell Journal of Economics*, *9*(2), 587–608. https://doi.org/10.2307/3003600

Meyer, W. G. (2013). *The psychology of project termination*. PMI Global Congress 2013--North America, New Orleans, LA. Newtown Square, PA: Project Management Institute.

Meyer, W. G. (2014). *Effect of optimism bias—Decision to terminate failing projects*. https://www.pmi.org/learning/library/optimism-bias-terminate-failing-projects-3779

NASA apollo mission apollo-1—Investigation. (1967). https://history.nasa.gov/Apollo204/inv.html

Neuneck, G. (2019). The deep crisis of nuclear arms control and disarmament: The state of play and the challenges. *Journal for Peace and Nuclear Disarmament*, *2*(2), 431–452. https://doi.org/10.1080/25751654.2019.1701796

Niezing, J. (1980). Broken arrows and bent spears—Towards a social theory of nuclear weapons accidents. *Bulletin of Peace Proposals*, *11*(1), 71. https://doi.org/10.1177/096701068001100107

Northcraft, G. B., & Wolf, G. (1984). Dollars, sense, and sunk costs: A life cycle model of resource allocation decisions. *Academy of Management Review*, *9*(2), 225–234. https://doi.org/10.5465/amr.1984.4277636

Okamoto, K. S. (2009). After the bailout: Regulating systemic moral hazard. *UCLA LAW REVIEW*, 54.

Optimism – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/optimism

Pellerin, M. (2002). *The lord of the rings: Fellowship of the ring (extended edition) appendices (part 2) editorial: Assembling an epic* [Film]. New Line Cinema.

Plan-continuation bias – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/plan-continuation-bias

Platt, J. (1973). Social traps. *American Psychologist*, *28*(8), 641–651. https://doi.org/10.1037/h0035723

Presidential Commission on the Space Shuttle Challenger Accident. (1986). *Report of the presidential commission on the space shuttle challenger accident*. https://history.nasa.gov/rogersrep/genindex.htm

Prinsen, S., Evers, C., & de Ridder, D. T. D. (2019). Justified indulgence: Self-licensing effects on caloric consumption. *Psychology & Health*, *34*(1), 24–43.

Project Management Institute. (2017). *A guide to the project management body of knowledge (PMBOK guide)*.

Reactance theory – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/reactance-theory

Reason, J. (1990). *The contribution of latent human failures to the breakdown of complex systems | Philosophical Transactions of the Royal Society of London. B, Biological Sciences*. https://royalsocietypublishing.org/doi/10.1098/rstb.1990.0090

Reiser, C. (2019). *JSC features—When encountering launch fever—* https://roundupreads.jsc.nasa.gov/pages.ashx/1218/When Encountering Launch Fever

Rice, M. T. (2010). *Escalation of commitment behaviour: A critical, prescriptive historiography*. Coventry University.

Ross, J., & Staw, B. M. (1993). Organizational escalation and exit: Lessons from the Shoreham nuclear power plant. *Academy of Management Journal*, *36*(4), 701–732. https://doi.org/10.5465/256756

Rubin, J. Z., Brockner, J., Small-Weil, S., & Nathanson, S. (1980). Factors affecting entry into psychological traps. *Journal of Conflict Resolution*, *24*(3), 405–426. https://doi.org/10.1177/002200278002400302

Rustichini, A., Conen, K. E., Cai, X., & Padoa-Schioppa, C. (2017). Optimal coding and neuronal adaptation in economic decisions. *Nature Communications*, *8*(1), 1208. https://doi.org/10.1038/s41467-017-01373-y

Ryou-Ellison, H. J., & Gold, A. (2020). Moral hazard at sea: How alliances actually increase low-level maritime provocations between allies. *International Interactions*, *46*(1), 111–132. https://doi.org/10.1080/03050629.2020.1688804

Sachdeva, S., Iliev, R., & Medin, D. L. (2009). Sinning saints and saintly sinners: The paradox of moral self-regulation. *Psychological Science*, *20*(4), 523–528. https://doi.org/10.1111/j.1467-9280.2009.02326.x

Salancik, G. R. (1977). Commitment and the control of organizational behavior and belief. In B. Staw & G. Salancik (Eds.), *New directions in organizational behavior* (pp. 1–54). St. Clair Press.

Schimschal, S. E., & Lomas, T. (2019). Gritty leaders: The impact of grit on positive leadership capacity. *Psychological Reports*, *122*(4), 1449–1470. https://doi.org/10.1177/0033294118785547

Schlitz, D. (1976). *The gambler*. United Artists.

Seeger, P. (1967). *Waist deep in the big muddy*.

Senders, J. W., & Moray, N. P. (1991). *Human error: Cause, prediction, and reduction*. Taylor & Francis.

Shalal-Esa, A. (2012, September 18). Pentagon tells Lockheed to shape up on F-35 fighter. *Reuters*. https://www.reuters.com/article/us-lockheed-fighter-idUSBRE88H00D20120918

Siebert, H. (2003). *Der Kobra-Effekt wie man Irrwege der Wirtschaftspolitik vermeidet*.

Spielberg, S. (1975). *Jaws* [Film]. Universal Studios.

Staff, N. P. R. (2011, January 17). Ike's warning of military expansion, 50 years later. *NPR*. https://www.npr.org/2011/01/17/132942244/ikes-warning-of-military-expansion-50-years-later

Stanovich, K. E., & West, R. F. (2000). Individual differences in reasoning: Implications for the rationality debate? *Behavioral and Brain Sciences*, *23*(5), 645–665. https://doi.org/10.1017/S0140525X00003435

Staw, B. M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, *16*(1), 27–44. https://doi.org/10.1016/0030-5073(76)90005-2

Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review*, *6*, 11.

Staw, B. M. (1997). The escalation of commitment: An update and appraisal. In Z. Shapira (Ed.), *Organizational decision makin.* (1997-97037-006; pp. 191–215). Cambridge University Press.

Staw, B. M., & Ross, J. (1978). Commitment to a policy decision: A multi-theoretical perspective. *Administrative Science Quarterly*, *23*(1), 40–64. https://doi.org/10.2307/2392433

Staw, B. M., & Ross, J. (1987). Behavior in escalation situations: Antecedents, prototypes, and solutions. *Research in Organizational Behavior*, *9*, 39–78.

Sun, T., Bin, Giles, & Lionel. (n.d.). *Sun Tzu on the art of war: The oldest military treatise in the world*.

Symanowitz, G. (2013). Seeing what's not there. *Finweek*, 44–46.

Takeoffs are optional, landings are mandatory. (1998, February 1). Aviation Pros. https://www.aviationpros.com/home/article/10389161/takeoffs-are-optional-landings-are-mandatory

Tavris, C., & Aronson, E. (2020). *Mistakes were made (but not by me) Third edition: Why we justify foolish beliefs, bad decisions, and hurtful acts*. Houghton Mifflin Harcourt.

Tennyson, A. (2000). *Charge of the light brigade*. Infomotions, Inc.

Thaler, R. H., & Sunstein, C. R. (2021). *Nudge: The final edition: Vol. Final edition*. Penguin Books.

The Independent Panel for Pandemic Preparedness & Response. (2021). *COVID-19: Make it the last pandemic* (p. 86).

Ting, H. (2009). *The effect of goal distance on goal value and escalation of commitment*. https://drum.lib.umd.edu/handle/1903/9667

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124–1131.

Vroom, V. H. (1964). *Work and motivation*. Wiley.

Ware, B. (2007). *Regrets of the dying*. https://bronnieware.com/blog/regrets-of-the-dying/

Wiegman, I. (2019). Payback without bookkeeping: The origins of revenge and retaliation. *Philosophical Psychology*, *32*(7), 1100–1128. https://doi.org/10.1080/09515089.2019.1646896

Wiegmann, D. A., Goh, J., & O'Hare, D. (2002). The role of situation assessment and flight experience in pilots' decisions to continue visual flight rules flight into adverse weather. *Human Factors*, *44*(2), 189–197. https://doi.org/10.1518/0018720024497871

Yuen, K. F., Wang, X., Ma, F., & Li, K. X. (2020). The psychological causes of panic buying following a health crisis. *International Journal of Environmental Research and Public Health*, *17*(10), 3513. https://doi.org/10.3390/ijerph17103513

Appendices

APPENDIX A – INITIAL RECRUITMENT EMAIL

To: [Participantemail@email.org]

Subject: Requesting Volunteers for Thesis Research

RADFORD
UNIVERSITY
Design

I am emailing because I am working on my graduate thesis project this summer to complete my M.F.A. in Design-Thinking degree from Radford University. This is a research study. The purpose of this study is to investigate aspects around decision-makers and leadership, specifically on aspects of changing one's mind. The title of the study is: Using design-thinking to address escalating commitment risks in decision-making.

There is no compensation for participation in this study. There is no cost to you for being in this study. There is no direct benefit to you for participating, though you may find the topic of discussion interesting or the design-thinking activities to be fun.

If you are interested in participating, you would engage in two workshops accomplished over Zoom. Each of the two workshops will be approximately 45 minutes. They would be followed up with a brief 10-minute critique by you of a proposed prototype.

Workshop One - Approximately 45 minutes: You and another participant will interview each other about the topic and participate in one design-thinking activity called "What's on Your Radar" (a prioritizing and brainstorming activity). This will involve using Zoom and Lucidchart.

Workshop Two – Approximately 45 minutes: You and all the participants will engage in three design-thinking brainstorming activities together. This will involve using Zoom and Lucidchart.

Critique: - Approximately 10 minutes: You will participate in a critique session via email on a student prototyped idea.

You must be 18 years or older to be eligible. You must hold, or have held a manager or decision-maker position at work within the last seven years.

If you are interested, or you know anyone else in a decision-maker role who might be interested, I would be thrilled to include as many participants as I can.

I appreciate your time and consideration. The best email for me is my Radford address tcooke3@email.radford.edu.

Best,

Tim Cooke—MFA candidate, Radford University

APPENDIX B – RECRUITMENT FOLLOW-UP EMAIL

To: [Participantemail@email.org]

Subject: Requesting Volunteers for Thesis Research – Thank you for your interest

RADFORD
UNIVERSITY
Design

Dear Sir or Madame,

Thank you for your interest in participating in this thesis study! Attached is a **consent form** for you to agree to participate in this study. Please review it and sign it if you agree to continue your participation. The completed consent form can then be emailed back to this address. Upon receipt of your complete consent form, you will be emailed about scheduling a time and date you are available for the workshops.

Please let me know if you have any questions or concerns. Thank you again for your interest in participating in this study.

Sincerely, Tim Cooke – MFA candidate, Radford University

APPENDIX C – CONSENT FORM

RADFORD
UNIVERSITY
Design

CONSENT TO PARTICIPATE IN STUDY

Title of Research: Using design-thinking to address escalating commitment risks in decision-making

Researcher(s): Tim Cooke and Dr. Joan Dickinson

Summary: This consent form is to explain your rights and expectations if you participate in this study. This research study is designed to use the design-thinking process to better understand decision-making, and to explore changing one's mind.

Participation is entirely voluntary—there is no compensation or direct benefit to you for participation in this study. There is no direct cost to you other than your time: Two 45-minute workshops, and one 10-minute critique over email. Your information will be kept confidential unless required by law to tell. You may decline to participate now or end your participation at any time once the study has begun without penalty. This is being conducted by Tim Cooke for the Radford University Department of Design. For a more detailed description of the study, please read on.

Purpose:

The purpose of this study is to explore concepts like plan-continuation bias and escalation of commitment in decision-making. Plan-continuation bias is the cognitive desire to stick with a plan in the face of adversity, and escalation of commitment is the realized manifestation of sticking with that plan. Understanding these concepts more in depth will provide insight into human thinking processes and decision-making on when to stick with a plan, when to alter a plan, and when to abandon a plan.

Procedures:

If you decide to participate in the study, you will be asked to engage in at least one of two 45-minute workshops to be conducted over Zoom.com video conferencing and Lucidchart.com digital whiteboard. The total number of subjects expected to participate is twenty (20). Doodle.com will be used for polling participant schedules. Please engage in both workshops if you are able to do so. Participation will conclude with your critique of a proposed prototype, based on the research of the study.

1. Workshop One – Approximately 45 minutes. You will interact with the student researcher and another participant. You will complete Workshop One with only the student researcher if we are unable to schedule another participant with you. *Participation in this workshop is contingent upon your consent to be video recorded.*
   1.1. Interview – You and another participant will interview each other over Zoom video conferencing.

1.2. "What's on your RADAR" Activity – Using a radar template provided by the student researcher, brainstorm on the statement, "When making decisions for work, what things affect your process and ultimate decision?"

2. Workshop Two – Approximately 45 minutes. You will interact with the student researcher and all other participants. This will take place approximately 3 weeks after Workshop One.
   2.1. Experience Diagramming – You and all other available participants will engage in a design-thinking activity designed to understand the experience of a person going through a situation. The situation being explored will have to do with what a person goes through when they are considering changing their mind or changing their plans. This involves filling out a flowchart template and including things like thoughts and feelings along with the described experience. This will involve a brief presentation by the student researcher on analysis of all the interviews and RADARs from Workshop One. This will involve defining and understanding key moments in a decision-making process.
   2.2. Creative Matrix – You and all the participants will engage in a creative matrix exercise to follow up on 2.1. This involves brainstorming ideas based on the intersections of two elements defined on the grid, such as different types of stakeholders along the top and environments along the side.
   2.3. Visualize the Vote – You and the other participants will engage in a voting exercise designed to allow for multiple ideas, while still organizing and prioritizing. Sometimes called "dot voting."
3. Critique of Prototype– Approximately 10 minutes. This will take place approximately 1-2 weeks after Workshop Two. You will receive an email with a summary of the results from the workshops and have an opportunity to provide feedback. This will involve critiquing a Quick Reference Guide, created by the student researcher, which will offer solutions to the issues discussed in the workshops.

Risks and Discomforts:

There is no more risk in this study than is encountered in everyday life. Some questions you will be asked in this study may make you uncomfortable. You should not feel compelled to reveal anything you are uncomfortable discussing, or you feel may compromise you, your employer, or anyone else. The primary risk to you is your information being seen by persons outside of the study. Please see the Confidentiality section of this form for an explanation on how your information will be protected by the researchers.

Compensation:

There is no compensation for participation in this study.

Benefits:

There are no direct benefits to you for being in this study. You may, however, find the topic of discussion and design-thinking activities to be interesting or fun.

Confidentiality:

The data collected in this research study will be kept confidential. Participation in the research may involve some loss of privacy. We will do our best to make sure that the information about you is kept confidential, but we cannot guarantee total confidentiality.

Your personal information may be viewed by individuals involved in the research and may be seen by people including those collaborating, funding, and regulating the study. We will share only the minimum necessary information in order to conduct the research. Your personal information may also be given out if required by law, such as pursuant to a court order. While the information and data resulting from this study may be presented at scientific meetings or published in a scientific journal, your name or other personal information will not be revealed.

The use of several websites and digital collaboration systems such as Zoom.com, Lucidchart.com, and Doodle.com may request you to create a login and/or connect a personal email address. Please be mindful of this if you wish to keep your email private from other participants. The student researcher can help you create an email address unique to this study if you so desire.

Zoom will be used for a video recording of you in Workshop One. There is no video recording for Workshop Two.

Lucidchart will be used by you for both Workshop One and Workshop Two and any information or ideas generated on Lucidchart will be collected by the researchers. The Lucidchart information is stored on their encrypted, cloud-based system. The video recordings and Lucidchart boards will be retained by the student researcher for up to two years before being deleted.

Doodle, a polling website, will be used for determining schedule availability of participants. This will only be used for scheduling; you will not be asked any other study questions through Doodle.

There are two circumstances where we would be required to break confidentiality and share your information with local authorities. The first is if we become aware or have a reason to believe that a child, an elder, or a disabled individual is being abused or neglected. The second is if you make a serious threat to harm yourself or others.

The research team will work to protect your data to the extent permitted by technology. It is possible, although unlikely, that an unauthorized individual could gain access to your responses because you are responding online. This risk is similar to your everyday use of the internet.

We will request that all participants respect the confidentiality of the group and do not share any other participant's responses outside of the group. However, we cannot guarantee your privacy or

confidentiality because there is always the possibility that another member of the group could share what was said. If you are not comfortable using your first name, a pseudonym will be assigned to you, and during the course of the study and in all notes, you will only be referred to by your pseudonym. If the study is published, your job title will be used in lieu of your name or pseudonym to reference your information directly. Your name will not be published or shared outside of the study. If you give the research team permission to quote you directly, the researchers will generalize your quote to remove any information that could be personally identifying.

Video recordings will be collected during this study and used to analyze your responses after the end of Workshop One. The recordings will not be shared with the general public but may be shared with other researchers. You must agree to be recorded in order to participate in Workshop One. Since this study involves the use of video recording and video conferencing over Zoom, please consider your surroundings and inform other members of your household before your workshops.

Costs to You:

There are no costs to you for participating in this study. You will need a device or devices that have access to the internet, a webcam, a microphone, and can run Zoom and Lucidchart. You may be most comfortable using a personal computer for using Lucidchart as it is best interfaced with a mouse and keyboard, although Lucidchart can operate on some touchscreen devices. Please ensure your device can access Lucidchart before the Workshops begin. The student researcher can send you a test page if necessary.

Questions about Your Rights as a Research Participant:

If you have questions now about this study, please ask before you sign this form. If you have any questions, or at any time you want to end your participation this study, you may do so without penalty by contacting: Tim Cooke, tcooke3@email.radford.edu. If you choose not to participate or decide to withdraw, there will be no impact on your employment, academic standing, or other involvement at Radford University.

If this study raised some issues that you would like to discuss with a professional, you may contact Dr. Joan Dickinson at jidickins@RADFORD.EDU.

This study was approved by the Radford University Committee for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Ben Caldwell, Institutional Official and Dean of the College of Graduate Studies and Research, bcaldwell13@radford.edu, 1-540-831-5724.

It is your choice whether or not to be in this study. What you choose will not affect any current or future relationship with Radford University.

You will be given a copy of this information to keep for your records.

Please read the statements below carefully and fill in the blanks or sign your initial as prompted.

*Job title to use instead of your name in publishing -- What job title you are comfortable being published? This will be used in lieu of your name to preserve anonymity in any publications. e.g., Project Manager, Nonprofit fundraiser, Human Resources supervisor, etc.

Job title_____

*Please initial here if you are comfortable being quoted:
(Initial here) _____

*Consent to use name during workshops -- Given the conversational nature of the workshops, the student researcher and other participants will need a name to address you by. *What name would you prefer others use to address you?*
_____
(Initial here) if you consent to use of this name_____

(Initial here) if you DO NOT consent to use of your name in any manner and would like a pseudonym assigned to you by the student researcher _____

*Consent to be video recorded – Please read the paragraph below carefully and initial only if you agree to be video recorded. Agreeing to this video recording is required to participate in Workshop One.

Workshop One involves video recording your conversation with another participant and the design-thinking activities you both will participate in. Should your recording be transcribed in whole or in part, the student researcher will transcribe the recording himself. Only the researchers of this study, which includes the student researcher and faculty researchers will have access to the recordings. The recordings will not be shown or released to any other participants or anyone outside of the study. You will not have access to the recording yourself once complete. You may request the

video recording cease at any point in the study. You may request the completed recording be destroyed at any time after the recording is made.

Please initial here if you consent to be video recorded during Workshop One_____

Please initial here if you agree to <u>not</u> share information about other participants whom you will encounter in this study_____

*<u>Preferred contact information</u> –Your contact information will be kept confidential and will only be available to the researchers. It will not be shared with any other participants or the general public.

In case of technical difficulties connecting on Zoom or Lucidchart:
Phone:_____
I am comfortable receiving texts from the student researcher:
(Initial here)_____
Email: _____
Other (Please specify):_____

Please read the statement below carefully and only sign if you agree to all stipulations described in this consent form and agree to participate in this study.

If all of your questions have been answered and you would like to take part in this study, then please sign below.

_____ _____ _____

Signature Printed Name(s) Date

----------**The following section is for researcher use only**----------
---

_____

___

I/We have explained the study to the person signing above, have allowed an opportunity for questions, and have answered all of his/her questions. I/We believe that the subject understands this information.

_____ _____ _____

Signature of Researcher(s) Printed Name(s) Date

APPENDIX D – PROBLEM TREE ANALYSIS TEMPLATE

Problem Tree Analysis is a method for mapping causes and effects of a particular problem being studied (Luma Institute, 2012). The problem being looked at is placed at the center of a chart. Causes are listed below the Problem Statement as "roots" and Effects are listed above as "branches." This exercise is meant to be exhaustive and so there is no limit to the number of causes or effects. Typically, the flow of cause and effect is unilateral but in some problems the effect can be shown to return to a cause demonstrating a positive feedback loop.

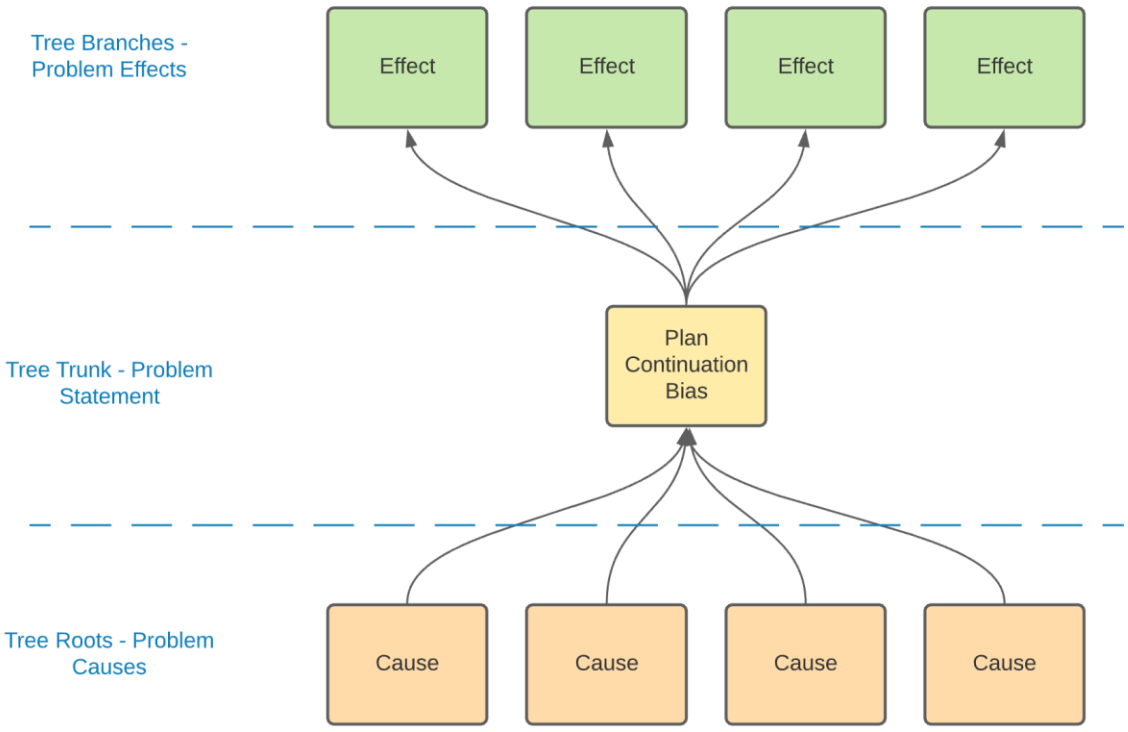


Figure 10 - Problem Tree Analysis Example

APPENDIX E – STAKEHOLDER MAP TEMPLATE

A Stakeholder Map is a method of mapping stakeholders on a problem or project and demonstrating their interconnected relationships (Luma Institute, 2012). Typically, stakeholders are represented on nodes and relationships are marked on the connecting arrows. This exercise is meant to be exhaustive so there is no limit to how many stakeholders or relationships can be depicted.

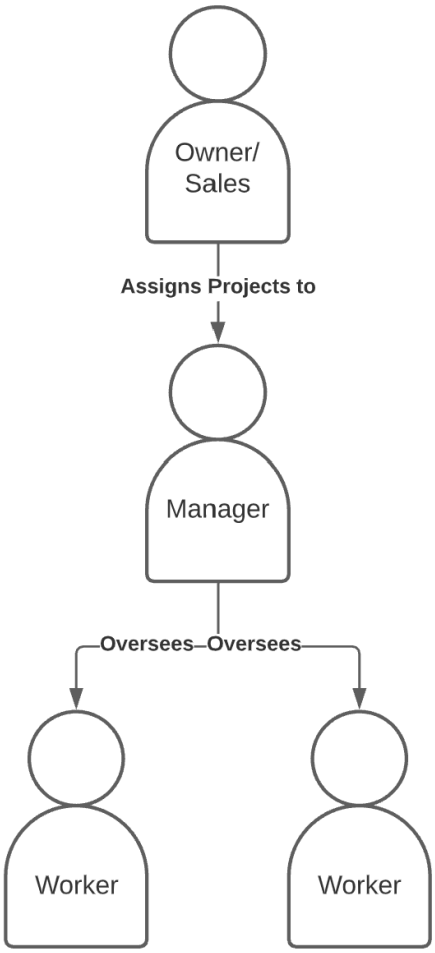


Figure 11 – Simple Stakeholder Map Example

APPENDIX F – WORKSHOP ONE EMAIL

To: [Participantemail@email.org]

Subject: Requesting Volunteers for Thesis Research – Thank you for your interest

RADFORD
UNIVERSITY
Design

Dear Sir or Madame,

Thank you for your willingness to participate in this study! You should receive several key items with this email:

1. An explanation of Workshop One and the tools you will be using.
2. A Doodle (https://doodle.com/en/) poll inquiring about your time availability over the next couple of weeks. This will be used to partner you up with another participant with a similarly available time schedule.

Please let the researcher know if you are missing any items from this list or if you have any questions or concerns.

Best,

Tim Cooke – MFA candidate, Radford University

APPENDIX G – WORKSHOP ONE EXPLANATION

RADFORD
UNIVERSITY
Design

WORKSHOP ONE EXPLANATION

Thank you for your willingness to participate in this study! Please read all the instructions before your workshop begins to have the opportunity to ask questions of Tim Cooke and to make the most of your time once the workshop begins.

Workshop One will consist of you interviewing another participant over Zoom and doing a short brainstorming exercise on Lucidchart. Zoom is an online video conferencing platform best for video calls. Lucidchart is an online whiteboard system for sharing ideas visually. It is recommended that you use a desktop computer, if possible, as Lucidchart will be easiest with a mouse/touchpad, but touchscreen devices can also work. You may also feel more comfortable using two devices, such as a phone or tablet for Zoom, and computer for Lucidchart. Please be mindful of your surroundings before and during the Zoom call.

You and your interview partner will each receive a unique link to your scheduled Zoom call and Lucidchart board. Tim Cooke will also be present on the call, but only to record and to guide if necessary. You may also ask questions of Tim Cooke while on the call if you have any concerns about the workshop. If a partner cannot be scheduled for you or if they are unavailable when the scheduled interview time arrives, you will be interviewed by Tim Cooke. In this case, you will not need to interview him. Your workshop may run long by a few minutes if there are issues connecting and/or spirited discussion. Please let your partner and Tim know at the beginning of the workshop if you are on a tight schedule and you will be accommodated as best as possible. If you are unable to commit to the full 45 minutes, please inform Tim and he will work with you as best as possible.

TOOL - ZOOM: Your Zoom appointment should be scheduled and set up for you by the student researcher prior to occurring. Information on Zoom can be found at https://zoom.us/. It is highly recommended you familiarize yourself with Zoom at least one day in advance of your

participation if you are not already acclimated to it. If you are experiencing difficulties connecting to your partner participant on Zoom, please notify Tim Cooke immediately so he can work with you both.

TOOL - LUCIDCHART: Your Lucidchart page will be set up for you along with your Zoom appointment. Information on Lucidchart can be found at https://lucid.co/. Only you, your interview partner, and the researchers will be able to see the contents of this page. Both you and your interview partner will lose access to this page shortly after your interview has ended. Lucidchart can draw many complex things with unique tools, but for this exercise you will only need to use the Sticky Note tool. Simply drag and drop a sticky note onto the board and type in the relevant information.

