# THE PERSISTENCE DILEMMA IN LONG-DURATION CREATIVE PROJECTS

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# ABSTRACT

Persistence, continuing effort in the face of challenges over time, can have clear benefits for creativity. At the same time, abandonment, stopping effort toward a course of action, is often necessary to help creators move forward towards their best ideas. Creative workers, and the organizations that employ them, thus face a dilemma between forces for persistence and forces for abandonment in developing ideas and projects, what I refer to as the persistence dilemma. Existing theory provides some clues about this dilemma (e.g. theories of motivation or escalation of commitment), but a lack of holistic theorizing leaves many questions outstanding. Through a longitudinal qualitative study of four organizations, I set out to explore how creative workers managed the persistence dilemma. I found that the organizational context shaped how project teams responded to the dilemma. Teams within the startups I studied managed the dilemma with a process focused on commitment. Leaders helped team members transform the ambivalence that resulted from the dilemma into commitment to the organizations core project. Teams in the established organization, by contrast, managed the dilemma with a process focused on balance. The organization focused on balancing forces for abandonment and forces for persistence since both were perceived as necessary and beneficial in their own way. My work has implications for understanding the persistence dilemma, as well as for theories of creativity more generally.

# TABLE OF CONTENTS

Table of Contents iv					
Ack	Acknowledgementsv				
1.0	Chap	oter 1: Introduction	. 1		
2.0	Chap	oter 2: Theoretical Foundations and Literature Review	10		
2.	1 W	hat is the Persistence Dilemma?	10		
	2.1.1	Theories of Persistence	11		
	2.1.2	Defining Persistence	15		
		2.1.2.1 Related concepts	16		
	2.1.3	Theories of Abandonment	18		
		2.1.3.1 Psychological perspectives on abandonment	19		
		2.1.3.2 Resource-related abandonment	20		
		2.1.3.3 Escalation of Commitment	21		
	2.1.4	Defining Abandonment	23		
		2.1.4.1 Related concepts	23		
2.2 The Persistence Dilemma and Creativity			25		
	2.2.1	Forces for Abandonment in Creative Work	26		
	2.2.2	Forces for Persistence in Creative Work	27		
	2.3.3	Tensions between Persistence and Abandonment	29		
2.3 Shortcomings of the Existing Literature					
	2.2.1	Considering Persistence and Abandonment Together	31		
	2.2.2	Lack of Relevant Study Conditions	33		
	2.3.3	Lack of an Interpretive Perspective	38		
2.	4 Su	mmary	41		
3.0	Chap	oter 3: Methodology	42		
3.	1 Re	search Contexts and Sampling	42		
	3.1.1	Discovery Center	46		
	3.1.2	TempTech	48		
	3.1.3	Hydro	49		
	3.1.4	Gateway	49		
3.	2 Da	ta Collection	50		
	3.2.1	Informants and Sampling	52		
		3.2.1.1 Semi-structured interviews	53		
		3.2.1.2 Observations	54		
		3.2.1.3 Archival data	55		

	3.2.1.4 Biweekly surveys	55				
3.2.2	Data Reduction					
3.3 Da	3.3 Data Analysis					
3.3.1	Open, Provisional Coding	58				
3.3.2	Axial Coding	58				
3.3.3	Delimiting Theory	59				
4.0 Chapter 4: The Persistence Dilemma at the Startups						
4.1 Ho	ow the Persistence Dilemma Manifested					
4.1.1	Psychological and Structural Forces for Abandonment	64				
4.2 Ma	anaging the Dilemma by Generating Commitment					
4.2.1	Overcoming Psychological Forces for Abandonment	67				
4.2.2	Overcoming Structural Forces for Abandonment	72				
	4.2.2.1 Task prioritization	73				
4.2.3	Managing the Persistence Dilemma via Commitment	76				
5.0 Chapter 5: The Persistence Dilemma at Discovery Center						
5.1 M	anaging the Dilemma: Organizational Practices	85				
5.1.1	Failing Fast and Moving on: Balancing Between Projects					
5.1.2	Stage Gates: Balancing Structure and Flexibility within Projects					
	5.1.2.1 Structure					
	5.1.2.2 Flexibility					
5.2 Ma	anaging the Dilemma: Individual Responses	100				
5.2.1	Highs and Lows of Go's and No-Go's	100				
5.2.2	Proximal and Distal Sources of Meaning	103				
	5.2.2.1 Day-to-day motivators					
	5.2.2.2 Abstract purpose	105				
6.0 Cha	pter 6: Implications	109				
6.1 Comparing across Organizations: Startups versus Discovery Center 109						
6.1.1	The Organizational Life Cycle and the Persistence Dilemma	109				
6.1.2	Managing Forces for Abandonment	113				
6.2 Br	oader Theoretical Implications	115				
6.2.1	Implications for Theories of Persistence and Abandonment	115				
6.2.2	Implications for Theories of Creativity	117				
References						
Appendix						

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# **CHAPTER 1: INTRODUCTION**

"It's not that I'm so smart, it's just that I stay with problems longer." – Albert Einstein, cited in Einstein (1996: 75)

"Winners quit all the time. They just quit the right stuff at the right time." – Seth Godin, cited in Tugend (2008)

Persistence is often considered a key to creative success. For decades scholars and practitioners have emphasized "perseverance in the face of frustration" and "concentrating effort for long periods of time" as important facilitators of creative performance (Amabile, 1983: 365). From businesspeople to scientists to artists, creators often attribute their success to persistence (e.g. Hague, 2018). The creativity literature has shown that persistence, defined here as consistent effort directed toward valued end(s) over an extended period of time, in the face of *obstacles* (Fetzer & Pratt, 2021)<sup>1</sup>, can improve both the quantity and quality of creative ideas (Campbell, 1960; Lucas & Nordgren, 2015; Nijstad, De Dreu, Rietzschel, & Baas, 2010; Osborn, 1953; Simonton, 1999a). For example, Osborn's (1953: 84) classic book on brainstorming, Applied Imagination, encouraged "criticism of ideas...be withheld until later" in order to allow individuals to persist in generating new possibilities. Likewise, models of variation and selective retention (Campbell, 1960) argue that idea quality is a function of idea quantity, suggesting that the longer a creator(s) persists, the more possibilities they are likely to generate and the better those ideas will be (De Dreu, Baas, & Nijstad, 2008; Nijstad et al., 2010). Other literatures on resilience (Caza & Milton, 2012; Stoverink, Kirkman, Mistry, & Rosen, 2020), motivation (Atkinson, 1957; Bateman & Barry, 2012; Jacobs, Prentice-Dunn, & Rogers, 1984; Seo, Bartunek, & Barrett, 2010), and grit (Credé, Tynan, & Harms, 2017; Southwick, Tsay, &

<sup>&</sup>lt;sup>1</sup> For brevity, I often replace "persistence in creative work" with "creative persistence" throughout the dissertation.

Duckworth, 2021) have found that persistence and perseverance can be crucial for achieving long-term goals, which would surely include many types of creative work (Van Gelderen, 2012).

Yet we know from other areas of organizational research that persistence is not without potential costs—individuals and groups can persist too rigidly, without incorporating new information or feedback (Grimes, 2018), or for too long, expending effort toward a losing course of action (Staw, 1981). A substantial literature on the escalation of commitment (Bowen, 1987; Sleesman, Conlon, McNamara, & Miles, 2012; Sleesman, Lennard, McNamara, & Conlon, 2018; Staw, 1976; Staw & Ross, 1987) has focused on how individuals come to persist in such dysfunctional ways-the proverbial throwing of good money after bad (Astebro, Jeffrey, & Adomdza, 2007). Traditionally, escalation research has focused on psychological factors to explain why individuals continue in a failing course of action (though recent research has taken a more multi-level approach; see Sleesman et al., 2018 for a review). Some recent scholarship (Drummond, 2014; Heath, 1995; Sleesman, 2019) has begun to acknowledge that individuals and groups feel pulled in multiple directions between the urge to quit and the desire to continue, what Drummond (2014) calls "forces for abandonment" and "forces for persistence", respectively. Yet the literature still largely ignores the fact that "inadequate persistence" (Sleesman et al., 2018: 188) can be dysfunctional, perhaps just as dysfunctional as escalating commitment:

The focus on avoiding escalation detracts from situations where organizations should press on the accelerator despite adversity. Consequently, there has been little synthesis of the conceptual tools...that might help an organization stay the course when it is wise to do so. (Drummond, 2014: 431)

We still have few answers to how individuals and groups can effectively manage the tension between forces for abandonment and forces for persistence—the "conceptual tools" referred to by Drummond.

The tension between (functional) persistence and (dysfunctional) escalation of commitment is evident for many, if not most, workers in organizations, but it can be especially acute for creative workers. Creative workers pour a large portion of themselves into their creations (Elsbach, 2009; Rouse, 2013), and the journey of a creative project can be a "roller coaster" (Mainemelis, Nolas, & Tsirogianni, 2016: 272). Creators are often motivated to keep investing effort in their ideas, because of their intrinsic enjoyment of the work (Amabile, 1985) and because they are psychologically attached to it (Baer & Brown, 2012; Rouse, 2013). Yet they risk missing out on potentially favorable "pivots" (Grimes, 2018; Kirtley & O'Mahony, 2020) or expending effort towards ideas which will not be successfully implemented. It is also notoriously difficult to evaluate the potential of creative ideas beforehand (Berg, 2016, 2019). Creative workers within organizations also face the additional challenge of temporal and resource constraints (e.g. schedules and budgets; see Acar, Tarakci, & van Knippenberg, 2019), as well as being (inter)dependent on others (e.g. teammates, managers, etc.). Creators thus face numerous forces for persistence and forces for abandonment (Drummond, 2014). Little work to date, however, has explored the dilemma created by these opposing forces, empirically or theoretically, and no work I am aware of has explored its implications for creativity.

The persistence dilemma (the tension individuals and groups feel between forces for abandonment and forces for persistence) is most evident when individuals and teams are engaged in long-duration projects: projects which are ambitious in scope, require long timelines, and involve complex, interdependent tasks (Drazin, Glynn, & Kazanjian, 1999). Such projects involve greater uncertainty, higher stakes, and larger commitments of time and resources, making the forces for persistence and abandonment more apparent and arguably more powerful (Drummond, 2014). Persistence is often acknowledged as critical to a creative project's success:

"The demands of professional creativity require perseverance to bring to lifelong projects and labor through tedious, but necessary tasks without losing intrinsic motivation for the larger project." (Grohman, Ivcevic, Silvia, & Kaufman, 2017: 8). This is likely even more critical for projects which are ambitious and have long timelines. Yet the very characteristics of these projects (e.g. multiple iterations of an idea) also seem to create forces for abandonment. A wealth of evidence points to the importance of intrinsic motivation to creative engagement and performance (Amabile, 1993, 1996; Amabile & Pratt, 2016); however, when a creative worker is unsure of their endpoint or when they will arrive, it can be difficult to maintain motivation (Amabile, 1985). Long-duration projects' higher ambiguity and uncertainty thus present challenges for motivation, creativity, and persistence. Similarly, research on goal setting shows that the most motivating goals are specific and challenging, but attainable (Locke et al., 1981; Locke & Latham, 1990). Long-duration projects often have broad, ambitious objectives which can appear extremely challenging, even impossible (Sitkin, See, Miller, Lawless, & Carton, 2011). Such projects thus shine a spotlight on the persistence dilemma: the potential of such projects can be highly meaningful and motivating (Carton, 2018), valuable for the organization, and involve significant sunk costs (Heath, 1995), providing forces for persistence. At the same time, the ambiguity around goals and possible outcomes, along with other challenges inherent in doing innovative work, provide forces for abandonment. We currently lack adequate theoretical explanations for how actors navigate these opposing forces.

As I describe in greater depth in the next chapter, the existing literature suffers from three major shortcomings which prevent effective theorizing of the persistence dilemma. First, the divide between persistence and escalation of commitment belies a larger underlying problem: we do not generally study persistence and abandonment together, even though they are conceptually

two sides of the same coin, involving the expenditure of effort over time towards a goal. The primary difference between these different literatures is how they approach setbacks and adversity. Specifically, the literatures on escalation generally assume that adversity or setbacks (e.g. negative feedback) are indications that a project will fail. The persistence literature, on the other hand, assumes that setbacks can be overcome through effort.

I will argue that it is critical to consider both the potentially effective and ineffective aspects of persistence when considering how individuals navigate the persistence dilemma; without considering this full picture our theorizing will be myopic. Often post hoc explanations are invoked to emphasize only the eventual value or folly of persistence or abandonment: "observers will tend to speak about tenacity when persistence ends in success (probe and learn approach) and obstinacy when it ends in failure (escalation of commitment)." (Cusin and Passebois-Ducros, 2015: 343). Such binary representation of outcomes reinforces the divide between persistence and abandonment. This post hoc bias is strongest in studies of escalation of commitment (see Bowen, 1987 and Drummond, 2014). Such post hoc interpretations obscure that fact that persistence and abandonment are a duality and should be conceptualized apart from the resulting outcomes. Put differently, how does persistence become escalation of commitment? Or how does escalation "turn around" and lead to success? Existing literature cannot speak to these questions because persistence and abandonment have been considered separately (e.g. after a project has succeeded or failed). To go beyond post hoc explanations, we need to consider how individuals and groups navigate forces for persistence and abandonment concurrently, with an acknowledgement that they are connected.

Second, existing research on persistence and escalation of commitment, both inside and outside the creativity literature, has used study conditions which likely do not apply to the long-

duration creative work done in organizations. Specifically, existing research has used relatively short timeframes, generally in artificial settings (e.g. psychology labs), and has emphasized independent, solitary work which requires little collaboration with others (e.g. Feather, 1961; Grant, 2008; Grant et al., 2007; Lucas & Nordgren, 2015; Seo et al., 2010; Sleesman et al., 2012; Tsai, Chen, & Liu, 2007). With regard to the former, much creative work today involves long timeframes, in complex and dynamic environments— in both organizations and industries (Drazin et al., 1999; IBM, 2010; Lingo & O'Mahony, 2010). Even the few studies which have collected longitudinal field data (Grant, 2008; Lucas & Nordgren, 2020; Tsai et al., 2007) have done so over a period of less than a month. This likely does not reflect the experience of working on long-term projects that last for months or years. We could expect that the tension between forces for persistence and forces for abandonment in such work is ongoing and dynamic as creative projects progress over time; deciding to continue or stop is not a one-time decision, but rather is an ongoing dilemma, likely to surface over the course of a project as creators hit roadblocks and challenges (Amabile & Kramer, 2011; Drazin et al., 1999; Drummond, 2014).

In addition to short time frames, most creative work is also often interdependent at some level, requiring collective effort and collaboration, as well as evaluation by others (Hargadon & Bechky, 2006; Harrison & Rouse, 2014; Harvey, 2014; Perry-Smith, 2006; Perry-Smith & Mannucci, 2017). This matters for the persistence dilemma because decisions will often not be made unilaterally by a single individual, as is generally the case in experimental scenarios (e.g. Lucas & Nordgren, 2015; Staw, 1976). Instead the decision will involve some degree of input from others, highlighting relational and social influences on the process. Recent theoretical work from Stoverink et al. (2020) on team resilience<sup>2</sup> recognizes the impact of interdependence, noting

<sup>&</sup>lt;sup>2</sup> See the next chapter for a discussion of how my conceptualization of persistence relates to other concepts like resilience.

that "effectively managing the tension [between persistence and adaptation] equates to choosing the most appropriate path and is therefore best described as a process of team decision making." (p. 409). These insights are not often reflected in study designs of most previous research. The literature has considered relational and group factors which contribute to escalation (Sleesman et al., 2018) but, as mentioned above, this literature suffers from a strong post hoc bias, which limits applicability to cases where persistence resulted in negative outcomes. The choice of study conditions used in existing research means that findings may be precise in identifying the psychological mechanisms behind short-term persistence, but may fall short on generalizability and realism (McGrath, 1981) with respect to long-duration projects in organizations (Bateman & Barry, 2012). Relevant longitudinal data from the field with interdependent workers would be ideal for building theory which fits the experience of individuals and groups in organizations.

Finally, we know very little about how creative workers make sense of the persistence dilemma—how they evaluate and attach meaning to different ideas, deciding which to pursue or discard (Fetzer, Harrison, & Rouse, 2021). Extant research emphasizes forces for abandonment, including the cognitive, emotional, and political challenges of creativity (Schooler & Melcher, 1995; Staw, 1995; Unsworth & Clegg, 2010), which lead many to quit prematurely (Lucas & Nordgren, 2015, 2020). Yet experience shows that creative workers can persist—indeed, some argue it is essential (Amabile, 1983; Staw, 1995). This raises the question of how? And how does this persistence relate to decisions to abandon an idea? Existing literature points to some important drivers of persistence—meaningfulness, affective states, attachment to creative ideas—yet the connection of these factors to the creative process, especially forces for abandonment, remains undertheorized (Amabile & Pratt, 2016), in part because there has been a lack of experiential theorizing in the creativity literature (Rathunde, 2001; Rouse & Pratt,

forthcoming). We lack an understanding of creator's "inner work lives" (Amabile & Kramer, 2007). How do creative workers elaborate and evaluate their ideas over time, deciding which to pursue and which to discard? Theories of persistence and escalation of commitment have touched on some of these questions (Astebro et al., 2007; Holland & Shepherd, 2013; Sleesman, 2019), but they focus primarily on behavior, either in laboratory settings or using post hoc examinations, with little explanation of how individuals and groups interpret or make sense of the persistence dilemma. To understand what makes persistence effective or ineffective, it is necessary to understand *how* creative workers think about and make sense of this dilemma, and with what outcomes. I offer an interpretive, processual (Langley, 1999; Maitlis & Christianson, 2014; Weick, 1995) perspective to complement existing theory.

Exploring these theoretical deficiencies is critical for at least two reasons. The tension between forces for persistence and forces for abandonment is ubiquitous in organizations, and should be tackled directly, rather than only examining one side (persistence or abandonment). Decisions to persist or pull back have important consequences for individuals and organizations; each extreme (persisting too long, quitting too early) can be costly (Drummond, 2014). And even though the outcomes of persistence or abandonment may be inherently uncertain (Bowen, 1987), understanding the perspective of individuals making these decisions should also provide some insights on how to improve these decisions. The consideration of both forces should shed new light on processes of creativity as well as on persistence. Long-duration creative projects are some of the most challenging, yet most valuable, projects organizations engage in. Understanding the persistence dilemma will provide needed insights into how creativity unfolds over time, and how creative effort can be effectively harnessed, so employees can do their most valuable innovative work.

This brief review highlights that creative workers experience both forces for abandonment and forces for persistence when working on long-duration creative projects. Yet it remains unclear how they navigate these tensions, and with what implications for creativity. Thus, the overarching research question I explore here is, how do individuals and teams engaged in long-duration creative projects decide to persist in or quit developing ideas? In Chapter 2, I define persistence and synthesize various theories which explain it to identify important shortcomings and to theoretically ground my research question. In Chapter 3, I describe the qualitative, inductive methodology I used to study this question in among individuals and teams working on long-duration creative projects in the fields of robotics, pharmaceutical drug discovery, and medical device development. In Chapters 4, I begin to relate my findings, first describing how the dilemma unfolded at Discovery Center, an established organization. In Chapter 5, I describe how the dilemma unfolded at the three startup organizations I studied, Hydro, TempTech, and Gateway. Finally, in Chapter 7, I explore comparisons between the organizations and the broader theoretical implications of my research, including contributions to theories of creativity and persistence.

#### **CHAPTER 2: THEORETICAL FOUNDATIONS AND LITERATURE REVIEW**

In this chapter I ground the persistence dilemma described in Chapter 1, and my accompanying research question, in the extant literature. I articulate what we currently understand—and do not understand—about persistence and abandonment in creative work, and how investigating my question presents opportunities to build theory. I begin by discussing how I conceptualize persistence and abandonment, and why each are particularly important for theories of creativity. I then discuss three major shortcomings which have hampered theorizing of the persistence dilemma in creative work: the need to consider persistence and abandonment concurrently, the lack of study conditions which reflect creative work in organizations, and the need for an interpretive perspective.

# WHAT IS THE PERSISTENCE DILEMMA?

As described previously, the persistence dilemma is about the tension between forces for persistence and forces for abandonment<sup>3</sup>. Forces for persistence (FP) are individual, task, group, and/or organizational factors which create a drive towards continued effort in a course of action, task, or idea. Some examples of these factors could include intrinsic motivation (Amabile, 1993; Amabile & Pratt, 2016), organizational inertia (Audia, Locke, & Smith, 2000), collective efficacy (Tasa, Taggar, & Seijts, 2007), or team resilience (Stoverink et al., 2020), among others. Forces for abandonment (FA) are likewise individual, task, group, and/or organizational factors which create a drive towards abandoning a course of action, task, or idea. Some examples of these could include anticipated regret (Markman, Baron, & Balkin, 2005; Sarangee, Schmidt, & Wallman, 2013), opportunity costs (Klingebiel & Esser, 2020), resource constraints (Holland & Shepherd, 2013; Mittermaier, Shepherd, & Patzelt, 2021), or negative feedback (Grimes, 2018;

<sup>&</sup>lt;sup>3</sup> I borrow the terms FA and FP from Drummond (2014).

Mueller, Melwani, & Goncalo, 2012), among others. I make no a priori assumptions about when persistence or abandonment may be beneficial or detrimental. The extant research demonstrates that each has potential benefits (e.g. persisting until success, abandoning ideas which would have eventually failed) and risks (e.g. escalating commitment to a losing course of action, premature abandonment).

Persistence as a research phenomenon has been studied under many guises perseverance, commitment, endurance, and resilience, for example—across a variety of fields, including management (Grant et al., 2007; Sleesman et al., 2018), psychology (Feather, 1961; Seligman & Schulman, 1986), and education (Lufi & Cohen, 1987), among others. Abandonment is less often the direct topic of study but is nevertheless present in a variety of literatures, including the escalation of commitment (Sleesman et al., 2018), entrepreneurial exit (DeTienne, 2010; Rouse, 2016), real options thinking (McGrath, 1999; McGrath, Ferrier, & Mendelow, 2004), and idea evaluation (Campbell, 1960; Rietzschel, Nijstad, & Stroebe, 2010), among others. This conceptual plurality, along with uses of persistence and perseverance in the vernacular (e.g., Wakeman, 2017), has led to considerable conceptual confusion about the persistence dilemma. To ground my study of the persistence dilemma in creative work, I first take a step back and provide some conceptual clarity around both persistence and abandonment.

# **Theories of Persistence**

Among the research focused on persistence, it has been described as a behavior (e.g. the amount of time spent on a task (Feather, 1961; Grant et al., 2007; Tsai, Chen, & Liu, 2007); as a decision (Bakker & Shepherd, 2017; Holland & Shepherd, 2013); as a trait (Duckworth, Peterson, Matthews, & Kelly, 2007); or as a process (Caza, Barton, Christianson, & Sutcliffe, 2020; Van Gelderen, 2012). Findings from diverse literatures also paint a conflicting a picture of the outcomes of persistence: as noted, persistence can be both a key to success (Bateman & Barry, 2012; Lucas & Nordgren, 2015; Southwick et al., 2021) and a driver of failure (Astebro et al., 2007; Audia et al., 2000; Sleesman et al., 2018). See Table 1 for a selection of different conceptualizations of persistence.

The dominant research perspective on persistence comes from research on self-regulation and motivation, going back more than 60 years (Atkinson, 1957; Bateman & Barry, 2012; Feather, 1961; Klehe & Anderson, 2007; Klein, 1989; Seligman & Schulman, 1986; Seo et al., 2010; Tubbs & Ekeberg, 1991; Wood & Bandura, 1989). Generally, self-regulation is the "capacity to guide one's activities over time and across changing circumstances" (Diefendorff & Lord, 2008: 153). Motivation is often a subtheme related to self-regulation. Motivation broadly defined encompasses the reason(s) that an individual engages in an action or behavior (Deci & Ryan, 1985); these reasons—motivators—can be intrinsic, meaning they come from the doing the task itself, as its own reward; extrinsic, meaning they come from something external, such as pay; or a combination of both (referred to by some as "motivational synergy" Amabile, 1993; Amabile & Pratt, 2016)<sup>4</sup>. Motivators affect how individuals regulate their behavior, choosing to do some things and not others (Diefendorff & Lord, 2008). Motivation itself can thus be a strong FP. The majority of motivation research, however, emphasizes persistence as a subcomponent of motivation. Campbell (1990), for example, describes motivation as having three components: direction, the choice to expend effort; level, the choice of how much effort to expend; and persistence, the choice to expend effort (Barr & Conlon, 1994; Grant et al., 2007; Klehe & Anderson, 2007; Locke & Latham, 2004). Persistent behavior (e.g. continuing on a task) thus has

<sup>&</sup>lt;sup>4</sup> Other forms of motivation have been studied in relation to creativity, such as prosocial motivation (Grant & Berry, 2011). I adopt a deliberately broad definition to include these distinct variations on the core concept of motivation as it is used across a variety of literatures (e.g. creativity, goal setting, persistence, etc.).

primarily been an avenue for studying motivation. Reducing persistence to a facet of motivation, however, actually obscures the persistence dilemma because abandonment is attributed to decreased motivation when the opposite may actually be true. Quitting does not necessarily have a relationship with motivation—in fact, one could quit a course of action precisely because one is motivated, perhaps by a higher order goal (Wrosch, Scheier, Carver, & Schulz, 2003). To understand the persistence dilemma then, we must define persistence separately from motivation.