EXERCISE 1 – INTERVIEW (25-30 min)

Interviewing involves one person asking another person a set of questions and documenting their responses (Luma Institute, 2012). For the purposes of this study, the interviews will not be conducted by the researcher, but the participants will interview each other over Zoom. The researcher will be present on your call to record and mediate or answer questions as necessary.

Please be courteous and respectful of one another. You may be partnered with a person from a different background and different opinions than yourself. Approach this interview with genuine curiosity and frame it as an opportunity to learn about another person and their processes, even if you strongly disagree with them. Give them time to answer their questions, but feel free to discuss the questions briefly. It is OK for this to feel conversational but take the time to listen to the other person, do not just wait for them to stop talking so you can take your turn.

Introduce yourself briefly to your partner as you would a friendly stranger at a party. You may ask your partner to elaborate on any answers they give. Phrases like “That’s interesting, would you please elaborate on what you just said?” or “Can you tell me more about that?” can prompt them to elaborate on questions. Since you are interviewing each other, they may ask you the same follow-up questions on your turn.

You are not required to reveal anything about yourself you are uncomfortable sharing with a stranger. You may say “I do not wish to discuss that” or “I am not comfortable answering that” if you feel uncomfortable with any questions, although Tim Cooke will intervene if any questions stray far from the script. By the same token, do not press your partner if they decline to answer a question or elaborate.

Determine who will start the interview with a coin flip and then start with question 1. After both people have answered question 1, move on to question 2 and so on. Once all the questions have been answered, Tim Cooke will facilitate Exercise 2.

Interview Questions and Prompts:

1. Please state your age range:
    - 18-29
    - 30-39
    - 40-49
    - 50-59
    - 60-69
    - 70 or older
2. Please state the highest level of education you possess:
    - Less than Highschool
    - Highschool degree or equivalent (GED)
    - Some college but no degree
    - Associates degree
    - Bachelor's degree
    - Graduate degree
3. Please briefly describe your current job and role as a manager or decision-maker. If you are not working, please describe the role you had and how long you have been away from it.
4. Please briefly describe what people or projects are or were affected by your decisions?
5. Do you have people working for you affected by your decisions? If so, how many?
6. Are you working for another supervisor or manager affected by your decisions? If so, how many?
7. Are customers or users affected by your decisions (Y/N)
8. Tell me about a time you changed your mind on a decision you made at work. Please explain.
9. Tell me about a time you changed someone else's mind on a decision they made at work. Please explain.
10. What would you need from someone else to convince you to change your mind on a decision you made at work? Please explain.
11. How do you know when it is best to change your mind on a decision you have made in a work context, and when to stick to your original plan? Please explain.
12. If you were told by a colleague or supervisor that a plan you came up with will not work, how would you convince them to change their mind? How would you follow up on the plan once you convinced them? Please explain.
13. Suppose you were in the middle of executing a plan at work and a team member expresses that the plan will no longer work. How would you handle this situation? What type of information would lead you to change the plan? What type of information would lead you to keep the existing plan?

EXERCISE 2 – WHAT'S ON YOUR RADAR? (10-15 min)

Once you have both answered your questions from the interview section, leave Zoom running and open up the Lucidchart page. You should see a large bullseye diagram with categories labelled in each corner. The RADAR screen is usually divided into 4-8 segments and consists of three rings demonstrating *Primary, Secondary, and Tertiary* levels of importance. The segments are labelled by themes relevant to the topic being discussed.

Your task is to consider a concept/problem statement and brainstorm concepts that you will write on sticky notes and to the board in the relevant rings. Things most important/impactful to you will be close to the center of the board, things that are less important/impactul will be towards the outside. If, for example, the concept was "Daily Life" and the categories were labelled "morning", "noon", "evening", and "night," you might write sticky notes that say "6:30 alarm," "breakfast," "shower," and "commute to work" in the "morning" category. These would also be spread out on the rings according to your opinions: a person who skips breakfast might not include that note at all, or only put it on the outer ring. It is important to remember that these rings represent importance as well as impact—a long, traffic-addled morning commute that you hate would go in the center of the board, as you would presumably avoid it if you could, while a shorter commute that you don't mind so much might go in the secondary or tertiary ring. Since you are working with a partner, you may have overlapping ideas. You do not need to agree with your partner on preferences. For example if breakfast is important to you and your partner skips breakfast, you could write two notes; one in the primary ring and one in the tertiary ring. You and your partner will have color coded notes for tracking purposes. This activity is meant to spark discussion and introspective thinking. Do not worry about doing this activity "perfectly." Instead focus on getting ideas on the page; all information from you is valuable either way.

Please contact Tim Cooke tcooke3@email.radford.edu before your workshop begins if you have any questions or concerns about this exercise.

What's On Your RADAR concept/problem statement

1. You are in the middle of executing a plan you and your team have worked on for the last 6 months. A team-member expresses one morning that the plan will no longer work. What kinds of things might affect your next steps?

Tim Cooke may ask you or your partner a few questions for clarification, but once you have finished your interview and RADAR screens Workshop One has ended. Your workshop may run a few minutes long in case of delays or spirited discussion. If you and your partner wish to continue discussing the matter beyond the two activities, Tim will encourage the discussion and continue recording.

When the workshop is at an end, please politely say your farewell to your interview partner and then you may log off. Tim will close out the Zoom session and Lucidchart board when your session ends.

Thank you very much for your time, you will hear from Tim Cooke about participating in Workshop Two soon.

DESIGN-THINKING PRACTICE

You may find it helpful to practice some techniques on your own before the workshop. These practice templates are only for your benefit and are not required to be completed, shared, or recorded in any way for this study. These are only here for you to practice with if you so desire. Feel free to ask Tim Cooke any questions you have about these activities.

Practice – Interview

Interviewing someone can feel intimidating as can being interviewed. In a way it can feel like public speaking and make participants uncomfortable or experience "stage fright". Practicing in front of a mirror can help you become more comfortable with it.

Sit in front of a mirror and ask yourself one of the questions below. Once you answer the question honestly, ask yourself to follow up to elaborate. Look yourself in the eye and take note that you will spend much more time answering questions than asking them. This will likely be the case when you are interviewing another person and it is OK! Answers are supposed to be longer than the questions that prompted them, and you might not be rambling as much as you think.

Practicing in front of a mirror might feel a little foolish at first, but after a few minutes you should feel more comfortable with it.

- What kind of work do you do? Tell me about your job.
- Where do you come from? Tell me about the town where you live.
- What was the last book you read about? Tell me about it

Practice – What's on your RADAR?

To practice the "What's on your RADAR" technique, emulate the template below (Figure 12). This template is pre-labelled to reflect a typical day in your life. On sticky notes, write down things that you enjoy throughout the day—one idea per note. Once a note is written down, place it on the RADAR screen based on how important it is to you or how impactful it is. For example, if your day doesn't truly start until you have had your first cup of coffee, you might put "morning coffee" toward the center of the board and in the Morning section. Add notes until you have exhausted all ideas. Do not worry about sticky notes overlapping or covering each other—this exercise is meant to

be a little messy. You can methodically analyze the notes one by one once the exercise is over. The value of this exercise is to take tacit knowledge that is rarely defined or discussed and turn it into explicit knowledge that can be analyzed. Feel free to give it a try—you might learn something about yourself and your day you never thought about before.

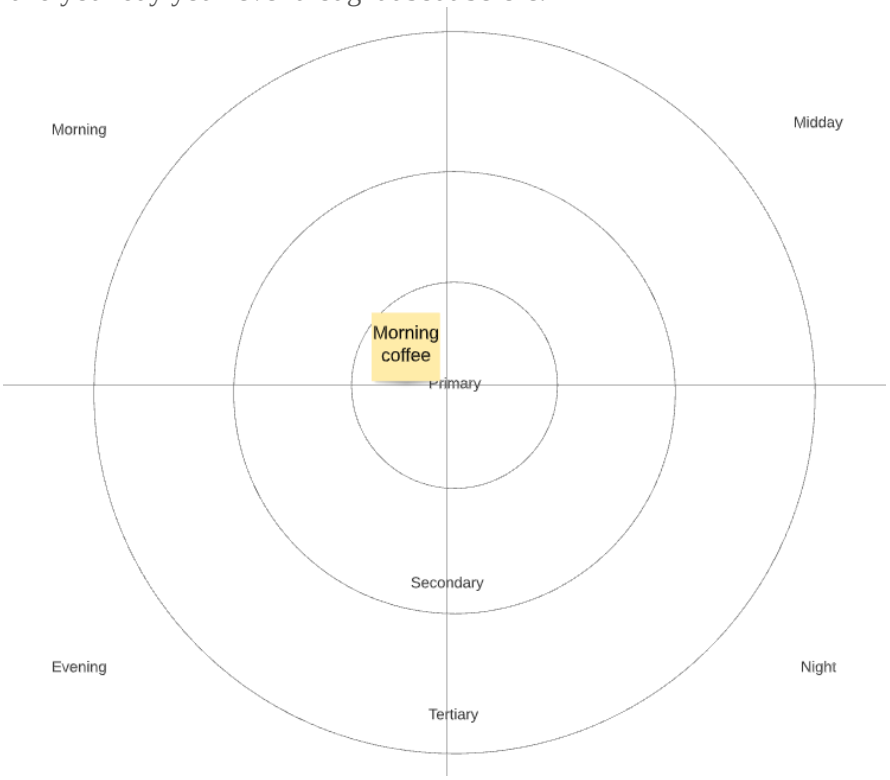


Figure 12 What's on your RADAR practice template

APPENDIX H – AFFINITY CLUSTERING

Affinity Clustering is an activity for taking disparate bits of information and organizing them into clustered groups to look for patterns (Luma Institute, 2012). Typically, concepts pulled from the data are placed in boxes and moved around on a chart until certain patterns emerge from similar concepts being placed near each other. Once all concepts are organized, the clusters are labelled based on the discovered patterns.

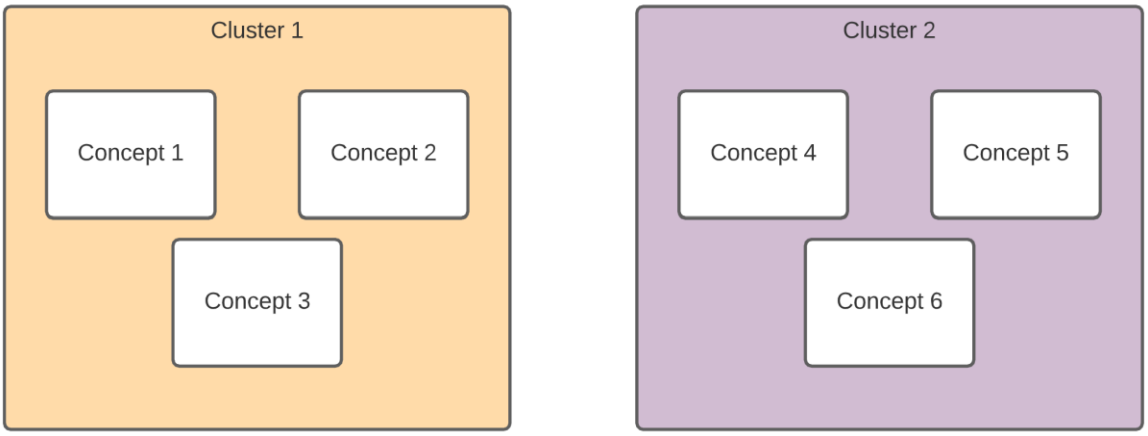


Figure 13 Affinity Clustering Example

APPENDIX I – WORKSHOP ONE THANK YOU EMAIL

To: [Participantemail@email.org]

Subject: Thesis Research – Workshop One – Thank you for your participation so far

RADFORD
UNIVERSITY
Design

Dear Sir or Madame,

Thank you for your willingness to participate in this study so far! Your input will be most helpful to the study. It will take the researchers approximately 3 weeks to assess all the interviews and RADAR boards from everyone. You should receive an email in about 2 weeks with a briefing on Workshop Two and a Doodle poll for your availability. This will involve coordinating with all participants so there may not be a perfect time for all involved. We appreciate your understanding.

Please let the researcher know if you have any questions or concerns.

Best,

Tim Cooke – MFA candidate, Radford University

APPENDIX J– WORKSHOP TWO BRIEF AND DOODLE POLL

To: [Participantemail@email.org]

Subject: Thesis Research – Workshop Two Brief and Doodle poll for scheduling

RADFORD
UNIVERSITY
Design

Dear Sir or Madame,

Thank you for your willingness to participate in this study! You should receive several key items with this email:

1. An explanation of Workshop Two and the tools you will be using.
2. A Doodle (https://doodle.com/en/) poll inquiring about your time availability over the next week. This will be used to determine the best time for the maximum number of participants.

Please let the researcher know if you are missing any items from this list or if you have any questions or concerns.

Best,

Tim Cooke – MFA candidate, Radford University

APPENDIX K – WORKSHOP TWO EXPLANATION

RADFORD
UNIVERSITY
Design

WORKSHOP TWO EXPLANATION

Thank you for your willingness to participate in this study! Please read all the instructions before your workshop begins to have the opportunity to ask questions of Tim Cooke and to make the most of your time.

THE STUDY UP TO THIS POINT

This study is about understanding two important concepts in decision-making: Plan-Continuation Bias (PCB) and Escalation of Commitment (EoC). PCB is the tendency to want to stick with a plan in the face of adversity or bad news. You can think of this as the voice in your head telling you to ignore the problems and stick with the plan you have. EoC is the actual realized manifestation of sticking with the existing course of action. This is the action of sticking with the plan instead of changing it or cancelling.

Say for example, you are on your way to the store to pick up some groceries. On the way you encounter some bad traffic—it is unclear if this backup is isolated or will hamper your entire route to the store. How long might you sit in the traffic before giving up and attempting to turn back? In this case, PCB would be the voice in your head telling you to get to the store. If you decided to hang in there and continue sitting in traffic, you would be escalating your commitment to the original plan of getting to the store. If, however you gave up and turned back home, or drastically altered your plan, you would be de-escalating your commitment to the original plan.

As it turns out, there are numerous things that might influence your decision beyond the frustration of sitting in traffic itself. Whether or not you have passengers with you, how critical the grocery items are, and the weather might influence your decision. However, some more complex things like social pressure, time pressure, how far you have come already, how far you have left to go, and your own cognitive biases all might play a role.

Understanding the nature of PCB and EoC is the focus of this study. If you choose to research EoC on your own, you will likely find examples and studies of money pits—situations or projects where people continued to invest despite the evidence that it was not working. I however argue that EoC should be viewed from a neutral perspective. After all triumph over adversity requires escalating commitment to a course that may at first appear to be failing, but perseverance will pay off. I argue that EoC can be classified and understood better by whether or not a problem is recognized whether or not action is taken, and whether or not the ultimate result is a success or failure.

The remainder of the study will be about analyzing the data so far and developing options for dealing with PCB and EoC in the real world.

WORKSHOP TWO

Workshop Two will consist of you interacting with the other participants over Zoom and brainstorming on Lucidchart. Zoom is an online video conferencing platform best for video calls. Lucidchart is an online whiteboard system for sharing ideas visually. It is recommended that you use a desktop computer, if possible, as Lucidchart will be easiest with a mouse/touchpad, but touchscreen devices can also work. You may also feel more comfortable using two devices, such as a phone or tablet for Zoom, and computer for Lucidchart.

TOOL - ZOOM: Your Zoom appointment should be scheduled and set up for you by the student researcher prior to occurring. Information on Zoom can be found at https://zoom.us/. It is highly recommended you familiarize yourself with Zoom at least one day in advance of your participation if you are not already acclimated to it. If you are experiencing difficulties connecting to your partner participant on Zoom, please notify Tim Cooke immediately so he can work with you both.

TOOL - LUCIDCHART: Your Lucidchart page will be set up for you along with your Zoom appointment. Information on Lucidchart can be found at https://lucid.co/ Only you, your fellow participants, and the researchers will be able to see the contents of this page. Both you and your fellow participants will lose access to this page shortly after your interview has ended. Lucidchart can

draw many complex things with unique tools, but for this exercise you will only need to use the Sticky Note tool. Simply drag and drop a sticky note onto the board and type in the relevant information.

Please be courteous and respectful of one another. You may be interacting with people from different backgrounds and different opinions. Approach this activity with genuine curiosity and frame it as an opportunity to learn about other people and their processes, even if you strongly disagree with them. Please remember all participants are volunteers.

Tim Cooke will be facilitating this workshop and will be guiding and helping as necessary but will generally stay silent and observe the group as they work through the problem. Feel free to ask questions or express concerns if you should have them. Do not worry about doing these exercises "perfectly." Instead focus on getting ideas on the page; all information from you is valuable either way. Please be mindful that large groups can be at risk of people talking over each other. Since these activities utilize Lucidchart as well as Zoom, you can still make your ideas known by writing them down on digital sticky notes if you find it difficult to be heard in the group. Tim Cooke may occasionally mute everyone to present some information or make an announcement.

Presentation and brief discussion of findings from Workshop One – (5 min)

An analysis of interviews and RADAR screens from Workshop One will be presented to the group to start you off, as well as some of the findings of the student researcher. The findings may differ slightly from your personal experience or feelings, but feel free to express your thoughts during the exercises.

EXERCISE 1 – Experience Diagram (15-20 min)

Experience Diagramming is a method of mapping a person's trip through a given situation or task (Luma Institute, 2012). Formats can vary in practice but the format that we will follow here will be based on Activity on Node (AON). Each box represents a particular step in an experience. Experience Diagrams typically include the task or process being performed along with what the person is doing, thinking, and feeling. The number of nodes is potentially infinite, but usually 6-8 nodes is the best for completing this activity in 15-20 minutes.

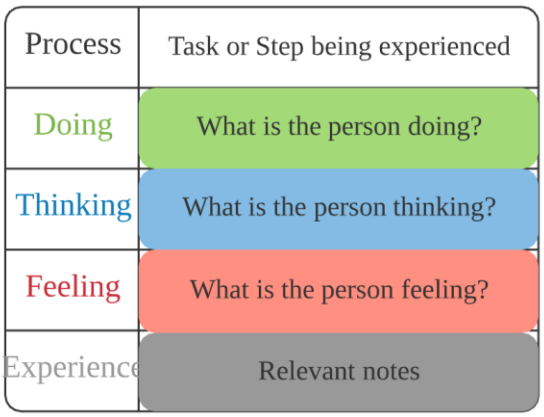


Figure 14 - Typical node for AON format

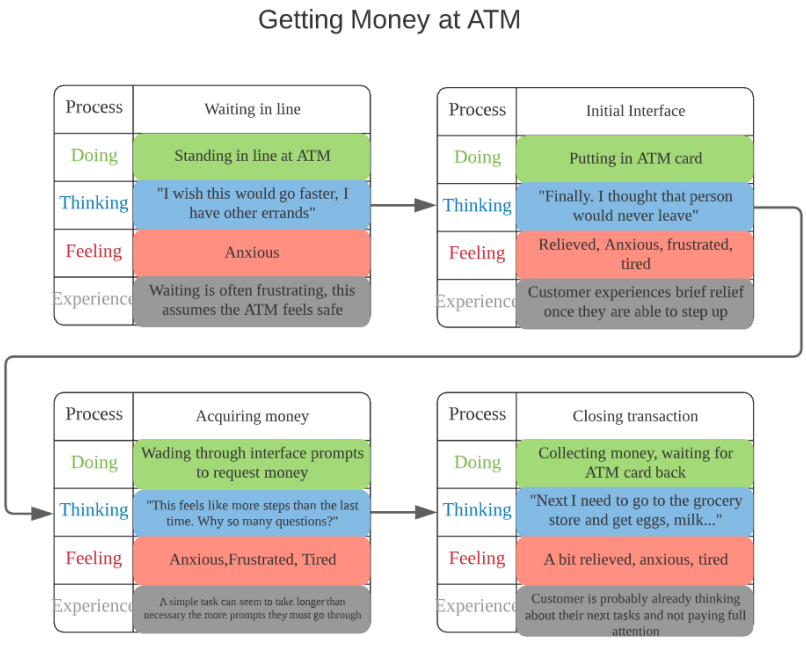


Figure 15 - Example of Experience Diagram

Your job in this is to fill in the blanks of the experience diagram template. The student researcher has already made a template for you and the other participants to work with. You may add or remove nodes as you see fit. Your facilitator will step in and guide as necessary as you work

through the exercise. The purpose of this is not to be perfect or accurate but to facilitate discussion. You may add notes to the diagram if you have additional thoughts or disagreements.

EXERCISE 2 – CREATIVE MATRIX (10-15 min)

Creative Matrix is a brainstorming exercise considering different intersections of varying categories (Luma Institute, 2012). Stakeholder types are listed along the horizontal axis and opportunities for solutions are listed along the vertical axis. Participants write down ideas on sticky notes and add them to the matrix at the relevant intersections. The creative matrix for your exercise might involve different categories from the example.

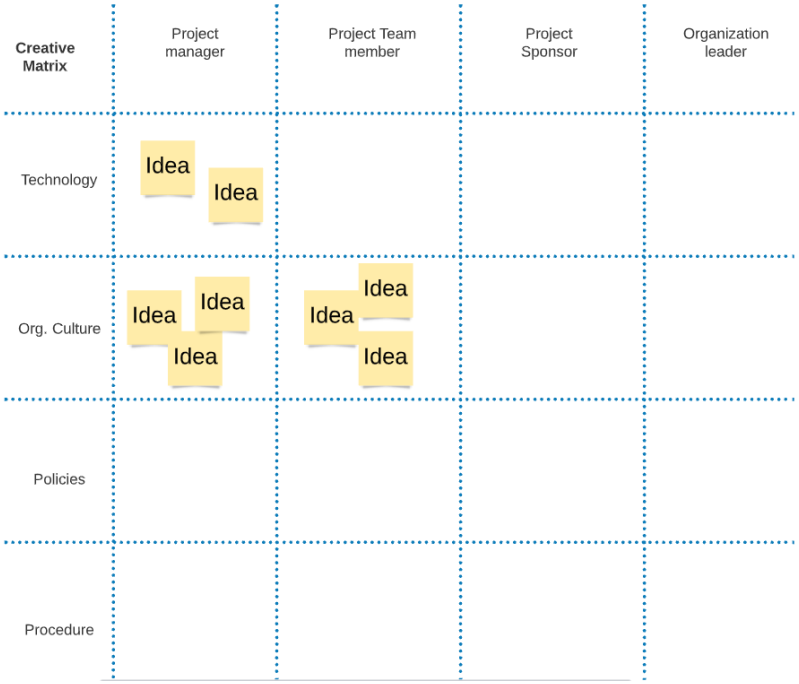


Figure 16 - Example of Creative matrix

EXERCISE 3 – VISUALIZE THE VOTE (5 minutes)

Visualize the Vote is a quick method of polling participants to gauge their thoughts and feelings on a subject (Luma Institute, 2012). This activity involves participants being given a single

overall vote token and two *detail vote* tokens so they can express a preference for a single idea but also demonstrate the elements they also liked—but not enough to dedicate their one vote to. Every participant receives the trio of votes and voting usually occurs in less than five minutes.

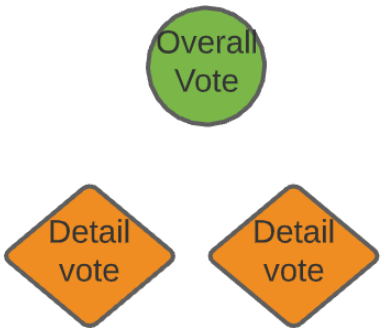


Figure 17 - Visualize the Vote token set.

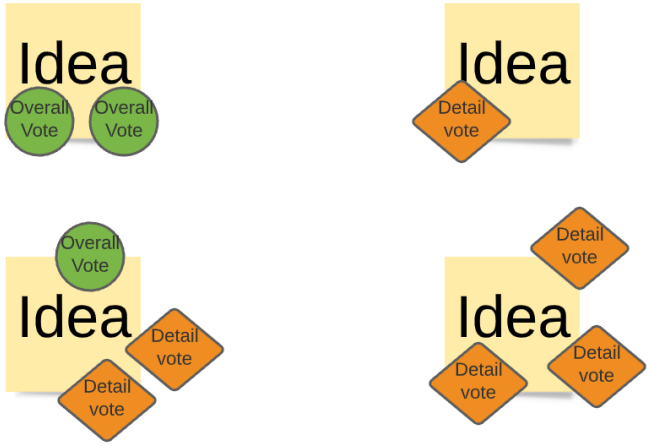


Figure 18 - Example of completed vote – The top-right idea will be pursued and details from the bottom-right and bottom-left will be considered or included.

DISCUSSION (Time remaining)

Any time remaining will be used at the facilitator's discretion for discussing all the exercises and any other thoughts people have.

Please contact Tim Cooke tcooke3@email.radford.edu before your workshop begins if you have any questions or concerns about this exercise.

Workshop Two topic of exploration

The topic of discussion for Workshop Two will be described to you by your facilitator at the time of the workshop. It will be based on the analysis of the interviews and RADAR screens you and the other participants did in Workshop One.

DESIGN-THINKING PRACTICE

You may find it helpful to practice some techniques on your own before the workshop. These practice templates are only for your benefit and are not required to be completed, shared, or recorded in any way for this study. These are only here for you to practice with if you so wish.

Practice Template – Experience Diagram

You can create a simple experience diagram for yourself using the template in the description above. Divide some sticky notes into two columns and five rows. An experience diagram can have as many nodes as necessary, but usually six-eight is a good starting point.

Think about the steps of getting to the airport. On one sticky note, write "Board airplane", this will be the end of your diagram. On all the other notes, write in the steps it takes to get from home to the plane. e.g., take cab to airport, check bags, get through security, etc. Think of any other steps you might personally like to take, like getting a meal or buying a book and fill in as many sticky notes as you feel are necessary. Often it helps to fill out some notes, put them in order, and then fill in any blanks you think of. Once you have the activities sequenced, fill in the blanks related to your thoughts and feelings during those experiences. Once each sticky note is filled out and you like the order, draw lines between them and label the lines if relevant. Once all the nodes are connected you have a rough experience diagram for a trip to the airport.

Practice Template – Creative Matrix

Draw out a grid that is 6x6. Refer to Figure 16. Along the top row, write down types of stakeholders at the airport. e.g., security, passengers, pilots, airline staff, etc.

Along the first column, write down areas of the airport. e.g., lobby, security, terminal, shops, etc.

In the empty cells, refer to the stakeholder and area intersection and consider the following:

How might we engage people at the airport to visit a lesser-known tourist destination?

Practice Template – Visualize the Vote

Refer to Figure 17. Develop a list of places you would like to visit on vacation. Write "Primary" on a sticky note of a certain color. Write "detail" on two sticky notes of another color. Make extra copies for every additional person you would like to include in the vote. Put the primary vote on your first choice and the detail votes on secondary choices. Once everyone has voted, review the results. Perhaps this is your next vacation spot?

APPENDIX L – QUICK REFERENCE GUIDE

A Quick Reference Guide provides a "document summarizing the key principles and elements of a proposed solution" (Luma Institute, 2012, p. 82). The format of these guides can vary depending on the solution it presents, but typically it includes visual elements as well as written descriptions. The general idea is for a highly truncated, easily understood, operator's manual for a particular solution. This can include general concepts as well as step-by-step instructions.

APPENDIX M – CRITIQUE TEMPLATE

To: [Participantemail@email.org]

Subject: Feedback on the study into decision-making

RADFORD
UNIVERSITY
Design

Thank you so much for your involvement in this study! Based on the research and analysis of the information you and your fellow participants provided, the student researcher, Tim Cooke, has developed the attached Quick Reference Guide (QRG) for your consideration. This Quick Reference Guide is meant to express possible ideas and solutions that were developed throughout the study thanks to your participation.

If you have a few minutes, it would be much appreciated if you would look over this Quick Reference Guide and offer any thoughts you have.

What do you like in this Guide?

What do you not like in this Guide?

What suggestions might you have for improving on this guide?

Finally, do you feel like this guide might be helpful to someone starting out in a management or decision-maker position like yours?

All feedback is welcome—everything from the content to the graphical layout, or anything else you have thoughts on. The more specific the better.

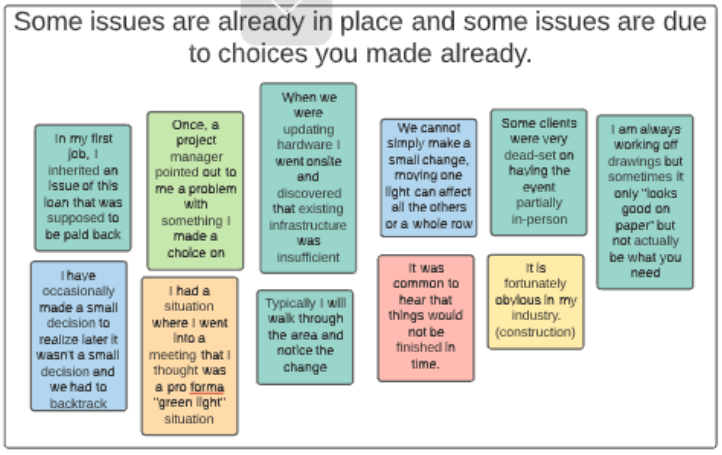
Thank you so much again for your participation and help with this study. It has been a pleasure having your input!

Best,

Tim Cooke – MFA candidate, Radford University

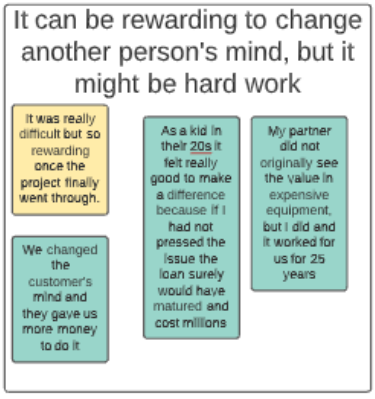
APPENDIX N - AFFINITY CLUSTERED INTERVIEW NOTES

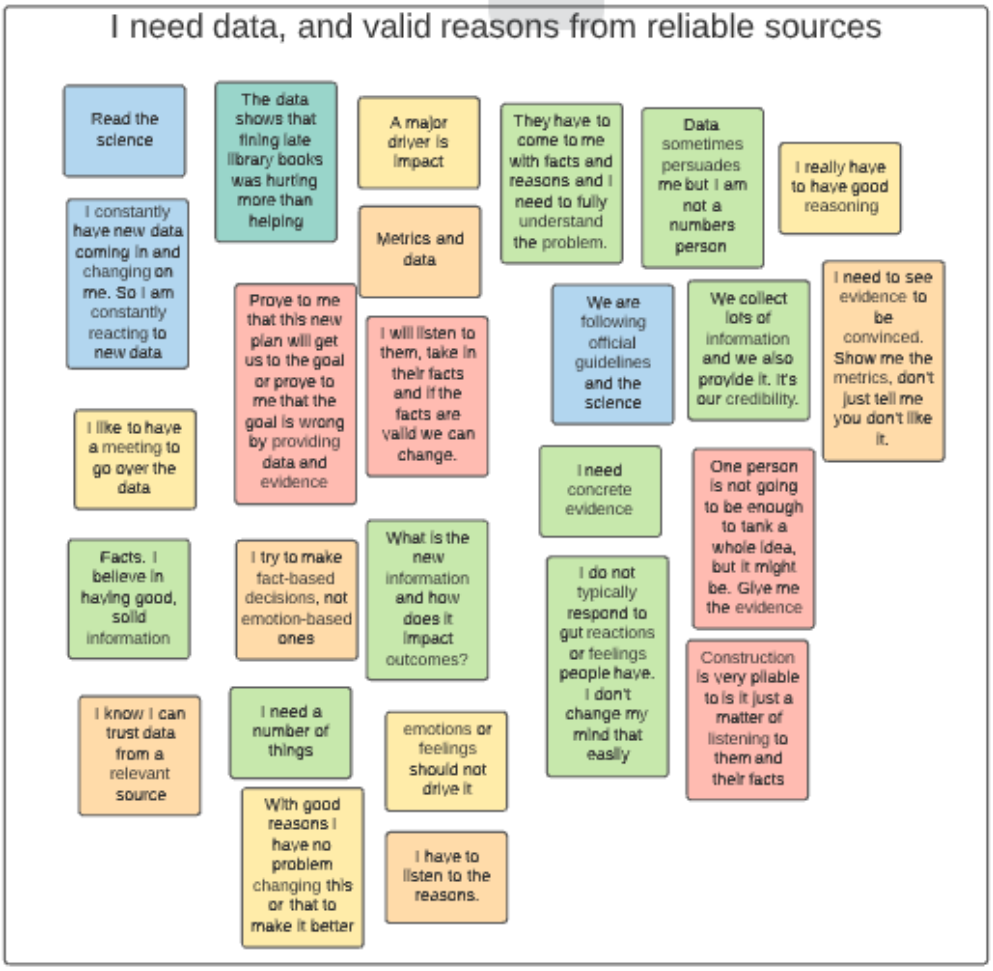
Question 8: A time you changed your mind	Q9. A time you changed someone else's mind	Q10 What do you need from someone to change your mind?	Q11 How do you know when its best to change your mind?	Q12 If you were told by a colleague that your plan will not work...	Q13 How would you handle being told that a plan will no longer work

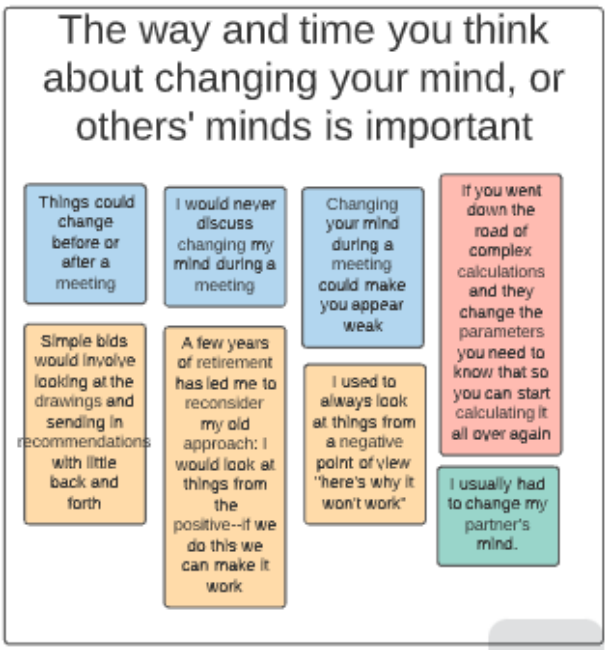

Some issues are already in place and some issues are due to choices you made already.
In my first job, I inherited an issue of this loan that was supposed to be paid back
Once, a project manager pointed out to me a problem with something I made a choice on
When we were updating hardware I went onsite and discovered that existing infrastructure was insufficient
We cannot simply make a small change, moving one light can affect all the others or a whole row
Some clients were very dead-set on having the event partially in-person
I am always working off drawings but sometimes it only "looks good on paper" but not actually be what you need
I have occasionally made a small decision to realize later it wasn't a small decision and we had to backtrack
I had a situation where I went into a meeting that I thought was a pro forma "green light" situation
Typically I will walk through the area and notice the change
It was common to hear that things would not be finished in time.
It is fortunately obvious in my industry. (construction)

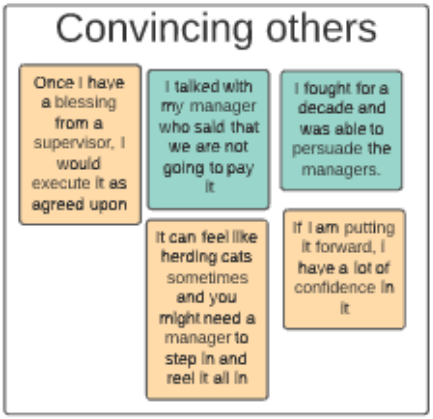

Sometimes the plan isn't working out. Make changes now if you can and remember to change the plan next time.
It doesn't matter what plan is in place. If it causes problems it has to change.
So we would go back and forth and sometimes I would let them do it their way and sometimes I would insist on my way but we would stop and assess at a certain point
If it is beneficial to change, then that is the path to take
Realize a project isn't working partway through
Do we carry on or do we start over?
I had a whole plan in place when I realized we needed more hardware I didn't initially realize
I learned more and changed my mind
Sometimes you have to scrap the whole thing altogether--its just not working.
If you tried it once and it didn't work, try it again but a little different this time
I changed my mind all the time.
I almost never changed a plan mid-stream but I would alter how I approached it the next time.
I try to alter the game plan based on how a technique worked the first time
Just because I put the plan in place doesn't necessarily make it the best one
A change in one of the elements that changed the plan often forces you to respond


Sometimes you have to pull rank to get things moving again
Someone would usually have to pull rank to change my mind
If I disagree, I will pull rank if I have to. I hate to do it but sometimes this is how it has to be.
If the change is not beneficial or they cannot explain it well enough then we are going with the original plan
If all things are equal, we will go with my plan because it is my responsibility and I will need to justify choices later if asked
It depends on who it is too. If its a superior, I can be overruled. If its a worker, it's ultimately my decision.
It often felt changed for me. As a manager I now had to think about how to make this thing happen

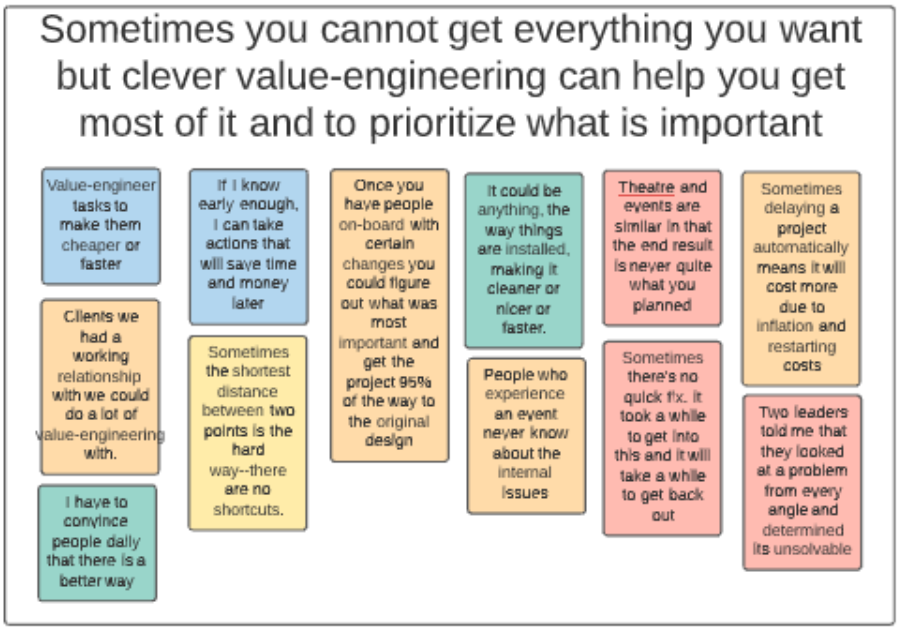

It can be rewarding to change another person's mind, but it might be hard work
It was really difficult but so rewarding once the project finally went through.
As a kid in their 20s it felt really good to make a difference because if I had not pressed the issue the loan surely would have matured and cost millions
My partner did not originally see the value in expensive equipment, but I did and it worked for us for 25 years
We changed the customer's mind and they gave us more money to do it

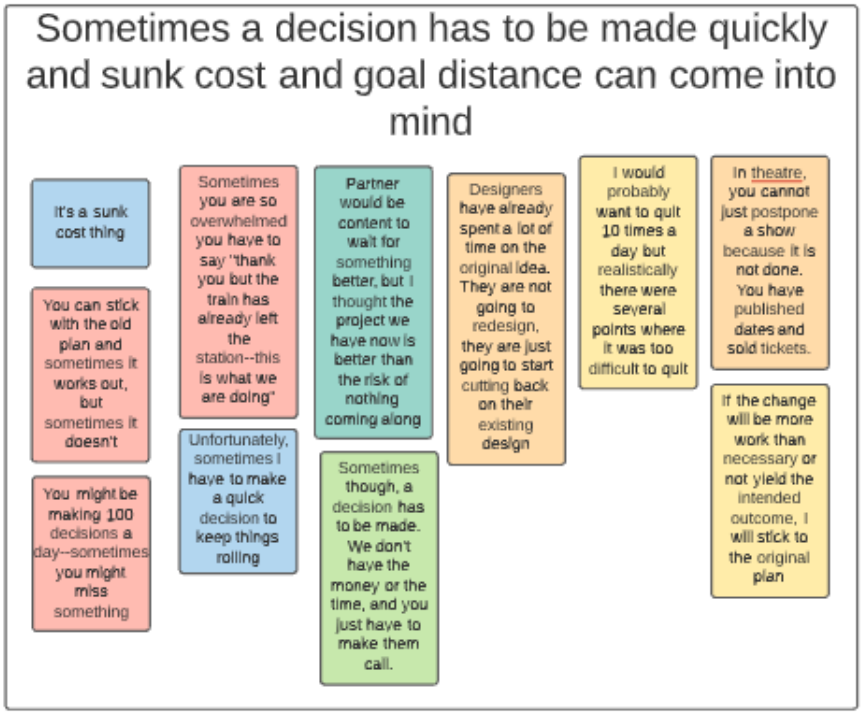

I need data, and valid reasons from reliable sources
Read the science
The data shows that fining late library books was hurting more than helping
A major driver is impact
They have to come to me with facts and reasons and I need to fully understand the problem.
Data sometimes persuades me but I am not a numbers person
I really have to have good reasoning
I constantly have new data coming in and changing on me. So I am constantly reacting to new data
Metrics and data
Prove to me that this new plan will get us to the goal or prove to me that the goal is wrong by providing data and evidence
I will listen to them, take in their facts and if the facts are valid we can change.
We are following official guidelines and the science
We collect lots of information and we also provide it. It's our credibility.
I need to see evidence to be convinced. Show me the metrics, don't just tell me you don't like it.
I like to have a meeting to go over the data
I need concrete evidence
One person is not going to be enough to tank a whole idea, but it might be. Give me the evidence
Facts. I believe in having good, solid information
I try to make fact-based decisions, not emotion-based ones
What is the new information and how does it impact outcomes?
I do not typically respond to gut reactions or feelings people have. I don't change my mind that easily
Construction is very pliable to is it just a matter of listening to them and their facts
I know I can trust data from a relevant source
I need a number of things
emotions or feelings should not drive it
With good reasons I have no problem changing this or that to make it better
I have to listen to the reasons.

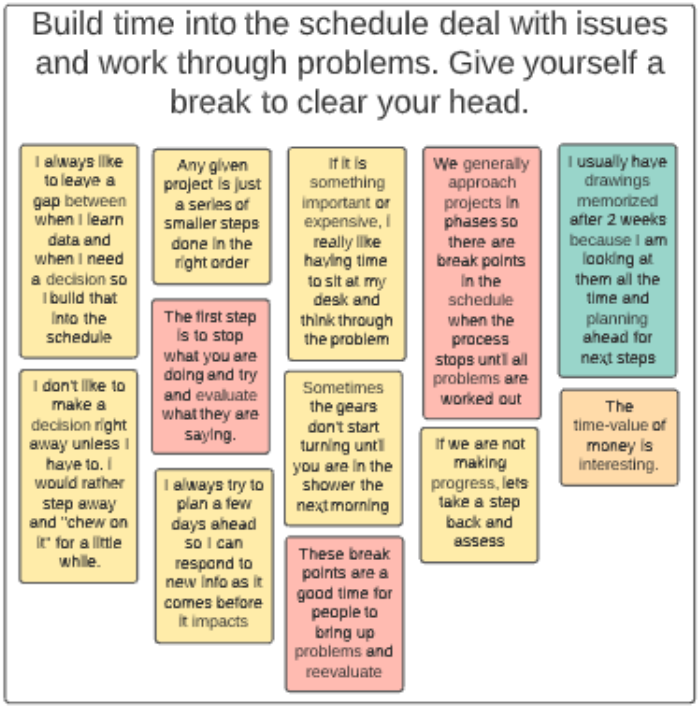

The way and time you think about changing your mind, or others' minds is important
Things could change before or after a meeting
I would never discuss changing my mind during a meeting
Changing your mind during a meeting could make you appear weak
If you went down the road of complex calculations and they change the parameters you need to know that so you can start calculating it all over again
Simple bids would involve looking at the drawings and sending in recommendations with little back and forth
A few years of retirement has led me to reconsider my old approach: I would look at things from the positive--if we do this we can make it work
I used to always look at things from a negative point of view "here's why it won't work"
I usually had to change my partner's mind.


Convincing others
Once I have a blessing from a supervisor, I would execute it as agreed upon
I talked with my manager who said that we are not going to pay it
I fought for a decade and was able to persuade the managers.
It can feel like herding cats sometimes and you might need a manager to step in and reel it all in
If I am putting it forward, I have a lot of confidence in it

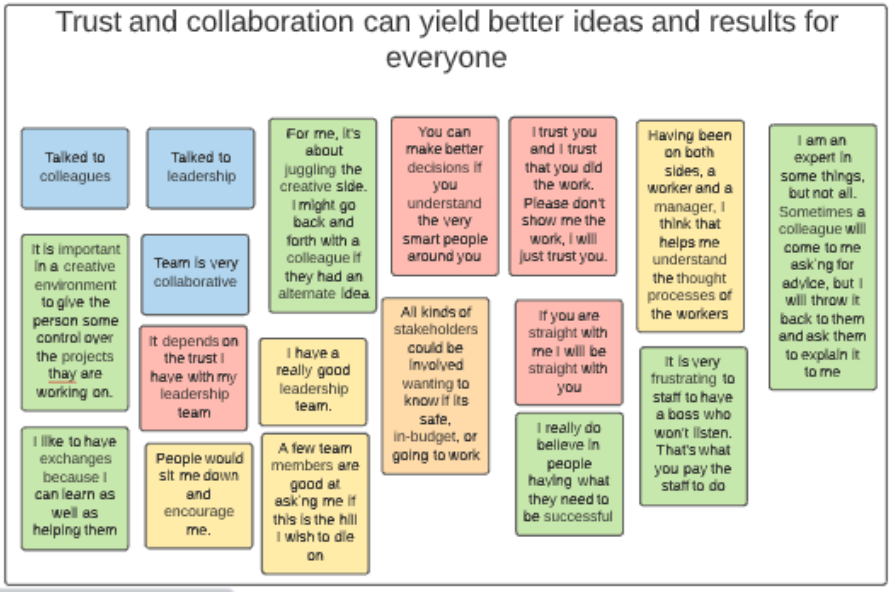

Often, changing the plan affects a lot of different things. Asking the right questions before taking action can spare you a lot of headaches
You have to ask, how will this affect stakeholders not obviously represented here?
Since we have offices in all 50 states, the local rules can vary quite a bit so you cannot just think about HQ alone
Deciding when to re-enter the workforce during COVID has been a challenge
What is going to help the most people?
I am a big believer in clear goals and metrics
Accounting for impact on constituents
The boss originally wanted everyone in the office pretty quickly during COVID
Does it require more money, or resources, or labor?
I simply ask "why won't it work?
Will this offend staff or community members who wish to celebrate this holiday?
What is the most compelling message?
Are we making progress towards the goals?
What alternatives will yield the results we want?
Is this new method cheaper? safer? whatever?
Is the current plan going to make the difference we want?
It falls back to: what are the options? What's the cost? Will it meet requirements?
Could we just tweak this or compromise a little and make it work?

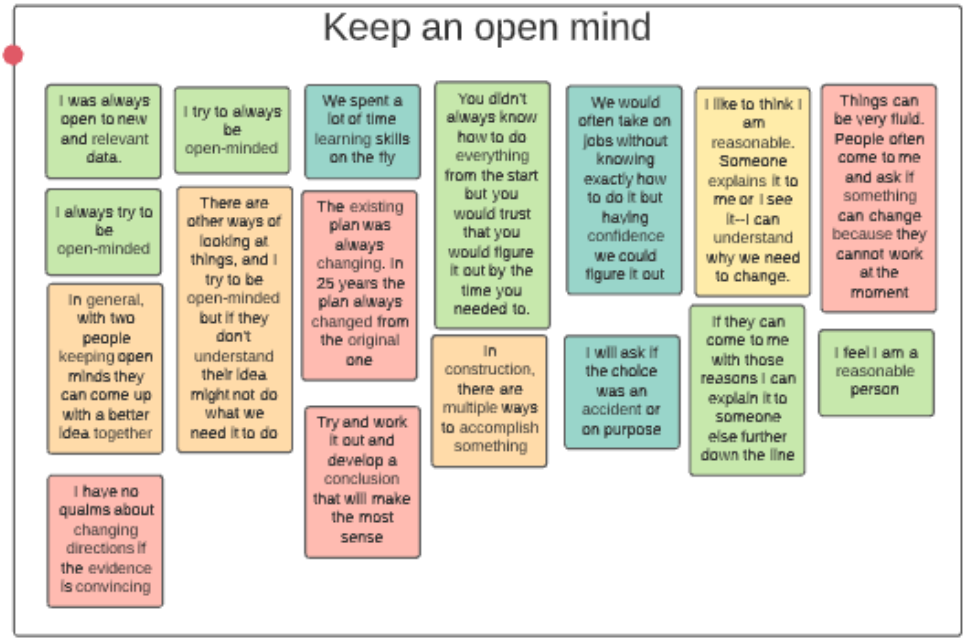

Sometimes you cannot get everything you want but clever value-engineering can help you get most of it and to prioritize what is important
Value-engineer tasks to make them cheaper or faster
If I know early enough, I can take actions that will save time and money later
Once you have people on-board with certain changes you could figure out what was most important and get the project 95% of the way to the original design
It could be anything, the way things are installed, making it cleaner or nicer or faster.
Theatre and events are similar in that the end result is never quite what you planned
Sometimes delaying a project automatically means it will cost more due to inflation and restarting costs
Clients we had a working relationship with we could do a lot of value-engineering with.
Sometimes the shortest distance between two points is the hard way--there are no shortcuts.
People who experience an event never know about the internal issues
Sometimes there's no quick fix. It took a while to get into this and it will take a while to get back out
Two leaders told me that they looked at a problem from every angle and determined its unsolvable
I have to convince people daily that there is a better way

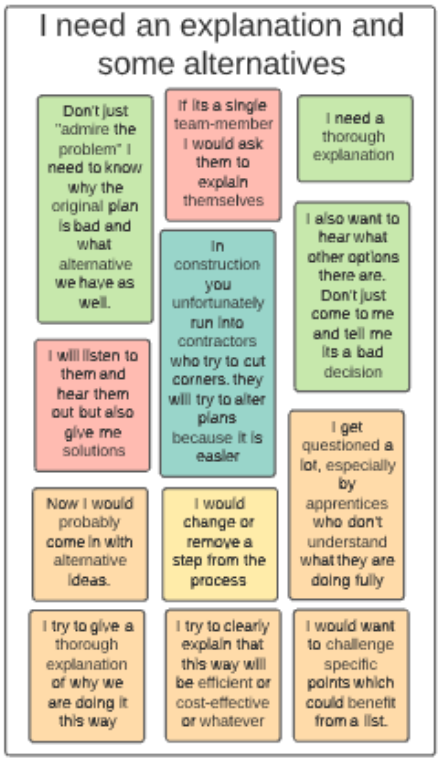

Sometimes a decision has to be made quickly and sunk cost and goal distance can come into mind
It's a sunk cost thing
You can stick with the old plan and sometimes it works out, but sometimes it doesn't
You might be making 100 decisions a day--sometimes you might miss something
Sometimes you are so overwhelmed you have to say "thank you but the train has already left the station--this is what we are doing"
Unfortunately, sometimes I have to make a quick decision to keep things rolling
Partner would be content to wait for something better, but I thought the project we have now is better than the risk of nothing coming along
Sometimes though, a decision has to be made. We don't have the money or the time, and you just have to make them call.
Designers have already spent a lot of time on the original idea. They are not going to redesign, they are just going to start cutting back on their existing design
I would probably want to quit 10 times a day but realistically there were several points where it was too difficult to quit
In theatre, you cannot just postpone a show because it is not done. You have published dates and sold tickets.
If the change will be more work than necessary or not yield the intended outcome, I will stick to the original plan

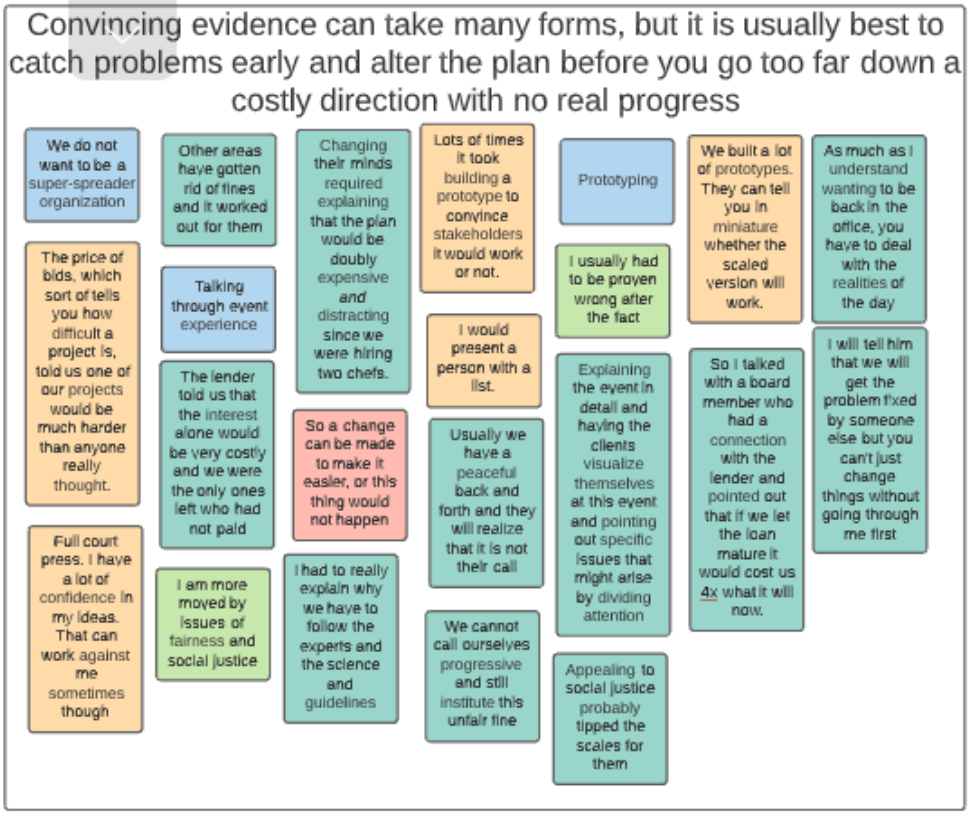

Build time into the schedule deal with issues and work through problems. Give yourself a break to clear your head.
I always like to leave a gap between when I learn data and when I need a decision so I build that into the schedule
I don't like to make a decision right away unless I have to. I would rather step away and "chew on it" for a little while.
Any given project is just a series of smaller steps done in the right order
The first step is to stop what you are doing and try and evaluate what they are saying.
I always try to plan a few days ahead so I can respond to new info as it comes before it impacts
If it is something important or expensive, I really like having time to sit at my desk and think through the problem
Sometimes the gears don't start turning until you are in the shower the next morning
These break points are a good time for people to bring up problems and reevaluate
We generally approach projects in phases so there are break points in the schedule when the process stops until all problems are worked out
If we are not making progress, lets take a step back and assess
I usually have drawings memorized after 2 weeks because I am looking at them all the time and planning ahead for next steps
The time-value of money is interesting.