Another literature closely related to motivation and persistence is the vast literature on goal setting, primarily established in the management field by Locke, Latham, and colleagues (e.g. Locke, 1996; Locke & Latham, 1990, 2020; Locke et al., 1981). Goals are an important part of persistence (see second facet of persistence as defined below). Researchers often refer to the connection between the individual and the desired outcome (i.e. goal) as goal commitment (Klein, Wesson, Hollenbeck, & Alge, 1999; Locke, Latham, & Erez, 1988). Commitment may be to a goal that is set either internally (i.e. by the individual) or externally (i.e., by the organization), but it must be of some perceived value for it to be internalized (Klein et al., 1999).

Commitment, yet another theoretical perspective related to persistence, can come in other forms as well. For example, behavioral (Mottaz, 1989) and normative (Meyer & Allen, 1991) commitment both emphasize a sense of obligation in continuing specific behaviors. This does not remove the individual's ability to choose but does emphasize that there are contextual pressures (Pfeffer & Lawler, 1980; Staw, 1981). Studies of escalation of commitment often describe commitment in this way. Other theories of commitment emphasize how individuals experience and transform both positive and negative elements (i.e. ambivalence) of a relationship when committing themselves (Brickman, Abbey, & Halman, 1987; Pratt & Rosa, 2003; Rothman, Pratt, Rees, & Vogus, 2017).

Source	Definition
Barr & Conlon 1994	Persistence reveals both magnitude and directional aspects of motivation. (p. 642)
Cardon, Wincent, Singh, & Drnovsek, 2009	persistence, defined as the continuation of effortful action despite failures, impediments, or threats, either real or imagined (p. 518)
Duckworth et al. 2007	We define grit as perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress (p. 1087)
Grant et al. 2007	we use the term persistence—the amount of time an individual spends on a task—to capture motivation maintenance. (p. 2)
Klehe & Anderson, 2007	Persistence is the degree to which level of effort is sustained over time (p. 982)
Stoverink et al., 2020	resilient teams, when facing a setback, possess not only the flexibility to adapt but also the grit to persist and persevere through adversity. (p. 414)
Markman, Baron, & Balkin, 2005	we define perseverance as one's tendency to persist and endure in the face of adversity. (p. 3)
Schrift & Parker, 2014	Persistence, going on resolutely in spite of adversity (p. 772)
Brockner, 1992	decision makers must have a real choice in deciding whether to persist with or withdraw from the previously chosen course of action (p. 40)
Schwenk, 1986	Persistence, consistency, focus: The capacity to maintain the organization's direction, especially when the going gets rough. (p. 300)
Seo, et al., 2010	persistence, refers to maintaining (versus changing) an initially chosen course of action over time (p. 952)
Tsai, Chen, & Liu 2007	Task persistence has been defined as the extent to which a person maintains the initially chosen behavior or duration of action (p. 1572)
Zhao & Wu, 2014	Persistencecan mean sticking to one's course while facing risks and difficulties. It can also be described as the behavior of staying in a specific direction over a certain time, or a propensity to undertake certain activities in the face of adverse situations (p. 1346)

# TABLE 1: DEFINITIONS OF PERSISTENCE

# **Defining Persistence**

A review of various the various conceptualizations of persistence suggests that it has four features: persistence involves 1) volitional continuance of effort that is 2) consistently directed toward valued end(s), 3) over an extended period of time, 4) in the face of obstacles (Fetzer & Pratt, 2021).<sup>5</sup> First, persistence is volitional, meaning that individuals consciously choose to continue expending effort to achieve the desired end(s) (Conlon, 1980; Dai, Dietvorst, Tuckfield, Milkman, & Schweitzer, 2017; Holland & Shepherd, 2013). I argue that persistence is volitional to the extent that individuals could theoretically choose to act otherwise, despite contextual pressures. Second, persistence must be focused on a valued end, goal, or outcome (Duckworth et al., 2007; Locke et al., 1981; Van Gelderen, 2012). That is, individuals must be invested or committed to a particular goal or objective. Regardless of how commitment is defined, the key is that the individual or group must be committed to the desired outcome in order to drive continued engagement toward achieving that end. It is also likely that individuals and groups have multiple valued ends or goals at any given time (Unsworth, Yeo, & Beck, 2014)

Third, persistence must involve an ongoing pattern of behavior towards this valued objective. Across all definitions of persistence there is a consensus that behavior must be engaged in over time (Feather, 1961; Fishbach & Choi, 2012; Grant et al., 2007; Klehe & Anderson, 2007; Locke et al., 1981; Tubbs & Ekeberg, 1991). How much time, or how often an actor should engage in a behavior to "count" as persisting is often implicit. Scholars rarely articulate their perspective on this issue, with many studies operationalizing persistence as a matter of minutes (e.g. Feather, 1961; Lucas & Nordgren, 2015), while others emphasize persistence over larger timelines (e.g. the founding of a startup; Cardon & Kirk, 2015).

<sup>&</sup>lt;sup>5</sup> Much of this section, including Table 1, is adapted from Fetzer and Pratt (2021), a working theory paper.

Lastly, this ongoing pattern of behavior happens in the face of obstacles (Atkinson, 1957; Seo et al., 2010; Staw, 1976; Zhao & Wu, 2014), often referred to as "adversity" in many literatures (Caza et al., 2020; Drummond, 2014; Holland & Shepherd, 2013; Southwick et al., 2021). These obstacles can be internal to the individual (e.g. self-doubt), a part of the task (e.g. technical challenges), external in the environment (e.g. lack of resources), or embedded in relationships with others (e.g. navigating organizational politics), but they have some direct bearing on the goal or desired outcome. Obstacles are the counter forces against which individuals strive; what I refer to frequently as forces for abandonment (FA). Without these forces, behavior could simply be performance or action over time (e.g. routine). This last component is the most pivotal for integrating the various literatures related to the persistence dilemma, as different literatures have conflicting findings (and thus conflicting recommendations) regarding the best way to continue in the face of obstacles. I discuss this point in greater detail below.

*Related concepts.* Persistence as defined here has some conceptual overlap with other constructs. As described above, motivation is clearly connected to persistence, and appears to be an important antecedent (Klehe & Anderson, 2007; Klein, 1989; Seo et al., 2010; Zhao & Wu, 2014). However, individuals can persist without being motivated (e.g. because of continuance commitment; Meyer & Allen, 1991) or be motivated yet not persist (e.g. lacking the resources to do so; Mittermaier et al., 2021). Motivation thus has some overlap with persistence, but persistence is more than just a manifestation of motivation. Two other related concepts are grit (Duckworth, 2016; Southwick et al., 2021) and resilience (Caza & Milton, 2012; Hartmann, Weiss, Newman, & Hoegl, 2020). Grit is defined as "passion and perseverance for long-term goals" (Duckworth et al., 2007). Conceptually, grit has two facets: perseverance of effort and

consistency of interest—not changing goals or interests frequently (Credé et al., 2017). Conceptually then, grit has some overlap with persistence as I conceptualize it in terms of perseverance of effort<sup>6</sup>. Unlike persistence, however, grit is generally considered (or at least measured) as an individual difference (Credé et al., 2017; Duckworth & Quinn, 2009) or a skill (Duckworth, 2016) rather than a behavior. It is generally considered an individual-level factor, while persistence as I define it could apply to individuals or collectives. In addition, Angela Duckworth, creator of the grit construct, has gone to lengths to argue that the usefulness of grit is that it goes beyond just perseverance to consider dedication to an activity over time consistency of interests (Credé et al., 2017; Duckworth, 2016; Southwick et al., 2021). Grit seems likely to be an antecedent to persistence (Jordan, Ferris, Hochwarter, & Wright, 2019), though further research is needed.

Resilience has been defined in several ways, but within organization studies is generally described as a "behavioral, affective, and psychological manifestations of positive adaptation and professional growth within the context of significant adversity at work" (Caza & Milton, 2012: 896). Resilience is studied at the individual, group, or collective level (Hartmann et al., 2020; Kahn et al., 2017; Stoverink et al., 2020) and appears to be a multilevel phenomenon (Caza et al., 2020). Resilience has some overlap with persistence, particularly in dealing with adversity, but it also has some conceptual distinctions worth noting. Resilience focuses on "positive adaptation" (Caza et al., 2020), while persistence is outcome-neutral. Growth and development are possible results of persistence, but such development is not the focus of persistence; indeed, some research would indicate that persistence can hamper growth and development (e.g. Wrosch,

<sup>&</sup>lt;sup>6</sup> Interestingly, Credé et al.'s (2017: 502) meta-analysis questions the conceptual integrity of grit's two facets, concluding that "perseverance is a much better predictor of performance than either consistency or overall grit...the focus of grit researchers should shift to perseverance as the most promising avenue of future research." The study of persistence could thus extend the scope of research focused on grit.

Scheier, Carver, & Schulz, 2003). Lastly, persistence focuses on challenges and obstacles which are related to an individual or group's desired goal or outcome (e.g. a creative project), while resilience research has focused on a adversity more broadly, including both professional and personal stressors (Stoverink et al., 2020; Sutcliffe & Vogus, 2003). Future research is needed to tease out this relationship.

Using this four-part definition of persistence provides two primary benefits when considering the persistence dilemma. First, it acknowledges persistence as a distinct concept which focuses on individuals and groups exerting effort over time; theorizing is not hampered by the conceptual baggage of other constructs, such as motivation or grit. This delineation of persistence actually allows more precise theorizing because it allows us to posit the relationship of persistence to other concepts as antecedents (e.g. motivation) or consequences (e.g. escalation of commitment), rather than conflating concepts with their outcomes, as I elaborate more below. Second and relatedly, this conceptualization is agnostic about the efficacy, rationality, or value of persistence in any given situation; persistence as described here could result in "throwing good money after bad" or it could lead to Horatio Alger-like success. Only by drawing these conceptual lines can we clearly begin to understand how individuals and groups make sense of the persistence dilemma—how they decide when to persist vs. abandon their ideas. I now turn to studies of abandonment provide an overarching definition of that concept.

#### **Theories of Abandonment**

Theories of abandonment focus on when individuals do, or should, give up a goal, project, or line of action. Like persistence, studies of abandonment have described both abandonment itself, as well as factors inhibit abandonment, from the study of psychological ownership (Grimes, 2018; Rouse, 2013), to real options research in strategic management

(McGrath et al., 2004), to the escalation of commitment (Sleesman et al., 2018; Staw, 1981). Unlike persistence, research on abandonment does not generally share a theoretical foundation; it has primarily come as scholars have studied other topics (e.g. investment choices, ownership). As I reviewed the diverse literature on abandonment, I found that there were two primary emphases: psychological perspectives on abandonment and resource-related perspectives on abandonment. The former draws primarily on psychological theories of identity and self, motivation, and goal-setting. The latter draws from the literature on decision making, particularly economic thinking related to the rational allocation of resources and decision biases (Tversky & Kahneman, 1974). There are also areas where these perspectives overlap, most notably in the research on the escalation of commitment.

*Psychological perspectives on abandonment.* Psychological perspectives on abandonment emphasize psychological processes by which individuals let go of ideas, tasks, or courses of action, and the effects that abandonment can have. The goal-setting literature, for example, has recently begun to acknowledge the importance of goal disengagement, the process by which individuals let go of personally valued goals when they are perceived to be unobtainable (Janoff-Bulman & Brickman, 1982; Wrosch, Scheier, Carver, et al., 2003; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). This literature generally argues that "disengagement appears to be an adaptive response when it leads to the taking up of other goals or enhances the probability of achieving remaining goals because it frees up resources for their attainment." (Wrosch, Scheier, Carver, & Schulz, 2003: 7). However, goal disengagement also has limitations with respect to abandonment within organizations. The primary limitation is that goals are conceptualized in a highly individualistic way—the emphasis is on goals set by the individual and for the individual (e.g. wanting to lose weight, wanting to be a good spouse). This naturally

limits applicability to goals which are more organizational (i.e. interdependent) in nature. Additionally, the explanation of what drives individuals to disengage from goals is primarily psychological, with no explanation of the role (if any) played by the organizational context or others (e.g. managers, etc.).

Similarly, studies of creative workers (e.g. entrepreneurs) have described how creators let go or disengage from their ideas or ventures (DeTienne, 2010; Elsbach & Flynn, 2013; Grimes, 2018; Rouse, 2013, 2016). Rouse (2016), for example, found that entrepreneurs took different approaches to their exit from ventures they created depending on their work orientation. Some anticipated the next venture, looking forward to the new ideas they had generated. Others focused first on detaching from their current venture, assuring themselves it would go on without them. Both of these literatures emphasize that "in leaving we move away, but also toward something else." (Rouse, 2016:1623). Elsbach and Flynn (2013) similarly found that creator's identity shaped how willing they were to abandon their ideas or allow others to revise them. Grimes (2018) observed that founders who collectively made sense of feedback were more likely to accept it, and potentially abandon less-promising ventures. This seems to provide clues that collective and/or organizational influences are important to psychological perspectives on abandonment, yet, as with goal disengagement, there has been little work in this vein.

*Resource-related abandonment.* Resource related abandonment has emphasized how financial and cognitive resources (e.g. time, energy) are related to abandonment decisions. Studies in this area primarily draw from economic and financial decision-making theories; as a result, these studies generally focus on the organizational level of analysis (e.g. strategic management). Real options reasoning is one of the primary theories in this area (McGrath, 1999). "A real option is a right—without an obligation—to invest resources (e.g., labor, money,

time) toward a course of action at a future point in time." (McCarter, Mahoney, & Northcraft, 2011:624; see also Dixit & Pindyck, 2012). Real options are meant to deal with the inherent uncertainty of many types of investment (e.g. financing a startup). Real options provide a "psychological hedge" for investors (Bazerman & Gillespie, 1999), allowing them to feel less vulnerable in case the investment fails. Options allow investors to leverage uncertainty because "increased volatility of the underlying asset increases the value of the option…potential gains are greater while the costs to access them remain the same." (McGrath, 1999:14).

Research on the management of project portfolios (Guler, 2018; Klingebiel & Esser, 2020; Klingebiel & Rammer, 2020) emphasizes a similar logic. Organizations can maximize their investment by only advancing projects which show promise after a small initial trial; if there are indicators of success the firm exercises the "option". Otherwise, the project can be abandoned (Klingebiel & Esser, 2020). Resource-related theories of abandonment emphasize the difficulty that individuals have letting go of projects and ideas (e.g. investments) once they have invested resources, known as the sunk cost fallacy (Arkes & Blumer, 1985). Because of this (often implicit) assumption, the emphasis from the literature on resource-related abandonment has been focused on encouraging abandonment, to better reflect economic rationality and utility maximization. As Guler (2018:494) put it, this work "is based on the premise that the best way to deal with unsuccessful projects is termination...it is based on the notion that investments and resources have opportunity costs, the fact that resources could be better invested in something else.

*Escalation of commitment.* Escalation of commitment is the largest cohesive literature which deals with both persistence and abandonment, both from psychological and resource-

related perspectives. I include escalation of commitment under theories of abandonment because the literature focuses on abandonment as the optimal outcome, and it addresses both psychological and resource-related perspectives. I discuss in more detail below how persistence and abandonment are interrelated—two sides of the same coin. Escalation is defined as the act of carrying on with questionable or failing courses of action. Specifically, "after investing significant resources (such as time, money, or effort) in pursuit of a goal and receiving negative feedback about the investment, decision-makers typically maintain or increase commitment to their goal, despite considerable uncertainty about whether this will result in success." (Sleesman et al., 2018:178). Research has been conducted across levels of analysis (e.g. project factors, group context, executive leadership, organizational and environment context; Sleesman et al., 2018), generally with a focus on the key decision maker(s). Escalation, then, generally focuses on the factors which prevent abandonment when it should be the rational choice; it generally shares the assumption of resource-based abandonment research that lack of success should lead to abandonment.

At the same time, escalation scholars frequently draw on psychological explanations related to ego threat and self-presentation effects to explain lack of abandonment (Sleesman et al., 2012). For example, individuals sometimes must justify their initial investment decision, so they continue persisting despite negative feedback (Brockner et al., 1986; Staw, 1976; Zhang & Baumeister, 2006). In other cases, decision makers have committed publicly to a course of action, and so feel they must continue despite evidence of failure (Brockner, Rubin, & Lang, 1981; Fox & Staw, 1979). When time or money have already been spent on a course of action (sunk costs), decision makers also are also more likely to continue, even with diminishing returns

(Arkes & Blumer, 1985; Soman, 2001; Thaler, 1980). All of these tendencies are considered irrational given the "objective' facts of the situation." (Staw, 1981: 584).<sup>7</sup>

# **Defining Abandonment**

This diverse set of studies allows us to create a general definition of abandonment: abandonment involves stopping effort towards a valued end (i.e. task or course of action), with the intention of doing so permanently rather temporarily. Just as persistence involves continual effort toward a valued end, abandonment involves discontinuing effort. There are two important considerations to note here. First, I remain agnostic about the degree to which abandonment is affected by a subsequent, anticipated course of action. For example, although often an idea is abandoned to pursue another idea that is more desirable (Gimeno, Folta, Cooper, & Woo, 1997; Rouse, 2016), that does not necessarily have to be the case. This definition leaves subsequent courses of action open. Second, it is possible that the abandoned idea, task, or course of action could be taken up again later, but I assume that abandonment is intended to be permanent. That is, abandonment should be distinguished from merely taking a break from a given project (e.g. Elsbach & Hargadon, 2006; Madjar & Shalley, 2008).

*Related concepts.* There are related concepts similar to abandonment, which are worth discussing here as well. The first would be incubation (Ellwood, Pallier, Snyder, & Gallate, 2009; Sio & Ormerod, 2009; Wallas, 1926) or task switching (Lu, Akinola, & Mason, 2017; Madjar & Shalley, 2008) both of which are relevant to research on creativity. Incubation occurs as a creative worker sets aside the ideas they are working on, returning to them later with fresh insights. Often the incubation period is marked by an illumination or "a-ha" moment when a solution presents itself, seemingly out of nowhere (Ellwood et al., 2009). Research has also

<sup>&</sup>lt;sup>7</sup> See Northcraft and Wolf (1984), however, for an alternative interpretation on why sunk costs are not economically irrational.

investigated how creative workers switch between tasks, laying aside a creative problem to pursue something else temporarily. Psychological detachment can help creative workers better manage cognitive resources (Ghosh, Sekiguchi, & Fujimoto, 2020) as well as activate new knowledge and restructure the problem (Shin & Grant, 2020). While incubation and task switching both emphasize stopping effort on a task, there is an assumption that stopping is temporary, and the individual or group will return to the task. Abandonment, as I have defined should be perceived by the actor to be more permanent, or at least long-term; they should feel that there is a good chance they may never return to the idea, task, or course of action.

A second related concept is pivots (Chaparro & de Vasconcelos Gomes, 2021; Kirtley & O'Mahony, 2020; Ries, 2011). Originating from practitioner writing on entrepreneurship (Ries, 2011), pivots involve "a change in a firm's strategy that reorients the firm's strategic direction through a reallocation or restructuring of activities, resources, and attention" (Kirtley & O'Mahony, 2020:3). Pivots certainly can involve abandonment as I have defined it, but they can also involve restructuring and reallocation activities which need not require abandonment. Often pivots involve small, gradual adjustments to a firm's strategy, rather than large strategic reorientations; as Kirtley and O'Mahony (2020:4) noted on their study of pivots: "Only three of the seven firms in our sample experienced a single pivot...Rather than make a pivot with a single decision, firms that pivoted made multiple incremental decisions that accumulated into strategic reorientation over time." In some cases, dramatic pivots may involve abandonment as defined here (e.g. Slack pivoting from a game company to a messaging app; The Economist, 2016), but oftentimes it will involve some gradual reorientation or repurposing of the organization's existing ideas.

Persistence and abandonment as defined above are both related to effort directed toward valued ends (e.g. goals). They are diametrically opposed in the sense that abandoning a course of action is the opposite of persisting in a course of action. Literature on escalation of commitment, for example, considers abandonment to be the solution to prevent dysfunctional persistence (continuing in a losing course of action). Findings from these disparate literatures on persistence and abandonment, however, offer conflicting findings related to how and when individuals and groups should persist or abandon their ideas and projects. Persistence can be beneficial for longterm achievement (Duckworth, 2016; Southwick et al., 2021), while abandonment can also be critical to improving performance and efficiency (Sleesman et al., 2012). At its core the persistence dilemma is a tension about how to direct effort, particularly in the face of adversity or uncertainty. The tension becomes vexing because the outcomes of effort lie in the future and are to some extent unknowable. As noted by Bowen (1987: 62): "there are times when decisions to recommit resources [persist] are clearly reasonable, times when they are clearly irrational, and times when one simply cannot prejudge the future effectiveness of continuing or discontinuing any particular course of action." (emphasis mine). Persistence and abandonment create a dilemma when individuals and groups cannot "prejudge" with certainty when effort will lead to success versus failure. I next describe why creative work is an area rife with such uncertainty.

# THE PERSISTENCE DILEMMA AND CREATIVITY

Although the tension described above is ubiquitous in organizations (e.g. investing resources, changing versus maintaining corporate strategy; Audia et al., 2000; Bowen, 1987; Drummond, 2014), I focus specifically on the persistence dilemma in creativity. Persistence and abandonment are continual, if implicit, themes in studies of creativity, as I elaborate below (Amabile, 1983; Astebro et al., 2007; Grohman et al., 2017; Lucas & Nordgren, 2015; Staw,

1995); creativity is natural fit for a theory of the persistence dilemma.<sup>8</sup> The literature on creativity, for example, provides theoretical building blocks (e.g. selection and retention of ideas, abandonment of others) which will facilitate theory building. Creative work illuminates many of the tensions that make persistence and abandonment decisions most challenging—forces for abandonment (FA) and forces for persistence (FP) of roughly equivalent strength. Table 2 provides many of the common FA and FP in creative work, with examples from the extant literature.

CREATIVE WORK					
Forces for persistence	Examples from the literature				
Intrinsic motivation	Amabile, 1982; Amabile & Pratt, 2016; Grant & Berry, 2011				
Psychological ownership	Baer & Brown, 2012; Rouse, 2013				
Completion effects	Wrosch, Scheier, Miller, et al., 2003				
Positive feedback	Harrison & Dossinger, 2017; Harrison & Rouse, 2015				
Forces for abandonment	Examples from the literature				
Negative feedback	Grimes, 2018; Harrison & Rouse, 2015				
Cognitive disfluency	Lucas & Nordgren, 2015; 2020				
Political challenges	Drazin, Glynn, & Kazanjian, 1999				
Resource constraints	Acar, Tarakci, & van Knippenberg, 2019; Rosso, 2014				

# TABLE 2: POTENTIAL FORCES FOR PERSISTENCE & ABANDONMENT INCREATIVE WORK

# Forces for Abandonment in Creative Work

Creative ideas in organizations face many challenges which can lead to them being

abandoned—indeed, the premature abandonment of ideas has been a problem frequently tackled

<sup>&</sup>lt;sup>8</sup> Creativity and innovation are often described as distinct literatures—creativity focusing on the generation of ideas, while innovation is about implementation of creative ideas. In practice they are generally connected as part of the same process (van Knippenberg, 2017). Since I take an inductive approach, I did not make a strong a priori distinction between creativity and innovation.

by creativity scholars, as part of the larger concept of idea evaluation (Berg, 2016, 2019; Drazin et al., 1999; Elsbach & Kramer, 2003; Harvey & Kou, 2013; Lucas & Nordgren, 2015, 2020; Mueller et al., 2012). Challenges to creativity can be organizational, structural, social, or inherent in the work itself (i.e. novelty and usefulness are difficult to integrate as they are negatively correlated; Rietzschel, Nijstad, & Stroebe, 2010). For example, creative work is disfluent, meaning it is cognitively challenging and effortful (Schooler & Melcher, 1995)—creative work is a classic "ill-defined domain" (Runco, 1994), leading creators to prematurely abandon some ideas (Lucas & Nordgren, 2015). As Aldrich (2019: 540) recently put it:

creative professionals are operating in a highly uncertain context. There are some wellestablished and standardized procedures for acquiring the skills needed to potentially do well...but for any given performance, whether it will be a "success" or "failure" is highly uncertain.

Evaluating when to persist and when to stop should thus be more challenging in creative work. Creative ideas can also face challenges within organizations, given that leaders and other evaluators often have pre-determined perceptions about success (Elsbach & Kramer, 1996) and demonstrate a bias against novelty (Mueller et al., 2012). Political conflicts can also make creative work challenging, as conflicts over prestige and resources emerge between groups (Drazin et al., 1999).