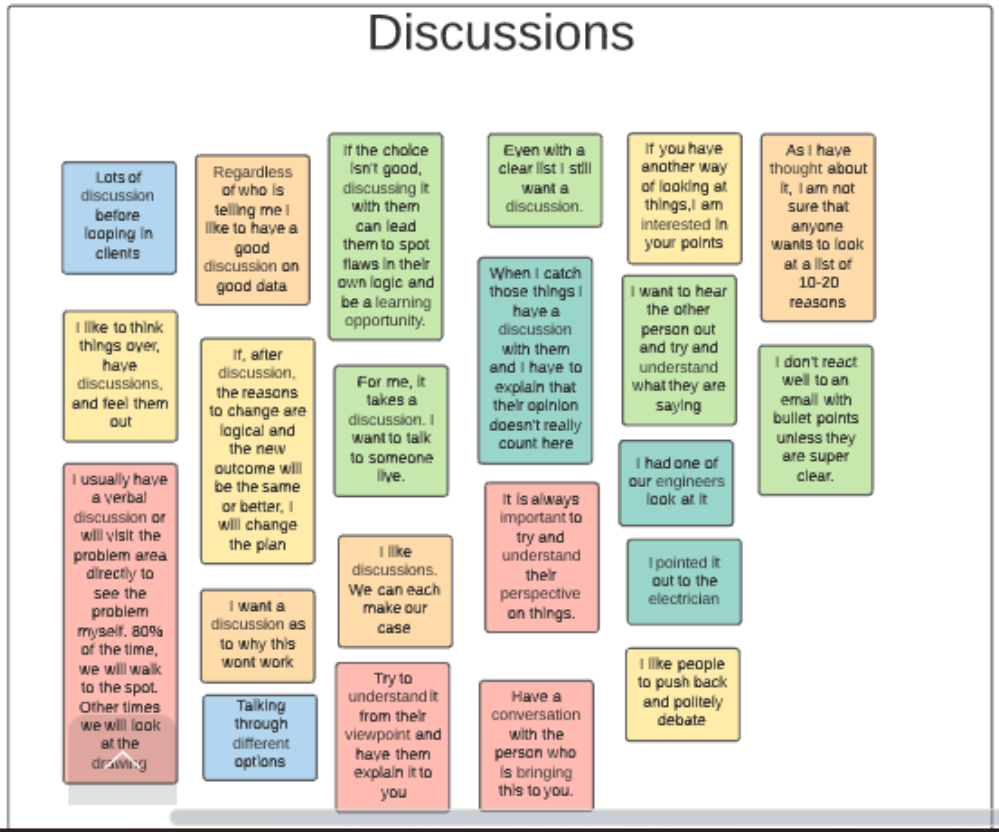

The consequences of a decision, right or wrong, can be painful. Sometimes the end result is for the best but still upsetting
He listened, but stood firm on the matter
Generally a popular decision, but some people were annoyed "We did all this planning..."
I had to take a lot of heat from the public over that--even though it was not my decision
The growing situation was even bigger than the original one and the student was uncomfortable and I was uncomfortable and I felt I had no power because it involved someone above me and someone below me
We are rolling along now, but I really struggled with that decision when it did not go as expected
You don't always make the right decision and if that happens you have to deal with those consequences
Accommodations to building and site put on hold
Telling the team that a b/g project was cancelled was one of the hardest things I ever had to do
I had to negotiate with other adults for a student who was uncomfortable with a situation
One stakeholder did not see what was in it for them so we had to explain the indirect benefits of the project.
In the meeting they rejected my proposal and I was stunned because I had no inkling they would not approve
This grew and grew and wound up affecting everyone
I worked on a project that took six years of negotiations with different stakeholders.
I don't have a thick enough skin to think some of those attacks were OK
The attorneys were a real pain
I told my boss that I was disappointed and the constituents would be too.
Some people were really unhappy and thought it was unfair but I thought the benefits outweigh that
We stood in place and looked at the issue. I understood then I had to go back and tell everyone else why the plan I came up with would not work
I asked for the opportunity to cut it back and the board declined.
We had a project with an issue that did not occur to us until delivery. There wasn't much we could do except email people and field complaints or responses as best we could
I made a call and being human I did not realize that this decision would create another b/g problem further down the line.
We are often thought of as in-charge but we often have very little control. Choices or changes are made on us and we have to adapt.


Trust and collaboration can yield better ideas and results for everyone
Talked to colleagues
Talked to leadership
For me, it's about juggling the creative side. I might go back and forth with a colleague if they had an alternate idea
You can make better decisions if you understand the very smart people around you
I trust you and I trust that you did the work. Please don't show me the work, I will just trust you.
Having been on both sides, a worker and a manager, I think that helps me understand the thought processes of the workers
I am an expert in some things, but not all. Sometimes a colleague will come to me ask'ng for advice, but I will throw it back to them and ask them to explain it to me
It is important in a creative environment to give the person some control over the projects thay are working on.
Team is very collaborative
All kinds of stakeholders could be involved wanting to know if its safe, in-budget, or going to work
If you are straight with me I will be straight with you
It is very frustrating to staff to have a boss who won't listen. That's what you pay the staff to do
It depends on the trust I have with my leadership team
I have a really good leadership team.
I really do believe in people having what they need to be successful
I like to have exchanges because I can learn as well as helping them
People would sit me down and encourage me.
A few team members are good at ask'ng me if this is the hill I wish to die on


Keep an open mind
I was always open to new and relevant data.
I try to always be open-minded
We spent a lot of time learning skills on the fly
You didn't always know how to do everything from the start but you would trust that you would figure it out by the time you needed to.
We would often take on jobs without knowing exactly how to do it but having confidence we could figure it out
I like to think I am reasonable. Someone explains it to me or I see it--I can understand why we need to change.
Things can be very fluid. People often come to me and ask if something can change because they cannot work at the moment
I always try to be open-minded
There are other ways of looking at things, and I try to be open-minded but if they don't understand their idea might not do what we need it to do
The existing plan was always changing. In 25 years the plan always changed from the original one
In general, with two people keeping open minds they can come up with a better idea together
In construction, there are multiple ways to accomplish something
I will ask if the choice was an accident or on purpose
If they can come to me with those reasons I can explain it to someone else further down the line
I feel I am a reasonable person
Try and work it out and develop a conclusion that will make the most sense
I have no qualms about changing directions if the evidence is convincing


I need an explanation and some alternatives
Don't just "admire the problem" I need to know why the original plan is bad and what alternative we have as well.
If its a single team-member I would ask them to explain themselves
I need a thorough explanation
I also want to hear what other options there are. Don't just come to me and tell me its a bad decision
In construction you unfortunately run into contractors who try to cut corners. they will try to alter plans because it is easier
I will listen to them and hear them out but also give me solutions
I get questioned a lot, especially by apprentices who don't understand what they are doing fully
Now I would probably come in with alternative ideas.
I would change or remove a step from the process
I try to give a thorough explanation of why we are doing it this way
I try to clearly explain that this way will be efficient or cost-effective or whatever
I would want to challenge specific points which could benefit from a list.


Convincing evidence can take many forms, but it is usually best to catch problems early and alter the plan before you go too far down a costly direction with no real progress
We do not want to be a super-spreader organization
Other areas have gotten rid of fines and it worked out for them
Changing their minds required explaining that the plan would be doubly expensive and distracting since we were hiring two chefs.
Lots of times it took building a prototype to convince stakeholders it would work or not.
Prototyping
We built a lot of prototypes. They can tell you in miniature whether the scaled version will work.
As much as I understand wanting to be back in the office, you have to deal with the realities of the day
The price of bids, which sort of tells you how difficult a project is, told us one of our projects would be much harder than anyone really thought.
Talking through event experience
I usually had to be proven wrong after the fact
I will tell him that we will get the problem fixed by someone else but you can't just change things without going through me first
The lender told us that the interest alone would be very costly and we were the only ones left who had not paid
I would present a person with a list.
Explaining the event in detail and having the clients visualize themselves at this event and pointing out specific issues that might arise by dividing attention
So I talked with a board member who had a connection with the lender and pointed out that if we let the loan mature it would cost us 4x what it will now.
Full court press. I have a lot of confidence in my ideas. That can work against me sometimes though
So a change can be made to make it easier, or this thing would not happen
Usually we have a peaceful back and forth and they will realize that it is not their call
I am more moved by issues of fairness and social justice
I had to really explain why we have to follow the experts and the science and guidelines
We cannot call ourselves progressive and still institute this unfair fine
Appealing to social justice probably tipped the scales for them


Discussions
Lots of discussion before looping in clients
Regardless of who is telling me I like to have a good discussion on good data
If the choice isn't good, discussing it with them can lead them to spot flaws in their own logic and be a learning opportunity.
Even with a clear list I still want a discussion.
If you have another way of looking at things,I am interested in your points
As I have thought about it, I am not sure that anyone wants to look at a list of 10-20 reasons
I like to think things over, have discussions, and feel them out
If, after discussion, the reasons to change are logical and the new outcome will be the same or better, I will change the plan
For me, it takes a discussion. I want to talk to someone live.
When I catch those things I have a discussion with them and I have to explain that their opinion doesn't really count here
I want to hear the other person out and try and understand what they are saying
I don't react well to an email with bullet points unless they are super clear.
I usually have a verbal discussion or will visit the problem area directly to see the problem myself. 80% of the time, we will walk to the spot. Other times we will look at the drawing
I like discussions. We can each make our case
It is always important to try and understand their perspective on things.
I had one of our engineers look at it
I pointed it out to the electrician
I want a discussion as to why this wont work
Try to understand it from their viewpoint and have them explain it to you
Have a conversation with the person who is bringing this to you.
I like people to push back and politely debate
Talking through different options

APPENDIX O - COMPLETED 'WHAT'S ON YOUR RADAR' SCREENS

All participants started with the same What's on Your RADAR template in Lucidchart. The prompt question is written above the RADAR screen. A large group of notes was made for the participants so they could simply grab and go rather than figure out how to copy and re-edit notes on the fly. Most completed RADAR screens are cropped to the content to make the individual notes visible.

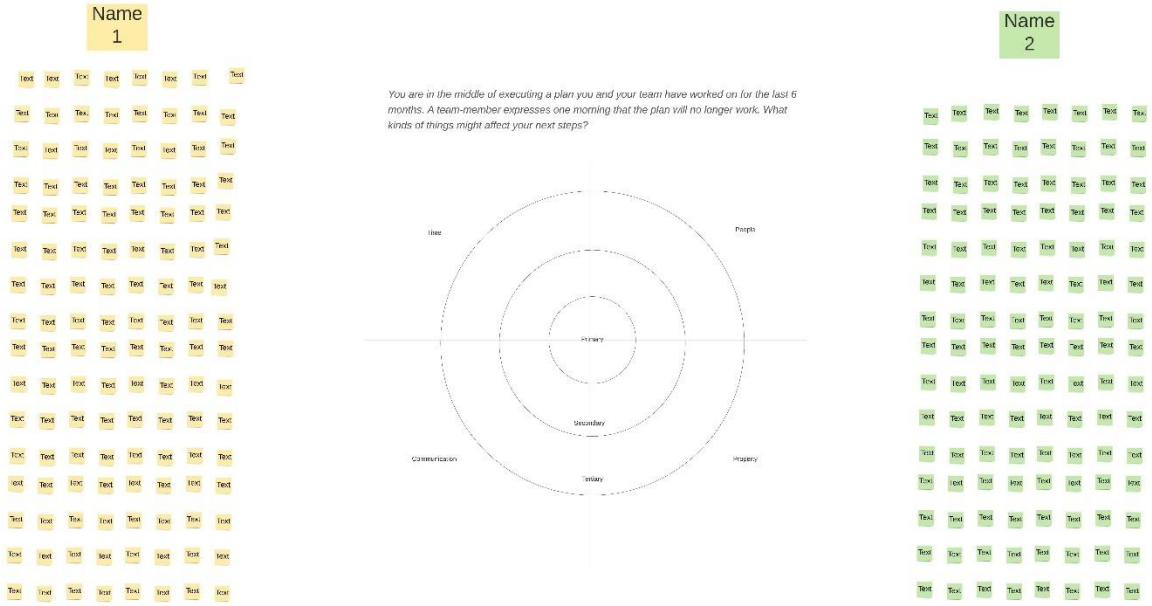


Figure 19 Standard RADAR template

Figure 20 RADAR screen of Electrical Construction Foreman (yellow) and Systems Engineer (green)

Figure 21 RADAR screen of Superintendent

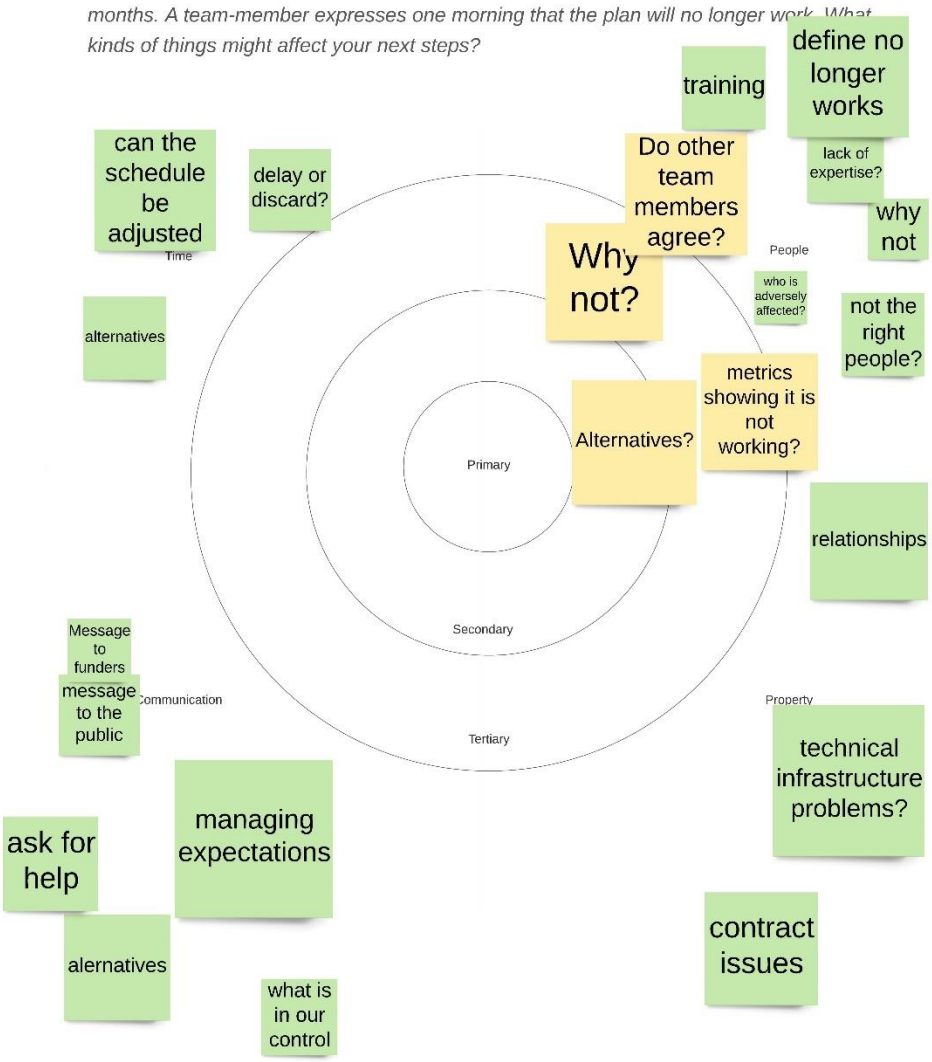


*Figure 22 RADAR screen of Public Library Director (Green) and Nonprofit executive (yellow). *These two participants were originally scheduled to participate together but conducted this exercise at two different times due to a last-minute schedule change for one of them.*

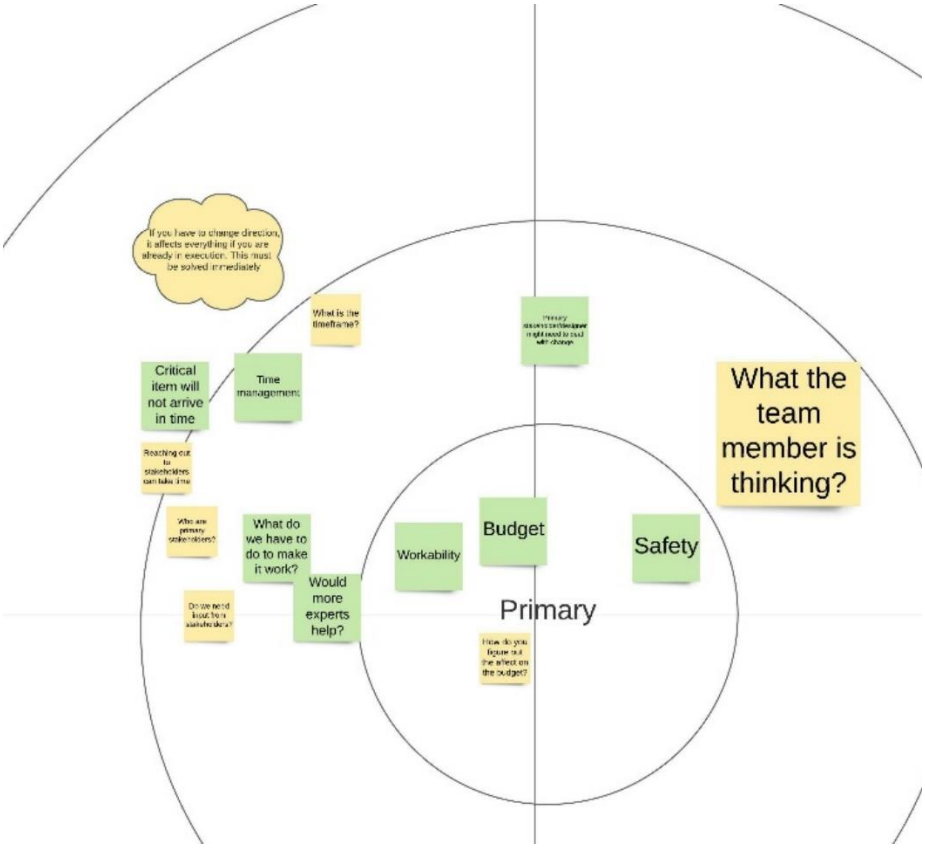


Figure 23 RADAR screen of CEO, consulting firm (yellow) and Business owner (green). The thought bubble reflects a thought that was expressed over the Zoom call and written in by the student researcher

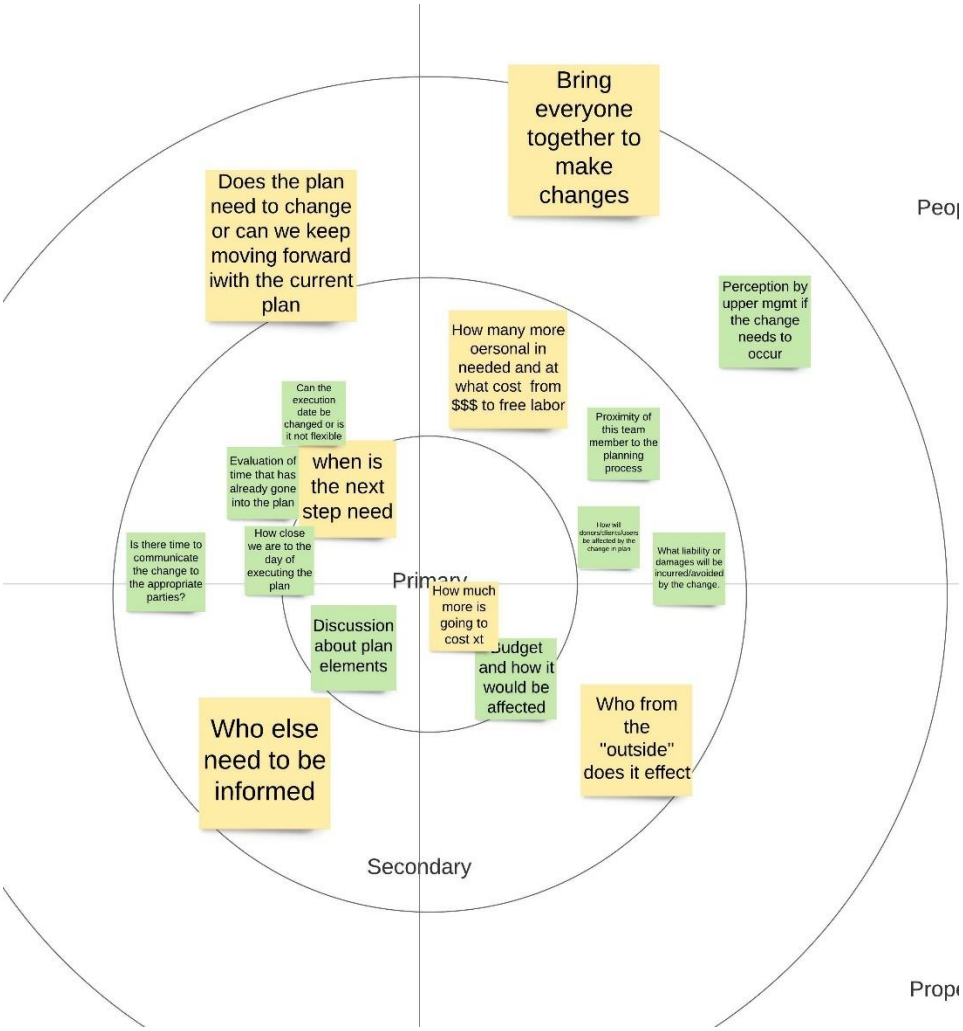


Figure 24 RADAR screen of Design/Tech Manager (yellow) and Assoc. Director of Special Events (green)

APPENDIX P - COMPLETED AFFINITY CLUSTER OF RADAR SCREENS

Figure 25 - Affinity cluster of RADAR screens. The color of each note calls back to the ring the participant placed the note into: Green is most important - Orange is least important. The note in the cloud bubble

APPENDIX Q - PROBLEM TREE ANALYSIS

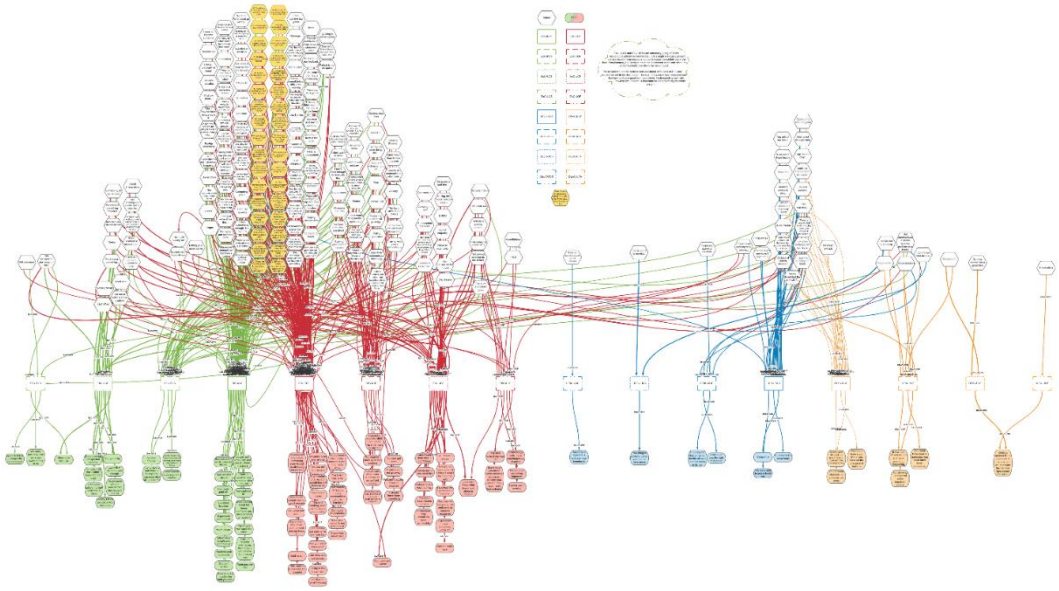


Figure 26 - Full Problem Tree Analysis. Note: Causes are on top, and effects are at the bottom.

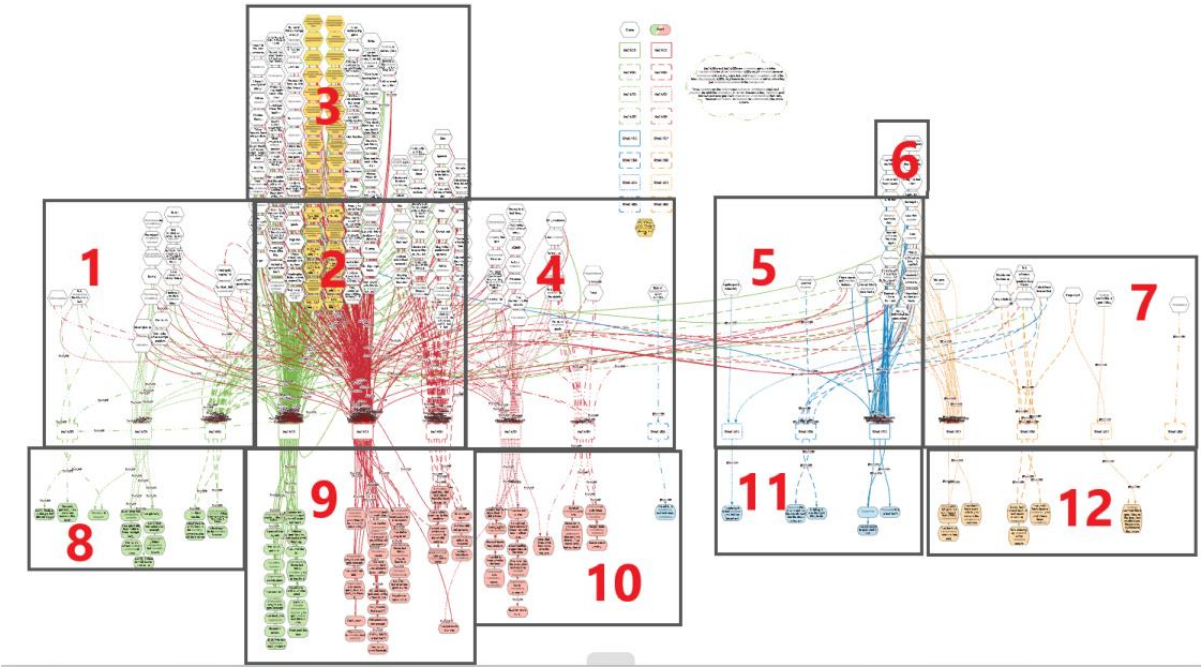


Figure 27 - Map of Problem Tree Analysis sections

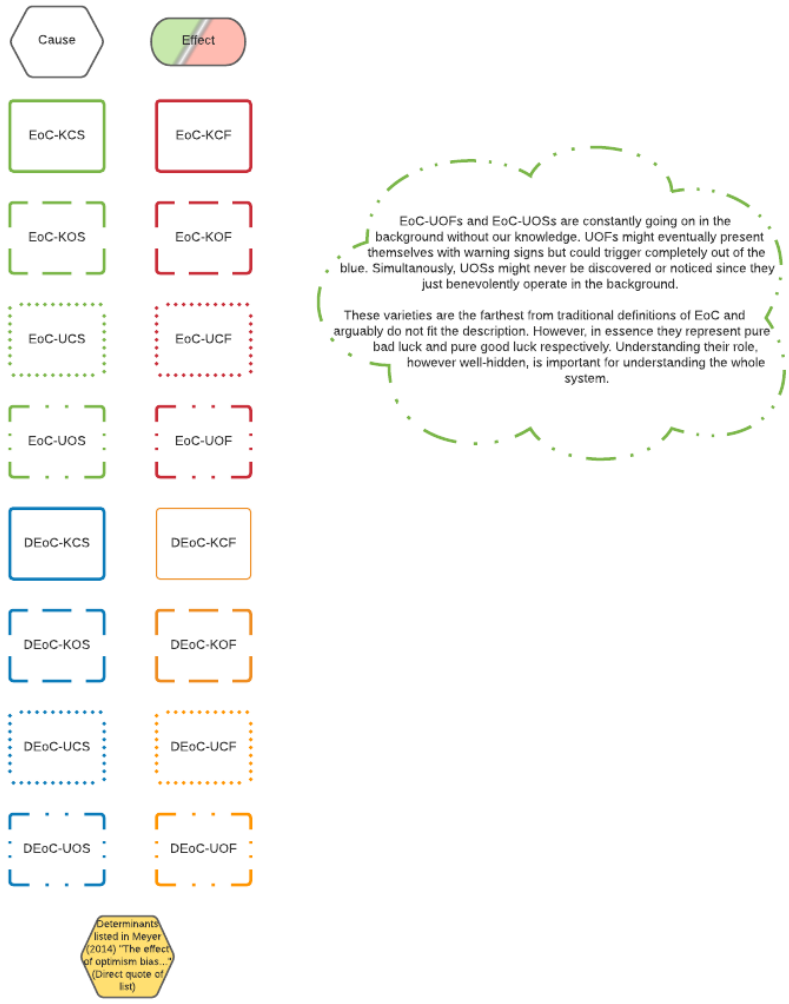


Figure 28 - Key for navigating Problem Tree. Connecting lines are formatted with color and dots/dashes to reflect the EoC variant they are connected to. Causes are hexagon shaped, and effects are oval shaped with an appropriate color code. Yellow hexagons are determinants described by Meyer (2014).

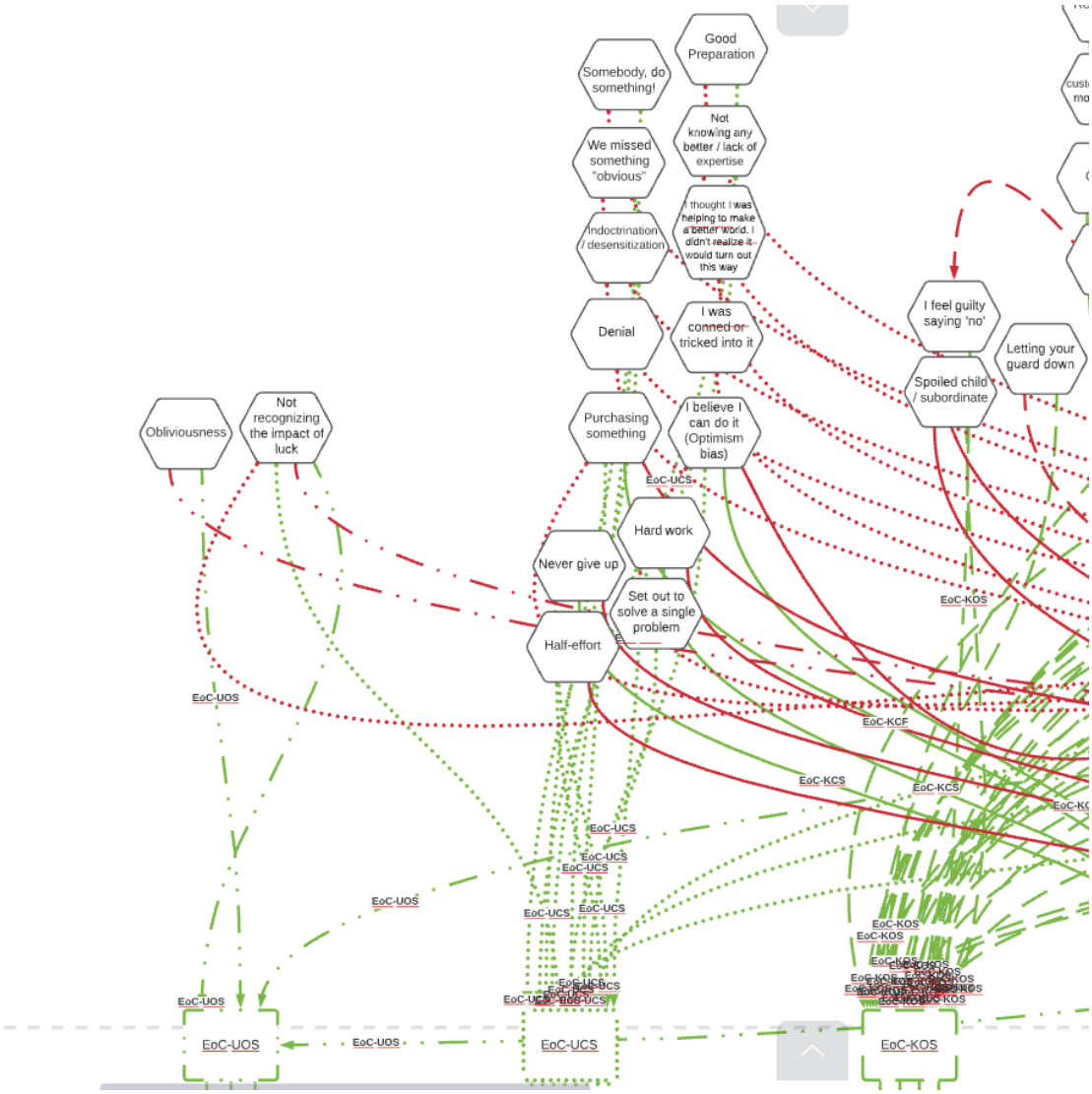


Figure 29 - Problem Tree section 1

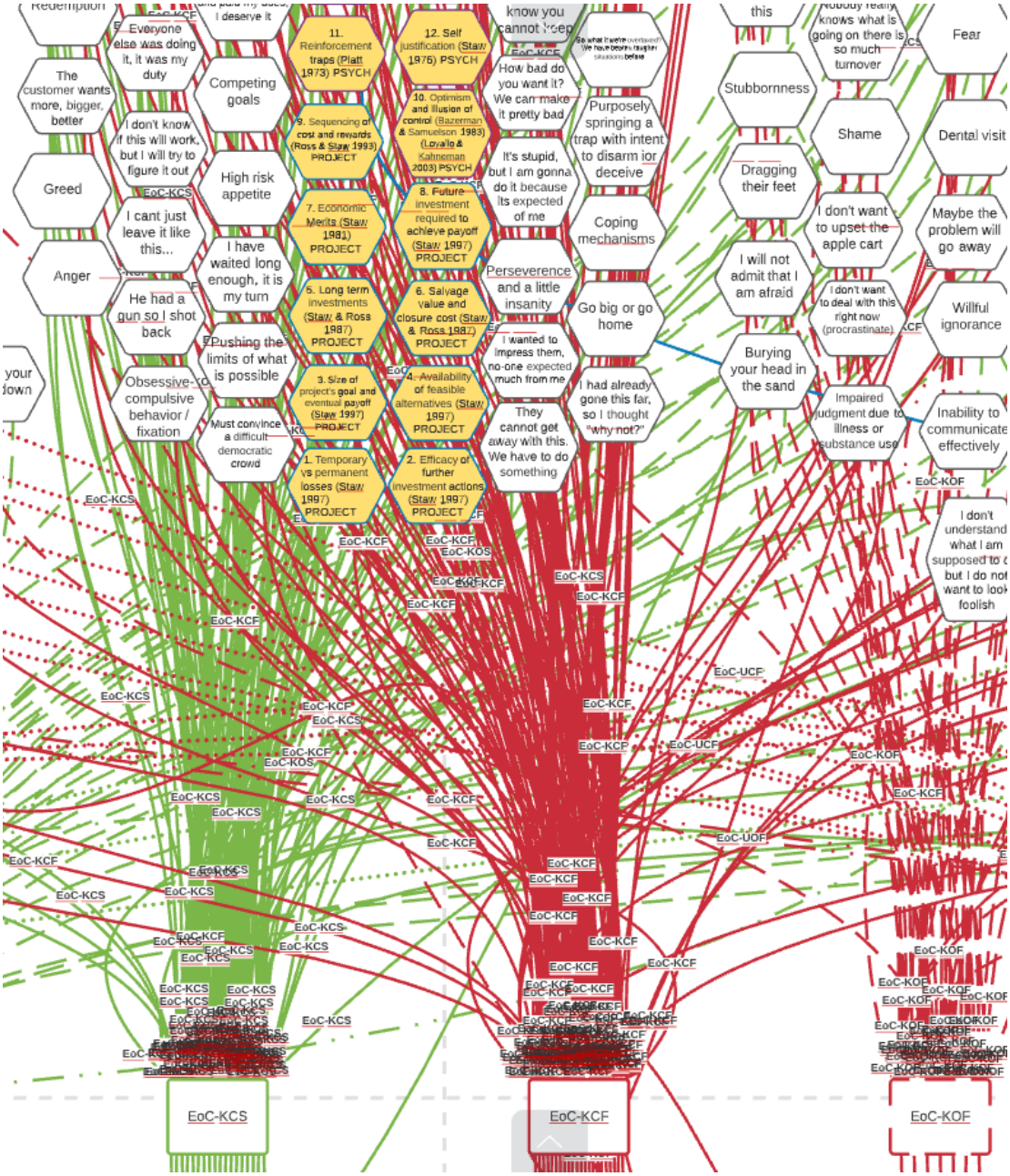


Figure 30 - Problem Tree section 2

Figure 31 - Problem Tree section 3

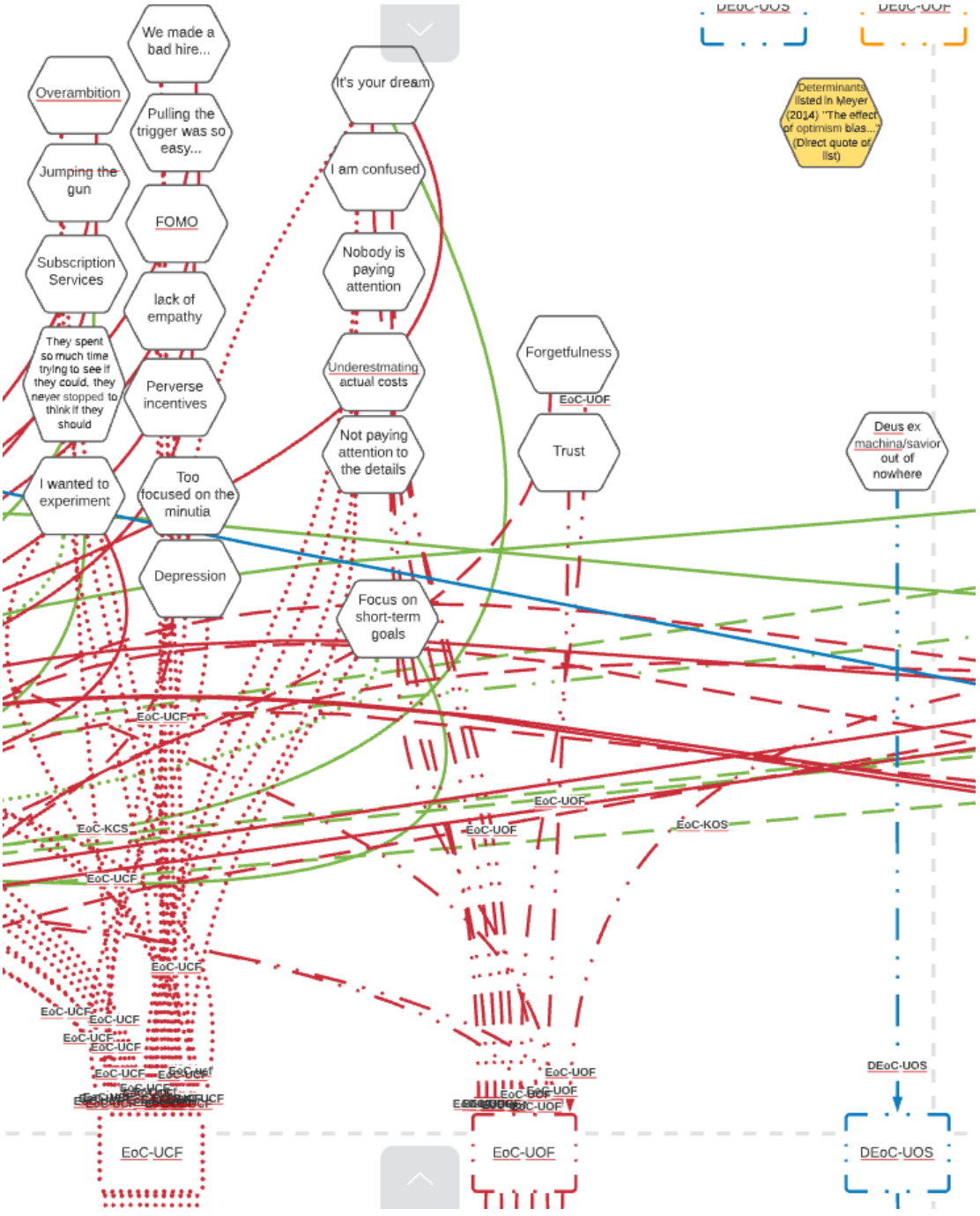


Figure 32 - Problem Tree section 4

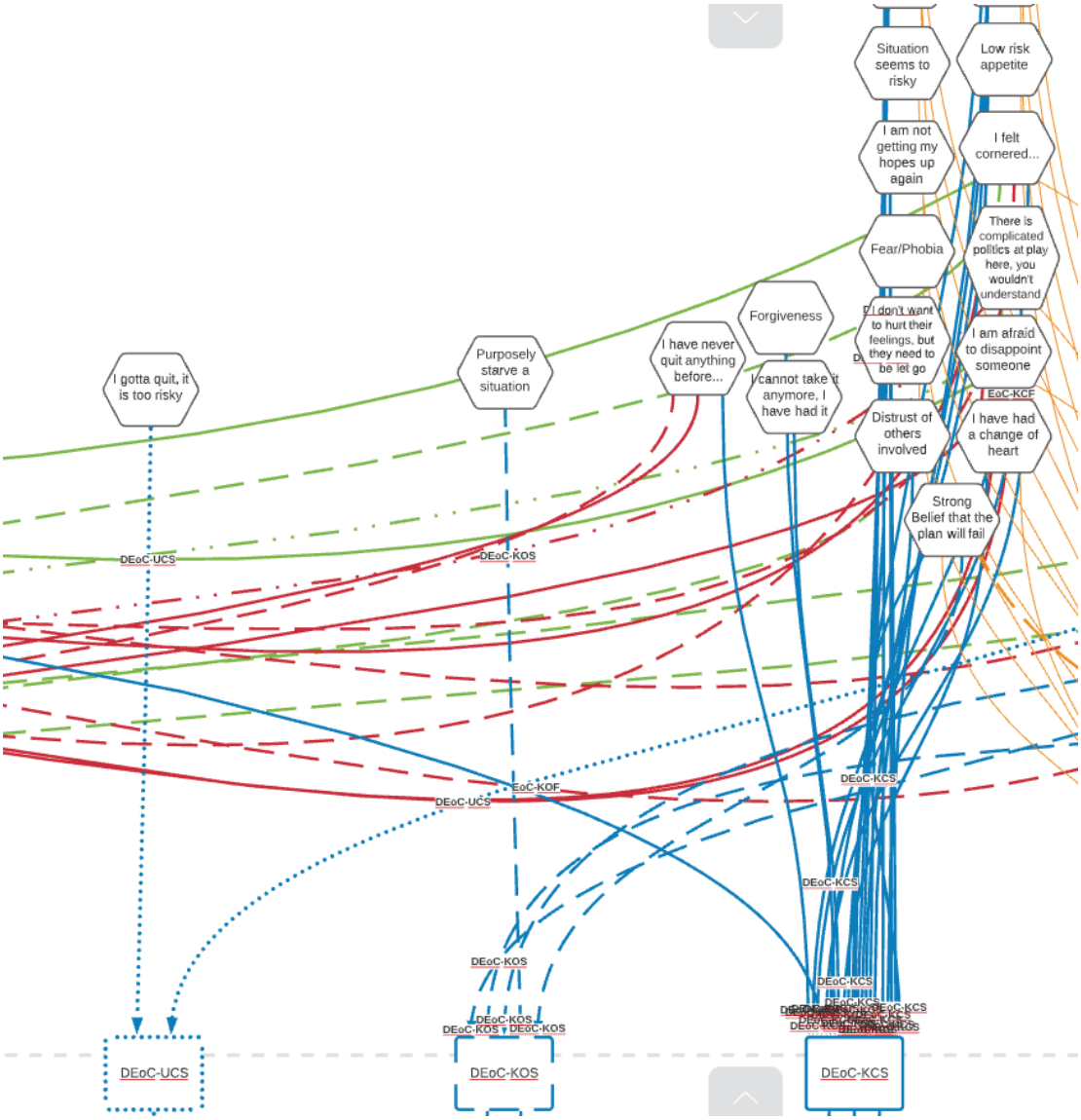


Figure 33 - Problem Tree section 5

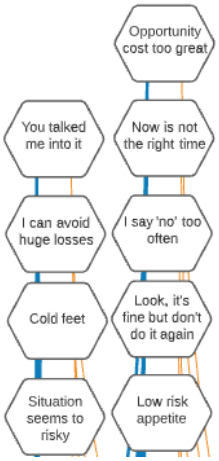


Figure 34 - Problem Tree section 6

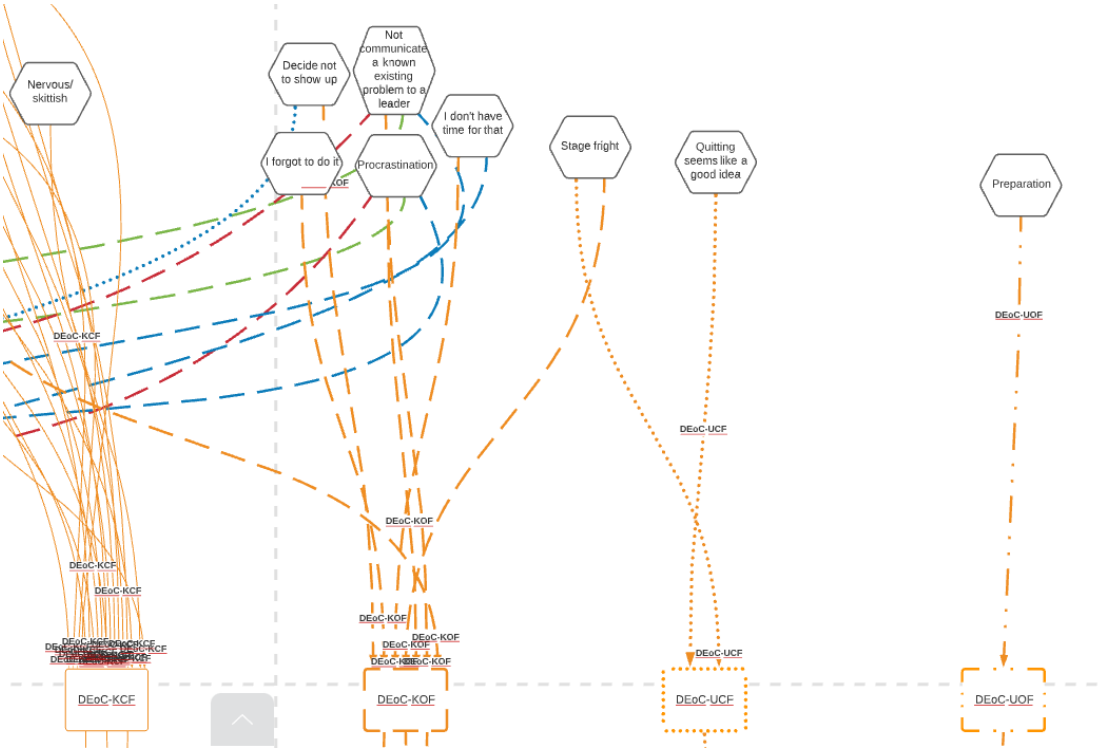


Figure 35 - Problem Tree section 7

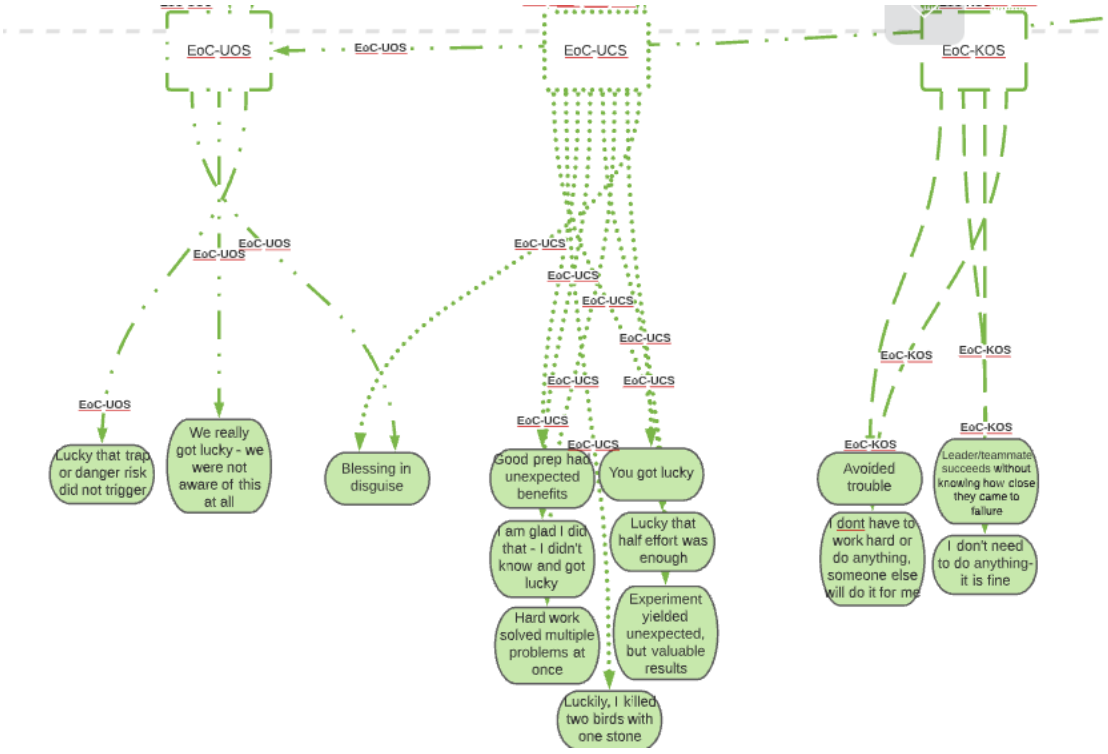


Figure 36 - Problem Tree section 8

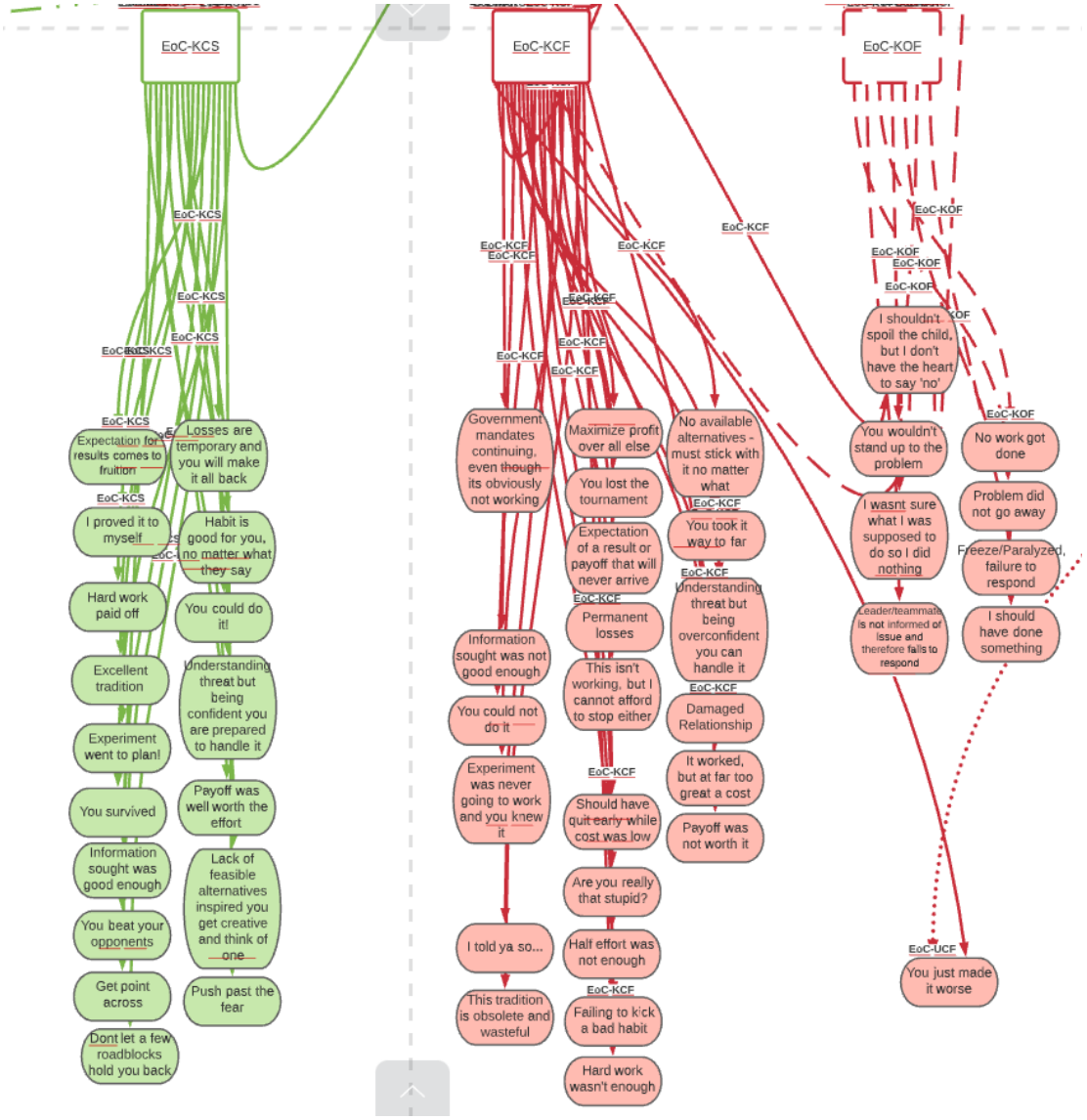


Figure 37 - Problem Tree section 9

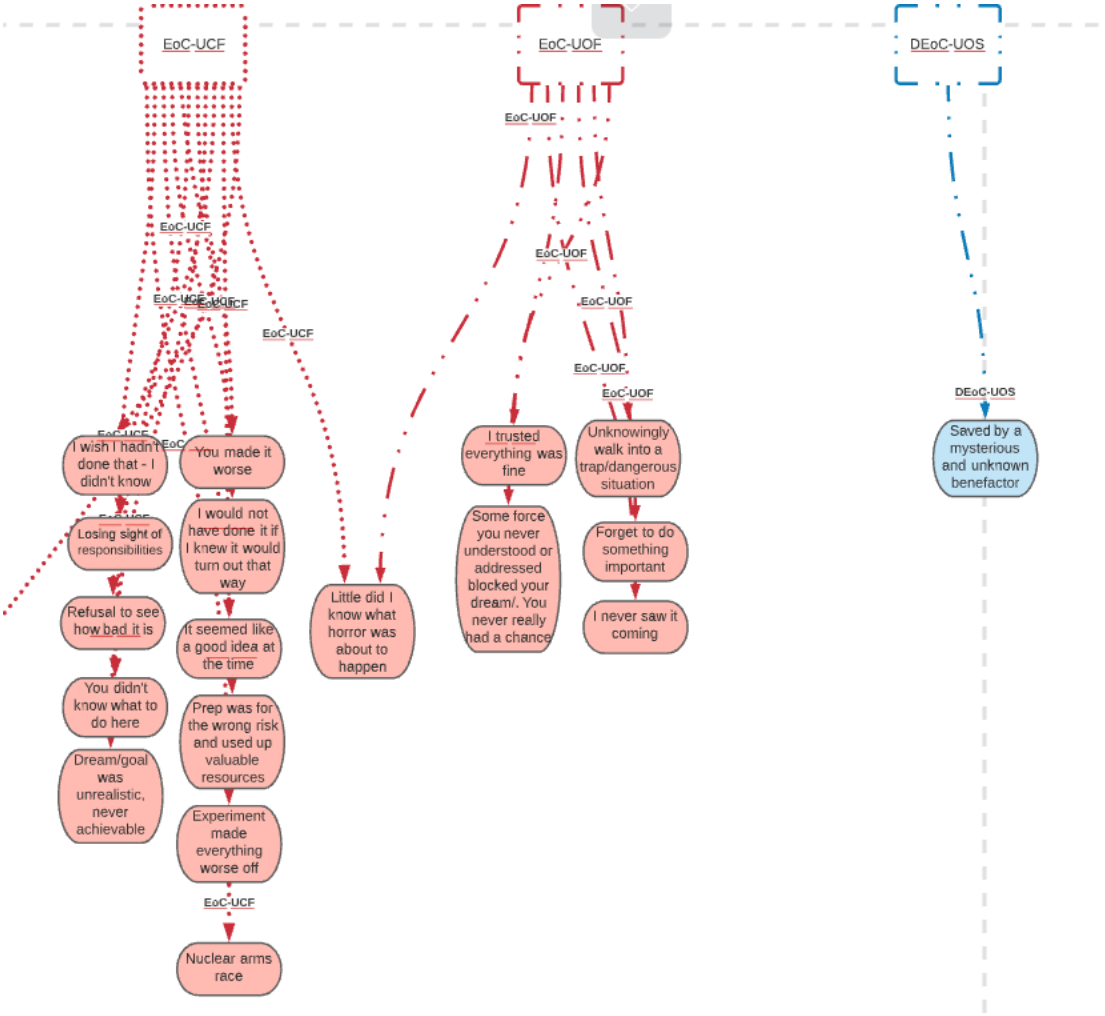


Figure 38 - Problem Tree section 10

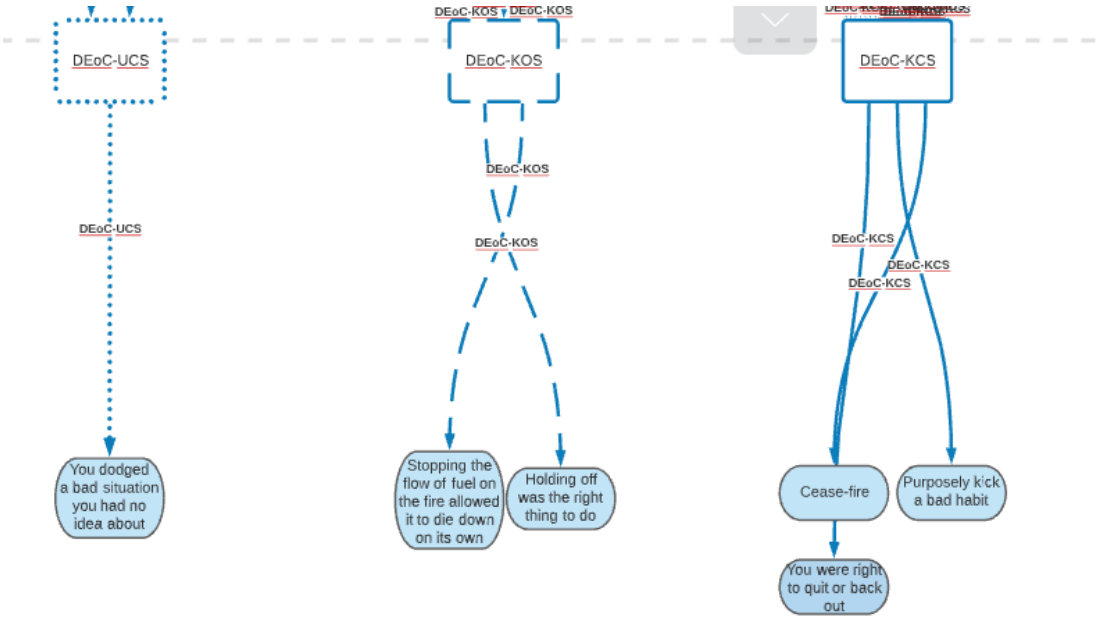


Figure 39 - Problem Tree section 11

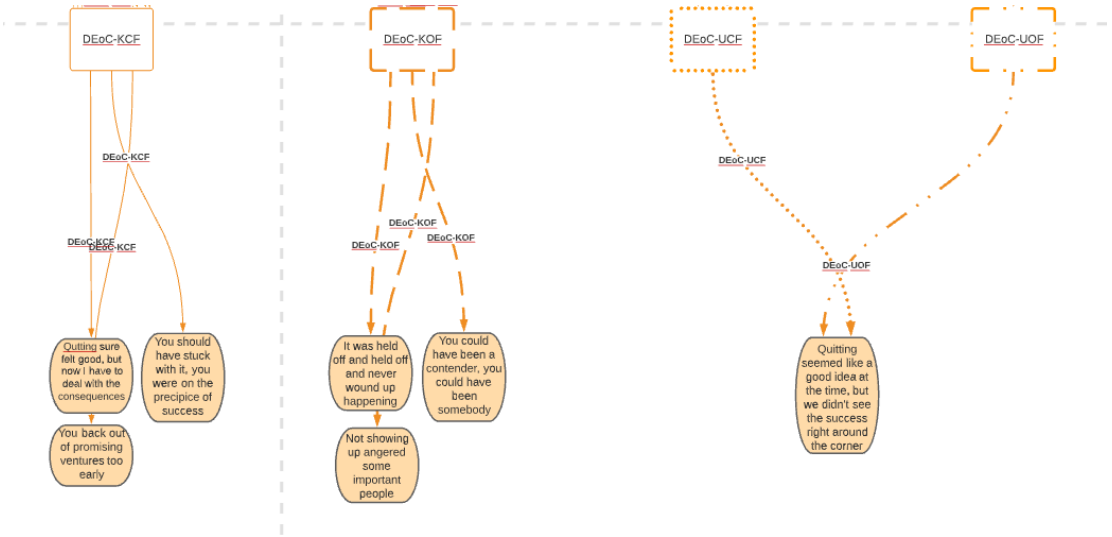


Figure 40 - Problem Tree section 12

APPENDIX R – ALL 16 VARIETIES OF EOC

EoC CODE	MEANING/LESSON	EXAMPLE 1 - JAWS	EXAMPLE 2 - PANDEMIC
DEoC-KCS	De-escalation of Commitment towards a Known Commissive Success - deliberate choice to discontinue the plan despite the risk. Investigate further to determine if this practice is worth continuing or if you just got lucky this time.	Sheriff deliberately decides to immediately close the beaches for the summer. Better safe than sorry.	Instead of developing a vaccine, everyone is forced to socially distance themselves from others to starve the virus of hosts. It takes longer but was arguably less work than developing a vaccine in a matter of months.
DEoC-UCS	De-escalation of Commitment towards an Unknown Commissive Success - Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.	The very act of closing the beaches starves the shark. By luck, it is unable to find any other food source and it leaves the area on its own.	The social distancing efforts not only prevent much of the population from being infected with the target virus, but also helps them avoid all manner of other contagious ailments.
DEoC-KOS	De-escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.	Deciding to not hire shark-hunters or close the beaches pays off when independently motivated shark-hunters come looking for the shark on their own.	Deciding not to fight the virus knowing that the seasonal temperature will kill it off on its own.
DEoC-UOS	De-escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck. (This is practically identical to EoC-UOS.)	Continuing through daily life oblivious to a shark that approached many swimmers, but never attacked anyone. Extremely lucky.	Continuing with business-as-usual unaware that a virus is circulating and infecting people, but fortunately not harming anyone.
DEoC-KCF	De-escalation of Commitment towards a Known Commissive Failure – Erroneous abandonment. Taking deliberate action to end a situation, but not providing adequate resources to accomplish it—half measure.	Only closing some of the beaches the shark is attacking, leading it to attack the open beaches.	Agreeing to vaccine development but only providing a meager budget to accomplish it. The virus outpaces development.

DEoC-UCF	De-escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.	Deciding to close the beaches leads smaller prey animals, normally afraid of humans to move in—thus providing a steady diet for the shark to stay for years to come.	Cancelling the vaccine leads anti-vaxxers, a relatively small subset of the population to gain political momentum and ultimately driving down vaccination rates of numerous diseases—leading to many unnecessary deaths from previously controllable diseases.