The flexibility required as part of the creative process may itself encourage abandonment. Indeed, foundational theories of creativity, such as Campbell's (1960) theory of variation and selective retention, emphasize the need to generate a high quantity of ideas, abandoning those which are less promising. Eminent creators who are make the largest impact also generate the most ideas, and thus by extension should also abandon many ideas (Simonton, 1997) as not all ideas are of high quality.

# Forces for Persistence in Creative Work

At the same time, there are also strong forces for persistence (FP) in creative work. Creators tend to be intrinsically motivated, meaning that they find interest, passion, and challenge in the work and will do it for its own sake, rather than for external rewards (Amabile, 1982, 1993; Amabile & Pratt, 2016). Intrinsic motivation is a strong predictor of persistence (Campbell, 1990; Klehe & Anderson, 2007). As Staw (1995: 476) described: "Creatives are persistent. They don't give up when they get frustrated or rebuffed by a problem, they keep at it." Amabile's (1983, 1988) work in particular highlights the importance of intrinsic motivation as a key driver of creativity: "No amount of skill in the [task] domain or in methods of creative thinking can compensate for a lack of appropriate motivation to perform an activity." (Amabile, 1988: 133). Intrinsic motivation emerges when individuals are driven "by the interest, enjoyment, satisfaction, and challenge of the work itself." (Amabile & Pratt, 2016: 4), rather than extrinsic rewards. In the last 30 years, scholars worked to tease apart the effects of intrinsic vs. extrinsic motivation on creativity, acknowledging that they can be either synergistic or conflicting (Amabile, 1985, 1993; Amabile & Pratt, 2016; Grant & Berry, 2011; Hennessey, 2003; Zhang & Bartol, 2010). A consistent thread through all of the work on motivation and creativity is that creative workers must have a strong internal drive to effectively develop ideas a strong FP.

Creators also tend to exhibit high amounts of psychological ownership; they often feel that their ideas are connected to their sense of self (Elsbach, 2009; Elsbach & Flynn, 2013; Rouse, 2013), making abandonment or revision of ideas difficult (Baer & Brown, 2012; Grimes, 2018; Rouse, 2013). Creative work is also often perceived as highly meaningful (Amabile & Pratt, 2016). Meaningful work describes work which is significant or worthwhile to those performing it (Pratt & Ashforth, 2003; Rosso, Dekas, & Wrzesniewski, 2010). Although not

connected to self-regulation paradigms, meaningful work does appear to have a close relationship with motivation (Rosso et al., 2010). Meaningfulness deals with both the realization of one's needs via work, and the justification of one's work as worth doing (Lepisto & Pratt, 2017). A potential distinguishing factor between motivation and meaningfulness is that motivation is primarily intra-individual, while meaningfulness can be shaped by broader sociocultural resources (Boova, Pratt, & Lepisto, 2019; Lepisto & Pratt, 2017; Pratt, Pradies, & Lepisto, 2013). The connection between meaningful work and creativity is small but growing (Amabile & Pratt, 2016; Cohen-Meitar, Carmeli, & Waldman, 2009; Grant & Berry, 2011; Kaufman, 2018; Vinarski-Peretz & Carmeli, 2011), with most work acknowledging that meaningfulness and creativity are reciprocally related. Meaningful work is thus likely another strong FP in creative work.

# **Tensions between Persistence and Abandonment**

Taken together, it seems clear that creative workers face both strong FA and strong FP. As Grohman et al. (2017: 7) note in their study of creativity and grit:

The demands of professional creativity require perseverance to bring to life long projects and labor through tedious, but necessary tasks without losing intrinsic motivation for the larger project...At each decision point, a [creator] is facing multiple options and often has to make decisions based on incomplete or ambiguous information (e.g., lack of previous research when starting a new area of inquiry). Such decision points involve weighing different options and often redefining goals and even abandoning what one has started in favor of a new approach or idea. (emphasis mine)

Creators must thus persevere, as well as abandon ideas which have already been developed. This dynamic is central to the (recursive) process of generating, elaborating, and evaluating ideas (Campbell, 1960; Harrison & Rouse, 2015; Perry-Smith & Mannucci, 2017). The uncertainty inherent in creative work contributes to the tension: due to the novelty involved, it is difficult forecast the success of creative ideas (Berg, 2016; 2019). Often creative ideas can end up far from where they began (Berg, 2014; Hargadon & Sutton, 1996). The differences across stages of
the creative process (Amabile, 1988; Lubart, 2001; Perry-Smith & Mannucci, 2017) would suggest that persistence and abandonment are in dynamic tension over time (e.g., persistence during idea generation vs. abandonment during idea evaluation). However, although abandonment and persistence thus appear important to creativity, how they are connected and relate to each other remains undertheorized.

The dilemma is most acute when creative workers are engaged in long-duration projects—projects with long timelines, significant investment of resources, and ambitious goals. Long-duration projects often drive key innovations within organizations (Glynn, Kazanjian, & Drazin, 2010). Such projects involve high stakes, which can increase the risk of escalating commitment (Ross & Staw, 1986), while also requiring significant effort to achieve success (Hoffman, 1997). As noted, given that creative work can change significantly as it moves between different stages (e.g. idea generation vs. implementation), FA and FP are also likely to shift over time at different stages of the project. Creative workers must manage themselves, both cognitively and emotionally, as they attempt to achieve broad, ambitious goals and have to decide when to pursue ideas, or let them go, in pursuit of these goals. Studying the persistence dilemma provides an opportunity to build theory around creativity, while also addressing some of the deficiencies of the literatures on persistence and abandonment.

# SHORTCOMINGS OF THE EXISTING LITERATURE

Although the existing literatures reviewed above—creativity, persistence, and abandonment—provide a starting point, none have addressed the persistence dilemma fully. I argue that there are three primary shortcomings which have hampered theorizing of the persistence dilemma: 1) the lack of considering persistence and abandonment together; 2) the lack of organizationally-relevant study conditions; and 3) the lack of an interpretive perspective.

## **Considering Persistence and Abandonment Together**

A central shortcoming of the existing literature is that there have been few attempts to consider persistence and abandonment together. This is especially problematic because, as I have argued, they are two sides of the same conceptual coin—the decision to persist is also the decision not to abandon and vice versa. Considering the two concepts together can begin synthesizing the distinct and conflicting findings of these literatures and effectively conceptualize the dilemma creators face when working on long-duration projects. These diverse literatures emerge from distinct disciplinary roots (e.g. economics vs. psychology) and thus contain embedded assumptions which make them difficult to reconcile (Thompson, 2011). Nevertheless, organizational studies, as an interdisciplinary field, is well positioned to bring these areas together (Heath & Sitkin, 2001).

Theories of persistence have emphasized what drives individuals to continue in specific behaviors, such as skill development (Wood & Bandura, 1989) and goal striving (Klein et al., 1999). These studies have an implicit assumption that success depends on (or is defined by) overcoming adversity (Cardon & Kirk, 2015; Littman-Ovadia & Lavy, 2016; Southwick et al., 2021). Theories of persistence emphasize overcoming FA, with little acknowledgement of the tension between FP and FA. Caza et al. (2020: 346) recently noted: "most studies today demonstrate a positive bias in their views of resilience." I argue a similar positive bias toward persistence (and a negative bias toward abandonment) affects theories of persistence generally. As a result, the literature has neglected to consider when abandonment may be the best decision.

Although undergirded by decision making, which implies the existence of multiple options, theories of abandonment also have limitations with regards to the persistence dilemma. The bulk of the literature has emphasized the challenges individuals and groups have with abandonment (e.g. sunk cost fallacy). Often this literature has an implicit assumption that adversity indicates a course of action will not succeed (Drummond, 2014), what I call a negative bias towards persistence (and a corresponding positive bias towards abandonment). Yet scholars have neglected to ask the bigger question of whether "commitment to a course of action inherently lead[s] individuals to errors of escalation" (Staw, 1981: 578). Indeed, this issue was raised by Staw (1981: 584) in a foundational article but subsequently dismissed as outside the scope of escalation research:

*Obviously, it is also possible that escalation of commitment [persistence in a course of action] can bring a turnaround of results and positive as well as negative consequences.* But this is not the point. The crucial issue is whether there is a *tendency* to escalate commitment above and beyond what would be warranted by the "objective" facts of the situation. (emphasis mine)

The narrowing of escalation studies to only dysfunctional forms of persistence has meant that the proposed solution to the persistence dilemma has primarily been abandonment (Ku, 2008; Molden & Hui, 2011; Sleesman et al., 2018). Although this certainly has led to important findings, particularly around the value of de-escalation when needed (Heath, 1995; Ku, 2008; Molden & Hui, 2011), this rather myopic focus has prevented the literature from focusing on *when* persistence and abandonment is beneficial versus detrimental (Drummond, 2014). This is despite the fact that early work acknowledged that benefits of persistence do exist. The narrow focus of theories of abandonment prevents them from adequately addressing the persistence and theories of abandonment can help us overcome the myopia of each.

A key difference between theories of persistence and abandonment in relation to the persistence dilemma is their perspective on responding to adversity. Southwick et al. (2021:2) summarize the perspective of most theories of persistence: "[I]ndividuals repeatedly face the decision to keep going or stop...*Logic suggests that those who maintain steadfast commitment* 

*have a distinct advantage over those who do not.*" (emphasis mine). The findings of the research on persistence suggest that the best response to adversity, particularly over the long term (Duckworth, 2016), is "steadfast commitment." Theories of abandonment on the other hand, argue that "resilience, dedication to goals, and persistence in the face of challenges" can "provide the seeds for escalation behavior, which can result in disastrous consequences." (Sleesman, 2019: 94). Indeed, findings on abandonment have documented numerous examples (Drummond, 1994; Ross & Staw, 1986; Sleesman, 2019; Staw, 1976; Van Oorschot, Akkermans, Sengupta, & Van Wassenhove, 2013) where persistence was disastrous precisely because of steadfast commitment.

How then are we to reconcile these contradictory findings? A reasonable response would be to examine when persistence (abandonment) is beneficial and when it harmful (e.g. when does persistence or abandonment improve creativity?). However, this approach may be too simplistic. FA and FP can shift and change over time—abandonment at one point in time may be disastrous, while persistence with the same course could be equally disastrous at another time point. Creative ideas, for example, can shift and develop over time, often ending at very different points than where they began (Berg, 2014; Hargadon & Sutton, 1996; Harrison & Rouse, 2015). What's more, for reasons discussed in greater depth below, we lack an understanding of the *how* of the persistence dilemma: how individuals and groups within organizations manage the tension between FA and FP over time. An extended inductive, field-based approach (Langley, 1999; Pratt, Sonenshein, & Feldman, 2020; Van de Ven & Poole, 2017) can provide new insights around the temporal dynamics of the persistence dilemma and provide an organizationallygrounded base for future research.

#### The Lack of Relevant Study Conditions

As noted in Chapter 1, the literatures on persistence and abandonment have relied on study conditions which often do not reflect organizational reality—designs which are retrospective, short-term, or use overly simplistic tasks performed only by individuals. Although all research designs involve tradeoffs (McGrath, 1981), the predominance of a few particular designs has limited theorizing of the persistence dilemma in creative work. Staw (2016: 10), for example, recalled that early on, "I was uncomfortable with the near total reliance on laboratory research to test the phenomenon [escalation of commitment]." Subsequent abandonment research has expanded the methodological repertoire some (see Sleesman et al., 2018), yet recent research (Klingebiel & Esser, 2020) continues to note the predominance of laboratory paradigms. Persistence research similarly has relied heavily on experimental designs (Fishbach & Choi, 2012; Grant et al., 2007; Klehe & Anderson, 2007; Schrift & Parker, 2014; Seo et al., 2010) as well as retrospective studies. The development of grit, for example, came in part from studying individuals who had reached eminence in their field and were reflecting on how they achieved it (Duckworth, 2016).

Existing experimental designs have limited theory building for three important reasons. First, existing research designs generally involve short timelines. For example, experimental tasks often measure persistence as effort over a matter of minutes (e.g. working on a task for an additional 4 minutes; Lucas & Nordgren, 2015). Even those who go the extra mile and attempt to tap into persistence over longer timeframes only do so over a matter of days or weeks (Grant et al., 2007; Lucas & Nordgren, 2020). Often short timelines stem from what can realistically be asked of research participants; nevertheless, they raise questions about the applicability of much existing work to the organizational context. Even shorter duration organizational projects are longer than these experimental tasks, to say nothing of the long-duration creative projects, like

the ones I study here. Researchers recognize that sustaining effort over the short-term is qualitatively different than sustaining it over the long-term (Bateman & Barry, 2012; Diefendorff & Lord, 2008). It therefore seems likely then that the persistence dilemma would differ significantly when considered over longer timelines (Drummond, 2014).

Second, the tasks involved in existing research are relatively simple, compared to the complex work involved in long-duration creative projects. For example, two classic tasks from the persistence and abandonment literatures are insoluble puzzles (Feather, 1961; Gong & Li, 2017) and investment games (Lee, Lee, & Keil, 2018; Staw, 1976)<sup>9</sup>, respectively. Similarly, research on creativity often uses simple idea generation tasks, such as the unusual uses task (e.g. "Generate as many uses for a cardboard box as you can"; Lucas & Nordgren, 2015: 235). Although these kinds of simple tasks provide insights into psychological mechanisms of motivation and decision making, it is unclear how their results will translate into complex tasks. This is especially the case for creative projects which often involve complex tasks and require not only creativity-skills but domain-relevant skills (Amabile, 1982). As Klingebiel and Esser (2020: 313) argued: "conducting laboratory studies requires the experimenter to predefine the decision context [or task] as the experimenter imagines it to exist in firms...it is unclear whether such designs are helpful representations of organizational decision situations." An additional problem is that these simple tasks do not reflect the complex interplay of FA and FP which arise in complex projects within and across multiple subcomponents of the creative process (Drummond, 2014; Van Oorshot et al. 2013).

<sup>&</sup>lt;sup>9</sup> Insoluble puzzles are generally math problems or other simple puzzles which do not have a solution; persistence is measured based on how long individuals will continue working on the puzzle. Investment games generally involve playing the role of a manager and evaluating which projects should receive funding. Vignettes describe different investment conditions (e.g. this project is falling behind benchmarks, the project has exceeded expectations, etc.).

Third, existing research designs emphasize the effort of individuals on tasks which are primarily accomplished by a single person. These designs generally involve atomistic assumptions about human behavior, meaning that behavior is taken in isolation, abstracted from meaningful context (Slife & Williams, 1995; Yanchar, Slife, & Warne, 2008). Meaningful context can include both the organizational environment and the relationships with others. For example, research on grit focuses primarily on goals set by individuals and the degree to which individuals exhibit passion and perseverance in striving for them (Duckworth, 2016; Duckworth & Quinn, 2009; Southwick et al., 2021). Experimental designs focus on tasks engaged in by individuals with the neutral context of psychological laboratory. It is unclear how well the findings of such studies generalize to creative work as it currently happens in organizations, where individuals often work collectively and interdependently (Hargadon & Bechky, 2006; Harrison & Rouse, 2014; Harvey, 2014; McDaniel & Salas, 2018). Creative work, especially on long-duration projects, may be cross-functional, meaning that individuals have to collaborate with others who have different expertise, without complete control over the end product (Mannucci, 2017; Mannucci & Yong, 2018; Rouse, 2013; Taylor & Greve, 2006). Interdependence thus adds another level of complexity to the persistence dilemma which is not accounted for by existing designs: the role of collaboration with others. Decisions to persist or abandon a creative project are likely not made by a single individual, but rather involve collective input (Harvey & Kou, 2013). As such, to fully understand the persistence dilemma in creative work, we need study designs which examine complex, interdependent work as it occurs in organizations.

Many of the shortcomings outlined above may appear not to apply to the literature on abandonment. For example, many studies of the escalation of commitment have examined the

interdependent nature of the persistence dilemma, such as the process for making decisions (Boulding, Morgan, & Staelin, 1997; McNamara, Moon, & Bromiley, 2002) and relational influences (e.g. authority pressures or groupthink; Roberto, 2002; Westphal & Bednar, 2005). Scholars have also used alternative designs, such as case studies (e.g. Ross & Staw, 1986). These studies clearly do have greater analytic generalizability to organizational contexts, yet they often suffer from a larger issue—using retrospective inference to draw theoretical conclusions. The majority of abandonment studies in the field use retrospective case studies (see Sleesman, 2019, and Van Oorschot et al., 2013, for exceptions). As a result, the presence of escalation of commitment is generally assessed post hoc. For example, Guler (2018: 486) describes:

I therefore *infer a venture's progress by observing the eventual outcome*. The assumption is that, if a venture has eventually failed, indicators of failure would be available to investing VC firm during financing. While there may be exceptions, we may expect, on average, that failure would not arrive without any indications. (emphasis mine)

Indeed, escalation is almost necessarily post hoc, given that the knowledge of whether a course of action is failing or not cannot be obtained a priori, at least with certainty. Scholars have dealt with this using the often-reasonable assumption that "failure would not arrive without any indications." Yet this assumption belies the uncertainty that can be experienced in the moment for decision makers in organizations; indicators which seem clear in retrospective, due to 20/20 hindsight, may not be clear in the moment. Escalation of commitment clearly does occur, with decision makers even recognizing it in the moment, as demonstrated by studies done in real time (e.g. Van Oorschot et al., 2013). The bulk of the abandonment literature, however, does not make explicit the degree to which decision makers recognize escalation, in large part due to the limitations of dominant research designs, as explained above. This prevents us from adequately understanding how individuals and groups make sense of the persistence dilemma.

## The Lack of an Interpretive Perspective

An interpretive perspective centers on the lived experience of people (Rathunde, 2001) how they make sense of and attach meaning to their experience, both individually and collectively (Daft & Weick, 1984; Weick, 1995). Just as a process perspective can illuminate temporal factors which are not visible in other approaches (e.g. Van Oorschot et al.'s insights described above), an interpretive perspective can bring new understanding by illuminating the lived experience of informants. Bringing this interpretive perspective to the persistence dilemma will allow us to better understand how individuals and groups make sense of FA and FP, and how this shapes their behavior. An interpretive perspective also highlights the importance of the organizational context as a key factor which shapes how individuals make sense of their work (Maitlis & Christianson, 2014; Weick, 1995).

Several aspects of creative work in long-duration projects call for an interpretive perspective. Given the long timelines and high level of uncertainty involved in creative work, assessments of success or failure are necessarily subjective. Indeed, Amabile (1983: 1001) made this point forcefully: "the necessarily subjective nature of creativity assessment must be emphatically underscored." It is difficult to evaluate or forecast the success or failure of creative ideas (Berg, 2016, 2019); this is especially true for those involved in generating and developing the ideas (e.g. the project team). Failures and setbacks are also a common, albeit challenging, aspect of evaluating creative work (He, Yao, Wang, & Caughron, 2016a; Khanna, Guler, & Nerkar, 2016); how individuals deal with failure seems to be shaped by their interpretations (Cannon & Edmondson, 2001; He, Yao, Wang, & Caughron, 2016b; Shepherd, Patzelt, & Wolfe, 2011; Sitkin, 1992). An interpretive perspective is thus necessary in order to understand

<sup>&</sup>lt;sup>10</sup> This has been a consistent criticism of the research on creativity as well (Drazin, Glynn, & Kazanjian, 1999; Harrison & Rouse, 2014, 2015; Rouse & Pratt, forthcoming; Taylor & Callahan, 2005).

how individuals and groups decide whether to persist or abandon a course of action and to understand the "necessarily subjective nature" of their work.

More specifically, to better understand how individuals interpret their creative work, Amabile herself has called for more theorizing around the "inner work life" of creators—their perceptions, emotions, and motivations (Amabile & Kramer, 2007, 2011). Amabile and Kramer's (2011) extensive longitudinal study of 26 project teams demonstrated the power that the subjective experience of progress can have on creativity, commitment, and productivity. Despite this valuable contribution, "we still lack profound insights and understandings about how people feel when they create, about how people relate to what they create, about how creative workers feel about their work more generally." (Rouse & Pratt, forthcoming, p. 15).

But simply understanding the inner life of a single creative worker may not suffice. As noted above, creative work in organizations is often highly interdependent. Combined with the uncertainty described above, this means that decisions to persist or abandon will not only be subjective, but socially constructed (Berger & Luckmann, 1991). Recent research (Hargadon & Bechky, 2006; Harrison & Rouse, 2014, 2015; Harvey, 2014; Harvey & Kou, 2013) has begun to acknowledge the socially constructed nature of the creative process. Harvey and Kou (2013), for example, describe how prior assumptions that "the collective creative process mirrors that of individual creativity" had hidden the ways that ongoing interactions within groups shaped idea evaluation. Harrison and Rouse (2014) similarly showed how groups flexibly coordinate their work to develop new ideas interdependently. This work points to the fact that creativity in organizations is an interpretive process, concerned with how "individuals and organizations develop systems of meaning about creative action" (Drazin et al., 1999: 292). The meanings attached to persistence and abandonment (e.g. which ideas are evaluated as worth persisting on

or not) and how these meanings are socially constructed, should thus be central to understanding the persistence dilemma in creative work.

Organizations seem likely to play a crucial role in how individuals and groups interpret persistence and abandonment (Maitlis, 2005; Pratt, 2000). Existing research has shown that organizations play an important role in sense giving (Gioia & Chittipeddi, 1991; Maitlis, 2005; Maitlis & Lawrence, 2007; Pratt, 2000), providing accounts and meanings to reduce uncertainty. Regarding failure, it appears beneficial for organizations to take an active and deliberate role in both structuring work so that failures are manageable, and in creating a culture where individuals feel that failure is facilitative for learning and growth (Khanna et al., 2016; Sitkin, 1992). Managers who provide high quality feedback can provide "inspiration to create meaning in the face of failures" (He et al., 2016: 57). Organizational practices also can play an important role in how individuals and groups evaluate creative ideas, and, as a result, how they make decisions about which to persist with or abandon (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Harvey & Kou, 2013). These interpretations are not just bound to an individual, but are influenced by the people around the individual and their context (Drazin et al., 1999). Existing research has been primarily focused on either individual (e.g. Duckworth et al., 2007; Grant et al., 2007; Seo et al., 2010) or organizational level factors (e.g. Guler, 2018; Klingebiel & Esser, 2020; Sleesman et al., 2018); an interpretive perspective allows for cross-level integration (e.g. Drazin et al., 1999). Organizations, then, should play an important role in how FA and FP are addressed and how and when individuals and groups persist or not, yet how this is accomplished remains an open question.

#### **SUMMARY**

Taking a step back, we see that the persistence dilemma, the tension between FA and FP, is an important but undertheorized phenomenon in organizations, particularly in creative work. Three major shortcomings have happened our understanding of the persistence dilemma. First, each side of the dilemma (persistence vs. abandonment) has been studied separately, with little recognition of the need to study them together. Second, study conditions and research designs in existing studies have weakness which hinder their applications to organizational work, particularly creative projects. Finally, we lack an interpretive perspective which highlights the experiential, cross-level nature of the persistence dilemma. To address these shortcomings, I began my study focusing on the question, how do creative workers decide when to persist with or abandon their ideas in long-duration projects? As I collected my data and became sensitized to the persistence dilemma (as described above), I adjusted my research question to the following: how do creative workers manage the persistence dilemma in long-duration projects? My data is longitudinal, allowing me to theorize the role of time more prominently, a shortcoming of research on both persistence and creativity (Gilson, Litchfield, & Gilson, 2014; Van Oorschot et al., 2013). I describe my methods for the study in the next chapter.

#### **CHAPTER 3: METHODOLOGY**

To undertake my study, I employed a qualitative, inductive approach. This is a good fit for studying creative persistence for three reasons. First, as described in Chapter 2, although several literatures touch on the dynamics of persistence and abandonment (Feather, 1961; Sleesman et al., 2018; Southwick et al., 2021; Van Gelderen, 2012), there are few process theories that tackle forces of persistence and abandonment together, particularly in creative work (but see Lucas & Nordgren, 2015 and Nijstad, De Dreu, Rietzschel, & Baas, 2010). Inductive methods are ideal for studying under-theorized phenomenon, where there is little existing work in which to ground hypotheses (Pratt & Bonaccio, 2016). Second, the long duration projects I studied naturally highlighted the importance of time; qualitative methods and their associated analytical strategies are especially useful for understanding temporal dynamics and process-"how and why things emerge, develop, grow, or terminate over time" (Langley et al., 2013: 1) and therefore should be fruitful for building theory from these contexts. Finally, an important dimension missing from the existing literature is understanding perceptions around persistence how people manage forces for abandonment and forces for persistence. Qualitative methods are ideal for illuminating informants' subjectively lived experience (Creed, DeJordy, & Lok, 2010; Creswell, 2012).

#### **RESEARCH CONTEXTS AND SAMPLING**

In qualitative research, the research context(s) should be one where the phenomenon of interest is present and observable. In studying the persistence dilemma in creative work, I sampled contexts that fit the key phenomenon I was interested in studying at the outset: individuals and teams working on long-term creative projects. As described in Chapters 1 and 2, such projects are generally high stakes, which brings decisions about persistence and

abandonment to the fore (Drummond, 2014). Such projects seemed an ideal context to examine the dynamics of persistence and build new process theory. From the outset, I remained open to both individual and collective responses to the persistence dilemma. Based on my review of the relevant literature, I used two criteria for selecting my research contexts. First, because I was interested in studying the persistence dilemma in the context of creative work, individuals had to be attempting to generate novel and useful ideas or products (Amabile, 1996). As described previously, I believed creative work provided a particularly illuminating context to understand how individuals and teams managed the persistence dilemma. In assessing whether potential informants are doing creative work or not, I focused on the creative potential of their projectsthe degree of novelty and usefulness within the creative domain if the project was a success—as well as if the informants themselves felt they were doing creative work (Berg, 2019). To assess potential, I targeted companies making products which were in cutting-edge domains-domains where there was much left to discover (e.g. robotics, pharmaceuticals, etc.). I also read press releases and other media sources to see which companies were described as novel or innovative. I was connected to several contexts through third parties I knew in the industries, who provided me their perspective on how innovative the company and its products were. All informants described the desire and goal of doing innovative work. Because I focus on creative engagement, rather than evaluations of creativity (Drazin et al., 1999), I sampled informants who were striving to be creative in projects, regardless of the outcome. In some cases, informants focused on a single major project; in other cases, informants work across multiple projects at once.

The second criterion was that the projects must have long timelines for completing their creative product or idea, generally at least a year or more. Given that what is a "long" time period may vary by different industries (e.g. biotech vs. robotics), however, I selected those with

a range of time frames for their project's completion. Choosing projects with long timelines was a way of focusing on projects which were ambitious in scope and involved complex, interdependent tasks (Drazin et al., 1999); such projects generally have distant goals that required team members to persist in the face of obstacles and adversity. For example, when describing my research question in my recruiting efforts, most informants responded with some variation of, "that sounds exactly like what we do here." Some projects were within startup organizations (Hydro, TempTech, Gateway), while others were within an established organization (Discovery Center). I describe the contexts in greater detail below. In addition to having different timeframes, the projects were at different stages when I began data collection (e.g. just beginning vs. nearing the end), which provided me perspective on how informants experienced persistence at different points in the project.

Using a maximum variation sampling strategy (Patton, 2014), I selected a variety of informants from within the organizations I studied; this allowed me to gain a broad theoretical understanding, while still balancing depth within each organization. Maximum variation sampling allows exploration of the uniqueness of each context (depth) while identifying patterns that emerge across a variety of contexts (breadth), leading to patterns which "derive their significance from having emerged out of heterogeneity." (Patton, 2014: 172). This strategy was effective for two reasons. First, I did not believe that one particular industry or context would provide a broad understanding of the persistence dilemma—a single project may be idiosyncratic and tied to the contingencies of a single context, and thus may not be as applicable to other contexts<sup>11</sup>. Although the creative outputs in each organization required similar investments of time and iterations to overcome failures and setbacks, sampling based on variation allowed me to

<sup>&</sup>lt;sup>11</sup> It is notable that the escalation of commitment literature has often drawn on single case studies (e.g. Ross & Staw, 1986; Sinha, Inkson, & Barker, 2012; Van Oorschot, Akkermans, Sengupta, & Van Wassenhove, 2013).

study persistence focused on different kinds of creative products (e.g. hardware, software, drug compound, etc.) and see what else they have in common. This strategy also allowed me to investigate potential differences that may arise due to contextual differences (e.g. organizational resources, project stage, etc.).

At the same time, a detailed engagement with informants and their lived experience is essential for doing qualitative research (Locke, 2001). By following each project team over time and conducting interviews longitudinally, I was able to gain a deep understanding of my informants and their context. Although I was not able to engage as deeply as I could in studying only one organization (e.g. by spending more time observing at one site), I traded off some level of depth to gain the breadth described above (see Bechky & O'Mahony, 2015)<sup>12</sup>. In addition to its other merits, this sampling approach also made the most practical sense. I found that it can be difficult to gain access to those working on long-duration innovative projects. Specifically, it is difficult to gain access to many people working within a given context who are doing long term creative work, necessitating the need of multiple contexts to derive a sample sufficiently large enough to reach theoretical saturation (Glaser & Strauss, 1967), meaning new data collected is no longer providing new insights, a common indicator of when to stop data collection in inductive studies. Generally, individuals are engaged in what they (and their organizations) consider very significant and valuable work and thus are less inclined to volunteer time to participate in research. As a manager at one organization told me, "my team is working to cure cancer, and we just can't afford to take the time to talk to you."<sup>13</sup> I therefore took a broad approach in order to get the largest sample possible, with the goal of building theory that would

<sup>&</sup>lt;sup>12</sup> My in-person data collection was also restricted due to the 2020 COVID-19 pandemic.

<sup>&</sup>lt;sup>13</sup> I contacted over 100 organizations in total (across a variety of industries) before settling on the final sample of four organizations in my dissertation.

generalize to more contexts (Pratt & Bonaccio, 2016). I sampled informants from four organizations, all of which were working on long-duration creative projects. I describe a bit more about each context below. See Table 3 for brief descriptions of each organization.

Organization	Industry	Description	Organization size
Discovery Center	Pharmaceuticals	Early-stage research division within a multinational pharmaceutical company (BioPharma). Cross-functional and focused on discoveries that could be useful for future drug development.	50 scientists plus administrative staff
Gateway	Medical devices	Medical device company focused on developing needle-free injector. Currently in the clinical stage.	20 members plus interns
Temp Tech	Technology	Tech company developing devices to help individuals regulate their body temperature. First product is currently on the market, second generation product in development.	20 members plus interns
Hydro	Robotics	Robotics company focused on building an unmanned autonomous vehicle for underwater applications. Prototype for first product is near completion.	7 members plus interns

# **TABLE 3: DESCRIPTION OF ORGANIZATIONS**

# **Discovery Center**

Discovery Center (DC)<sup>14</sup> is an early stage research division within BioPharma, a multinational pharmaceutical company. Team members work on a variety of projects related to drug discovery including both new "targets", molecules with the potential to be turned into a drug, as well as technologies which could facilitate the drug discovery process. The center

<sup>&</sup>lt;sup>14</sup> All names of organizations and informants are pseudonyms. Where necessary, quotations and publicly available text have been paraphrased or redacted to mask identifying information, either of projects, informants, or organizations.

consists of roughly 50 scientists, along with administrative staff. Scientists are divided into four functional groups based on disciplinary training (e.g. chemistry, biology, etc.) who each report to one member of the leadership team. Each of the functional groups tackles a different aspect of the drug discovery and development process: some focus on lab-based biology, while others focus on developing chemical assays and synthesizing compounds, or on advanced statistical analysis. Although each group has its own specialization, they work cross-functionally, with two or more groups represented on any given project. The lack of silos was deliberate on the part of BioPharma when they created the center [company press release]. Discovery Center had been around for about 5 years at the time of the study.

The center works on a variety of projects, most of which "pre-pipeline" but have the potential to influence BioPharma's larger drug pipeline. Projects are marked by their color to indicate status: "whitespace" projects are early stage or preliminary, blue are lower priority, and green are high priority. Timelines for projects are often quite long; generally, once a project moves out of the whitespace stage, it will have milestone check-ins every 6-12 months with management to see if enough progress is being made. Many projects last for multiple years; it takes around 10 years, on average, for a drug target to make it into the hands of patients as a therapeutic, with most failing somewhere along the way (Khanna et al., 2016; Wolfe & Shepherd, 2015). Throughout the course of a project at DC, teams create small check points for themselves which are described as "go/no go" points; if there is enough data supporting a particular aspect, it is considered a go; if there is no support it is a no go. If there is insufficient data, the decision may be discussed with others within the organization (outside the team) or delayed for further consideration.

I began my initial collaboration with Discovery Center in February 2020; however, due to the shutdown following the onset of the COVID-19 pandemic, my data collection was delayed until July 2020, when I began conducting formal interviews. Unlike other contexts where I followed workers engaged in one primary project, informants here worked on multiple projects. The projects that I studied covered a range of potential applications, from the development of a specific molecule which had the potential to become a drug (referred to as a target) to the development of technological platforms used to improve different aspects of the drug discovery process (e.g. making it easy to observe or manipulate specific cell functions).

## TempTech

TempTech is a technology startup which develops devices used to regulate body temperature. Their primary current product is a wearable device which heats or cools the individual user. The team has roughly 20 full time employees, plus contractors and interns, having grown some since I began my data collection in summer 2020. Most of TempTech's employees are designers, engineers, or product developers, along with others with more traditional business expertise (e.g. marketing). The company was started by three co-founders, who developed the prototype of the first device in the late 2010s while in graduate school. TempTech's core project at the time of the study was the development of their second-generation wearable device ("Paradise"), which had been redesigned from top to bottom. They also had smaller projects which are related to their underlying temperature technology and their mission, focused on the therapeutic benefits of temperature. These included partnerships with large organizations to integrate their technology and clinical trials with external collaborators to validate the therapeutic effects of their devices. I began data collection in May 2020, and have watched the primary project, Paradise, move from design to launch. At the time of writing (summer 2021), they are accepting pre-orders for Paradise, with a plan to ship in the latter half of 2021, after roughly 18-24 months of development.

#### Hydro

Hydro is robotics startup focused on building unmanned underwater exploration vehicles. They are a team of seven core employees with a few interns. The company was founded in the late 2010s and so is the youngest organization in my sample. All of the members of Hydro's team have some background in engineering, either mechanical or electrical, and the co-founders have worked for several years in the robotics domain at other companies. Hydro's core project is the "MVP" (minimum viable product): their first-generation robot. A prototype vehicle of their own design, the MVP functions as a small unmanned submarine, which can be used for surveying and exploration for government or energy organizations. The prototype was built from the ground up and took almost two years to design and construct. Once it is tested/validated, they hope to build more at scale (e.g. dozens) and sell them. In addition to the MVP project, which is their highest priority, Hydro is also working on external contracts which provide them funding and are necessary for revenue (e.g. government projects, partnerships, etc.). I began data collection with Hydro in March 2020, and have watched the MVP unfold from assembly (i.e. constructing the vehicle) and system integration to testing and refining the vehicle's design and functionality. They concluded most of the testing of the vehicle as of spring 2021, after roughly two years of building and design validation. As of this writing, they are beginning to commercialize the vehicle and beginning assembly of more units.

#### Gateway

Gateway is a medical device startup. The technology is a spin-off from a local university, led by two co-founders who helped develop it. The organization has about 20 employees, including interns. I received access to interview the core team working on development<sup>15</sup>. The team has diverse backgrounds, some coming from engineering, software design, or even physics. Gateway's primary project is a needle-free injection device; they have been developing and building the product since spring 2014. The project was one of the co-founder's master thesis in graduate school and was in development for years before it was spun out into Gateway. Gateway's funding is primarily through venture capital and partnership with two major pharmaceutical companies, which pay them bonuses for hitting milestones and developing devices related to their specific drugs. Over the course of my data collection they were focused on design verification and approvals need to make the product a regulated medical device, in anticipation of seeking FDA approval and clinical trials by the pharma partners. At the time of writing, Gateway is still making design adjustments to be able to pass the various tests required to gain these approvals. They have also begun working on a second major project, an iteration of the main injection device (e.g. to make larger quantity injections) for their pharmaceutical partners.

## **DATA COLLECTION**

I collected several types of data, which provided me multiple perspectives on the phenomenon, allowing for triangulation (Creswell, 2012). Specifically, I drew on semi-structured interviews, observations, biweekly surveys, and archival materials. I elaborate each of these data sources below. See Table 4 for a description of each source of data.

<sup>&</sup>lt;sup>15</sup> All but one member agreed to participate (9 out of 10 possible informants).

# TABLE 4: DATA SOURCES

	Discovery Center	TempTech	Gateway	Hydro	
Interviews					Total
Semi-structured	32	12	9	5	58
Follow up interviews	9	10	6	4	29
Biweekly check in entries	7	15	5	7	34
Observations					
Meetings, general observation	None	~17 hours (non- participant)	~2 hours (non- participant)	~15 hours (participant)	~34 hours
Archival data					
Chats (e.g. public Slack messages)	N/A	Yes	No	No	
Company documents	No	Yes	Yes	Yes	

## **Informants and Sampling**

Consistent with most inductive work, I began with purposeful sampling before moving to theoretical sampling. I initially sampled my informants by focusing on the central phenomenon of managing the persistence dilemma in creative projects, as described above. Specifically, I sampled informants who had a central role on the long-duration creative projects that the four organizations were engaged in, in an effort to understand their projects and how they engaged in and thought about persistence. These informants were generally technical staff—engineers, chemists, biologists, designers, software programmers-as well as managerial-project managers or executives. Given the structure of my organizations (e.g. startups and a small R&D division), most employees were involved in the central technical work. In some cases, the organization had employees not directly involved in the project work (e.g. marketing or business development roles), but I interviewed these informants where possible as well, in order to provide me a breadth of perspectives on the team's project(s). As my data collection progressed and themes began to emerge, I shifted to theoretical sampling, targeted at elaborating and refining the categories and themes that seem most promising in the data (Charmaz, 2006; Strauss & Corbin, 1990). In theoretical sampling, rather than sticking rigidly to the original sampling criteria at the beginning of the study, "the researcher follows the analytic trail" (Corbin & Strauss, 2008: 146). Sampling was thus driven by the emerging concepts. To elaborate the process of persistence, I theoretically sampled informants who were centrally involved in both the decision making and the creative work of the projects I was studying; and these are the informants with whom I conducted longitudinal follow up interviews. Due to the time commitment involved and the willingness of organizational members, I only selected a few

informants from each organization<sup>16</sup>. Generally, these informants were in leadership positions within their teams and/or the organization, and could give me information regarding the entire project. I continued to collect data until reaching theoretical saturation (Locke, 2001).

Semi-structured interviews. The primary source of data for my study are semi-structured interviews with informants. Interviews allowed me to understand the perspective of my informants: how they experience forces for persistence and abandonment, and how, if at all, they manage this tension. One of the key strengths of interviews is that they allow flexible and targeted exploration of specific themes and how they are perceived by informants. In short, they capture, "the complex world of lived experience from the point of view of those who live it" (Schwandt, 1994: 118). In the spirit of grounded theory (Charmaz, 2006; Glaser & Strauss, 1967; Locke, 2001), my interviews followed a semi-structured protocol which I updated frequently as I collected and analyzed my data (Locke, 2001). More specifically, my initial semi-structured interviews drew from ethnographic interviewing where I began with grand tour questions<sup>17</sup> to help orient me to informant's work before shifting to mini tour questions focused on persistence and the topics related to it, Beginning with grand tour questions gets informants talking and helps build rapport (Spradley, 1979). I conducted a total of 58 interviews, with 29 follow ups (87 total interviews; see Table 4 for a breakdown across each organization). Interviews were digitally recorded and transcribed verbatim. See the Appendix for a copy of the first and final interview protocols for both Discovery Center and the startups (Hydro, TempTech, Gateway).

<sup>&</sup>lt;sup>16</sup> TempTech had the most informants who were willing to participate at the outset, and thus had a larger number of follow ups. Gateway only provided access to 10 informants to begin with, leading to a smaller possible theoretical sample, as was the case at Hydro given their small numbers. Discovery Center had relatively few follow ups given the delays in data collection and challenges associated with the COVID-19 pandemic. More follow ups are planned outside the scope of this dissertation.

<sup>&</sup>lt;sup>17</sup> Grand tour questions revolve around the broad features of events (e.g. one's role) while mini tour questions which are more focused on a specific aspect of one's work (e.g. how did you continue developing that idea? Spradley, 1979).

Follow up interviews, from those in the theoretical sample described above, primarily focused on: 1) changes or updates to the key projects they were working on, and 2) elaboration based on emerging themes and concepts. For example, as the role of organizational priorities became more apparent during my data analysis, I included questions about how organizations set priorities as part of my follow up interviews. Follow ups were particularly useful for checking the status of the various projects, since in person visits to the organizations (see below) was restricted due to the COVID-19 pandemic. Data collection unfolded over the course of 16 months, from February 2020 to June 2021, including interviews and follow ups as well as virtual and in person site visits.

*Observations*. In addition to my semi-structured interviews, I conducted participant and non-participant observation (Van Maanen, 1979). These focused on of informants engaging in work tasks and meetings. Observations provide the opportunity to watch the phenomenon unfold in real-time to supplement other forms of data (Yin, 1994), providing a perspective that can illuminate the interactional processes of the individuals being studied. Given the COVID-19 pandemic, which began shortly after I entered the field, nearly all of my observations were done on virtual meetings over Zoom, Google Meet, WebEx, etc. However, I made in-person visits to every organization except for Gateway, either before the pandemic began or later in the data collection, following mandated masking and social distancing measures. In most cases, I was not a participant but rather observed as a "fly on the wall"; the exception was at Hydro, the only organization where I was able to spend significant time observing in person. I participated in some basic assembly tasks, such as helping team members remove and carry parts of the robot that they were testing. Due to pandemic-related restrictions, I was unable to conduct observations at Discovery Center. In total I conducted 34 hours of observation.

During observation I focused on the interactions among the informants (both verbal and non-verbal) that occurred around project ideas and recorded relevant descriptions of exchanges in my fieldnotes (Emerson, Fretz, & Shaw, 2011). In particular, I focused on how the creative projects developed over time. Fieldnotes provided a record of what I observed, and provided a form of data reduction. Observations were analyzed alongside the interview transcripts (more about analytic strategies below), and these multiple sources of data collection allowed me to triangulate between what informants say and what they do (Creswell, 2012).

*Archival data.* In addition to the interviews and observations, I supplemented my data collection with as much archival data as I could acquire from the organizations in my sample. I gained access to internal documents where possible<sup>18</sup>, and I had access to publicly available information including company websites, blogs, and industry reports. With regard to the latter, all of the organizations I studied had publicly available mission statements, which helped me better understand the organization's stated purpose and how this informed decisions to persist or stop working on a given project or idea. Several of the organizations also produce scientific publications of their findings which were available. Such data helped contextualize the experience of my informants, and provided me insight into the history and culture of each organization and industry. Archival data were not subject to formal analysis.

*Biweekly surveys.* In addition to the interviews, I also collected short survey responses from informants over the middle period of the study to get a better understanding of their perceptions and feelings about their projects, in the style of diary-type surveys which have been used elsewhere (e.g. Amabile, Barsade, Mueller, & Staw, 2005; Amabile & Kramer, 2011; Fisher & To, 2012; Ohly, Sonnentag, Niessen, & Zapf, 2010). Surveys contained a combination

<sup>&</sup>lt;sup>18</sup> In some cases, materials were deemed too confidential to share, though my informants were very open and forthcoming in discussing project details with me during interviews, knowing they would be anonymized.

of open-ended questions (e.g. "In the last two weeks, have you decided to keep working on an idea despite facing challenges? What challenges did you face? What made you want to keep going?") and Likert-style questions (e.g. "I generated novel, but feasible ideas to achieve goals or objectives."; 1 = strongly disagree, 5 = strongly agree). A full list of survey questions can be found in the Appendix. Surveys were sent to informant's email every two weeks from the beginning of September 2020 through the end of January 2021 (5 months, 10 waves). Response rates to the survey were generally low (e.g. one or two participants per week) but each organization was represented (see Table 4). Respondents (n=13) tended to be key informants who participated in interviews and follow ups. Open-ended survey data was coded along with interviews and observations, and helped provide a more fine-grained perspective on informant's weekly work, thus improving data triangulation (Creswell, 2012).

#### **Data Reduction**

As I collected my data, I employed several data reduction tools—contact summary forms, memos, and fieldnotes—to begin to capture and make sense of the data. Given the enormous amount of information collected in qualitative studies, and the variety of contexts within which I was embedded, data reduction helped me organize and orient myself as I began analyzing the data inductively, based on emergent themes (described in great detail below).

A contact summary form is a brief summary of the main topics of an interview and was completed with every informant interview (Miles & Huberman, 1994). I used these forms to document main themes and reoccurring topics as data is collected, as well as a way to share insights from the data with relevant others (e.g. committee members). Contact summary sheets were generally limited to a single page. I also wrote research memos to explore themes and trace ideas throughout the data analysis process (Glaser, 1978). Memos provided a way to integrate

codes generated from interviews with observations and archival materials and to triangulate data from multiple sources (Creswell, 2012). Memoing was also used in tandem with coding to begin connecting the theoretical threads between concepts emerging from my data. Fieldnotes provided a record of my observations, including both insights I gained and snippets of conversations and interactions that I recorded between informants. Fieldnotes were written as close to the time of observation as possible, following the 24-hour rule; for example, if Monday morning I observed, I wrote up my fieldnotes for Monday's observations no later than Tuesday afternoon.

#### **DATA ANALYSIS**

In analyzing my data I used a grounded theory building approach (Charmaz, 2006; Locke, 2001; Strauss & Corbin, 1990). Grounded theory provides a rigorous yet flexible set of analytic moves (Pratt et al., 2020) for developing theory grounded in empirical reality. The method emphasizes "discovery' through direct contact with the social world...coupled with a rejection of a priori theorizing." (Locke, 2001: 34). Given my goal of building new theory around the persistence dilemma and the lack of explanations in the existing literature, grounded theory seemed an ideal analytic strategy. I used the same data analysis strategies for all forms of elicited text data (i.e. interview transcripts, open-ended survey questions, and fieldnotes). Archival data was coded for contextual information and other information which was useful in establishing timelines for projects. Quantitative data collected from the surveys was not formally analyzed, given the small sample size, but was used as a way to observe within person changes over time (e.g. self-rated creativity shifting from 3 to 5 based on the point in the project) and thus aided in triangulation. Although I describe the analytic process in a linear fashion, in reality I moved through these steps iteratively in conjunction with data collection and data reduction (see Harrison & Rouse, 2014). Consistent with grounded theory research in management (Locke,

2001; Pratt et al., 2006), the following three stages were used to move from the raw data to a theoretical model and provide a clear chain of evidence.

## **Open, Provisional Coding**

I began analyzing the data as it was collected, so that I could adjust my interview protocol to capture themes that emerged as important. I coded the data first using open codes, sticking close to the perspective of my informants, and remaining open to exploring whatever theoretical dimensions emerged from the data (Strauss & Corbin, 1990). These codes were provisional in the sense that they were subject to revision based on increasing understanding that occurred as additional data was collected. At this stage, one fragment of data may would have many different open codes. A fragment of data is a segment of text, ranging from a sentence to a paragraph or more. The emphasis was on fragments as they pertained to a specific idea (e.g. the response to an interview question), rather than on their word count or length per se. This process generated a set of open codes. Some examples of early open codes included "following through", "sticking with it", and "grinding it out", all of which reflected the idea that informants felt they needed to maintain effort to finish what they began. As noted, these codes often changed as my understanding increased during data collection and coding. For example, over time I began to see that the open codes described above were connected to one's commitment to the project, and that they varied across the different contexts I studied.

## **Axial Coding**

I eventually began to aggregate the open codes into higher order axial codes which provided the beginnings of my theoretical model. The purpose of axial and theoretical coding is to move from the descriptive level to the conceptual level (Locke, 2001; Strauss & Corbin, 1990). I began by consolidating open codes into broader categories (axial codes). For example, I

began to see that a variety of open codes ("proving it works", "data speaks for itself", "needing evidence", "not having clear data") all referred to proof of effectiveness, a higher-level axial category. I also compared similarities and differences among creative workers, their experiences, perceptions, and the context within which they are embedded (Glaser & Strauss, 1967), which led me to begin focusing on the analysis of specific projects and their key decision points within each of the organizations I studied. I began here to pay more attention to the differences between the organizations I studied and how this impacted persistence. For example, I saw that startups faced greater constraints with regards to quitting, and thus saw persistence as a default, takenfor-granted approach. At this stage I also began integrating extant theory to start explaining my findings.

## **Delimiting Theory**

In the final stage of analysis, I considered the theoretical codes together in order to understand how my axial codes related to one another, so that underlying theoretical dimensions could be determined. For example, I began to see the persistence dilemma manifested in different ways between Discovery Center (an established organization) and the startups (TempTech, Hydro, and Gateway). The tension at Discovery Center appeared to be more about what to focus on, while at the startups it was about how to persist effectively given constraints. As a result, I began more explicit comparisons both between DC and the other organizations, as well as among the startups. These comparisons provided the basic structure of my findings chapters. I evaluated a range of alternative conceptual frameworks (e.g. inspired by construal level theory, goalsetting, organizational life cycles, among others) to see how my codes relate to one another as well as to existing theories. I then re-examined any potential mismatch between my emergent theory and the data (Locke, 2001; Strauss & Corbin, 1990). I also used member checks (Lincoln

& Guba, 1985) to evaluate my emergent theory with some of the key informants in my sample, to make sure I have minimized violence to the data—"distortion that may be caused by translating their [informant's] experiences...into theory" (Pratt, 2008: 499). This "recursive, process-oriented analytic procedure" (Locke, 1996: 241) allowed me to integrate my codes into theoretical models which provide analytic generalizability, meaning that the findings generalize to a theory, which can be applied to other contexts (Pratt & Bonaccio, 2016; Yin, 1994).