DEoC-KOF	De-escalation of Commitment towards a Known Omissive Failure – Procrastination. Understanding the problem but refusing to address it.	Recognizing that something must be done but stalling and allowing the shark to operate unimpeded.	Recognizing the need for a vaccine but keep putting it off to deal with other matters instead.
DEoC-UOF	De-escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late. (This is practically identical to EoC-UOF.)	A swimmer is killed by a shark everyone was oblivious to.	A novel virus emerges and begins infecting and killing.
EoC-KCS	Escalation of Commitment towards a Known Commissive Success - deliberate choice to continue with plan despite the risk. Hard work paid off but investigate further to determine if this practice is worth continuing or if you just got lucky this time.	Sheriff and rag-tag team barely, but successfully, kill the deadly shark. Risky venture, but hard work paid off.	A vaccine is produced in unprecedented time and successfully inoculates against target virus. Hard work paid off.
EoC-UCS	Escalation of Commitment towards an Unknown Commissive Success – Unintentional benefit. Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.	The very act of hunting the shark conveniently draws it out to sea and away from the beaches it was attacking. Unintended, but beneficial.	The vaccine not only protects against the target virus, but also protects against other viruses by chance.

EoC-KOS	Escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.	Deciding to not hunt the shark or close the beaches and hope it goes away on its own. It conveniently does go away. Very lucky.	Deciding not to develop a vaccine in the face of a virus and hope the problem goes away. It miraculously does by chance.
EoC-UOS	Escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck.	Continuing through daily life oblivious to a shark that approached many swimmers, but never attacked anyone. Extremely lucky.	Continuing with business-as-usual unaware that a virus is circulating and infecting people, but fortunately not harming anyone.
EoC-KCF	Escalation of Commitment towards a Known Commissive Failure - Classic EoC. Deliberate action that resulted in a predictably poor outcome – Foolish. Bad process that should be modified in the future.	Insisting on reopening the beaches for the 4th of July following their closing due to shark attack. More attacks occur.	Insisting on using unsubstantiated anti-viral measures like ineffective medicines even after experts warn that they do not work. Many die from the virus while others die from the bad medicine itself.
EoC-UCF	Escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.	Hiring fishermen to hunt the shark who then overfish and unintentionally endanger the larger ecosystem.	Administering a vaccine that protects from the target virus but also yields debilitating side effects.
EoC-KOF	Escalation of Commitment towards a Known Omissive Failure - Deliberate inaction that resulted in poor outcome - failure was inevitable.	Refusing to hire shark hunter to hunt the shark until after there are more attacks on 4th of July.	Doing nothing to mitigate the virus and hoping it goes away on its own. It does not go away and kills thousands.
EoC-UOF	Escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late.	A swimmer is killed by a shark everyone was oblivious to.	A novel virus emerges and begins infecting and killing.

APPENDIX S - STAKEHOLDER MAP

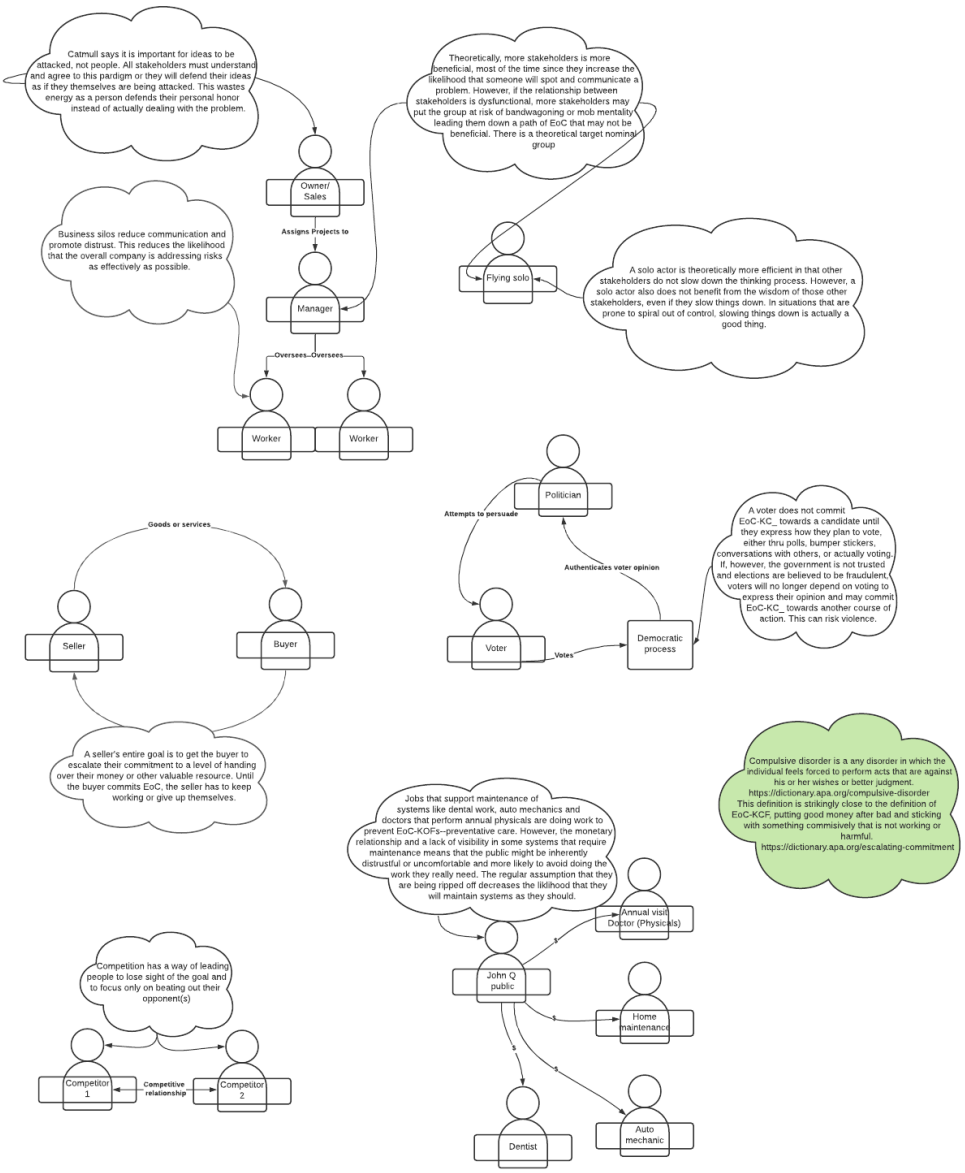


Figure 41 - Stakeholder map pg. 1

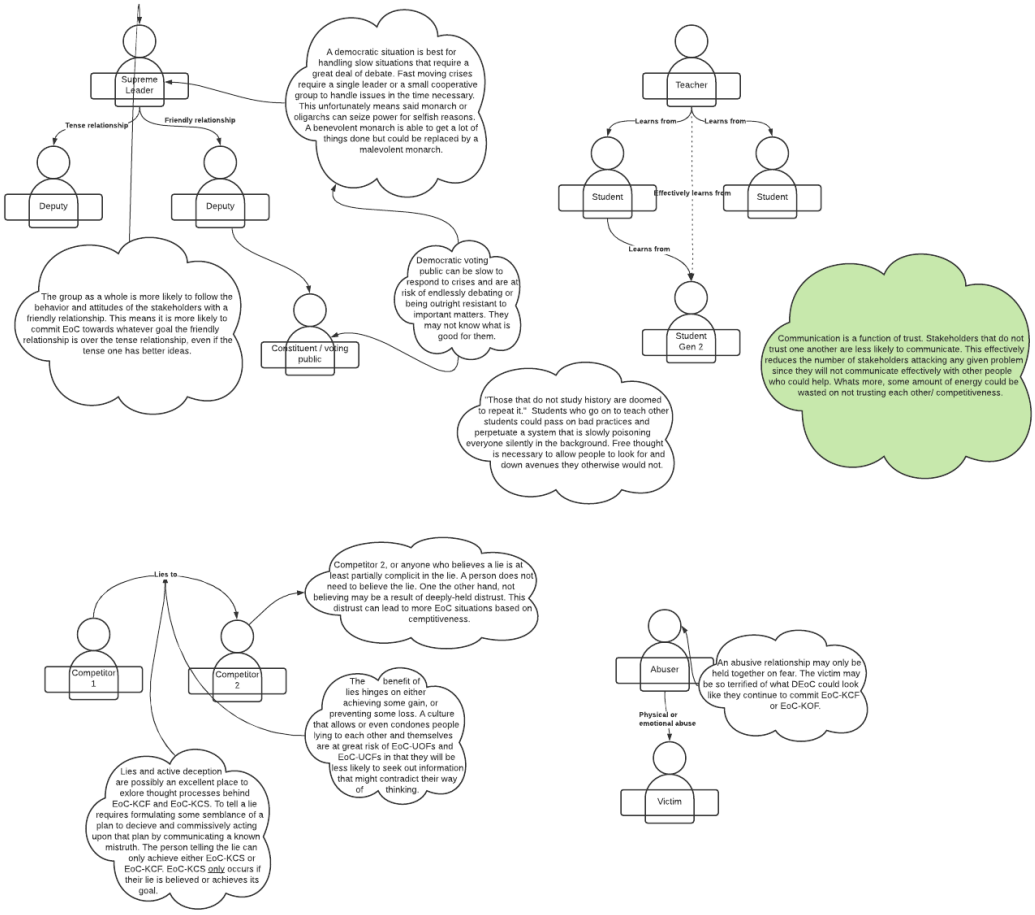


Figure 42 Stakeholder map pg. 2

APPENDIX T - SLIDE SHOW PRESENTATION TO PARTICIPANTS ON WORKSHOP TWO

Below is the slideshow that was presented to the participants of Workshop 2.