## **CHAPTER 4: THE PERSISTENCE DILEMMA AT THE STARTUPS**

As I began my data collection, I found that startup teams experienced a tension between strong forces for persistence (FP) and strong forces for abandonment (FA). Table 5 gives some examples of these forces. However, as I explored further, I saw that each organization had a core project for which persistence was essential because the project was central to the organization's survival. Given that the organization's survival depended on persistence, teams (in particular, leaders) had to find ways to increase commitment to the core project, despite team member's ambivalence. Across the organizations, I found that firms attempted to manage the persistence dilemma through binding the positive (FP) and negative (FA) so that team members could manage the ambivalence resulting from the persistence dilemma (Brickman et al., 1987; Pratt & Rosa, 2003).

	Forces for persistence	Forces for abandonment
Organizational	Organizational survival External pressure, expectations	Resource constraints External pressure, expectations
	Positive feedback	Negative feedback
	Leader sensegiving	Opportunity costs
Technical	Progress toward milestones	Failures
T. 1	Descient	E for a set
Individual	Passion	Fear of regret Wanting to work on now
	Intrinsic enjoyment, learning	things

TABLE 5: FOI	RCES FOR	PERSISTEN	CE AND	ABANDONN	ΊΕΝΤ ΑΤ	' THE STARTUPS
			· · · · · · ·			

# HOW THE PERSISTENCE DILEMMA MANIFESTED

Even though the startups had a key need for persistence (i.e. organizational survival<sup>19</sup>), this did not automatically negate the FA that they faced. Team members were passionate about the product, but they faced challenges common to most entrepreneurs: resource constraints, time pressure, frustration and doubt, along with high levels of uncertainty, all of which could be demotivating and weaken team member's engagement (see Cardon & Kirk, 2015; Holland & Shepherd, 2013). The adversity faced by the teams could create ambivalence about ideas and

projects:

There's definitely been at least one project that has taken like a year and a half...So something that kind of dragged on for multiple months. And then we didn't end up using it in the final product anyway... *I still don't know, like whether we should have put it on a shelf sooner or not*. (Natalie, engineer, TempTech, emphasis mine)

In the prototyping I was doing...I found that I had a lot of setbacks...like, in general, being like, *is this stuff I'm working on a good path to go down? And like, should I continue in doing this part?* And so I faced setbacks in terms of just trying to get things to work...And when I got the results from testing that prototype, I found that a lot of the things I built there weren't necessary. (Vera, designer, TempTech, emphasis mine)

So in the next iteration, we're deciding, are we going to keep the same general philosophy design philosophy of the [mechanism]? Or are we willing to abandon it and go some other direction? The way we're going to do that is we're going to build up some mock ups of different options for how we might do it, and really try to consider...you could look at a new design and say, yeah, this is going to be way better...*But we don't know the problems that we will face*...When we looked at the first [mechanism], we're like, yeah, this is gonna work perfectly. And then, you know, *five iterations in, you're still trying to hammer out little problems*. (Ethan, co-founder, Gateway, emphasis mine)

Setbacks, especially in the form of technical failures ("still trying to hammer out little

problems") and uncertainty ("is this...a good path to go down?"), left informants feeling

ambivalent about continuing forward. By ambivalence, I mean "the simultaneous experience of

<sup>&</sup>lt;sup>19</sup> All my informants cared deeply about the organization's survival, though letting the organization fail is conceivable as alternative possibility which would eliminate the tension.

opposing orientations toward an object or target." (Rothman, Pratt, Rees, & Vogus, 2017: 35).<sup>20</sup>

Particularly, they were torn by competing forces ("opposing orientations") to persist ("should I

continue?") and abandon ("are we willing to abandon it and go down some other path?").

More broadly, the dilemma was thus a tension between high FP (i.e. need to survive) with high FA (e.g. setbacks, constraints, etc.). Founders often described a "survival mentality", which articulated well the dilemma they faced:

The hardest part of being an entrepreneur is like managing your own expectations or like managing your own emotions and I think the most meaningful form of failure is not about specific projects or outcomes. It comes in the like emotional health and engagement dimension, and as long as people are feeling good and feeling like it's worth marching forward...your company doesn't fail when you run out of money, you fail when the people stop showing up, which can happen before or after you run out of money. And the most important thing for a company to be successful is just staying alive because so much of what you need to be successful like does depend on like luck and like timing. (Peter, CSO and co-founder, TempTech; emphasis mine)

Success, then, was focused on "just staying alive" in the largest (organizational) sense. To

and feeling like it's worth marching forward."

The startups faced both large challenges in terms of achieving their goals (e.g. building a

product, securing funding) combined with high levels of uncertainty regarding whether they

were even achievable<sup>21</sup>. Gavin (CDO, co-founder, TempTech) described:

I found that persistence is required also, because in spite of *the kind of fail fast model that you hear a lot in innovation, circles, I found that as actually that's kind of bullshit.* I don't mean to say that most ideas aren't bad, and in fact, they shouldn't be stopped. But the people actually leading those projects are going to be the last person to let go of it. Because if they were the kind of person who were willing to let go, then they would have stopped doing it a long time ago, even if it were possible. *Even the good ideas would be failed very quickly, if you didn't have just like ridiculously stubborn people*...So I feel like even if they are bad ideas, we're just going to keep working on them until somebody

<sup>&</sup>lt;sup>20</sup> The persistence dilemma led to experiences of ambivalence; the persistence dilemma was not itself a form of ambivalence.

<sup>&</sup>lt;sup>21</sup> The projects I studied would be considered closer to the radical end of the incremental-radical creativity spectrum (Gilson & Madjar, 2011).

forces us not to. Because we don't know whether it's a good idea or a bad idea. So the best thing we could do is just try to make it work. (emphasis mine)

Recognizing that "even the good ideas would be failed very quickly" without persistence meant that the organization and its leaders had to find ways to help the team stay committed, to remain "ridiculously stubborn." Facing uncertainty meant that teams had to accept that "we don't know whether it's a good idea or a bad idea"; commitment was the way for them to "try to make it work."

# **Psychological and Structural Forces for Abandonment**

Startups faced two primary types of FA: psychological forces for abandonment and

structural forces for abandonment. Psychological FA were factors which affected team members'

motivation and drive to continue working on the project-frustrations, doubts, and negative

feedback. Often these emerged as a result of technical failures or other setbacks:

We are buried right now in issues related to our prototype circuit board design... And that's been pretty discouraging. And there's not much we've been able to do other than sort of set up the problems one by one and knock them down ...But that's probably been the biggest setback in the project '(Evan, head engineer, TempTech, emphasis mine)

Team members also expressed frustration with the "grind" of working to continually solve

problems:

But [sigh] sometimes when you're trying to solve a problem, sort of persist through it, it can get tiring, right? When you're not sure if something's necessarily working, it can be draining, and the more focused you are in that particular moment, the higher chance you have of catching something unexpected, but at that point, you're like, okay, what am I trying to catch? And you know, I think it's a challenge that all scientists and engineers face. So sometimes the repetition of the work can be a little bit draining and I sometimes feel that at times, you know, I don't lose motivation, but it's just not as exciting to do the same thing, over and over...and so that's where it can kind of get a little bit tiring. (Diana, engineer, Gateway, emphasis mine)

Structural FA, by contrast, were factors within the organization or the external

environment which undermined the team's ability to work on the project. Central among these

were time and resource constraints, which were ever-present at the startups:

Often, it's a question of limited resources, in my experience we're very resource and bandwidth limited a lot of the time...We really need to start moving on to something else. And it's just been whatever we were building, it's just not in a place to kind of graduate. So we have to just kind of shelve it, hoping we can get back to it later. (Gavin, CDO, TempTech, emphasis mine)

One thing that we got kind of screwed up by was resource constraints. We're a small team and there's relatively little elasticity free in any given discipline. So we wound up actually losing a lot of resources to kind of getting the device, what we call integration...getting all of the parts of the new version of the device working nicely together. And the way we handled that, pretty much, to kind of say, okay, we're just going to let this slip, this other thing is going to have more knock-on effects if it gets delayed. And if we try to do both, we're going to do both of them poorly. And so let's do one well and come back to this later. (Finn, senior engineer, Gateway)

Forces for abandonment, whether psychological or structural, could thus lead informants to feel ambivalent about their projects and question whether it was "worth marching forward" as Peter said.

In sum, the persistence dilemma among the startups was about weakening both psychological and structural FA in order to persist with the core project—how the organization could survive by improving its core project and bringing it to market. The need to address FA remained across growth stages as resource constraints and challenges were continual. What's more, the ways to manage the different types of FA varied. For example, structural FA were a matter of resources and thus less pliable, while psychological FA were primarily about meaning and motivation. Having described how the tension manifested, I turn now to exploring how the startup teams responded.


## FIGURE 1: CREATING COMMITMENT VIA CHOICE IN THE STARTUPS

#### MANAGING THE DILEMMA BY GENERATING COMMITMENT

To combat psychological FA, I found that startup organizations, via leaders<sup>22</sup>, used sensegiving tactics, practices which targeted team member's ambivalence in order to help them believe in and stay engaged in the core project. Sensegiving is "an interpretive process in which actors influence each other through persuasive or evocative language" (Maitlis & Lawrence, 2007: 57), particularly from leaders to followers (Gioia & Chittipeddi, 1991). The teams themselves addressed structural FA—time and resource constraints—via *task prioritization*, which directed team member's attention to key tasks within the project, and helped them postpone problems where necessary. Together these practices helped team members stay committed by transforming ambivalence via choice (Pratt & Rosa, 2003) and allowing team members to continue forward free of regret. Figure 1 depicts this process.

#### **Overcoming Psychological Forces for Abandonment**

I found that startups, primarily via leaders or founders, lessened the impact of psychological FA through three sensegiving tactics: narratives of success (e.g. success is right around the corner, we've persisted in the past and it paid off, etc.), collective efficacy (e.g. we have a unique team, we can do it), and opportunity focusing (e.g. we have to see this through).. Sensegiving from leaders weakened team member's willingness to quit and helped them say committed to the project despite the negative feedback, frustrations, and doubts they faced. I first discuss the tactics here, then discuss how they helped team members transform ambivalence into commitment.

First, leaders constructed and promulgated narratives of success, stories of how they, or others like them, had persisted through adversity and setbacks in the past and triumphed:

<sup>&</sup>lt;sup>22</sup> Consistent with extant work (Kazanjian, 1988; Schein, 1983), leaders played a significant role in the startups; leaders embodied the organization to a large extent. Leaders within the organization were generally the founder(s).

I think just *the way we talk about the history of the company, and how long we've been doing this, people hopefully see that it's not been a short journey to get here* and it's been—you know, I think what we're doing is so new and different, that it's easy for people to understand that it was not trivial to convince people this was worth doing. (Victor, co-founder, TempTech)

It was adversity from day one...[Pharma company] was interested in initially funding the company. So gee, this is great. I want to raise \$20 million in two months, and we're going to be off and going, right? So optimism's always great to have, but it took us a year and a half to close this deal, and it was atrocious. *And we only raised half the money, but that's the entrepreneurial journey right there. And it was still a good deal*. And in fact, if they hadn't come on board, the company will not be on the map. So I think *it's tenacity, is the most important thing* (Stefan, CEO & co-founder, Gateway, emphasis mine)

These examples illustrate the kind of narratives which teams shared in the startups to generate commitment. Narratives of success allowed the team to frame setbacks within the larger journey of the organization ("it's not been a short journey to get here", "it was adversity from day one"). Indeed, these narratives emphasized that setbacks are just part of "the entrepreneurial journey." By explaining failures or challenges in a way that normalized or justified them, teams were able to focus on "tenacity", continuing to persist, as the solution to current and future setbacks. Narratives of success had an inherently optimistic tone, without ignoring FA: "we only raised half the money, but...it was still a good deal." Olivia (CEO, TempTech), for example, emphasized "it's just well-known startup mythology that a lot of people give up right before you've turned the corner." The optimism inherent in narratives of success emphasized that, despite obstacles, success would be worthwhile, and close—right around "the corner"—for those who persevere.

Second, leaders emphasized the team's collective potential, the belief that the team supported and believed in each other, and that together they were capable of achieving their goals:

I've been here for years, and I've just seen what these engineers can do. And so, I mean, I'm completely to the point where I just like...*there's no challenge that these engineers can't rise to and conquer, you know, I've just seen it time after time, after time after time.* 

So I'm just completely convinced anything that's thrown in their way, you know, given enough time and enough resources they're gonna get it...it's kind of easy for me to believe. (Fred, COO, Gateway, emphasis mine)

So knowing how we all do things and how we don't give up. *There's the kind of communal sense of achievement. And a bar that we have to reach for each other.* (Olivia, CEO, TempTech, emphasis mine)

Emphasizing collective potential helped encourage persistence by increasing the belief that team members were in the same boat (no one "lacks that [persistence]"), mutually supportive ("a bar we reach for each other"), and that their efforts would bear fruit ("there's no challenge [we] can't rise to and conquer"). While narratives of success emphasized what had happened in the past as a guide for the future, collective potential emphasized that regardless of future unknown setbacks, success will come through a "communal sense of achievement." Leader thus created the expectation that team members could depend on each other when facing challenges and help each other persist:

Definitely being on such a small team...we're all working towards the same goal...And specifically, as it pertains to working on that vehicle, the four of us working in the same direction, and also all having a sense of accountability, and like pride in what we're doing, and a desire to really improve things...And so anytime we can decide to implement a feature, just because we want to. So, like, I think it helps I would say, fuel, some of that, and continue to constantly be trying to improve and how to stick things out and tackle really challenging problems. (Will, head engineer, Hydro)

If you see people near you stop caring as well, and nobody cares, then I think you're less prone to push yourself to persist. If everybody's super engaged in the project, and everybody cares about user satisfaction, and so on and so forth, then I think it's easier to persist. Kind of collective effort. (Hector, engineer, TempTech)

Finally, leaders engaged in opportunity focusing, concentrating the team's attention on

the opportunities which were central and would provide success. Identifying (or creating)

opportunities is central to the entrepreneurial process (Eckhardt & Shane, 2003; Shane &

Venkataraman, 2000; Stevenson & Jarillo, 1990); opportunity focusing was a way for leaders to

put "blinders" on the team and encourage them to keep moving toward the organization's goal.

For example, Gateway team members described how their leaders focused on a single mission, to

the exclusion of other opportunities:

*Gateway's mission is pretty clear, right? Our vision is [quotes mission verbatim from website]*. And so we've had business opportunities, and this spoke a lot to me, because we had business opportunities where companies wanted us to have a micro-needle right, so use our exact same mechanism...where we could potentially use our device with a micro-needle to perform injections and Stefan [CEO] said, you know, even though this business model or this partnership would bring us additional income and be good for us financially, it's not exactly what we are, and what we want to be as a company. And if we deviate from that in one case, then it doesn't really show character within our business. And so in that sense, I think that we decided to stick with applications that can directly apply our technology as is. (Diana, engineer, Gateway, emphasis mine)

Stefan himself felt that Gateway's mission was a meaningful enough opportunity that it was

worth persisting, even at the risk of failure:

The mission, the opportunity to make a huge difference was there right? Given the risk, at least it would be worth one's while. *You could look back many years down the road and say, geez I tried to really make a difference. And even if it didn't pan out, it would be worthwhile to try*. You wouldn't look back and see I wasted my time working on a trivial problem that in the end didn't matter...if you don't work on the right problem, you're probably just wasting your time. (Stefan, CEO, Gateway, emphasis mine)

Other leaders explicitly acknowledged and used sunk costs as a kind of opportunity focusing.

Although sunk costs are generally considered irrational<sup>23</sup>, at least from a purely economic

perspective (Arkes & Blumer, 1985; Sleesman, Lennard, McNamara, & Conlon, 2018; Staw,

1976), startup leaders would often explicitly point to sunk costs as a way to drive commitment

and increase the team's effort:

The whole sunk cost fallacy...I think last year, you can point to examples...we did a thing thinking it was gonna cost a certain amount of money and, you know, launch in a certain time, and then it ends up launching 50% later, and you just sort of, you know, there's not—I think it's really hard at those times to say, you know what, this isn't worth it. And even with the Paradise project...when it became clear that it was going to go over budget and take longer, like you have nothing, you grin and bear it, you know...You can't, once you start to put up the sides and walls, you can't stop without a roof. Right,

<sup>&</sup>lt;sup>23</sup> But see Northcraft and Wolf (1984) for an argument in defense of the rationality of sunk costs.

you sorta committed to, otherwise the whole thing is gonna go to waste. (Victor, COO, TempTech, emphasis mine)

It's just like being in a casino, right? You put time into something. And you're like, shit, *I've already put all this time into it. I'm solving this thing*. You know what I mean? *I'm not gonna let it [the problem] beat me*. And rarely does it beat me, that's the thing. I just go at it so hard until it's solved. (Ethan, CTO, Gateway, emphasis mine)

Even when informants could recognize that persisting in the face of sunk costs was risky (i.e. they were aware of the sunk cost fallacy), they also recognized that letting go would negate the effort they had put in previously, and still leave them with little to show for it ("the whole thing is gonna go to waste"). Instead they explicitly acknowledged the sunk costs and used it to foreclose alternative opportunities while focusing more effort on the opportunity to be found in the current project.

Leader's sensegiving helped team members stay committed by showing the linkages between the positive (FP) and negative (FA) forces they experienced. This, combined with providing workers a feeling of choice transformed their ambivalence into commitment. Narratives of success acknowledged the FA faced in the past, while connecting them to a meaningful reason to persist in the present (e.g. success is right around the corner). Opportunity focusing similarly acknowledged the existence of FA which could threaten the project, but they provided a rationale for persisting regardless (e.g. we've come this far, our mission is focused on X). Collective potential provided a window into what the team could do, while allowing them to choose to dive in and do it. Together these tactics, along with allowing team members to choose to continue or not, helped them bind FA and FP in a way that helped them stay committed. Even leaders<sup>24</sup> described how this sense of choice helped them stay committed:

There's been a few times where I was kind of like de-energized and kind of demotivated...the prospect of raising money...I've found to be kind of exhausting, and

<sup>&</sup>lt;sup>24</sup> Leaders played an important role, but they were also members of the team. Due to the size of the startups, the teams were low on hierarchy, with leaders primarily being differentiated because of their work experience.

demoralizing...I feel like Victor [COO] and Peter [CSO] and Olivia [CEO] at times have encouraged me both in terms of their excitement about what we're going to be able to build and with a reminder that this may not take that much longer, and that we're almost there...And, oddly enough, also a reminder that I'm not stuck...[B]eing reminded that...like, *I can stop any particular project that I'm working on, or I can stop...anytime that I want*. And somehow, the option exists now and will continue to remain *somehow depressurizes the whole tension*. (Gavin, co-founder, TempTech, emphasis mine)

Feeling a sense of choice helped team members manage their ambivalence that resulted from the

tension between FA and FP and remain committed to their projects.

## **Overcoming Structural Forces for Abandonment**

Entrepreneurial teams often operate in resource constrained environments and are forced

to make do with what they have (Baker & Nelson, 2005)—my informants were no exception.

Time and resource constraints were especially salient across the startups:

I: What do you see as the key challenges in the work you're doing right now? R: So, time constraints and just availability and basically like the price of my time kind of thing. *I can't spend as much time as I would like doing everything. And everybody on the team is kind of under the same constraints there*. (Kaden, engineer, Hydro, emphasis mine)

I think maybe a month ago, we kind of had it like, guys, Paradise [core project] is running behind, you guys need to like start working on this more. And I think that made us all take a step back and be like, oh, how can I more efficiently do this or this...*They kind of said like our budget is at the very end of its limits, and the deadlines are coming up a lot faster than we thought*. And like things outside of our control, like contractors and manufacturers, are taking a lot longer to do their work. And so we kind of have to speed up to make up for that. (Natalie, designer, TempTech, emphasis mine)

Although leaders could alleviate psychological FA through sense iving, they had less

control over the structural FA-time and resource constraints ("everybody on the team is kind of

under the same constraints"). These latter FAs were salient for all team members:

We're not getting paid for that work yet [developing the vehicle]. We haven't sold the vehicle yet. So we can't be working on that stuff [right now]. (Will, head engineer, Hydro)

The situation is just okay, we don't have time, we have to move on to another project, that's kind of like the pressure from higher levels, saying okay. We have a list of projects

[within Paradise] going on, we need to get something done, and this takes too long. (Ling, engineer, TempTech)

Leader's sensegiving could answer the *why* of persistence (by connecting both FA and FP), but the question of *how* team members would accomplish their goals remained. Persisting in developing an idea led to better ideas and solutions (Lucas & Nordgren, 2015; 2020) but also used valuable time and scarce resources.

I found that teams attempted to overcome structural FA through task prioritization: , they prioritized the tasks which were most critical to the project, although these priorities were dynamic and could change. This enabled continued persistence on the tasks which were most important to the project's success (and thereby, the organization's survival) while also allowing the team to postpone potential problems they could not address in the moment. Priorities helped them accept FA as necessary without threatening the core project's continuance. Team members felt choice in how they prioritized helped them manage the tension between FA and FP in way that they could be committed to it and not focus solely on FA or FP.

*Task prioritization.* Connections between a given task and the project itself were a key consideration in the decision to persist or not; not all tasks within a project are created equal:

For the group of seven of us to get a vehicle in the water of this size, it's gonna take every ounce of energy that we have being directed in the right locations, not wasting a ton of time doing something else that is not directly impactful. (Will, head engineer, Hydro)

Priorities were generally set early on in the project's development by leaders in collaboration with team members<sup>25</sup>, and were embodied in guiding plans, such as technical requirements documents. And although priorities in such documents appear straightforward, they were often in flux, making these decisions more dynamic. In cases of change, team members collectively

<sup>&</sup>lt;sup>25</sup> This varied somewhat depending on the technical nature of the task. Often leaders guided high-level priorities, with input from team members who had specialized knowledge (e.g. user experience testing, etc.).

decided how to reassess priorities, with leaders generally making the final decision. Continuing

with Will, head engineer at Hydro, described how their team set task priorities:

There's a few subsystems in the vehicle that we flagged as...non-MVP [minimum viable product], so we basically decided that they weren't part of our minimum product...I think ultimately, *what it boiled down to was spending time on something that just wasn't worth the time*...we have so much to do, it's not worth talking about this [idea] right now. So that's kind of balancing what I know about our technical ability...we just need to spend the appropriate time to get it right or as close to right as possible, and in a lot of cases, right really just means workable...So it's a matter of kind of understanding where the cutoff is. (Will, head engineer, Hydro; emphasis mine)

Together the team decided which "subsystems" were going to be essential to their minimum

viable product, to help them spend "the appropriate amount of time"-neither too little nor too

much.

No matter who was making the decision, product functionality was generally the highest

priority. For Hydro this meant a vehicle that was reliable (i.e. would operate without

breakdowns) and was flexible (i.e. provided customers options for use in different situations):

I think what we are trying to do is we recognize there is a lot of waste in this industry right now, underwater robotics...So we're trying to simplify what is a very complex problem and has had many complex solutions with a more straightforward approach...I think we're trying to provide an option to a market right now that is full of overpriced, over-developed [vehicles]...by stripping out things we see as unnecessary. (Mike, engineer, Hydro)

For TempTech, this meant a device which improved heating and cooling (compared to the first-

generation model) and had an improved design (e.g. smaller, sleeker, etc.):

The next big important inflection point for TempTech as a company is when we launch the second product, and it's better and our sales economics are better and our user satisfaction is better. (Gavin, CDO, TempTech)

A sleeker, smaller, more effective...device...Improved usability and efficacy across the entire experience...maintain current functionality (Paradise project design proposal)

For Gateway, this meant a device that delivered a drug painlessly, was affordable enough to

manufacture, and met the regulatory requirements of the FDA and their pharma partners.

Gateway's environment, working in the medical device industry, was the most regulated, compared to Hydro and TempTech. As a result, there was often more clarity around what the specifications should be because of the external criteria:

Our whole quality system is based around basically performance that needs to be met, right. And so like in a clinical study, let's say...you will negotiate with the FDA, some form of primary endpoint. And if you don't meet that endpoint, then the study is invalid. It's a failure, so to say. So that's, an important thing. So the fact that we can't just, if it doesn't work, we can change our own goalposts. (Stefan, CEO, Gateway)

For Hydro and TempTech, criteria changed based on internal challenges: technological difficulties (e.g. a component does not work as expected) or timeline constraints (e.g. the project is taking longer than expected). For Gateway, criteria changes were primarily external, based on what was being asked by their pharmaceutical partners (their primary customers).

Nevertheless, priorities were dynamic depending on the status of the project and the external environment. Technical setbacks sometimes required adjustments in priorities as well. Tasks that were critical to the core functionality were deemed worthy of extra effort and persistence because without them the project risked failure. For example, Fred, COO of Gateway, described the effort the team put in to perfecting a key piece of their device, the cartridge:

We always knew that drug companies like having their drugs in glass...We weren't doing glass because you know, glass cartridge under the pressure that our device introduces to it could crack...So we worked on actually lasering the two components together and you know laser bonding clear plastic is not an easy thing to do. But we partnered with a container company and a small laser company...and we just kept working on it, working on it, working on it and I don't know how many different settings and different tweaking of the laser we've done but thousands and thousands of experiments. But we've finally have gotten down the laser settings and specifications to make sure that [piece] stays firmly bonded to the body. (Fred, Gateway, emphasis mine)

When a task was a high priority within the project, teams would keep "working on it, working on it, working on it, working on it" until the design was where it needed to be. Thus, once tasks were identified as high priority, this served as a signal to persist.

By contrast, Diana (engineer, Gateway) explained that some tasks were not as important to the team and thus not deemed worth extra time to improve on the ideas:

So we have the tool, which takes the measurement directly with a jet. And so what you end up getting is this like CSV file with just a bunch of diameter measurements and two axes...So, we needed to create this script to analyze the data, and I did this, but could it be better? Could it compute in terms of computer science theory, could it be more optimized? And you know, look cleaner? Yes. Am I interested in doing that? Yes. But does it have, is it going to change how the data is processed? No. So it's like if the function is virtually the same, or if it becomes more usable by five seconds, if people need to put in one fewer inputs, *it's not going to change people's lives like we need to*. We have other things we need to do. So, I think that's where I kind of make the distinction on where to stop developing it, but it's not always that clear or that, like, measurable. (emphasis mine)

Diana points out that the priority was on finishing the device and getting it into the hands of patients, in order "to change people's lives like we need to." The priority of a task within the project was the critical determinant which shaped whether team members would spend more time to "work out the kinks" or if they could postpone improvements until later. The ability to set these priorities helped reinforce team member's feeling of choice.

The startups teams generally viewed their work iteratively; fixes which could not be incorporated now were "put on a shelf" to be used in a later iteration of their product. However, tasks that were low priority could not be forgotten altogether. Mitch described how ideas could be postponed in order to prioritize persistence:

You can say that's something that's important for later and you can put it on a backlog but like it's important to actually manage the ideas that you've had, and try to prioritize them...and once you prioritize them, put them on the backlog of work to do, then you can reevaluate and go back to them and make sure that they get done [later]. (Mitch, software engineer, Gateway, emphasis mine)

Task prioritization thus allowed the team to acknowledge problems without ignoring them (e.g. putting them on the backlog) while still focusing their energy on the key tasks needed for the project's survival.

## Managing the Persistence Dilemma via Commitment

The persistence dilemma in the startups manifested as a tension between strong FA and strong FP, which triggered ambivalence. Persistence was required, however, to keep the organization alive, so teams had to find ways to foster commitment despite team member's ambivalence. I use the term commitment in the Brickmanian sense (Brickman, 1987; Brickman, Abbey, & Halman, 1987; Pratt & Rosa, 2003): "Commitment is about the relationship between 'want to' and 'have to'. Commitment involves three elements: a positive element, a negative element, and a bond between the two" (see also Ashforth, Rogers, Pratt, & Pradies, 2014; Rothman, Pratt, Rees, & Vogus, 2017). This conceptualization is useful because it reflects the opposing tension my informants felt between FP (a positive element) and FA (a negative element). Commitment is the process by which the positive and negative elements become bonded when individuals feel responsibility for the choice—they feel committed (Brickman et al., 1987).

Leader's sensegiving was aimed primarily at psychological FA—acknowledging the linkages between positive (FP) and negative (FA) while allowing team members to choose for themselves. Tactics were not coercive or Pollyannaish, but rather helped teams see the connection between FA and FP; this connection was solidified by workers as they were provided choice to engage in tasks for not. That is, choice allowed team members to internalize and accept the bond between the positive and negative elements of their work, with the belief that even failure would be worth the attempt (e.g. "even if it didn't pan out it was worthwhile to try", Stefan, CEO, Gateway). Sometime the negative element was more prominent, and sometimes the positive, but the commitment remained because of the bond between them, the internalized feeling that team members had freely chosen to commit themselves to the project (Brickman et al., 1987).

77

Team responses to the structural FA also contributing to generating and sustaining commitment. Task prioritization helped individuals acknowledge structural FA, which could not be ignored, without disregarding the need for persistence. Leader's sensegiving provided a why (the connection between positive and negative which could be chosen or rejected), while task prioritization provided the how. Prioritization allowed team members to exercise choice; they could choose to postpone some challenges to a later time (when their priority could potentially change), and they could choose how to economize time and resources. This feeling of choice cements the bond between positive and negative (commitment) as team members feel they have freely chosen to accept both FAs and FPs, and accept the consequences willingly. Together these tactics connected "want to" (e.g. belief in the project) and "have to", which Brickman describes as the two faces of commitment(e.g. need to overcome setbacks; Brickman et al., 1987).

Both the organizational responses (targeting psychological FA) and team responses (targeting structural FA) contributed to the development of commitment. Sensegiving from leaders (e.g. narratives of success, opportunity focusing) provided a meaningful rationale for continued persistence. By giving team members a coherent meaning structure—this is what we are doing and why it matters—they gave the projects (and by the extension the organization) intrinsic meaning. As Brickman et al. (1987:108) describe, "behavior that generates a sense of meaning is necessarily...characterized by a sense of intrinsic value. This...entails the transformation of the effort involved in behavior, which in turn requires the bonding of positive features of a behavior with its negative features." By providing an intrinsic meaning to the projects, leaders helped team members see the projects as something worth committing to, offering them a way to transform their effort into commitment. Leaders also allowed informants to choose to persist, based on their belief in the potential of the organization's core project and

78

mission. Team members felt responsibility, and accepted both the positive (e.g. passion for the work) and the negatives (e.g. technical setbacks) of continuing with the work. The choice to persist is thus "experienced as the best possible—and in this sense, perhaps the only possible—action given the circumstances and given one's capacities. Such actions leave the person free of regret." (Brickman et al., 1987: 108). Team members could thus allow structural FA to shape *how* they persisted, without consideration of abandoning the larger project, due to the leader sensegiving which provided a meaningful why.

## **CHAPTER 5: THE PERSISTENCE DILEMMA AT DISCOVERY CENTER**

Like the startups, I found that informants at Discovery Center (DC) also experienced a tension between strong forces for persistence (FP) and strong forces for abandonment (FA). Table 6 gives examples of these forces. As opposed to commitment, however, I noted that informants at DC most often used the word "balance" to describe how they approached the persistence dilemma, both individually and collectively. Often informants described the crucial importance of being persistent, while simultaneously recognizing the risk of continuing too long:

It's that balance, because you could spend forever persisting on something that [you] just shouldn't, but pretty much every story, if you start at the marketed drug...*every story I've ever heard, you always had to have a champion that was persistent, that wouldn't take no*. And even in the face of all of this negative data would push forward. So it's a weird thing, right? So almost every success is that, but then we know that most of the time we're doing stuff that's going to fail so how do you know that you're on the right track, where you should do that next experiment and sort of doggedly champion and follow something versus...do this clever experiment that tells you not to do it? So, we live in that sort of, *you sort of have to hold multiple guiding principles in your mind at any one time, right, which conflict with each other*. Should I be dogged and persistent or should I stop this project? (Henrik, dept. head emphasis mine)

Both the organization and the individuals within it felt the need to respond flexibly to the FA and FP that they faced ("hold multiple guiding principles in your mind at one time") so they neither continued too long nor quit too early—"balance." To understand DC's emphasis on balance, it is helpful to first understand the context of drug discovery and the kinds of employees the organization hired.

	Forces for persistence	Forces for abandonment
Organizational	Strategic fit	Likelihood of failure
	External positive feedback	Strategic misfit
		External negative feedback
Technical	Proof of effectiveness	Lack of evidence
Individual	Passion	Frustrations
	Success stories	Uncertainty, doubt
	Professional background	Awareness of alternatives
	Meaningful purpose	

## TABLE 6: FORCES FOR PERSISTENCE AND ABANDONMENT AT DISCOVERYCENTER

In drug discovery, the organization's goal (for both BioPharma and DC) is to develop and test as many targets as possible in order to increase the odds of success. Within the pharmaceutical and biotech industry generally, 95-97% of compounds initially tested will fail before making it to market (Arora, Gambardella, Magazzini, & Pammolli, 2009; Khanna et al., 2016)<sup>26</sup>. This meant that the organization was driven to test as many targets as possible in their projects, as quickly as possible, in order to find the most promising ones. Consequently, DC had a portfolio of projects, with the goal of filtering out projects which would not succeed. The high failure rate, mentioned above, was a strong FA at the project level—any given project had a low likelihood of success. Informants became acutely aware of the high project failure rate upon entering the industry:

I know plenty of scientists that go through their whole careers without touching any molecules that are this late in development...*When I first joined the company, I really was not aware of that*...I was talking to somebody, a fairly senior scientist, who had been in industry for years, *he had just had some molecule that he worked on years ago approved as a drug*. And he was just over the moon. I didn't get it. I didn't get that it's a huge effort. (Nasir, emphasis mine)

<sup>&</sup>lt;sup>26</sup> The success rate at Discovery Center seems to be in this same range, based on my data.

The challenge is most of our stuff, it's gonna fail at some point right? And that we don't know when that failure's gonna happen. It could be that everything in our hands, maybe it works and we pass it to the next group and it works but it gets to the clinic and it fails, right? And then *there's always this knowledge that these are long shots, but we'll do the best to get them, move them fast, and then create the best sort of data around them, so they've got the best chance...So you've got a long-term horizon for success, you also can have a long-term horizon for feedback on that, you may find out a long time later that what you were doing failed. (Henrik, emphasis mine)* 

The uncertainty of doing cutting-edge science meant that failure was always nearby but its timing was unpredictable ("we don't know when that failure's gonna happen"). The high likelihood of failure also meant that any particular project was unlikely to make a significant impact ("these are long shots"). Likewise, a particular scientist could have a long career before "touching any molecules" which make it in the hands of patients. This high failure rate was compounded by drug discovery's long timelines (nearly a decade to develop a drug on average). Drug discovery was a context with strong "built in" FA, though these ultimately served the goals of the organization by helping to filter out less-promising projects.

Although these strong FA were essential to the organization's goals (e.g. vetting projects quickly), DC also recognized that eventually-successful projects required persistence to overcome the numerous setbacks and uncertainty. Leaders and team members often shared stories of projects which achieved their goals to remind team members of the importance of not quitting too early:

I've been involved in my career, probably on at least 50 different projects. And I can count on one hand, in fact, probably half of one hand, how many actually became drugs ...And even the ones that did make it into drugs were beset by challenges and obstacles and all sorts of moments where everybody kind of looked at each other and said do we stop now? like this is the time to stop, right? *And if we had stopped, they wouldn't have become drugs*. (Daniel, dept. head, emphasis mine)

Such stories reinforced the importance of persisting through setbacks if *any* of their projects were to eventually become successful ("if we had stopped, they wouldn't have become drugs"). If the team was overwhelmed by FA, they would not persist enough to achieve the breakthrough drugs

the organization wanted: "Science is hard, really hard...So, if you don't persist, you may never crack it or get to the answer." (David, dept. head).

In addition to these organizational factors (which were largely inherent in the drug discovery process), there were personal FP, due to the kinds of employees hired at DC. All were trained scientists, and tended to be passionate about their work and ideas. All informants exhibited intrinsic motivation—they found enjoyment, interest, and personal challenge in the work itself (Amabile, 1993):

I think it's just being driven in general...I'm reading science when I wake up, like I'm very driven. I'm very driven about science. I just love new discovery. (Theo)

We're very passionate about this, right? Nobody just gets up in the morning and does a PhD because they thought it was fun, or because it's well paying. We do it because we're inherently driven and very passionate about finding something that isn't apparent to others. (Jaipal)

They also believed their work contributed to helping patients: "I ultimately think that's the point of all the work that we do, is trying to make improvements to people's lives and medicine." (Grant). This passion and motivation promoted a strong tendency toward persistence (see Cardon & Kirk, 2015; Grohman, Ivcevic, Silvia, & Kaufman, 2017).

Thanks to their scientific training, informants also had experience working on creative projects with their accompanying failures: "I think scientists are generally, at least we're trained to do that [be persistent]. You're sort of not expecting everything to be smooth." (Amina). All but one of my DC informants had a PhD<sup>27</sup>, with many relatively fresh from their graduate training, post docs, or careers in academia. Only about a third of DC scientists I interviewed had previous experience in the pharmaceutical industry. Informants described how their training in science (e.g. graduate training) had socialized them to persist:

<sup>&</sup>lt;sup>27</sup> The informant without a PhD had a master's degree and several years' experience in the field.

Now *in academia, it [persistence] never hurt you, you just kept going, as long as you published a paper, you were okay.* In industry, if you persist on something that's gonna fail, then you're using resource on something that's going to fail. And so what you want to do is recognize that early and then pivot to the next project. (David, dept. head, emphasis mine)

For us, if you try to answer it one way, and it didn't work, especially coming from academia, it's like, well, you could do this other technique, what about this other tool, what about all of the other things, and you really have to be like, no I picked the one that right now is what we're considering the gold standard in the field. And that didn't work...I can't really go down—like if I was in still an academic setting, I'd try all 10...And *it's more of a mindset, because, you know, a lot of us came from there [academia] and you would just keep going*. (Madison, emphasis mine)

The tendency to "just keep going" was part of their "mindset" since it was an asset in academia ("persistence never hurt you"). This professional background created a preference for DC team members to keep going, regardless of the FA they faced.

Together, this meant that scientists and Discovery Center experienced strong FP and FA in the work of drug discovery, both due to the nature of the work and the characteristics of the people doing it. Although scientists wanted to work on the most impactful projects and were willing to kill projects with no scientific validation, they were also highly invested in their work and often attached to their ideas (see Rouse, 2013) making them more persistent. Discovery Center, for its part, needed to kill projects quickly to improve their success rate, while preventing employees from being discouraged by the high failure rate and the need to abandon their ideas they needed some FA, but not to the point of overpowering scientists. The nature of this process meant that Discovery Center and its members had to balance FA and FP both within projects (e.g. persistent scientists vs. high likelihood of failure) as well as between projects (e.g. low commitment to any one project vs. persistence needed to succeed on a given project). To respond to these tensions, I found that the organization engaged in practices which helped them balance FA and FP both within and between projects. Specifically, the organization had a broad portfolio of projects at different stages (e.g. early, middle, late) and used a stage-gate process to evaluate them, which provided structure and flexibility. These practices prevented either FA or FP from dominating at any given time both within and between projects. At the same time, individual scientists found temporally proximal and distal sources of meaning in their work which helped them redirect effort and align their persistence with the organization's goals. Figure 2 depicts this process.

#### MANAGING THE DILEMMA: ORGANIZATIONAL PRACTICES

In order to balance FA and FP within and between projects, Discovery Center used two interrelated practices. First, they had a portfolio of projects. Each project was a "long shot" or a small bet (Cooper, 2008; Sims, 2011)—projects received increasing resources based on the progress made. In order to evaluate the various projects, they employed a stage-gate process (Cooper, 2008; Klingebiel & Esser, 2020), where project teams set a priori "go/no go" points which controlled whether the project would continue or not. The stage gates provided structure and flexibility to allow project teams to balance FA and FP; the stage gates only worked, however, because the organization had a portfolio of projects—the organization's success or survival did not depend on any one project (as occurred with the startups). These interrelated practices helped Discovery Center maintain the necessary FA without destroying the engagement and effort of its members.



## FIGURE 2: BALANCING PERSISTENCE AND ABANDONMENT

#### Failing Fast and Moving On: Balancing Between Projects

Discovery Center emphasized the importance of filtering through projects quickly, to

arrive at the more promising ideas. Leaders emphasized the mantra of "fail fast", and "killing"

projects quickly:

What we try to do is bring that failure closer so that we can fail sooner. I think inevitably you must have a persistence attitude to live in that environment. Because you're on one hand trying to pour all of your energy and thoughts and stuff into a project that then you're trying to, you know, get off and kill it as quickly as you can. So it's like this, sort of weird thing, right? Like, oh, this [idea] seems like it's got potential, I'm gonna do all of this. Now how can I kill it? [laughs]...We're trying to break things. We build things and then hammer on them and try to break them. (Henrik, dept. head, emphasis mine)

I tell people...don't be afraid to kill projects. In fact, *you should almost be going into every project thinking, how can I kill this project?*...so that I can move on to the next one that maybe will work...A lot of people avoid doing the killer experiment, because they don't want to kill a project. And I tell people, do the killer experiment. *Kill the project! If a project's not gonna get killed, it won't get killed? You can't kill it. So try to kill it.* Because most projects are gonna get killed. (Daniel, dept. head, emphasis mine)

The presence of projects thus had a dual effect. It created a force for abandonment at the organizational level because it encouraged rigorous and rapid evaluation of the projects ("doing the killer experiment"; "bring that failure closer so we can fail sooner"). At the individual level, however, having multiple projects aided persistence, because it allowed scientists to move on more quickly from failure (i.e. persist across projects). Since there were many interesting and challenging projects at DC, scientists had alternatives which helped them redirect their effort quickly. As one scientist noted, "we have less people than projects right now" (Sabal).

Discovery Center's portfolio had projects in various stages, creating a project funnel. Projects moved through three primary designations: "whitespace" projects, which were promising ideas still in development and without a fully-developed research plan; "blue" projects, which were lower priority but did have some resources allocated; and "green" projects, the highest priority projects which received the greatest investment of time and resources. Funneling allowed DC to prioritize resources for the projects which were most promising while maintaining an influx of new ideas (whitespace projects). Whitespace projects developed organically, from ideas of individual scientists or groups of scientists. Members were expected to have a variety of projects at different stages and to continue developing new ideas:

The whitespace is sort of the pilot, and just fooling around with trying to figure out whether you should do something or not. And it's kind of bottom heavy that way. So most of the projects are whitespace...It's a constant self-evaluation [what to focus on] that I have within myself. But when our team is meeting with other people, we're always asking about them [projects]. So what's the goal? What priority does this project have? And then we kind of prioritize it. (Quinn)

The project portfolio thus provided a strong FA for any given project, as it was compared to

others ("a constant self-evaluation...what priority does this project have?") to help the

organization find the most promising ideas.

The portfolio strategy used by DC also had important effects on the individual scientists.

Rather than providing a FA, however, it provided a FP, helping them to remain engaged in the

work even after a specific project failed. Owen explained:

We always, as default, have multiple projects in our portfolio...I think if you put everything into one project and it failed, then you'd be probably devastated...So if one does fail for whatever reason, [negative] data or corporate strategy [misfit] or something, you've got another one to draw upon. (Owen, dept. head)

The presence of alternatives also provided more incentive for scientists to move on from less

promising ideas:

# (Interviewer) It sounds like it's a little bit easier to let go because of the variety of projects or like the number of projects you have.

Yeah it's the variety, it's the number and it's knowing that there's always new things coming on board...I feel like in academia, you're given like one project, and it might morph into like, two or three, it might change, but like, that's kind of it...Here there's so many others that like, if something just isn't working out, you can let go and there'll be a new thing next week. (Madison)

"Knowing that there's always new things coming on board" was another way that the organization encouraged informants to kill projects quickly. This helped informants manage their attachment to any particular project:

And so, you can have it sort of an individual and team level, have those sort of just being able to look at the person next to you, the team next to you, and say, okay, we're gonna be okay...Either we're going to get this to work or, you know, *there's easily 10 other things we could do that are also really interesting*. (Henrik, emphasis mine)

Having "10 other things...that are also really interesting" helped scientists redirect their effort: as one projects hit setbacks or was abandoned, they could shift their focus quickly to something new and exciting. They persisted, but the locus of that persistence could shift to a new project.

Having a portfolio of projects served as a FP for the individual scientist because it tapped into their intrinsic interest in and passion for science. Informants believed that the "new things coming on board" were going to be as interesting and impactful as any project they had to abandon. This reflected how DC reinforced their academic background, while still allowing them to have the impact on patients. Informants frequently described DC as a "hybrid" between traditional pharma and academia:

What I really liked about DC is, *it's almost like this weird little middle ground*...most people either came straight from academia to DC...It's kind of this really, in the middle group where yes, it's a pharma company. Yes, you have, you know, a lot of that. But...that like, [academic] culture is still kind of preserved. Like you still have the really collaborative nature, *you're still on all sorts of different projects, you work across different people, you have the ability to just kind of start something and talk about it* and have it, so it's like this kind of middle ground between big pharma, startups, and academic labs. (Madison, emphasis mine)

Having a center that's very, like, *almost academic-ish, right? It's like a true research center with some freedoms that come with that.* You're able to pursue those kinds of long-term projects, as well as the short-term things... I think they really foster a good kind of more freedom, creative, entrepreneurial space, which is nice. (Joseph, emphasis mine)

Discovery Center thus offered informants the "best of both worlds"-they could continue to

work in an academic way, with the "freedoms that come with that", while still having the

resources and reach of a large pharma company—the chance to help patients. The fit between the work at DC and informant's professional background assured them that they would have other exciting science to work on even if they abandoned a given project.

### Stage Gates: Balancing Structure and Flexibility within Projects

In order to rigorously evaluate its portfolio of projects, DC used a stage-gate process (Cooper, 2008; Ding & Eliashberg, 2002; Klingebiel & Esser, 2020; Van Oorschot et al., 2013), common among pharma and biotech firms. This stage-gate process emphasized placing many small bets: "Firms can either place bets early and see some of them turn sour...or they can wait and risk being preempted by less hesitant competitors. The conceptual solution to this conundrum is to pursue multiple product options." (Klingebiel & Esser, 2020: 312). Without "multiple product options"—a portfolio—the stage-gate process would not work. As resources were not unlimited, some projects had to be abandoned; only projects which cleared the requisite stage gates continued moving forward (Arora et al., 2009; Gassmann & Reepmeyer, 2005). Maddox described how the stage-gate process unfolds at DC, centered on the "go/no go decisions":

When a project gets sort of proposed and accepted, one person or maybe a handful of people...they're going to take the project idea in front of the leadership team asking for approval...And as part of that presentation, typically you lay out a timeline of how the project's going to go, when it's going to reach a state of completion, when some key decision points are going to be made, and that's where the go/no go decisions really come in. So you might say the first year is data collection, data quality control, and some exploratory and basic analyses to start. And then you can have a time point in there that says, based on the results...if there's something compelling about the data, then we go and if not, then we just scrap the project. And that's okay too. But to me go/no go decisions are typically something that we decide upon ahead of time, and then we reach them at certain time points. And at those time points, we sort of retrospectively look back and decide whether it's worth continuing or not.

This process emphasized both the scientific evidence ("something compelling about the data") and the strategic fit with the organization's goals. When projects were proposed and approved to

receive resources, core team members created a "research operating plan" (often referred to as an ROP). The ROP included a timeline with go/no go points, where the project must clear with positive results in order to continue ("go") or otherwise be stopped ("no-go"). Projects had to pass through multiple of these stage gates over time, from early development to clinical testing.

The stage gates helped team members balance FA and FP within their projects. As described above, scientists were passionate about ideas and the potential impact of their project, which operated as strong FP within projects. Stage gates provided a check on this persistence within a given project, balancing it with structure and data (FA). As Henrik described:

...the go/no go point sets a limit on our persistence...You've done all the things you need to do to get there, and there's no reason now to stop without having like a door [and] you gotta have a key to get through it" (Henrik, dept. head, emphasis mine)

Decision points created "doors" which could only be opened by having the "key" of supporting evidence. The emphasis was on "killing" projects which did not have enough potential or evidence ("you gotta have a key to get through it"), creating a FA to counteract scientists' natural tendency towards persistence ("there's no reason to stop now"). As I describe next, the stagegate process provided both structure (some FA) and flexibility (some FP) for teams as they evaluated their ideas.

*Structure.* The stage-gate process described above was an organizational practice deeprooted in BioPharma (and the industry more generally; Ding & Eliashberg, 2002) and shaped how teams generated, developed, and abandoned their ideas and projects. Informants described how the structure provided by the stage gates allowed them to manage the natural attachment they felt towards their projects:

Sometimes, I think it is very difficult because when you kind of invested that much in a project and just saying that it doesn't work is not easy, because there's always something, you will come up with another idea, that might, you know, let's try this, let's try that. But I think at some point you have to make that decision. I think *having those go/no go, clear* 

kind of objective, you know, what you're looking for and what that go/no go would be, that makes the decision making much easier. (Sabal, emphasis mine)

The sense that go/no go points were "clear" and "objective" helped informants make difficult

decisions and move on from projects when necessary. Structure thus provided a necessary FA so

that scientists did not continue persisting too long ("there's always something, you will come up

with another idea").