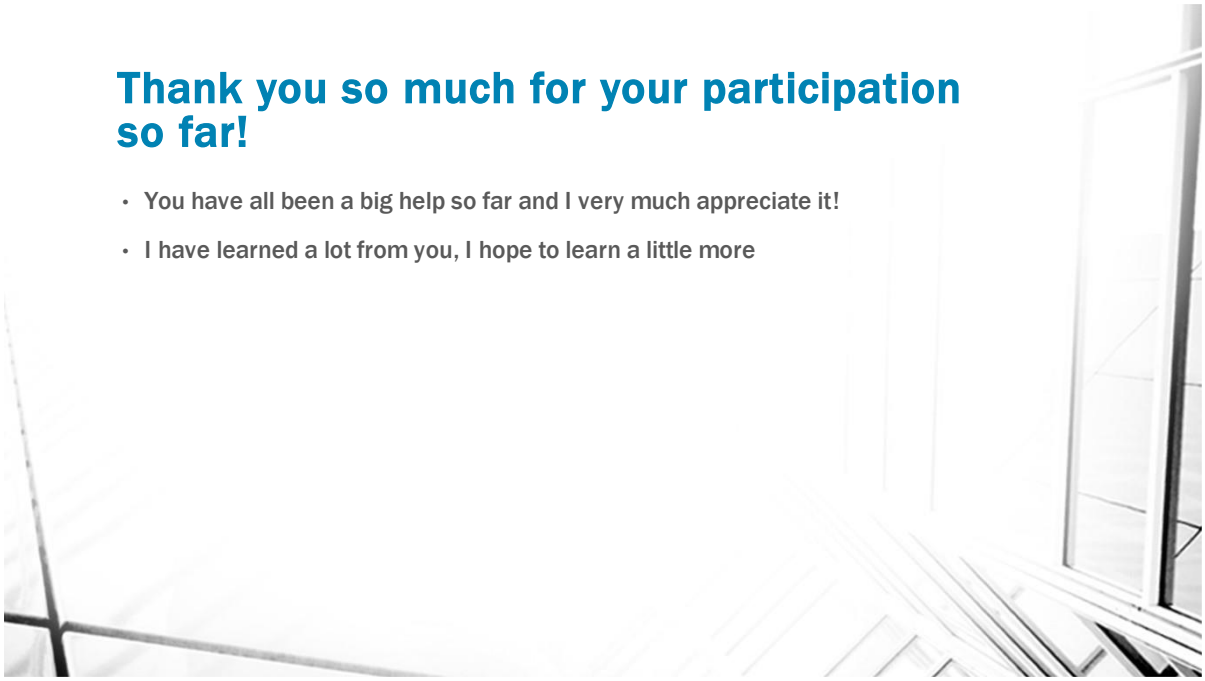


Figure 43 - Workshop Two Slideshow presentation - Slide 1

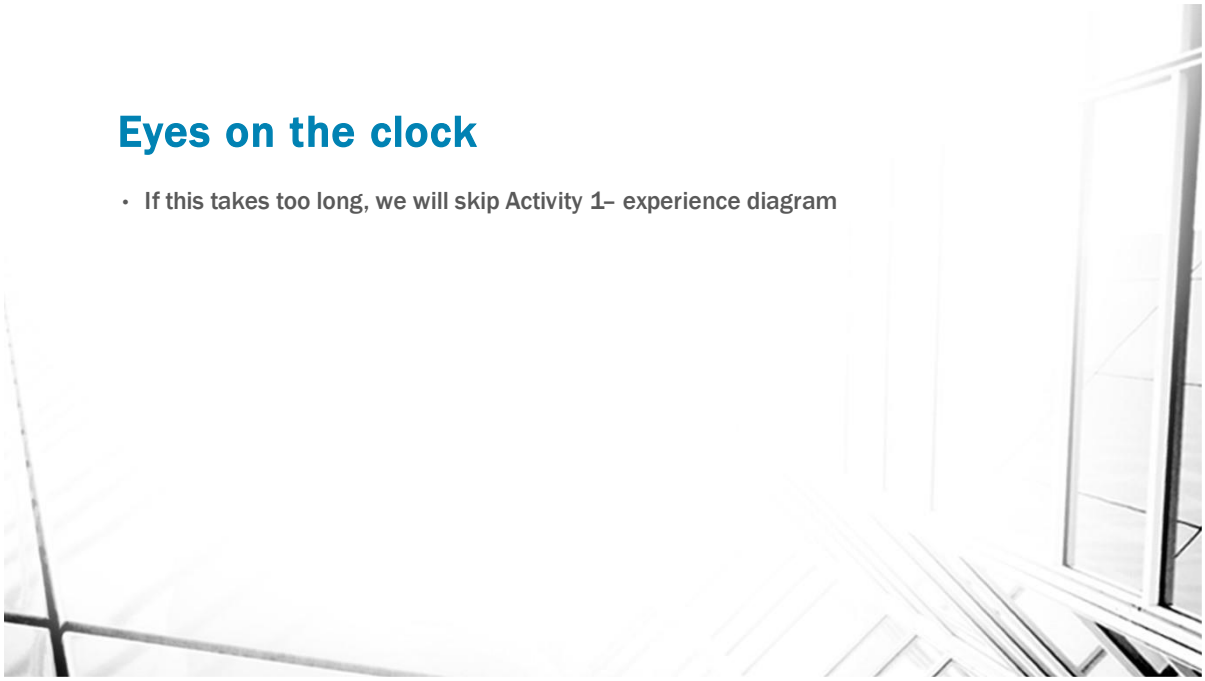


Figure 44 - Workshop Two Slideshow presentation - Slide 2

Figure 45 - Workshop Two Slideshow presentation - Slide 3

Figure 46 - Workshop Two Slideshow presentation - Slide 4

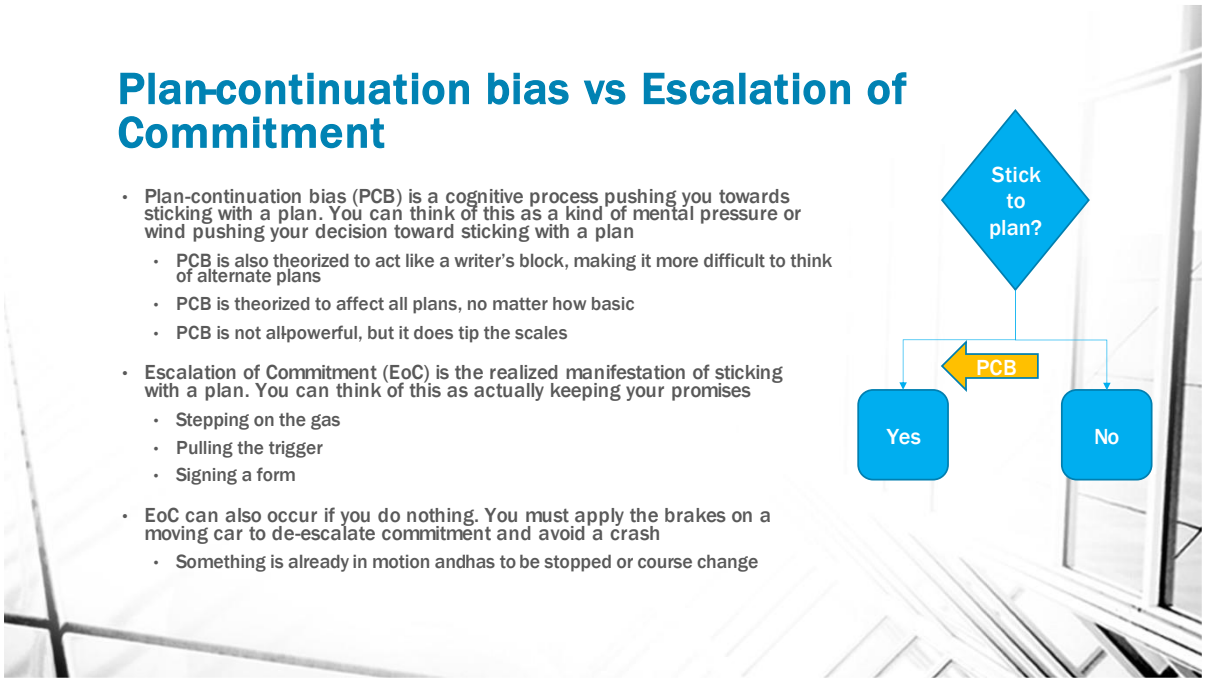


Figure 47 - Workshop Two Slideshow presentation - Slide 5

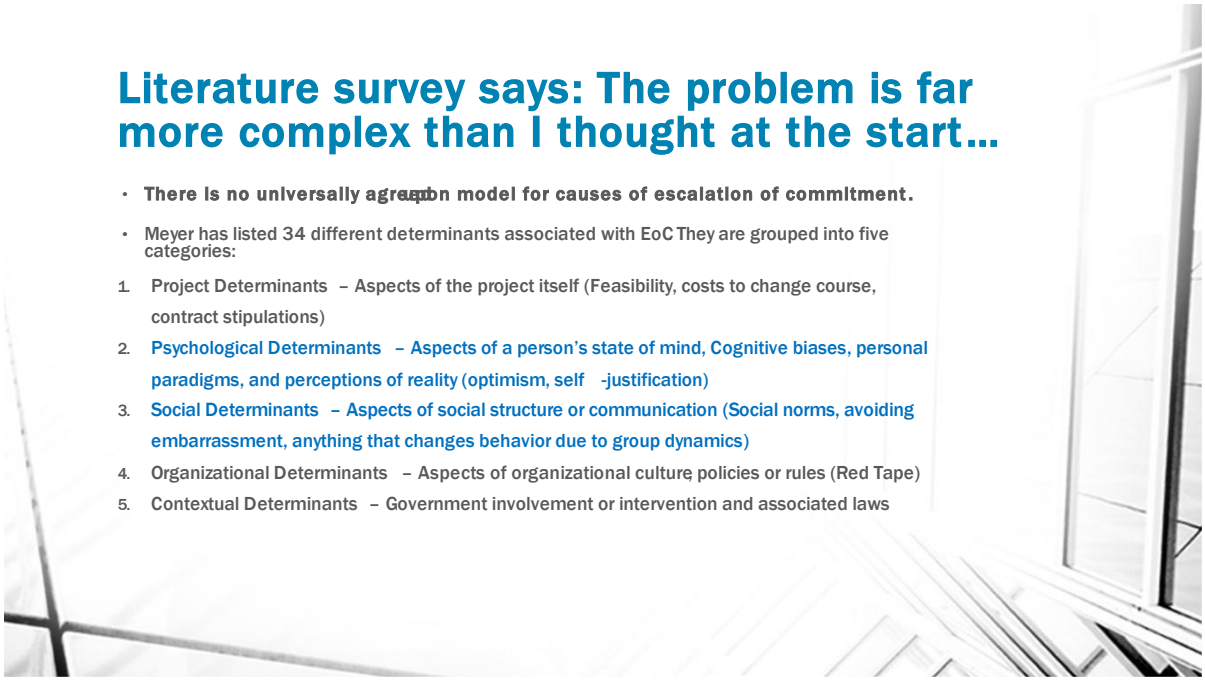


Figure 48 - Workshop Two Slideshow presentation - Slide 6

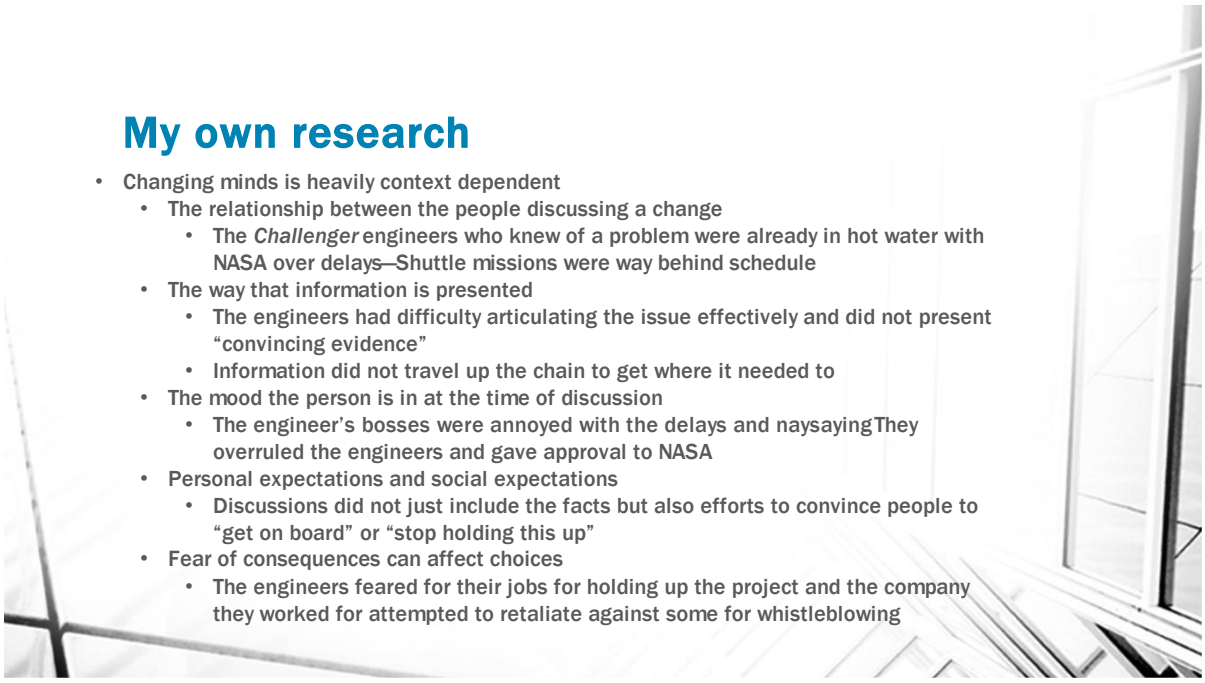


Figure 49 - Workshop Two Slideshow presentation - Slide 7

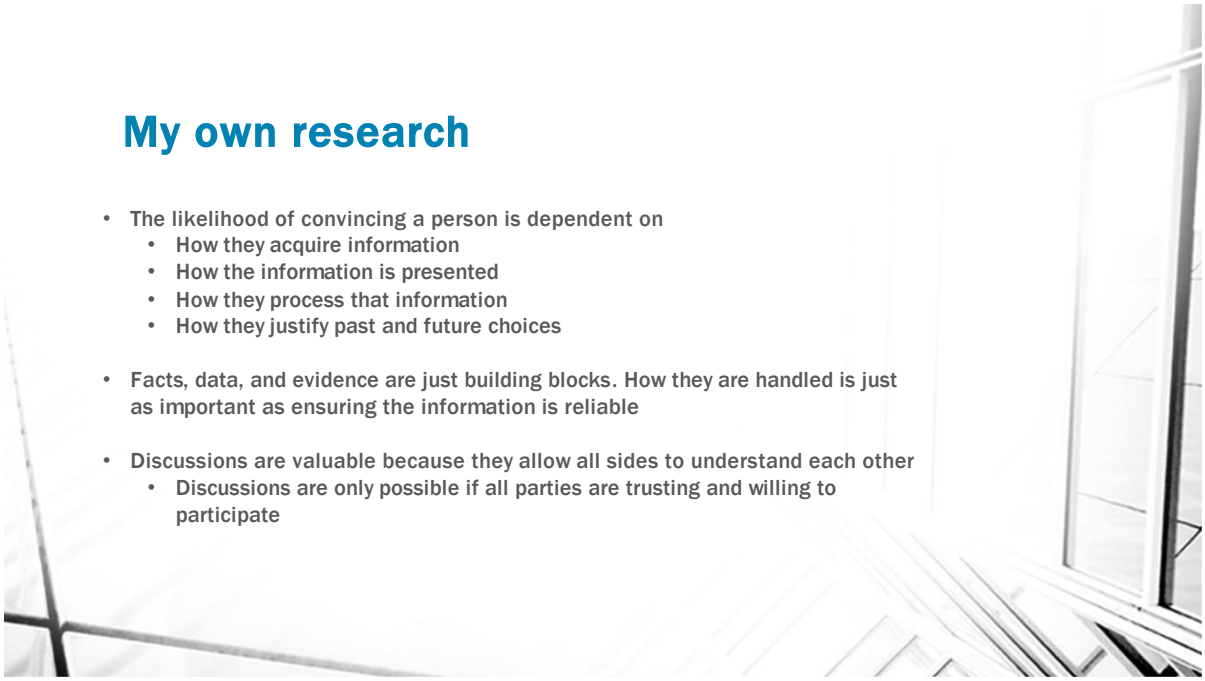


Figure 50 - Workshop Two Slideshow presentation - Slide 8

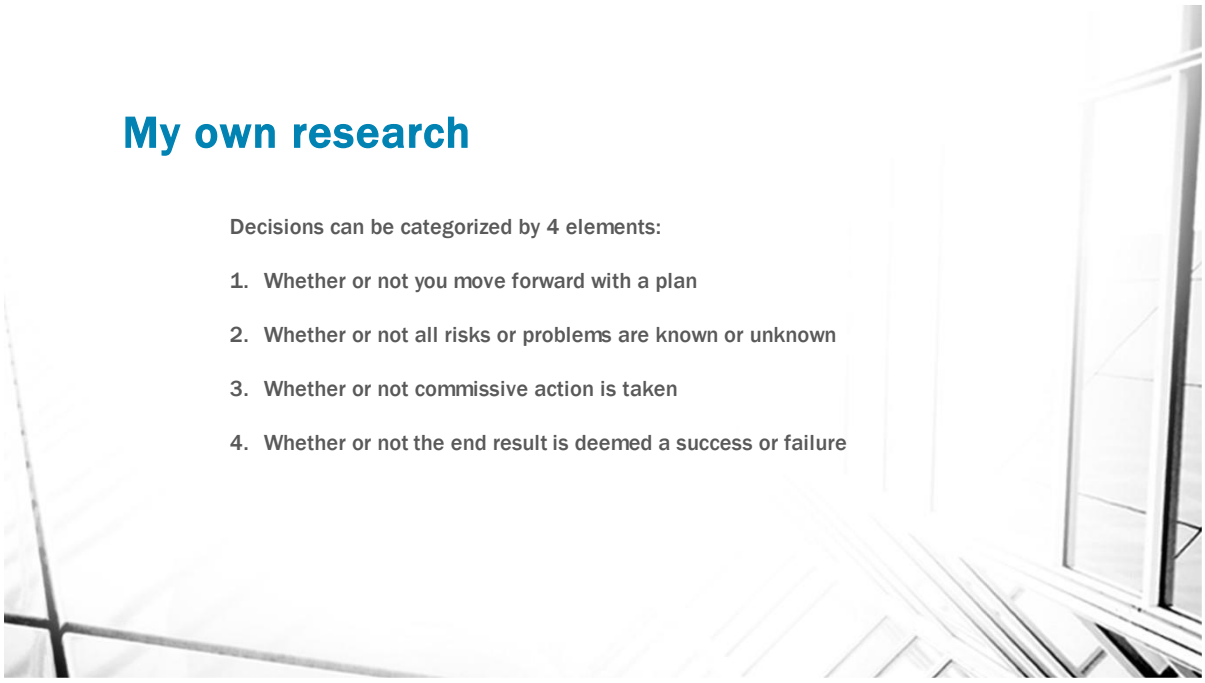


Figure 51 - Workshop Two Slideshow presentation - Slide 9

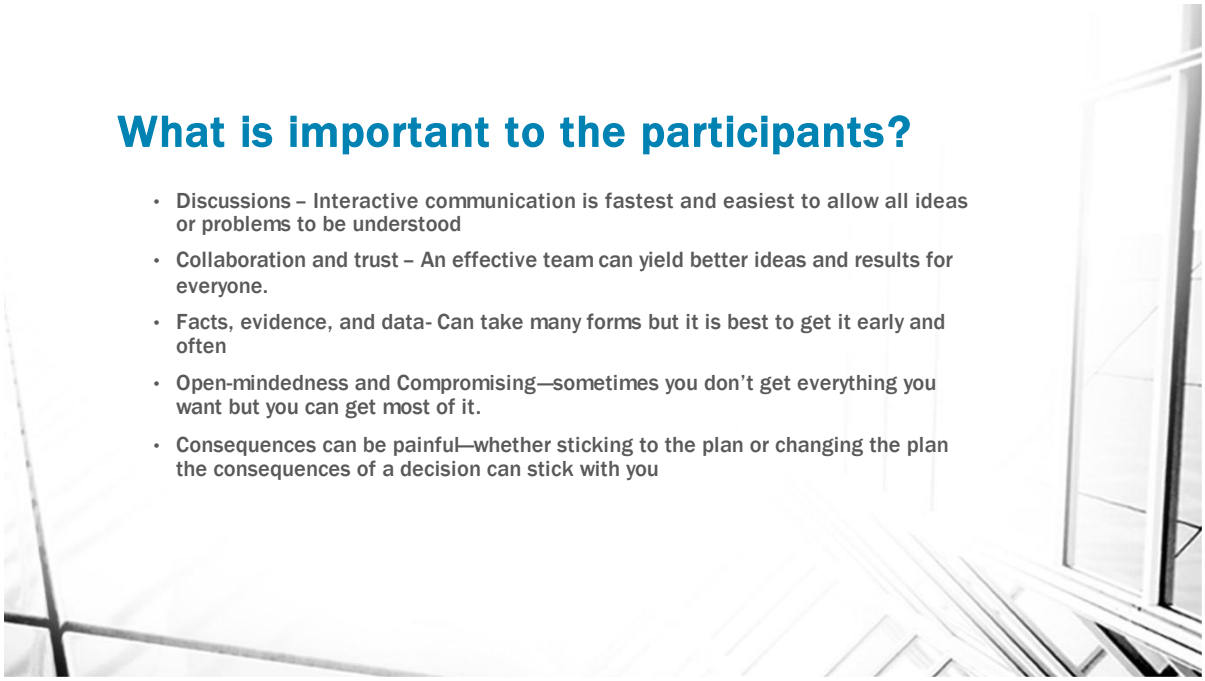


Figure 52 - Workshop Two Slideshow presentation - Slide 10

Figure 53 - Workshop Two Slideshow presentation - Slide 11

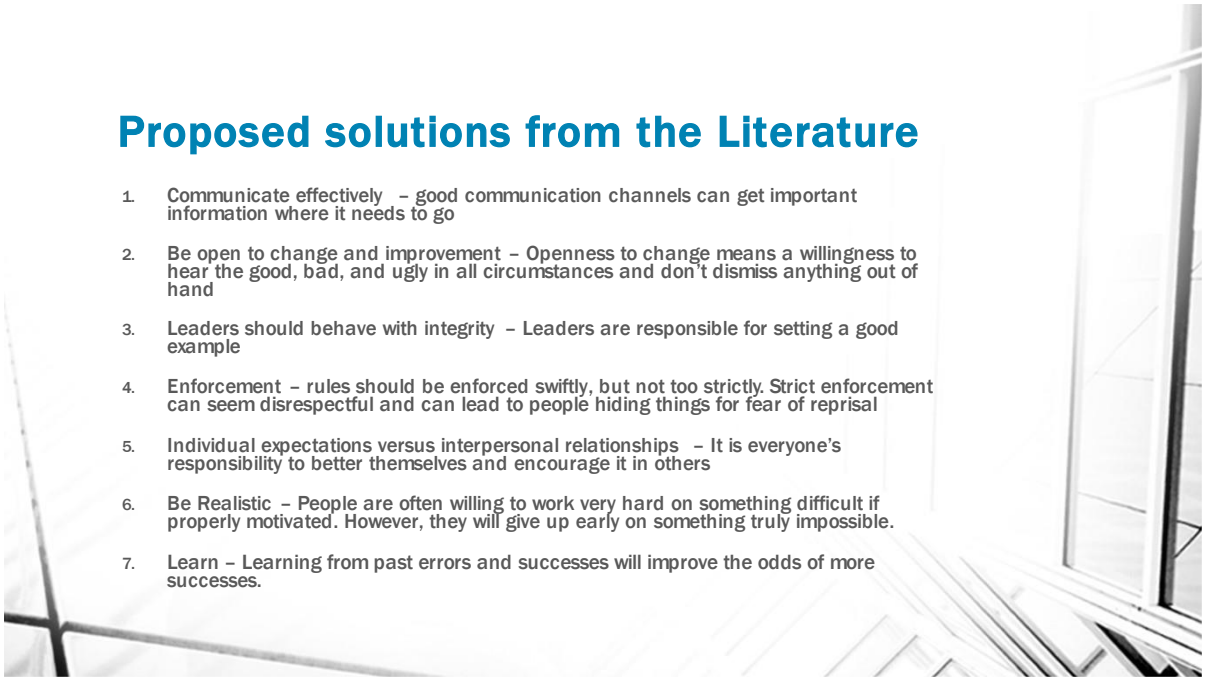


Figure 54 - Workshop Two Slideshow presentation - Slide 12

Figure 55 - Workshop Two Slideshow presentation - Slide 13

APPENDIX U - CREATIVE MATRIX

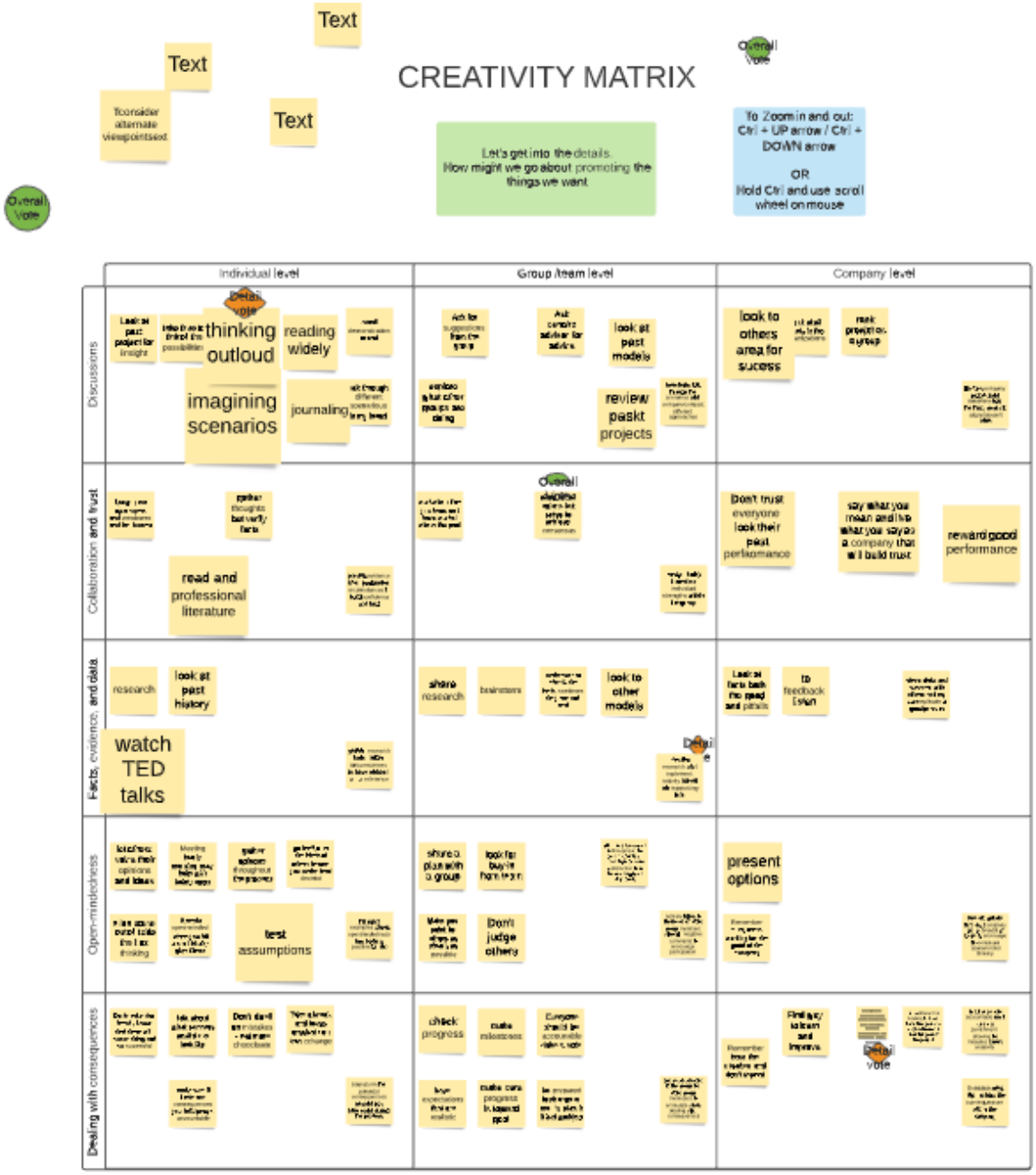


Figure 56 - Creative Matrix with notes from participants and voting dots

Figure 57 - Creative Matrix notes organized for improved visibility. Some notes are color-coded based on recieving a vote. Green = Primary vote; Orange = Detail vote

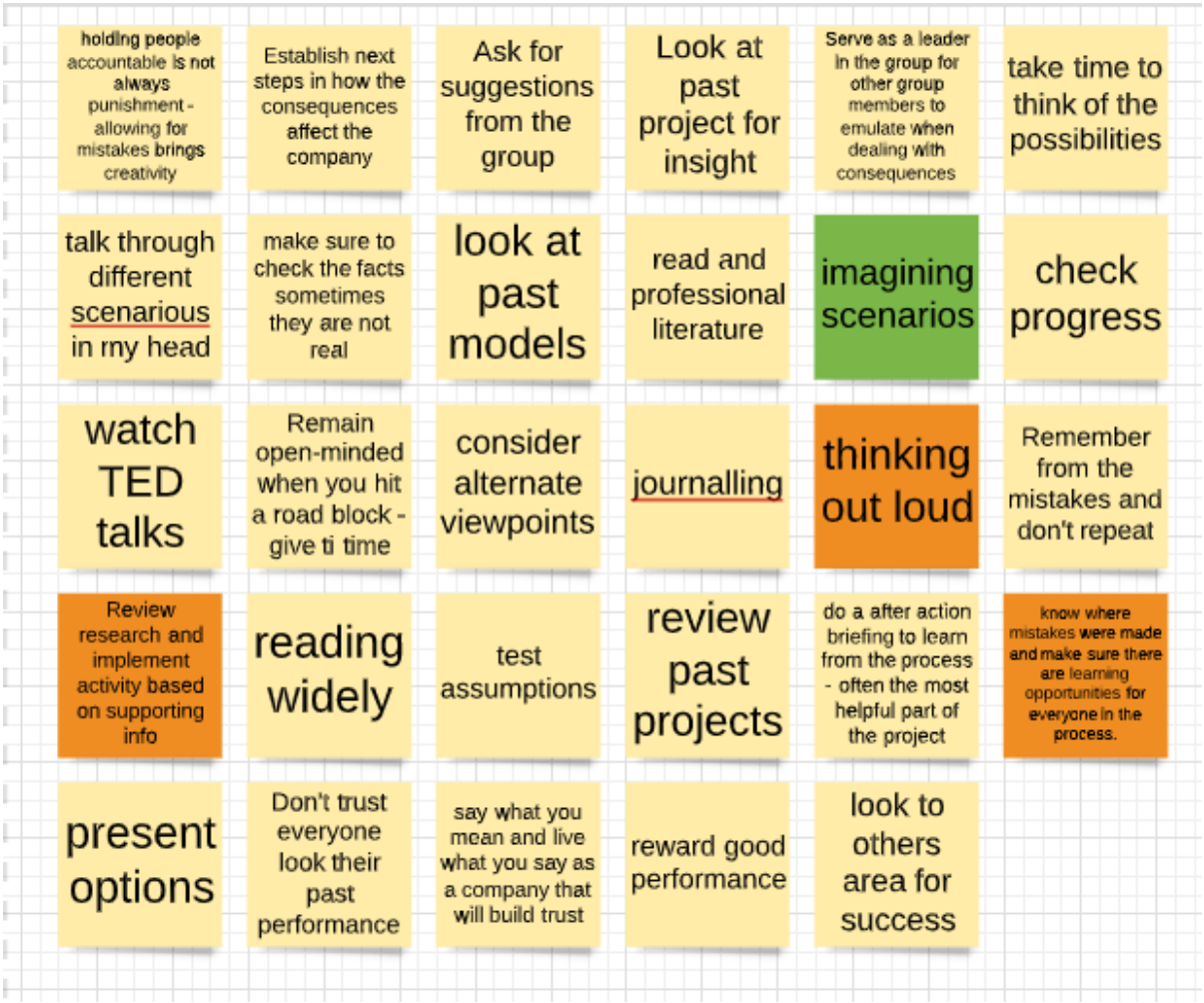


Figure 58 - Creative Matrix notes organized for improved visibility. Some notes are color-coded based on receiving a vote. Green = Primary vote; Orange = Detail vote

APPENDIX V - DRAFT QUICK REFERENCE GUIDE SENT OUT TO PARTICIPANTS FOR CRITIQUE

QUICK REFERENCE GUIDE

USING DESIGN-THINKING TO ADDRESS ESCALATING COMMITMENT RISKS IN DECISION-MAKING

ABSTRACT

Thank you for taking the time to read this document. The information presented here consists of ideas provided by study participants as well as other published studies in the field of decision-making and management.

Please understand that this document represents a work-in-progress and as such is not approved for publishing or sharing at this time. It is requested that after you provide your notes/critiques to the author that you not retain any digital copies or print off any hard copies. The final version will be made available to the study participants upon its completion and approval for publishing. Thank you for taking the time to participate.

Tim Cooke

Tcooke3@radford.edu

2

Making Better Decisions

QUICK REFERENCE GUIDE

Tim Cooke | Radford University – Department of Design | 10/4/2021

OVERVIEW

"You've got to know when to hold 'em, know when to fold 'em, know when to walk away, know when to run…"

-Excerpt from *The Gambler*, famously performed by Kenny Rogers (Schlitz, 1976)

We make decisions every day on all manner of topics. Some decisions seem important in the moment, and over time seem inconsequential. Conversely, seemingly small decisions occasionally yield a substantial impact in the long run. This document is intended as a quick reference for numerous aspects related to decision-making specifically deciding on when to stick with an existing plan, and when to abandon or change a plan. The topic of decision-making and changing minds is extensive. While the author has gone to great lengths to neatly summarize the information gathered, some concepts are at risk of being somewhat lost in translation. As such, the author recommends all readers do some of their own research into the various concepts and ideas to allow them to understand in greater depth, but hopefully can retain this document for its intended purpose—a simple, easy-to use reference for a refresher on the concepts.

PLAN-CONTINUATION BIAS AND ESCALATION OF COMMITMENT

Planning for the future is one of the most valuable abilities humans have. Unfortunately, planning is not without its pitfalls. Plan-continuation bias (PCB) is the cognitive process that pushes people toward continuing with a plan in the face of adversity (*PlanContinuation Bias – APA Dictionary of Psychology*, 2020). PCB has not been studied extensively but was first theorized by investigators who were studying preventable aviation accidents (Berman & Dismukes, 2006). PCB is closely associated with escalation of commitment (EoC) which is the realized manifestation of continuing with a plan despite adverse information (Staw, 1976). PCB is your brain telling you to stick with a plan, and EoC is the action, or inaction required to stick with the plan. These two elements, in essence, represent the before and after of a decision. PCB influences thoughts before a decision and EoC is the result of it. A plan can be well-thought out and highly detailed, or little more than an inkling—the mere existence of a plan in a person's mind can be enough to tip the scales toward sticking with it. PCB is not necessarily a bad thing, as many plans turn out successfully

despite difficulties. The key is learning how to overcome PCB when a plan is genuinely headed towards failure.

We often think of ourselves as being in control of our own decisions since the process takes place within our own brains. It turns out however, that a significant portion of decision-making is based on context. The following pages contain descriptions of common circumstances and psychological elements that contribute to PCB and EoC, followed by suggestions for addressing them provided by existing literature and the design-thinking study that helped produce this document. The goal of this is not to eliminate PCB or EoC but to recognize when they are leading in the wrong direction. The trick, as it turns out, is not to avoid failure, but instead to use failing small and quickly to learn from it and succeed big in the long run.

The following advice largely stems from the following documents and studies: Meyer (2014), Kaptein (2012), Catmull and Wallace (2014), Kanki et al. (2010), A.M. Grant (2021), Berman and Dismukes (2006), the Project Management Institute (2017), Galef (2021), Aaker and Bagdonas (2021), Tavris and Aronson (2020), Drummond (2012), and Cooke (2021). Other sources are cited as appropriate.

EOC CLASSIFICATION

Any given decision can be described by answers to the four questions. A letter code can be assigned to each answer resulting in a final code describing a result.

1. Are you going to continue with the plan or not? (Yes/escalate=EoC, No/de-escalate=DEoC)
2. Are all the risks associated with the decision known or not? (Known=K, Unknown=U)
3. Is commissive action being taken or are you omitting to act? (Commissive=C, Omissive=O)
4. Is the result a success or failure? (Success=S, Failure=F)

EoC code	Meaning/Lesson
EoC-KCS	Escalation of Commitment towards a Known Commissive Success - Deliberate choice to continue with plan despite the risk. Hard work paid off but investigate further to determine if this practice is worth continuing or if you just got lucky this time.
EoC-UCS	Escalation of Commitment towards an Unknown Commissive Success – Unintentional benefit. Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.
EoC-KOS	Escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.
EoC-UOS	Escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck.
EoC-KCF	Escalation of Commitment towards a Known Commissive Failure - Classic EoC. Deliberate action that resulted in a predictably poor outcome – Foolish. Bad process that should be modified in the future.
EoC-UCF	Escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.
EoC-KOF	Escalation of Commitment towards a Known Omissive Failure - Deliberate inaction that resulted in poor outcome - failure was inevitable.
EoC-UOF	Escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late.
DEoC-KCS	De-escalation of Commitment towards a Known Commissive Success - deliberate choice to discontinue the plan despite the risk. Investigate further to determine if this practice is worth continuing or if you just got lucky this time.
DEoC-UCS	De-escalation of Commitment towards an Unknown Commissive Success - Good luck due to actions taken that addressed an unknown risk accidentally. Explore further to determine if future exploitation is possible.

DEoC-KOS	De-escalation of Commitment towards a Known Omissive Success - Deliberate choice to do nothing worked out. Explore further—either you dodged a bullet by dumb luck or deliberate action would have worsened the situation.
DEoC-UOS	De-escalation of Commitment towards an Unknown Omissive Success - Good luck not attributable to any actions taken whatsoever. Sheer dumb luck. (This is practically identical to EoC-UOS.)
DEoC-KCF	De-escalation of Commitment towards a Known Commissive Failure – Taking deliberate action to end a situation, but not providing adequate resources to accomplish it—half measure.
DEoC-UCF	De-escalation of Commitment towards an Unknown Commissive Failure – Unintended consequences. Bad luck due to actions taken – good opportunity to learn.
DEoC-KOF	De-escalation of Commitment towards a Known Omissive Failure – Procrastination/sticking your head in the sand. Deliberate inaction to end a situation that predictably failed.
DEoC-UOF	De-escalation of Commitment towards an Unknown Omissive Failure - Bad luck with no direct mitigation whatsoever. Arguably the most dangerous as it might not be spotted until it is too late. (This is practically identical to EoC-UOF.)

The first three questions are somewhat under your control, while the ultimate success or failure is often not known at the time of a decision. The hope and effort are to yield a success, but it could turn toward failure. Ultimately, classifying every decision is not the point, but it can be helpful to understand what results are possible under different conditions.

HOW WE ACQUIRE INFORMATION

The way in which we acquire information is a critical step towards making decisions. Actively seeking information can yield different results than someone bringing you information because of how that information is presented and how open you are to receiving it.

Open-mindedness

Open-mindedness means a willingness to hear the good, the bad, or the ugly in all circumstances. A person must also demonstrate their open-mindedness to gain trust. You can state directly to people that "You can always come to me, I always try to keep an open mind," but they will respond to your actual behavior. If ideas are dismissed out of hand or you become agitated, belligerent, or otherwise unapproachable when you receive bad news, others will come to understand that you are not truly open-minded, and they will become hesitant to bring more bad news forward.

Do not shoot the messenger. Punishing whistleblowers or other bearers of bad news implicitly states to others that you don't truly want to hear bad news and thus do not truly want to fix the problem. The whistleblowers are not the problem. The activity or behavior that needs calling out is the problem. Whistleblowing generally comes from a good place— a desire for accountability, fairness, and safety. Treat harbingers of doom with respect and work the problem, not the messenger.

Keep an ear to the ground

Any given plan or situation has the risk of turning sour. The particulars are specific to the project, but it is common to hear both good and bad news. If you are not hearing bad news that does not mean bad things are not happening, but instead, those things may be hidden by some mechanism. Hidden problems are not always the result of sabotage or fraudulent behavior—in most cases they are continuing unnoticed or unspoken. Meetings can be a valuable opportunity for numerous people to share their thoughts, but the perceived formality of some meetings can be enough to discourage some folks from speaking up for fear of looking foolish (Catmull & Wallace, 2014). It is important to recognize that not all bad news might make it into a meeting if someone has reservations. For this reason, it is also important to pay attention to whispers and rumors.

Good ideas are generated anywhere and from anyone. Give everyone an opportunity and platform to speak up, and chances are they will if they feel like they are heard. A suggestion box is more than a deposit box for people to slip anonymous suggestions into, it is also a symbol and a message that leadership is open to suggestions. These subtle messages do not just encourage use of the suggestion box itself but also encourage people to talk to leadership directly. Just make sure the

suggestion box is reviewed occasionally and does not become a glorified trash can—which will send the wrong message.

Facts, Data, and Evidence

Facts are verifiable pieces of information. One method of ensuring information is reliable is by ensuring it comes from a reliable source. This does not mean that unreliable sources cannot provide facts, only that an extra step of verifying the information is necessary.

We often tend to think of emotions as getting in the way and clouding decisions when we should be focused on the facts. Facts are important because they reflect reality, but it turns out that emotions are also very important and impact decision-making in a surprising way (Bechara et al., 2003). When we have choices before us, we unconsciously attribute feelings to those choices. Would you prefer a 5PM train out of town or a 9pm train? As you think through the options, you might prefer the 5pm train so you can relax and enjoy dinner as you travel. On the other hand, you might prefer the 9pm train because you can enjoy dinner with family ahead of time and sleep on the train. In either case, your feelings about when you can have dinner, interactions with family, and the option to sleep greatly impact your ability to make decisions. In fact, neuroscientist studies of an individual who suffered damage to a part of the brain closely associated with emotion also found that the individual was almost completely unable to make a decision (Bechara et al., 2000). The individual would mull over the facts, but since there was no emotional weight tipping the scales, indecision ruled.

Ultimately, facts are merely building blocks in telling a story. People generally do not respond to the facts or data directly, but instead to the story that is told with those facts (Drummond, 2012). Therefore, two different stories could be heard in a court case: One from the prosecution and one from the defense. It is important to ensure that decisions are made based on facts, but it is also important to recognize that the way they fit a story is just as impactful in how you might ultimately decide. Make sure the facts fit the story but also that the story fits reality. Stop all activity and investigate if necessary to root out any anomalies. It could make all the difference.

HOW INFORMATION IS PRESENTED

Framing and Prospect Theory

Framing is the way in which information is presented or viewed from (Amos Tversky &

Daniel Kahneman, 1986; Kahneman, 2011). Would you rather have a 100% chance of losing $50, OR a 50% chance of losing $100? Statistically they are the same, but most people would prefer the second option because it gives them the illusion of control. Framing things in the negative can cause people to think defensively and framing them positively can get them to think offensively. Would you rather use hand soap that kills 99.9% of dangerous microbes, or a hand soap that leaves 0.1% of dangerous microbes alive? Prospect theory demonstrates that on average, people tend to focus on losses more heavily than gains and thus will spend more energy to avoid losses than to exact gains (Kahneman & Tversky, 1979). Be careful how you frame your questions and statements to people when making your case. The framing of the question can lead a person feeling like they have less choice in the matter than they do.

Storytelling and myth

Many of the best stories involve a protagonist struggling and failing over and over throughout the course of the tale only to snatch a narrow victory from the jaws of defeat at the last moment. Conflict is considered an essential component to good storytelling (Aristotle, 2000) as conflict is what allows for interesting drama. This is exciting storytelling, but it is not necessarily the best way to approach decision-making.

Mythology is defined as the stories that cultures tell themselves to explain how the world works. Contemporary television and movies are the myths of modern societies and numerous studies have shown that many people alter opinions and behaviors based on what they see in these stories (Khan et al., 2021). Since good storytelling involves the drama of the characters' struggle, they will generally continue to depict exciting, narrow victories. Some of your own projects may occasionally succeed narrowly, but this should only be because the project was difficult on its own merits, not because the modern myths in popular culture make it seem normal or admirable.

Mental models

People see and understand how the world works from a collection of mental models they refer to in their head. People tend to struggle with ideas or situations that are completely novel, because they cannot rely on any mental model to help them understand. Mental models are why analogies, similes, and metaphors are so useful in language—they allow a person to partially depend on a mental model to help understand the new concept. Information that is like what a person is used

to is best presented with a comparison mental model (Lidwell et al., 2010). *"This new software is just like the one you are used to, but with the following new features..."* Completely new information is best introduced a little bit at a time, so a person has time to grasp the new and confusing concept. *"We are going to teach you this new software step by step, let's start by learning basic controls and learning advanced features later."*

Communication

Use "I" statements to communicate feelings. "I feel _____ when _____ behavior occurs." "I feel frustrated when the dishes are not cleaned up from dinner."

Refrain from using ""You" statements as it can put a person on the defensive. "You really tick me off!" "You never do your share of the chores."

The most effective communication expresses one's feelings or judgement, points out a specific problem, and offers a potential solution (Kanki et al., 2010). Consider the following:

- *"I have a bad feeling about this"* – Good, but not specific enough yet
- "I have a bad feeling about that storm cloud" – Better, but no path forward yet
- "I have a bad feeling about that storm cloud, maybe we should find some cover" – Best

Communication is not just a function of sender and receiver; it is rooted in the relationship of the people needing to communicate. People that have a tense relationship will generally communicate less or communicate in a way that induces stress. People with a congenial relationship will generally be more comfortable communicating regularly. Bottom line: A dysfunctional relationship will usually yield less communications and therefore at risk of allowing problems to slip by, even if they are noticed by someone.

HOW INFORMATION IS PROCESSED

Cognitive biases are patterning that humans are documented to follow under certain conditions. The list of cognitive biases is far too long to list here, but several biases and patterns that are commonly associated with EoC behavior are listed and described.

Naïve realism

Naïve realism is the tendency to assume that we see the world as it is, while others who disagree must be subjective, uninformed, or otherwise biased. The reality is that none of us see the world objectively and must take care to not draw erroneous conclusions based on our own subjective perceptions (*Naive Realism – APA Dictionary of Psychology*, 2020).

Identity

Things that are associated with a person's identity tend to be held very close and might be fiercely defended as it is a part of them. This is often why religion and politics are typically taboo subjects when first meeting someone as they are considered a part of identity. Certain things can usually be considered common identity elements like country of origin, strong social groups, and career field, but people can latch on to potentially anything. Most people consider their identities to be something they cannot change easily and thus may potentially be offended when they feel their identity group is attacked.

Be very careful when passing judgments on anything associated with identity. For this reason, it is important to word statements carefully to focus on behavior, actions, or ideas themselves and not the person who generated them. Consider the following statements:

1. "That was a bad choice"
2. "You made a bad choice"
3. "You make bad choices"
4. "You are a bad person"

Notice how the statements get increasingly personal as they go along? They also grow increasingly insulting as the statements get closer and closer to attacking a person's identity. If you are looking to reason with a person and gain their cooperation, be very mindful of how they may interpret your word choice as an attack on their identity.

Critical Point theory and Habituation

Critical point theory argues that people need a certain amount of information, or a certain quality of information, to become convinced that a failing situation is irretrievable (Meyer, 2013). This means that a project or situation might start failing at certain point, but the decision-maker will

assume the signs of failure are just 'hiccups' and not a sign of ultimate failure until the information has crossed their mental 'critical point.' Seemingly insignificant information is usually at risk of not adding up quickly enough to pass the critical point in time to catch major problems. However, the opposite end of the spectrum is also at risk of being ignored: hyperbole. Statements that sound too outlandish or ridiculous to be true ("the sky is falling!") are likely ignored but there is a chance they could be real (Drummond, 2012). The farther a piece of information seems to be outside expectations, assuming the source is reliable, the more attention should be paid to it.

Habituation is the tendency for a person or people to notice a small change, but to become used to it and eventually ignore it (Ueda et al., 2021). This is why some people become entrapped in growing problems. The changes do not occur all at once but instead, they occur little by little until it is too late to effectively respond.

Waste Avoidance

Despite the pessimistic news about humans wasting food and other important consumables, most people are shown in studies to spend energy avoiding waste, sometimes to their detriment (Drummond, 2014). The sunk cost fallacy is the tendency for people to focus on money or energy that has already been spent to justify continuing with a failing project (Kahneman & Tversky, 1979). This is inadvisable however as the past is in the past and has no more effect on the future. It is best to analyze a project's current state and what remains to finish it before deciding how to proceed. Beware of sunk costs' cousin, however:

goal distance (Ting, 2009). It can be easy to focus on how close you are to finishing to justify seeing it through, but this can also be fallacious if finishing is not worth the effort. You may have driven a thousand miles to see a friend and only have a few miles left to go but it will be pointless to continue if they call and tell you they cannot see you anymore.

HOW WE VIEW AND JUSTIFY PAST AND FUTURE CHOICES

Not all information that is objectively untrue is a lie. A lie requires a person to *knowingly* spread false information—usually motivated by protection or gain. It is not a lie if a person truly believes the false information—they are simply incorrect.

Memory

Memory is a valuable tool in recalling past situations to learn from, but it is not infallible. In fact, human memory is notoriously unreliable and numerous studies have shown that under certain conditions, people can be led to believe that they have memories of situations that never truly occurred (Dekker, 2014; Galef, 2021; Tavris & Aronson, 2020). Do not fall into the trap of believing that your own memory is set in stone and remember that this is the same for everyone else.

Memories of past successes can also be a dangerous justification for continuing with a current troublesome project. Just because the last project managed to succeed in the face of great challenges does not mean that the current project will also succeed. Confirmation bias is the tendency to seek out and cleave to information that confirms your existing beliefs and to subsequently discount information that does not fit the existing model. Optimism bias is the tendency to focus on the positive aspects of information and to downplay negative information. These can be reassuring, and even inspiring, but also dangerous if not kept in check. Unsustainable practices often devolve from sustainable practices that become distorted over time with overconfidence. Be careful when recalling past successes—they can mislead you.

Goal Substitution

Goal substitution is the tendency to mentally substitute the original goals of a project with more favorable goals when a project is troublesome or unengaging (Drummond, 2014). Goal substitution can happen when people grow tired of a project and just want to get it done, when perceived competition leads them to focus on beating the competitors instead of the original goal and focusing on rewards or distractions instead of the task at hand. Ultimately, goal substitution occurs any time a person shifts priorities from their original goal to something else. Keep your eyes on the prize, but don't let the reward itself overtake the value of hard work.

Self-justification

Self-justification is a complex topic on its own, but in broad strokes it is the tendency for people to make excuses, blame others, and rationalize past decisions to make themselves look better (Tavris & Aronson, 2020). In short, self-justification allows for a person to avoid having to admit they are wrong. This can include self-deception. While they may make outward statements that are

demonstrably false, self-justification can allow a person to convince themselves that they are telling the truth—they believe their own lies.

Self-justification is theorized to stem from cognitive dissonance—the mental discomfort people feel when trying to hold two or more contradictory thoughts. Mental discomfort has also been shown to manifest as physical discomfort in the way of anxiety and stress.

POSSIBLE TACTICS AND STRATEGIES

Communication

Many struggles within an organization are a result of communications issues. Everyone is impacted when communications go awry.

- Communications should be as open and accessible. Anyone should be able to communicate anything with everyone else without having to play the game of "telephone."
- Messages should be clear and concise, but people should be understanding if someone else struggles with the words. Euphemisms can dilute or confuse a message. Word-choice is important.
- Focus communications on actions and ideas. Communications that focus on a person's identity are at great risk of insulting and distracting them from the intended message.
- Humor and levity can improve communications but only if the jokes are appropriate and tasteful.
- Consider crafting statements with three elements: your feelings, the specifics, and potential solutions. "I have a bad feeling about that storm ahead, I think we should pull over," explains much more than "That storm makes me nervous," but don't hold back feelings just because you haven't thought of a solution yet.
- Communication is a function of the relationship between the people communicating and their level of trust. A dysfunctional relationship will not communicate and will inevitably let problems slip by unaddressed.
- Messages that seem too insignificant or too outlandish are at risk of being ignored. Pay close attention to messages that seem out of step to ensure you know about a growing problem, or a problem that has already grown out of control.

- Everyone should be encouraged to speak up if they see a problem, even if the problem is not a part of their job. Things are allowed to continue slipping through the cracks if nobody says anything after they spot an issue.
- Allow for multiple communication channels. Some people prefer to communicate in writing, while others prefer face-to-face. Keeping multiple channels open affords everyone an option to get their message out.

Open-mindedness

Open-mindedness means a willingness to hear good, bad, and ugly news at any time from anyone.

- Keep an open mind and encourage others to do the same.
- Communicate your willingness to hear out ideas to everyone. Be sure to practice what you preach; it does no good to say you have an open mind if you immediately reject ideas or seem unapproachable.
- Foster a culture of curiosity and encourage everyone to question preconceptions, "best practices" and themselves. Do not just scrutinize the failures, investigate successes as well to ensure that you succeeded due to good processes and not luck.
- Formal meetings sometimes make people feel like information they present also needs to be formal. This can lead to people hiding bad news to avoid embarrassment. Make it clear that you are open to hearing bad news in meetings, especially if it affects many of the attendees.
- People say and do regrettable things when they are frustrated or angry. Politely inform them to be civil and professional but try to be empathic—they often lash out when they feel they have no control.
- Encourage outside the box or silly ideas for solutions to some problems. These ideas might not go anywhere but can surprisingly inspire some actual solutions.

Leadership

Leaders should behave with integrity and act as role models for others to follow. Employees will follow their example, for better or worse.

- Leaders should be willing to have difficult conversations and make difficult decisions.
- Leaders should hold themselves accountable and should admit their own mistakes when they make them. They should hold themselves to a higher standard because of their responsibility.
- Mixed messages from leadership confuse employees. Explicitly saying that safety comes first while implicitly telling them to hurry it up can lead to cutting corners. Make sure your behavior matches your messaging.
- Leaders should indict themselves first if employees are making numerous errors and bad calls. Many errors are a result of systemic problems, not individual incompetence.
- Leaders should be open to fielding questions and giving advice to junior staff. Employees should feel free to approach leadership with concerns.
- Some situations require a decision to proceed forward, but some situations are already in motion and require a decision to be stopped. Indecision can be as costly as making the wrong decision. It is often best to try a decision out for size and then correct for issues later, especially if there is significant time pressure. On the other hand, if time is not an issue, patience may be the best course.

Enforcement

Rules should be enforced, and everyone should be held accountable for their actions, both good and bad.

- Accountability means rewards as well as punishment. The reward or punishment should scale with the activity and should be fair.
- Mild punishments are better at altering behavior. Severe punishments usually harbor resentment. If a change in behavior is not feasible, it is probably best to terminate the relationship.

- Fraud and honest-but-bad practices thrive in the dark. Regular introspection both personally and organization-wide is important for spotting issues early before they grow out of control.
- Reward and punish based on processes and practices, not results. Results are often important but focusing solely on them can lead people to cut corners and substitute goals to finish because the end justifies the means.
- Trust in people and only write enough rules to guide people in the right direction. Too many rules can feel like a restriction on freedom, disrespect, and resentment which in turn, leads to reactance rule breaking.
- Mistakes come in two forms: Choosing the wrong plan or choosing the right plan, but poorly executing it. Know the difference and respond accordingly.
- Do not assume that all problems stem from "bad apple" employees. Assume that in most cases, employees are behaving reasonably and responding to the situation they were put in. This does not mean there are no "bad apples," only that systemic error should be reviewed first.
- People should be praised loudly in public. They should be punished quietly in private.

Individual responsibility and Interpersonal relations

- Empathize with people when mistakes are made and cut people some slack if they are working hard. Nobody's perfect.
- Frame "being wrong" as "learning opportunities." Nobody likes to be wrong, but everyone likes to learn.
- Share all ideas, even incomplete or silly ones, as soon as possible while brainstorming. Most ideas will not go anywhere but some might inspire better ideas.
- Foster curiosity in yourself and others. Withhold judgement until the evidence stacks up one way or the other. Things are not always as they seem at first.
- Give everyone some freedom and agency to think and act for themselves. They will appreciate the freedom as a strict chain of command can be demoralizing and slow to respond to crises.

- No-one sees the world entirely objectively and often have an easier time spotting issues with other people than in themselves. A functional, trusting, team will include peer-review processes and trust.
- Tactics and strategies should be tailored to the size of the team. A small or one-person team is nimble, but prone to missing things. A large team can see and accomplish a great deal but can be slow to respond to crises. Be on guard for different errors that are unique to different team sizes.
- Know your own strengths and weaknesses and understand that projects take time and resources to happen. If it is not worth doing right, is it worth doing at all?

Be realistic

People are often willing to work very hard on something difficult if properly motivated. However, they will give up early on something truly impossible.

- Determining how something will be accomplished is as important as figuring out what to accomplish. Unpacking or decomposing problems and solutions will help determine the level of difficulty to address them. If someone is setting unrealistic goals, ask them to explain how they envision it happening. This
- Set goals that seem within reach or slightly beyond reach. People may surprise you with their skill but will give up early if goals are way beyond reach. Monitor progress and modify goals, as necessary. If progress is slow, either the goal needs to be scaled back or more resources are needed. Failing to address this could lead to burnout and compromise morals and quality.
- Employees are people, not robots. They have complex thoughts, feelings, and lives outside of work. Respect them as people and they will be all the happier to work hard.
- It is important to track progress, but do not let tracking accidentally become the goal. There is a risk that people wind up spending more time tracking their work than doing it— which is wasteful and demoralizing.
- Time pressures and other constraints can be motivating if they are realistic. Too much pressure can overwhelm a person and cause them to shut down.
- Just because a project is over budget or behind schedule does not mean it is a failure, the original estimates might have been inadequate to cover the project in the first

place. Judge a project based on how much is left rather than on what has already happened.

- Progress on some projects is obvious, while on others it might be less visible. Make sure you have methods of tracking progress and experts to consult. The last step for an electrician is turning on the lights, all the other work that proceeded it took place in the dark.
- Innovations can allow for completing projects on smaller budgets and shorter timelines, but there is a limit. Expecting the same or better results while continually cutting budgets and timelines is a recipe for disappointment. Good results require realistic budgets and timelines.

Learn

Learning from past errors and successes will improve the odds of future successes.

- Both success and failure can be due to a combination of decisions made, actions taken, and luck. Take the time to investigate the true nature and cause of things to make sure the right lessons are learned.
- Learning from someone else's mistakes is best but learning from your own is a virtue. Learning from neither will likely doom you to repeat errors forever.
- Learn about other people's lives, jobs, and experiences through direct interaction, reading, and research. Sometimes someone else has already thought of a solution to your problem but it never reached you because they worked in another department, industry, or time. Surprising solutions can come from anywhere and making synthetic connections between disparate concepts is one of the great achievements of learning.
- Always ask open-ended questions like: "What assumptions are being made that could be wrong?" "Are we solving the right problem?" and "In what ways might this go sideways?". Yes-or-No questions are faster but can miss nuances.
- Cut you and your colleagues some slack. Some problems were out of your control from the beginning, and it is normal to be frustrated when things go badly. Giving people a break during and after a project can help everyone mentally recharge.
- Whenever possible, give yourself some breathing room for errors, breaks, and disruptions.

No plan remains unchanged after contact with reality.

Humor and Respect

Q: Why did the chicken cross the road?

A: To break his writer's block and solve complex problems of course!

The above joke is probably not very funny, but it does serve to illustrate a point. Humor and levity have been shown in studies to improve moods, foster cooperation, and believe it or not, break forms of writer's block that prevent us from thinking outside the box. Humor can help bring people together in tense negotiations, sway opinions towards the humorist, and allow people to discuss difficult topics. Do not underestimate the value of humor and levity in turning someone else's opinion. Even if you are not in the mood yourself, a genuine smile can brighten someone else's day to make them more cooperative and willing to help you.

Remember to:

- Look people in the eye
- Smile
- Ask people how they are and then pause to listen before making any requests
- Read the room - Only tell jokes that are appropriate for the audience
- You don't have to tell jokes to gain someone's favor. Sometimes simple questions like

"What's your favorite color?" can show that you recognize them as a person **Pitfalls:**

- Jokes that attack someone's identity or something they closely identify with should be handled with extreme care. As noted earlier, people will often fiercely protect their identity and a joke they deem distasteful can shatter any favor you have earned. It is usually best to steer clear of humor that hinges on identities.
- Clean jokes, even if they are not especially groundbreaking, can still send a message to others that you have a sense of humor and are open to communicating.

Prototype

Prototypes are experimental or scaled-down versions of a proposed solution. The value of a prototype is that a small number of resources are used to answer lingering questions and generate new ones. Prototypes will vary depending on the problem to be solved but the general idea is that a scaled down version is developed. Physical prototypes can be models, or paper drawings while more abstract prototypes can be summaries, outlines, or diagrams. Whatever your problem, prototyping quickly answers questions. When a prototype has answered the questions, build another one to incorporate the lessons learned. At a certain point the prototype is developed enough to demonstrate its capabilities, and the process of development can help everyone practice and learn the best techniques for when they need to tackle the real thing. When all else fails or stalls, try developing a prototype.

Think it through

Many problems could be avoided by thinking through and analyzing the possibilities that resulted from a given decision or plan (Virine & Trumper, 2019). Gather thoughts and opinions during planning and throughout execution. Chaos and problems will inevitably sneak in but simply taking the time to think through problems and situations can allow many issues to be foreseen and addressed. Talking through decisions with a team and envisioning a personal experience might highlight holes in a plan.

Write it down

If you have discovered or developed a good practice, write it down so you can share it. If it is a bad practice, let it be a warning. Successes and failures in past projects can often be forgotten or lost but taking the time to analyze projects after they are completed can be invaluable in making decisions in future projects. It is unfortunately more common for failures to be analyzed far more often than successes. Take a scrutinizing look at successes and failures to ensure that the best lessons are saved for posterity. Journaling throughout a process can also be helpful in capturing thoughts and feelings in the moment. A hard-earned success can feel good in the end, but the pain of the trial might also be worth remembering.

REFERENCES

Aaker, J., & Bagdonas, N. (2021). Humor, seriously: Why humor is a secret weapon in business and life (and how anyone can harness it. even you.). Crown/Archetype.

Amos Tversky & Daniel Kahneman. (1986). Rational choice and the framing of decisions. *The Journal of Business*, *59*(4), S251–S278.

Aristotle. (2000). *Poetics*. Infomotions, Inc. https://public.ebookcentral.proquest.com/choice/publicfullrecord.aspx?p=3314345

Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral Cortex*, *10*(3), 295–307. https://doi.org/10.1093/cercor/10.3.295

Bechara, A., Damasio, H., & Damasio, A. R. (2003). Role of the amygdala in decision-making. *Annals of the New York Academy of Sciences*, *985*, 356–369. https://doi.org/10.1111/j.17496632.2003.tb07094.x

Berman, B. A., & Dismukes, R. K. (2006). *The limits of expertise: Rethinking pilot error and the causes of airline accidents*. 1–28. https://humansystems.arc.nasa.gov/flightcognition/Publications/KD_CRMHF_Conference.pdf

Catmull, E., & Wallace, A. (2014). Creativity, inc.: Overcoming the unseen forces that stand in the way of true inspiration. Random House. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=nlebk&AN=750163&site=eds-live&scope=site

Cooke, T. B. (2021). Using design-thinking to address escalating commitment risks in decision-making. Radford University.

Dekker, S. (2014). The field guide to understanding “human error.” CRC press.

Drummond, H. (2012). Guide to decision making: Getting it more right than wrong. Wiley. https://learning.oreilly.com/library/view/guide-to-decision/9781118240557/

Drummond, H. (2014). Escalation of commitment: When to stay the course? *Academy of Management Perspectives*, *28*(4), 430–446. https://doi.org/10.5465/amp.2013.0039

Galef, J. (2021). The scout mindset: Why some people see things clearly and others don't. Penguin.

Grant. (2021). *Think again: The power of knowing what you don't know* (Popular Reading - Level 3 NFGRANT). [New York, New York] : Viking, [2021]. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=cat04559a&AN=rau.1191456279&site=eds-live&scope=site

Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–291. https://doi.org/10.2307/1914185

Kanki, B. G., Helmreich, R. L., & Anca, J. M. (2010). *Crew resource management*. Burlington : Elsevier, 2010. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=cat04559a&AN=rau.635292683&site=eds-live&scope=site

Kaptein, M. (2012). *Why do good people sometimes do bad things?: 52 reflections on ethics at work* (SSRN Scholarly Paper ID 2117396). Social Science Research Network. https://doi.org/10.2139/ssrn.2117396

Khan, H., Pandey, A., Agarwal, V., & Mishra, S. (2021). A perception of medical students about role of cinema on mental health. *Indian Journal of Community Health*, *33*(2), 382–385. https://doi.org/10.47203/IJCH.2021.v33i02.024

Lidwell, W., Holden, K., & Butler, J. (2010). *Universal principles of design*. Rockport publishers.

Meyer. (2013). The critical point—The psychology of project termination. https://www.pmi.org/learning/library/project-failure-optimism-business-benefit-investigated-5808

Meyer, W. G. (2014). Effect of optimism bias—Decision to terminate failing projects. https://www.pmi.org/learning/library/optimism-bias-terminate-failing-projects-3779

Naive realism – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/naive-realism

Plan-continuation bias – APA Dictionary of Psychology. (2020). https://dictionary.apa.org/plancontinuation-bias

Project Management Institute. (2017). *A guide to the project management body of knowledge (PMBOK guide)*. Newtown Square, PA : Project Management Institute, 2017. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=cat04559a&AN=rau.995162610&site=eds-live&scope=site Schlitz, D. (1976). *The gambler*. United Artists.

Staw, B. M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, *16*(1), 27–44. https://doi.org/10.1016/0030-5073(76)90005-2

Tavris, C., & Aronson, E. (2020). Mistakes were made (but not by me) third edition: Why we justify foolish beliefs, bad decisions, and hurtful acts. Houghton Mifflin Harcourt.

Ting, H. (2009). The effect of goal distance on goal value and escalation of commitment. https://drum.lib.umd.edu/handle/1903/9667

Ueda, K., Sekoguchi, T., & Yanagisawa, H. (2021). How predictability affects habituation to novelty. *PLoS ONE*, *16*(6). https://doi.org/10.1371/journal.pone.0237278

Virine, L., & Trumper, M. (2019). *Project decisions: The art and science*. Oakland, CA : Berrett-Koehler Publishers, [2019]. https://lib-proxy.radford.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=cat04559a&AN=rau.1123220809&site=eds-live&scope=site

APPENDIX W - 2 PAGE SLICK