Teams also had to create a detailed (if preliminary) research operating plan (ROP) laying

out decision points before commencing the project. They therefore had an idea of what the

evaluation criteria would be before they began work on the project:

I think *if you set, define the criteria, way ahead, when to reach that go/no go decision and what should be towards go and what should be towards no go,* that will help to avoid potential conflicts. So I would say, defining and redefining as the project continues. So *you start with defined goals and defined criteria.* And as the project continues, we have to be flexible, this is science and can't be very rigid. So, we will define those criteria based on the data. (Brinda, emphasis mine)

You want to hash out those disagreements [about evaluation criteria] before you have the data, because after you have the data, it's easy to try to move the bar...Data don't lie. But where you put the bar is important. (Daniel)

These practices created a high bar for projects to reach-a priori measures of efficacy-while

helping team members navigate the uncertainty they faced. The ROP and go/no-go points

provided scientists a minimum structure (Preston, 1991) to help guide their idea development,

without being overly rigid:

I don't want to make it sound like every project has a decision tree, or anything like that. But I guess you could think of it almost like exploring the ocean. Like the first six feet, you can see it already, you know, what's going to be there, if there's any fish, they are not. Once you get down in the water, the water gets a bit murkier, *but you're not gonna know that until you get down*. So the further that you get into the ocean, that you know, away from the surface, the less you're going to know ahead of time, what's going to happen. (Maddox, emphasis mine)

The presence of these structures and processes for developing and evaluating ideas softened

informant's tendency towards persistence by placing specific temporal and technical constraints

(e.g. has to show progress by this date, has to have this much efficacy, etc.) on the team's efforts. For example, the ROP and stage gates placed a strong emphasis on data and empirical support. Daniel described how evidence is the ultimate arbiter when conflicts arise in a project:

[Interviewer] So are there ever conflicts or disagreements about the go/no go decision? Yeah, all the time. All the time. So, there can be conflicts or disagreements within the team itself...to avoid the disagreements, you have to agree beforehand... Sometimes people are gonna say no, I don't think this is a go/no go decision. I think even if we get this result, we keep going because of this, this, and this, and you hash it out, you sit down within the team, and you bring all the arguments to the forefront...Honestly, in all my years...I've never been in a situation where I had to make a decision that was contrary to the vast majority of the team's opinion. Because honestly, I mean, again, if you can eliminate emotion, science is science, it doesn't lie. Data doesn't lie. (emphasis mine)

This emphasis on data ("data doesn't lie"), provided important FA that helped temper

individual's tendency toward persistence and contributed to balance.

*Flexibility.* As alluded to by some of the quotes above, the stage-gate process also allowed for flexibility—"we have to be flexible, this is science and can't be very rigid" (Brinda). Evaluation was not as black and white as it could sometimes appear on the ROP; flexibility thus allowed teams to persist when there strategic or scientific ambiguity. This was most evident in how teams actually made the go/no go decisions about projects. The core project team engaged in a collective interpretation process with others in the organization (e.g. leadership team, other subject matter experts within BioPharma) to evaluate the project's scientific validity (e.g. supporting evidence from experiments) and its strategic fit within the organization. Interpretation is a central process of organizational life (Daft & Weick, 1984; Gavetti & Warglien, 2015; Gioia & Chittipeddi, 1991; Walsh, 1995); I describe the go/no go decision-making process as collective interpretation because it involves ascribing meaning to events and developing shared understanding (Daft & Weick, p. 286).<sup>28</sup> The collective interpretive process unfolded as team

<sup>&</sup>lt;sup>28</sup> The process I describe differs from collective sensemaking in two important ways. First, it was not generally triggered by a discrepant event or violated expectations, a key attribute of sensemaking (Maitlis & Christianson,

members created an account of the project at a specific point in time. Accounts were "discursive constructions of reality that interpret or explain" (Maitlis, 2005: 21; see also Antaki, 1994) which emerged as core team members made sense of a project's progress. Accounts fostered "motivation (reasons for action)" and "imagination (ways forward)" (Maitlis, 2005: 43). As noted, teams evaluated two primary factors at the go/no go points: the proof of the project's effectiveness or success (e.g. data) and the strategic fit of the project with the broader goals of both DC and BioPharma. Figure 3 depicts this interpretation process.

Despite the work that went into developing a detailed ROP, making stage-gate decisions was often not simple or straightforward—there could be conflicting evidence and strategic priorities could change over time. Part of the collective interpretation process was thus clarifying again what qualified as a go or no-go. Proof of effectiveness was dependent on the success or failure of shorter-term tasks, most often experiments. Often multiple sources of data could conflict with each other, such as multiple experiments showing conflicting results. Evidence, and the faith team members had in that evidence, was a crucial factor in how teams evaluated their projects:

So, for example, right now we are doing a project...we have identified a protein in the microbiome, which is we think plays a role in [this] disease...And we have all the good data out there, which actually really correlates with the disease, but it doesn't really prove whether this is a causal...And we're doing some experiments right now to prove that... And then you can always find a way, if the experiment doesn't work, that this might not have worked because, you know, the rodents probably have more tolerance...That's why I'm saying that I think you have to be firm that this is a no-go. *If you can't prove it...then that's a no go.* The fine thing in between is basically, how you are designing those experiments to catch it? *How confident you are in those experiments?* which is actually, you are depending upon that to say a no-go for those. (Sabal, emphasis mine)

<sup>2014;</sup> Weick, 1995); rather it was triggered by a priori timelines and criteria. Second, the evaluation criteria used were to some degree stable and routine, and involved less enactment than is typical in theories of sensemaking (Weick, 1995). The emphasis on creating an account, however, was similar to the accounts that result from sensemaking (Maitlis, 2005).

## FIGURE 3: COLLECTIVE INTERPRETATION AT DECISION POINTS



Informants often emphasized the need to focus on data and the scientific process to make decisions, even while they recognized flexibility in how they designed those experiments and how confident they were in them.

Teams first evaluated the data generated by the project, its proof of effectiveness. Due to the complex, cross-functional nature of the projects<sup>29</sup>, there was often disagreement and multiple interpretations of the same data or evaluation criteria. Conflict was common: "Conflicts will always be there in science, when two minds are working on it" (Brinda). Conflicting views had to be elaborated via this interpretive process until the group reached a consensus:

I think you first want to listen to whoever brings that dissent...you know, listening, *everybody's perspective is very, very important I think*...So I think, working with the team, just kind of initially, their point of view, and then, you know, just not imposing what you think, this is the way to go. Equally kind of taking everyone's initiative, I think that becomes very important...*When you have different perspectives I think that makes it easier for you to also make that decision. And so it takes time*, so you will not have it in one meeting that everybody is on the same page, sometimes it takes much, much longer. And sometime you probably have to change your point of view. So I think, but *you don't like go to the next step without having the whole team on the same page*. (Sabal, emphasis mine)

The collaborative nature of the decisions-encouragement of "dissent" and hearing "everybody's

perspective"—gave the process flexibility to make sure that the diverse expertise of the whole

team had been acknowledged. Quinn described how collaborative the process was:

I've been in [go/no go] meetings where there are people who think one way as opposed to another way. And *it's usually a good debate, sometimes it's inconclusive*. Quite often, no decision is made. So it was, ah okay well, we'll wait and we'll have another meeting, you know, next month or two months from now we'll revisit this again. So that happens as well. But yeah, we *it's not like it's all one sided*, where you go into a meeting, and it's go/no go and it's always well, you know, time's up, you didn't produce, it's no go if you can't convince us, kind of thing. No, *it's a little bit more flexible*. (emphasis mine)

<sup>&</sup>lt;sup>29</sup> All projects had members from at least two of the four functional areas at DC, and often included other members from within BioPharma.

Go/no go decisions were viewed as collective decisions, rather than top-down decisions. This contrasts somewhat with how stage gates are implemented in other contexts (e.g. Cooper, 2008; Klingebiel & Esser, 2020)<sup>30</sup>. Generally, the core team would deliberate about what recommendation (go or no-go) they would give to the leadership team. As Sabal and Quinn described above, this could take time. Team members generally would not make decisions without the input and agreement of everyone on the team:

We try to approach things as a team, as a united front, right?...People in industry should not have that much of an ego either. Because you work in a team setting, *this is not your project or your thesis, you work as a team*...So I think it's just as long as you say, the team was involved in all these things should be fine...So *the decision at the end, it's made by the leadership team, but it does bring in the input of the scientists*. And I think scientists should know or acknowledge the fact that if it's not working, it's not working...So from my understanding, you know, leadership makes the decision but obviously takes the input of the scientists...So they'll bring the data to the leadership and just say, this is what we did. This is what we got. We don't know, maybe we can try this. Maybe, you know, we can try this other idea. But the decision is done there where, if there's a consensus and leadership and likely also the scientists, they'll decide. (Valeria, emphasis mine)

Members of the leadership team then served as "devil's advocates" to probe the projects and

provide suggestions. Even though they had official authority to make the final decision, the

leadership team preferred to influence the core team or provide feedback, but would stop short of

imposing a decision the team disagreed with. Here David, a department head, talks about

encouraging his personnel to not just come to him, but to the wider leadership team to get advice,

rather than giving a definitive decision:

It's a little tricky, because again, *I'm not in charge [of this particular project], right?* So if we hit something really sticky, I'd advise the team or the person [in my dept.] to package it up, take it to the [entire] leadership team, present it and ask for direction...And *having a discussion on that I think is really important.* (David, dept. head, emphasis mine)

<sup>&</sup>lt;sup>30</sup> There continues to be a debate in the literature regarding how best to implement stage gates in innovation projects (see Guler, 2018; Klingebiel & Esser, 2020; Klingebiel & Rammer, 2020). Some organizations use a more top-down approach, with external committees making the final decisions, while others are more bottom-up, as occurred at DC.

Teams thus had flexibility in attempting to reach their goals and "making their case" to the leadership team. The a priori criteria of the ROP provided a constraining structure (as described above) but the evaluation process allowed for flexibility "based on the data." (Brinda). In other words, teams could persist in the face of ambiguity, if they had some data to support their case.

Strategic fit was a different, if no less important, factor in shaping the account of the project. Unlike proof of effectiveness and external feedback, strategic fit incorporated information about the broader environment, considering the portfolio of projects at DC, the drug pipeline and capabilities of BioPharma, and even the broader pharmaceutical industry (e.g. drugs being developed by competitors). Strategic fit thus centered on how well the project fit with the goals and mission of DC, and to some extent, BioPharma more broadly:

It's the combination of...science, internal and external forces and development, as well as where you think you have the biggest novelty...Maybe you as a scientist may not see why this is exciting or not exciting. But when you bring in the regulatory colleagues, when you bring in the medical affairs team, when you bring in the commercial team, they may say, look, I think this is great. But no insurance company is ever going to reimburse a particular patient on this territory. So, we can't do it, right...Having a demand at the end is important. And so maybe there are, the decision has to be non-scientific...And so to me, I think it has to be both scientific as well as strategic. (Jaipal, emphasis mine)

It's about how the [go/no go] decision is made...We got to think about, as a whole, as a whole group, what is the best interest to the group and the best interest to the company? That's what is most important. It's hard. You need to, sometimes you have to shut down projects. (Bao, emphasis mine)

Justifying a project's strategic fit was not "straightforward" but was viewed as essential, since it

provided them a link back to BioPharma which justified the center's value as an organization

("the best interest of the company").

Strategic fit was another aspect of the stage-gate process which provided flexibility, since

organizational goals and priorities could change. For example, Brinda described how she paused

a project in the hope of it being more strategically aligned in the future:

Sometimes if there's a change in organization itself, which it could be your upper management, or the priorities within the organization those can affect what you're doing...The business goals have changed. Or...your leadership team, has changed dramatically, that you no longer have the same kind of support... I think every scientist has to be able to communicate transparently those changes in the organization to the leadership team, and try to show them the bigger picture from their side and show them why it's important for them to invest in this strategy, and how much have you achieved. But again, as I said, this may not work always, it might work sometimes, may not work sometimes...So what do you do? You have to make most of this...take a deep breath, pause, and hope that things will fall back to the same priority sometime in the near future...In my last almost four years, I had been through that...I persisted, although I would say, I stopped it for a while. I paused it, but I didn't leave it. So, there are two different things, pausing it, holding it closer to you is different than leaving it and saying goodbye is a difference. So, what I did was to keep myself aligned with the organization and have an open mind. I paused the activity with an open, or with an optimistic notion that someday I will get back to it. And I was right, someday I got back to it. And that kind of open mindedness and flexibility, resilience, helped me. (Brinda, emphasis mine)

Similarly, Bao recalled an example of a project that BioPharma "rescued" after attempting to sell

the compound:

Sometimes scientists feel very strongly about something but if it's not aligned with the company's strategy, high level strategy, then it's really hard for you to sell...The best-selling drug from BioPharma actually was sitting on the shelf for a long time. *So sometimes, to be honest with you the decision made by management does not really make sense.* And the drug is rescued, because BioPharma sees the clinical results [from another company]...That's why they bring it back, otherwise it would still be sitting there. BioPharma was trying to sell to somebody else, but fortunately nobody tried to buy it, it's still ours. But it's not purely scientific, a lot of times. (Bao, emphasis mine)

Strategic fit was thus another area where the stage-gate process allowed the organization to

balance between structure and flexibility. The interpretive flexibility provided by conflicting data and the potential shifts in strategic goals all could provide both FA and FP depending on the context of the project. Flexibility acknowledged the uncertainty inherent in the process, and allowed for some of the persistence which was critical to success. As Henrik noted above, when looking at successful drugs, "if you have them tell you the early history of it…you always had to have a champion that was persistent, that wouldn't take no [for an answer] and sort of, even in the face of all of this negative data would push forward." In this way DC maintained balance within its portfolio: creating structures to encourage abandonment while allowing teams to follow data and their expertise to know when to "push forward" despite adversity.

#### MANAGING THE DILEMMA: INDIVIDUAL RESPONSES

The practices described above—stage gates and a portfolio of "long shots"—helped the organization create a successful pipeline of projects: several projects reached "go's" and moved into the larger BioPharma organization since Discovery Center's founding. Nevertheless, individual scientists had to strike their own balance between persistence and abandonment in relation to their projects. They believed strongly in their ideas and were often attached to them. They also wanted to work on the most promising projects which would help patients. Scientists faced not only the tensions between FP and FA which were inherent to their work (e.g. being passionate about science vs. a high failure rate), they also had to manage the tensions created by the organizational practices. They experienced highs of excitement when they reached a go, but also could experience crushing loss when a project was stopped. Stage gate decisions, for example, could increase both FA and FP, with informants describing a go decision as both "exciting and scary" (Uma)—exciting because their persistence paid off, but scary because the possibility of failure is still there, with now-higher stakes. To cope with these challenges, I found that informants drew on one temporally proximal (day-to-day motivators) and one temporally distal (abstract purpose) source of meaning in their work. The proximal source of meaning helped provide a sense of progress and learning in their daily work (Amabile & Kramer, 2011); the distal source of meaning helped them connect their projects, both failures and successes, to a broader mission. Together they helped informants align their persistence with the organization's goals and balance FA and FP.

#### Highs and Lows of Go's and No-Go's

100

When a project was deemed to make acceptable progress—reaching a "go" decision—it was obviously perceived as a huge success for the team:

When you've gone from one stage-gate to another...it's a sense of like pride...we had one or two [projects] which had transitioned between stage gates [recently] and we actually have you know, *you have a bit of a celebration about that because it's actually quite a big deal* but it's just the first stage-gate, literally in the whole of the hundred stage gates of these things, but we just do number one and then there's a sense of achievement in that. (Owen, dept. head, emphasis mine)

Early go decisions were no assurance of continued success ("it's just the first stage-gate"), but

they were an important first step; after progressing far enough, the project would eventually be

handed off to BioPharma for development (e.g. clinical trials, etc.). Reaching a go point

strengthened the FP which the team members had previously recognized, reinforcing how

meaningful they believed the project could be and their desire to see it successfully implemented.

It seemed that over time, the more successful stage gates were cleared, the more difficult it

became for team members to abandon their projects<sup>31</sup>.

Reaching the decision to abandon a project, on the other hand, could be quite

demoralizing. Informants told of projects which had showed initial success and seemed

promising, yet were eventually abandoned:

One of my biggest disappointment of my career to this day, is one of my first projects that I led essentially, from the beginning all the way to *almost going into clinical trials*... I was working on a backup to [another drug, which had complications], that was going to avoid all of these [complications], but still work just as well. And at least, you know, that was our thinking at the time. And we were about two weeks before it went into their first clinical trials...and because of the backlash around [the first drug], BioPharma made a decision, a strategic decision, to no longer work in this pathway, because they felt it would be too complicated to convince the FDA that...this is safe... And so my project got yanked for non-scientific reasons. *Which was, again, to this day the most frustrating ever had to go through because I had been working on this for six, seven years as the lead biologist*. (Daniel, emphasis mine)

<sup>&</sup>lt;sup>31</sup> I did not observe any projects that reached a no-go after multiple go decisions, likely due to the timelines involved. Most go/no go points are between 6 and 12 months apart, while I only studied DC for 15 months.
Although most DC scientists did not spend as long on projects as Daniel did here, it was not

unheard of; informants could easily spend three or four years on a project only to have it reach a

no-go decision.

The rationale behind a no-go decision mattered, however, when it came to how

emotionally difficult it was for informants. Generally, projects were stopped either for scientific

reasons (i.e. proof of effectiveness) or for strategic reasons (i.e. lack of strategic fit), as outlined

above. Scientific reasons for stopping a project were generally easy for informants to deal with;

strategic reasons were more difficult:

We had an idea, we pushed it fairly far but we saw tox [toxicity] in the disease model. And we stopped it then. And you go, ah, that's a shame. Well, *glad we stopped it because you know, we don't want you taking something toxic through...If it stopped scientifically is easier to deal with.* I think if it's stopped from some other reason, that's a little bit more harder thing. I've worked on a project when I was at [other pharma company], it was actually working, that they decided to stop. I'd spent a year and a half on this. Not my whole time but a chunk of time, and they stopped it cause they thought, strategy and stuff. I thought...you could have known this up front, you know, a year and a half ago, and I wouldn't have bothered. It didn't get stopped for any scientific reason it got stopped through like this general portfolio strategy. And that's harder to take. Scientifically you can deal with that. (Owen, emphasis mine)

There's a lot of just basic science that we can't reproduce, for instance...those are easy decisions, it's like, it just didn't pan out or the molecule was toxic, those are a lot easier to say, no, we're just not going to do this. The more difficult ones are the ones where you say, yeah, this is interesting, there's compelling biology, but there's just not enough, we as an organization, either in DC or within BioPharma, there's just not enough traction. I think those are definitely more difficult choices. (Nasir)

Scientific reasons were considered justifiable—"we don't want you taking something toxic

through"; they resonated with informants' identities as scientists. Strategic decisions, by contrast,

were often less clear cut-not having enough "traction" could include anything from working in

a disease area not prioritized by BioPharma to not having a senior employee willing to champion

the project. In the most severe cases, strategic no-go decisions were intensely negative emotional

experiences:

One of the main [setbacks] is, you know, putting a project on the shelf because of business reasons, not driven by data... For instance, my no-go decision at that I had previously...that was a huge setback...so that makes you stop for a minute and reassess the way you do your work...*Emotionally as I said, it was very, very tough because I was super confident of the importance of it.* And so it's not been easy, I think probably I have to admit that I never cried at work and I cried twice at DC. Yeah, I mean, nobody saw me [laughs]. But it got to a level of frustration and I think it's because we really care about what we're trying to do...I thought I was sitting on a, and I even said to my boss, we're sitting on a goldmine, and not goldmine for money, [but] for saving people, and we're not using it. *So that was extremely difficult and in a way I don't think I will ever get over it, but I'm over it.* One of these experiments is a fail, doesn't matter, as I said, you still look at it and you think, oh, I can solve this. I made a mistake here, you know, you learn from it. *So when it's the data that drives failure, yeah, no problem.* It's the remaining part that is more difficult to digest. (Uma, emphasis mine)

Informants could bear emotional scars ("I don't think I will ever get over it, but I'm over it")

from having to kill certain important projects.

Fortunately for my informants, examples like Uma's were the exception rather than the

rule. If a project reached a no-go and was abandoned, I observed that scientists were generally

able to redirect their effort to other projects, even in the face of strategic decisions:

I mean, it's tough to get rid of it [a project], but at the same time, then it frees up your time. Which is, again, exciting, right, if you have other things you want to do, and it's like, okay, well, it's done, let's do some other cool stuff. (Joseph)

I feel like at the beginning, it will be a little bit sad because it's like you're giving away your baby, this is what I've been working on. But if you're in industry, you have to be willing and able to just let go, because *that's part of the job*...Hopefully you love them [your projects], let's say, but you know that at one point, you have to let go...*If you're in industry, you have to, like, it's just, that's part of your job.* (Valeria, emphasis mine)

To cope with the highs and lows of stage-gate decisions, I found that informants drew on two

sources of meaning (reasons their work was worth doing; Lepisto & Pratt, 2017) in the face of

(even because of) failures and setbacks. One source of meaning was temporally proximal,

focused on the daily tasks they engaged in; the other was temporally distal, focused on the

overarching purpose they were serving.

## **Proximal and Distal Sources of Meaning**

*Day-to-day motivators.* Informants described how they enjoyed many of the small, dayto-day tasks which they engaged in as scientists. I refer to these factors together as day-to-day motivators, since they were shorter-term and focused on the concrete tasks team members were engaged in. Nasir articulated the range of these day-to-day motivators:

Lab based work is sometimes easier to persist just because you see a result no matter what, how small it is, you still see something and so a lot of times you have to really enjoy the basic sort of work that's done in the lab. And in biology I mean, you're growing things...we do a lot of sort of basic molecular biology, altering DNA one way or another. And that's I mean, at a basic sort of level is very fun to me. So that, day-to-day that's sort of what keeps you going... a lot of people, I think, think of it as grunt work. But I mean, I still enjoy lab work a lot...But then it, maybe one level higher than that, you know, every experiment, you want to see that arc of an experiment...You want it to have a beginning, designed well and implemented well...and then you want to see the result. Now yeah, most of the time, those experiments don't pan out...But there's very few experiments that are just crash and burn failures, right? You learn something from what you did, even though it might not have given you the results that you expected. And a lot of times, it isn't the results you expect, which is actually I mean, that's another level is that, that's the fun of it...You see a result you say, that's weird, right?...That's a very satisfying moment, although not at the time...But then you stare at it, you're like, no, this is actually kind of, it's weird in a good way...So day-to-day I think just liking the work is important. (emphasis mine)

Nasir described the day-to-day motivators which helped informants continue in their work

despite failures and setbacks. First they enjoyed the tasks themselves because they were

passionate about the work (Vallerand, Houlfort, & Fores, 2003) and gained intrinsic enjoyment

from it (Amabile, 1993; Amabile & Pratt, 2016)—"at a basic sort of level [it's] very fun to me."

Others similarly described their passion and enjoyment of their daily work:

I really like science. I like asking questions. I really like understanding...that's basically why I got into this in the first place. Just knowing, just liking the biology and wanting to know more about disease biology basically. (Amina)

What helps me persist? I don't know, stamina, I guess, just being like, nuts and going into the lab and doing stuff. And just, I mean it's, yeah, it's that. *I do enjoy working in the lab. I am officially a lab rat. That's what I do. And I have no shame on it.* (Valeria, emphasis mine)

This enjoyment of learning about disease biology or being a proud "lab rat" helped them find pleasure day-to-day, regardless of whether they were pivoting to a new project or carrying on an existing line of work. Day-to-day motivators were also cross-situational: the tasks involved were often similar across projects (e.g. working at the lab bench) and thus could be relied on even if a given project was stopped.

Day-to-day motivators provided meaningfulness as informants learned from incremental steps forward—what could be called small wins, "concrete, complete, implemented outcome[s] of moderate importance" (Weick, 1984: 43; see also Amabile & Kramer, 2011). Making small progress, such as recognizing a new pattern in the data from a failed experiment ("that's weird…in a good way"), was often very satisfying to informants, regardless of what outcome would arrive later. Small wins were significant not just because they inched informants closer to solving a project's problems, but also because they piqued the scientist's inherent curiosity (Harrison, 2011) and re-kindled their passion. Working at the cutting edge assured that they would continue to be challenged and learn new things, as Madison related:

I think on the more basic level, kind of the everyday stuff is, you know, we get to work on a lot of really cool things. We're trying to be like, kind of the cutting edge. So, we have a lot of new technologies, new ideas, that kind of stuff. So it never really gets old or boring. Like, you're never just doing the same thing over and over again. So, there's always options to learn.

Even as the day-to-day work of executing experiments and testing compounds could be emotionally and mentally challenging ("there's times when you're frustrated", Wade), learning and being able to work on "really cool things" provided significance and helped sustain informant's effort.

*Abstract purpose.* While day-to-day motivators were temporally proximal, focused on the daily tasks they engaged in, informants also drew on a broader purpose to their work which was abstract and highly meaningful. Sense of purpose emphasized the significance and potential

impact of any project if it was successful. It was focused on the distant future, when a project

would be completed:

Just the hope that anything or something that we can contribute to a potential drug in the future for whatever disease indication that maybe, that will make me happy...So I think *the dream, for me as a scientist in industry, will be to hopefully one day help find something new...be able to put like your grain of sand into something* that hopefully down the road at some point, becomes something like really cool and big. I think that's the Holy Grail I feel for me, it'll be awesome. (Valeria)

Note the language Valeria uses: the "hope" of a "potential" success "in the future", "anything or

something...whatever" the area. The dream is temporally distant and abstract, emphasizing a

potential, though modest, contribution, "your grain of sand."

I observed that other team members at DC generally construed the purpose of their work

in a similarly abstract way:

So, DC is Discovery Center, right? So...it's a little different from the [nearby BioPharma] site, for example...it's different from being directly on a drug pipeline. It's not like you're working on a drug pipeline to get a product commercially...We're doing projects to keep the science in BioPharma going. It's exploratory...So essentially, *my contribution is contributing to the science of BioPharma*. Just because you're producing or developing drugs, it doesn't mean that you can stop doing science and looking at the actual basic stuff. So it's *contributing to the science*. (Amina, emphasis mine)

Joining BioPharma also gave me another, different perspective on doing science, right? in academia, the goal is, it's different, it's do something interesting, and fascinating that is data driven, or something that's hypothetical and you were able to break that hypothesis, find an answer. I think when I joined BioPharma, it was beyond that. It's not only a hypothesis driven, *there is a purpose, you know, that at the end, you are part of, or you are responsible in creating a drug or therapy or vaccine, that could be beneficial to many people.* (Brinda, emphasis mine)

"Contributing to science", or creating drugs to help people, were broad enough purposes to

encompass both the success and failure that team members faced in their work. Construing the

purpose of their work this way gave them a higher-level source of meaning, which could make

failure acceptable or even beneficial (e.g. failure is part of science, necessary for learning, etc.).

A broad mission allowed for equifinality, many possible ways to succeed. Uma described how

she found meaning in "impact[ing] human life", even if her work today may or may not have a direct impact on that goal:

So, I wanted for a long time to transition out of academia, because *I wanted really to be able to impact human life*. And in academia, you can if you are at the right place at the right time, in the right lab, with the right funding, but it's very, very unlikely. And of course, being in industry doesn't mean that you are going to be able to...but I feel it's easier. You know, every day I go home and I did a little step towards something, it could be something that I'm going to ditch tomorrow, or could be something that in 10 years leads to some kind of treatment. (Uma, emphasis mine)

In other words, having the broad purpose of "impact human life" allows her to accept that her

ideas could be "ditched tomorrow" or could "lead to some kind of treatment."

This abstract purpose also helped informants manage their emotional attachment to their

projects, and helped them be willing to abandon projects when needed:

I think, as scientists we are more emotionally connected sometimes if an idea was developed within us, and we called it like, oh, it's my baby, or it's me, we say that, that project is me. That means we are emotionally connected. Which is good, that means you're giving your hundred percent. But *I think when you know the bigger purpose of that, which is you want to put a vaccine in the market.* Your goal is to find an answer to an unsolved question that's been bothering the industry for 17 years, *then you need to take yourself away from that emotion aspect, and be closer to the reality.* (Brinda, emphasis mine)

The "bigger purpose" helped expand scientist's views beyond the particulars of a single project to a larger contribution, such as "an unsolved question that's been bothering the industry for 17 years." This abstract purpose was worthwhile enough to invoke a sense of duty: "I think it is almost our duty not to waste time. We're trying...to really help [people]." (Uma)

Discovery Center also helped reinforce this abstract purpose and align it the organization's mission via its practices and culture. The organization's focus on the most promising projects (e.g. via stage gates) helped informants recognize that "contributing to science" and "helping patients" also meant prioritizing some things over others:

That [stopping a project] sort of *goes to what we do as a company and our mission as a group*...When we run into a complete black box, a biology area that just has not been

explored...we definitely do work in those areas because there's novelty, and there's new, let's say, targets or molecules that could come out of that work. But a lot of times what we do better is to take something that maybe somebody knows a little bit about, and has done some sort of fundamental research into and drive that closer to a therapeutic. I think *that's where our particular type of innovation is*, it becomes important and then becomes an important contribution to drug discovery to just generally bettering human health. So, yeah, those are the times that I sort of have to maybe stop myself...Those kinds of questions when there's just absolutely nothing known is and it might be a very intriguing area of biology, but we have to kind of pull back and say, look, we just don't know enough here. *Let's move to something else where we can make a better contribution* to what is known and to drug development of course. (Nasir, emphasis mine)

Their purpose was thus connected to "our particular type of innovation", which allowed them to

make the best contribution possible. Discovery Center's mission and practices helped informants

feel they had an "individual mandate" to do important work:

I think that *the individual mandate is always important, where you have to understand the bigger picture and the bigger goal.* And you can be in an academic lab, doing cool science and that alone can just drive you to a huge discovery. In industry, the patient is important...it takes you more into understanding what a patient is going through. You see a lot of folks win a Nobel Prize, the Nobel Prize for oncology about blah, blah, blah, but it doesn't mean shit, when it comes to patients...Doesn't matter because at the end, patients don't want to die. So if you can think about it from that perspective, then from an industrial perspective, it's not about the money we make, it's about the patient that we are caring for...It takes you outside, it gives you that proper individual mandate to strike that balance [between persistence and abandonment]...where you will be your own judge, you are critical of yourself, because if you're not critical of yourself, then, you can't wait for people to be critical of you. (Ben, emphasis mine)

This "individual mandate", which came from connecting the sources of meaning to the

organization's mission, took informants "outside" of themselves, and helped them balance

between persistence and abandonment. This helped informants keep their effort aligned with the

organization's goals while still finding their work worthwhile.

#### **CHAPTER 6: IMPLICATIONS**

I found that the persistence dilemma—the tension between forces for persistence (FP) and forces for abandonment (FA)—manifested across the four organizations I studied. There were two overarching rationales that were used for responding to the dilemma. The startups (Hydro, TempTech, and Gateway) emphasized commitment, transforming ambivalence created by the dilemma into commitment to the project; commitment and persistence were necessary for the organizations' survival. Discovery Center, by contrast, emphasized balance, engaging in practices designed to harness and contain both FA and FP so that neither was overpowering the other within or between projects. In this chapter, I take a step back to examine the larger theoretical implications of my study. First, I compare the different organizations to theorize how the organizational context shapes the persistence dilemma. I then conclude by discussing broader implications for theories of persistence, abandonment, and creativity.

# COMPARING ACROSS ORGANIZATIONS: STARTUPS VERSUS DISCOVERY CENTER

Each organization I studied (and their members) experienced the persistence dilemma, though this tension manifested in different ways. The life cycle stage of the organization, in particular, was a key contingency which shaped the persistence dilemma and how my informants responded.

#### The Organizational Life Cycle and the Persistence Dilemma

To facilitate comparisons between the organizations in my sample, I draw on Kazanjian and Drazin's (Kazanjian, 1988; Kazanjian & Drazin, 1989, 1990) four-stage growth model for technology startups<sup>32</sup>. This theory, along with other life cycle theories, emphasizes the structural

<sup>&</sup>lt;sup>32</sup> There are many life cycle theories, but most involve similar sets of stages (Kazanjian, 1988). I draw on this theory in particular given that the organizations I studied are focused on developing science and technology products.

elements which change as an organization grows (DeSantola & Gulati, 2017; Quinn & Cameron, 1983). Stage 1, conception and development, is concerned with development of the product or technology and selling the idea to investors. Stage 2, commercialization, is focused on developing the product for sale and taking it to market. Stage 3, growth, faces the problem of producing and selling the product at volume and adding functional differentiation to the firm. Stage 4, stability, occurs when the growth rate slows to the market rate and the focus is on maintaining momentum and market position. Underlying each of these is an emphasis on profitability of the key product or technology. Although the stages do not perfectly reflect my informants' work, I use them as sensitizing concepts (Kreiner, 2015) to facilitate comparison.

My sample contained an organization in three of the four growth stages. Hydro and Gateway were in the commercialization stage (the former being early in this stage, the latter late in this stage,), focused on developing their core product for sale on the market. TempTech was early in the growth stage, focused on producing and selling their products at volume and expanding. Discovery Center (DC) would appear to best fit the final stage of Kazanjian et al.'s model, stability. Here the focus is on growth momentum and market position, and the development of multiple product lines (Kazanjian, 1988). Although DC was only about five years old at the time of the study, they were housed within a large pharmaceutical company which was over 100 years old. The organizational context, then, was one of stability in terms of the organization's growth and structure. Although I had no organizations in the first stage, conception and development, the challenges of the first stage were also present across the projects I studied, as they focused on generation and development of new ideas. As Kazanjian (1988:276) notes, stages can be "somewhat fluid, with sometimes overlapping problems in adjacent stages."

For the start-ups in the commercialization and growth stages, the survival of a core project was essential. As a result, persisting with that core project was the norm, short of drastic external disruptions. FP were quite strong both internally (e.g. excitement of the team members) and externally (e.g. pressure from stakeholders) in order to keep the organization financially viable. At the same time, they faced strong FA in the form of technical setbacks, given that their products were at the very edge of developed technology, and resource constraints, given that they were small teams. The persistence dilemma was about survival—persisting with the core project which was central to the organization's mission and future growth, while not ignoring FA (e.g. budgets and timelines) which could sink the company in the short term.

For Discovery Center, in the stability stage, a portfolio of projects was the norm. This changed the persistence dilemma significantly—the challenge became balancing persistence and abandonment rather than creating commitment among team members. Unlike the startups, DC had the backing and structure of a large organization, which allowed them to generate a portfolio of projects and implement their stage-gate processes for evaluating the projects (Cooper, 2008; Klingebiel & Esser, 2020; Van Oorschot, Akkermans, Sengupta, & Van Wassenhove, 2013). Often these organizations are seeking an acquisition from a large pharma company like BioPharma, at which point their product becomes part of the larger pipeline and enters the stage-gate process. Discovery Center's strategy was to build in organizational practices which balanced FA and FP both within a given project and across the portfolio of projects. Balancing allowed them to generate a variety of ideas (Campbell, 1960) and persist with them, while avoiding escalation traps (Van Oorschot et al., 2013).

There appears to be a key tipping point after which organizations have enough resources to generate and evaluate multiple projects simultaneously; at this point, the persistence dilemma

shifts from being primarily about overcoming FA, to ensure survival, to being about allocation of resources to ensure innovation (i.e. a balance between FA and FP). Early stage organizations (those in development, commercialization, and even growth stages) have to find ways to manage the FA which are likely to be strong in new any venture. As Peter (co-founder, TempTech) put it in Chapter 5: "your company doesn't fail when you run out of money, you fail when the people stop showing up." Once an organization has achieved sufficient growth, they are faced with the challenge of managing multiple projects and allocating resources to each—the dilemma faced by Discovery Center, and one likely to confront Gateway and TempTech in the near future. A key outstanding question is when it is most effective for organizations to switch from a commitment response to a balancing response in managing the persistence dilemma. Future research should investigate this question, either longitudinally in one organization (e.g. as it begins managing multiple projects), and/or in a larger sample of firms across the life cycle.

My findings also extend some of Kazanjian and Drazin's work by examining the role that multiple projects play in a firm's life cycle growth. One of the assumptions of Kazanjian's (1988: 261) model is that the "focus is on initial growth within a single product technology base." I found, however, that as organizations grow, they are often able to expand their project portfolio, even with small "experiment" projects, which shaped how the persistence dilemma manifested. Particularly when organizations are using iterative development practices, such as agile development in software (Beck et al., 2001) or "scrum" methods (Schwaber & Sutherland, 2013)<sup>33</sup>, they are likely to develop multiple iterations and permutations on their products which can be rapidly tested by users.

<sup>&</sup>lt;sup>33</sup> Scrum is an agile development framework which emerged from software development. It focuses on doing collaborative work in two-week sprints, and iteratively evaluating the project at these points (Schwaber & Sutherland, 2013).

Although multiple projects were most evident as DC, organizations can diversify their projects and products even before they reach the stability stage. Both TempTech and Gateway, for example, the persistence dilemma began to change in a small way near the end of my data collection. TempTech was focused primarily on their main project, the second-generation device, but was also pursuing partnerships and clinical testing of their product. Gateway was in the final stages of verification for their first product, and decided (at the request of a pharma partner) to develop a second product with some modified specifications; this entailed a significant redesign and balancing among two development teams. With this diversification comes the dilemma of *what* to focus on. The introduction of multiple major projects appears to be a key inflection point in the life cycle of technology organizations as they attempt to manage the tension between persistence and abandonment.

#### **Managing Forces for Abandonment**

I found that FA, in particular, played a critical role in the persistence dilemma across growth stages. This could be due to the fact that the individuals I studied seemed to exhibit a strong tendency to persist, all else being equal; this was true among the startups and at Discovery Center. Although I did not assess individual traits, it seems reasonable that many of my informants would score high on persistence traits, such as grit (Duckworth et al., 2007). They generally felt passionate about their projects and enjoyed their work. A key question, then, given the individual tendency toward persistence, was how organizations addressed or managed FA, which were a critical force (potentially positive or negative) for such persistent individuals. At different stages, however, FA had to be managed differently.

In the startups, FA—either structural or psychological—were threats to the organization's survival. Although addressing structural FA were a primary focus of the team, I found that the

startup leaders focused on addressing psychological FA, via commitment-generating tactics. Leaders did spend time working to reduce structural FA (e.g. courting investors, securing funding, etc.), but these tended to be more rigid or fixed—one cannot conjure extra resources or time out of thin air. Within the organization, I observed the focus to be primarily on the psychological FA. Structural FA were largely external (e.g. partially or completely out of the team's control) and were thus addressed by the team in a more flexible manner via task prioritization. In using commitment to respond to the tension between FA and FP, startups risked escalation. Given their situation, however, potential escalation seemed a necessary risk; the alternative was the organization's demise.

For Discovery Center, FA were not considered a threat but were rather a tool to help the organization balance escalation (i.e. persisting too long) and missing opportunities (i.e. not persisting long enough). Forces for abandonment were only a threat to individual motivation and satisfaction in terms of projects being abandoned. The organization focused its practices primarily on balancing both structural and psychological FA and FP, within and between projects. Helping individual creative workers see FAs at least somewhat in a positive light helped to prevent ambivalence from being an acute challenge, as it was in the startups; for DC scientists, FA and FP both had the potential to be positive or negative. The organization's practices, aimed at actively managing this tension, helped scientist see the positives of FA (e.g. moving on to more promising projects), which softened the experience of ambivalence by DC scientists.<sup>34</sup> Comparing the role that FA played across different growth stages shows that threats to the organization early on can become important tools to encourage later growth and innovation. The need to grow and survive requires putting off FA early on; however, those same

<sup>&</sup>lt;sup>34</sup> As discussed in the previous chapter, however, there were also challenges associated with these practices for individual scientists—hence the need for individual's responses.

FA become necessary tools to prevent the organization from becoming rigid and limiting its options. The persistence dilemma thus seems to shift across growth stages because FA mean something different to any early stage organization attempting to commercialize its first product compared to an established organization trying to remain innovative.

### **BROADER THEORETICAL IMPLICATIONS**

#### **Implications for Theories of Persistence and Abandonment**

My findings also have broader implications for theories of persistence and abandonment more generally. As noted in Chapter 2, there has been very little consideration of persistence and abandonment together (Drummond, 2014). My study demonstrates that persistence and abandonment are in dynamic tension over time; I also induce two broad sets of strategies for managing the tension—commitment and balance. My study is one of the first to begin to integrate persistence and abandonment, demonstrating that each is effective in different situations (e.g. depending on organizational growth stage, place in the project portfolio, etc.). I thus provide a first theoretical bridge between theories of abandonment (e.g. literatures on escalation of commitment and decision making) and theories of persistence (e.g. literatures on motivation, grit, resilience, etc.).

My study is also one of the first to examine the persistence dilemma across multiple levels of analysis (e.g. organizational and individual). My data provides insights into both the individual experience of the persistence dilemma (e.g. ambivalence around whether to persist or quit) as well as the tension that organizations face in managing these tensions (e.g. encouraging persistence without enabling escalation of commitment). The different tensions experienced by the organization versus its employees highlight the possibility that there may be misalignment across levels of analysis. For example, creative workers, like those at DC, may wish to persist on a project longer than is in the best interests of the organization, and may continue to do so without the organization's approval (Criscuolo, Salter, & Ter Wal, 2014; Mainemelis, 2010). By the same token, organizations may persist longer than is desired by any one team member or leader (Fotaki & Hyde, 2015; Van Oorschot et al., 2013). These point to the possibility that the persistence dilemma is not isomorphic across levels of analysis; it thus requires different strategies to manage the tension at different levels (and different points in time, as discuss previously). Similar arguments have been made about resilience, a concept related to persistence (Caza, Barton, Christianson, & Sutcliffe, 2020; Stoverink, Kirkman, Mistry, & Rosen, 2020). Stoverink et al. (2020), for example, argue that a group of resilient individuals will not make a team or organization resilient, since a resilient collective is more than just an aggregation of resilient individuals. Similarly, the tension between persistence and abandonment may differ qualitatively across levels of analysis (e.g. individual vs. organizational). Just as research on resilience has begun to focus on the distinct processes for individual (Moenkemeyer, Hoegl, & Weiss, 2012) versus organizational (Kahn et al., 2017) adaptation, future studies of persistence and abandonment should account the for the influence of factors at different levels of analysis. Theories of paradox and dilemmas (Dawes, 1980; Schad, Lewis, Raisch, & Smith, 2016; Sleesman, 2019; Smith & Lewis, 2011) could be an especially promising theoretical home for studies of persistence and abandonment, given their focus on tensions and "both/and" thinking. Such perspectives would avoid either/or thinking which has been prevalent in existing research which has not considered persistence and abandonment concurrently.

I also observed that leaders played a critical role in managing the persistence dilemma across all the organizations I studied. Theories of abandonment have acknowledged the importance of organizational leaders, albeit with a focus primarily on behaviors which weaken

FA (e.g. stifling dissent; Janis, 1997; Roberto, 2002; Weick & Sutcliffe, 2003). By contrast, I found that leaders, at least at DC, were often the ones *encouraging* abandonment. Across all organizations, however, leaders played an important role in evaluating ideas and projects; how that evaluation occurred, however, shifted, based on the organizational context. Startup leaders often played the role of visionaries (Carton & Lucas, 2018), using commitment-generating tactics to help weaken psychological FA. Leaders at DC, on the other hand, often had to "enforce" abandonment, and worked to help team members see its value (e.g. "fail fast"). As organizations grow and build a portfolio of projects, leaders have to transition from emphasizing strong commitment to a more moderated perspective, which shifts the vision to beyond a single project. Future research should examine how leadership tactics differ when managing one large project versus a portfolio of projects. Leaders are the link between employees and the organization, and thus need to find the right alignment between the organization's needs for persistence or abandonment, while still providing a meaningful and motivating vision or employees. Future research should examine how, if at all, leaders navigate organizational versus employee priorities in terms of managing persistence or abandonment, especially as the organization grows and develops.

#### **Implications for Theories of Creativity**

My findings also have implications for theories of creativity. First, I expand existing theorizing to show that persistence can play a distinct role at different stages of the creative process. Persistence has been shown to help individuals generate more ideas, leading to novelty (Lucas & Nordgren, 2015, 2020; Nijstad et al., 2010), an important first step in the creative process (Berg, 2014). My findings expand on this to show that persistence is often important for the idea evaluation and implementation, as well as idea generation. I found that while early idea

generation was focused on novelty, evaluation and implementation were concerned with usefulness-how to make a novel idea or technology functional. For example, the team at Gateway described how they had to persist to develop the technology underlying their core product to make it useful; it had been developed in an academic setting yet required years of iteration to bring to a marketable device. Similar examples were evident at Discovery Center, where ideas from the scientific literature had to be tested and adapted to bring them into a clinically relevant product. This was not simply a question of implementation—it involved returning to earlier stages of the creative process, "questioning assumptions", elaborating new ways of building components, and extending the earlier research. Persistence was thus a critical part of how ideas were evaluated and elaborated; once identified as novel, creative workers had to persist in order to work out an idea's kinks and prove it was useful or effective. My work thus builds on emerging work emphasizing the importance of usefulness or appropriateness in the creative process (Harvey & Cronin, 2020; Harvey & Mueller, 2021). My findings illustrate that, especially for technological innovations, usefulness is a key challenge which must be overcome for creative ideas to be evaluated and implemented. I show that evaluation and implementation can be recursive, just as other stages of the creative process (Amabile & Pratt, 2016): attempts to implement an idea can lead to re-evaluation and even new idea generation, leading to changes. My work thus also speaks to the connection between idea generation and idea implementation (Anderson, Potočnik, & Zhou, 2014; Baer, 2012).

Second, my study highlights a largely-implicit theme of foundational theories of creativity, based on variation and selective retention (Campbell, 1960; Harvey, 2014; Simonton, 1999b)—the issue of abandonment. Abandonment has largely been seen as an enemy of creativity, as individuals often quit before generating their most creative ideas (Lucas &

Nordgren, 2015; 2020) and decision makers showing a bias against new ideas, killing them too quickly (Harvey & Mueller, 2021; Mueller et al., 2012; Mueller, Melwani, Loewenstein, & Deal, 2017). My findings suggest that abandonment may not always be detrimental to creativity, particularly when ideas are not considered in isolation. At DC, for example, the portfolio of projects meant that ideas were evaluated not in isolation, but rather in comparison with other ideas. Abandonment thus can be an adaptive outcome, which facilitates creative performance (at least for the organization) in the long run. Indeed, this should be expected given that, in variation-selection models of creativity, "quality is a probabilistic function of quantity" (Simonton, 1997: 73); to achieve breakthrough ideas, creators much generate—and discard many ideas. This is a theme which is largely unexplored in research on creativity. Future research should further examine the conditions under which abandonment facilitates versus harms creative performance. It would be particularly interesting to examine how idea evaluation operate in contexts where ideas are "competing" against each other. For example, are more novel ideas penalized (as existing research shows) when they are compared to other novel ideas? Do the most useful ideas win out in a portfolio? Answers to these questions would expand our understanding of persistence and abandonment in creative work.

A related implication speaks to the broader understanding of effort in creative work. A considerable body of evidence speaks to the importance of effort in creativity (Amabile, 1983, 1993; Tierney & Farmer, 2011), especially given the challenging nature of creative work (Rouse, 2020; Schooler & Melcher, 1995; Staw, 1995). Although this work has focused on engagement in the creative process, there has been less understanding of how creative workers re-engage in the process over time; that is, how they re-direct their efforts. If successful creators generate many ideas, they must naturally abandon many ideas, as described above. We have less research,

however, on how they redirect their effort as they abandon these ideas. My study is one of the first I am aware of to investigate how that redirection occurs in an organizational context, both from technical setbacks (e.g. needing to accept resource constraints) and organizational practices (e.g. reaching a project no-go). Future research is needed on how abandonment of ideas plays a role in the creative process over time, both within projects and across a creator's career (Fetzer et al., 2021).

Finally, my study strengthens the emerging connection between creativity and meaningfulness (Fetzer & Pratt, 2020). In general, my informants found their work highly meaningful, which was one key driver of their persistence (Amabile & Pratt, 2016). I also found that meaningfulness was a key factor that helped individuals navigate the tensions associated with the persistence dilemma. At DC, a meaningful, abstract purpose (e.g. "contributing to science") helped creative workers accept failures and let go of ideas. Letting go has been a consistent problem in the creativity literature, with creators often showing a high degree of psychological ownership (Baer & Brown, 2012; Elsbach & Flynn, 2013; Grimes, 2018; Rouse, 2013). Meaningfulness may be a key factor which can help creative workers construe their work in more abstract terms, helping them let go when necessary (Berg, 2019). Future research can build on this work, and especially examine when meaningfulness can be an enabler versus constraint on creativity.

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## APPENDIX

## First interview protocol (used across all organizations)

Intro and background

What do you do here at [company]? Will you take me through a typical day? Will you please take me through the lifecycle of one of your projects? Specifically, who is involved (types of workers)? What timelines are typically involved?

## Persistence

You are working on long-term projects with distant goals. How important is persistence in your projects?

Are there times when persistence is especially beneficial? Detrimental? In what ways, if any, does [company] try to promote persistence?

What do you see as the broad goal or purpose of the work you're doing at [company]? What is the goal or purpose of your current project(s)? Do you see it (them) fitting the larger goals of [company]? If so, how? If not, why not?

Where are you at with the current project? Do you feel that you are making progress? How do you assess if you're making progress or not? How long until a project is complete?

What motivates you in the short run? What, if any, long term creative goals do you have?

Are there times when your short term and long-term creative goals conflict? ...align? How you do manage your goals if they conflict?

What do you see as the key challenges to the work you're doing? How do you deal with these challenges?

Have you experienced failure in your work? What is that experience like? How do you handle it?

More generally, how do you deal with setbacks? Are some more problematic than others? If so, in what ways? [getting at different types of setbacks] How do you keep at it?

Whom do you see as the beneficiaries of your work? That is, who does your work benefit?

Please walk me through how you decide if an idea or project is worth pursuing.

Alternatively, how do you know when it is time to pull the plug on a project or an idea? What factors go into that decision?

## Meaningful work

What motivates you to do [current type of work]?

What, if anything, do you find meaningful about your work? What do you think makes the work here worth doing?

Can you give me an example of event or story from your working life that was especially significant or meaningful?

More broadly, what do you enjoy about your work?

### Creativity

What parts of your job, if any, do you find creative?

[If yes] In your own words, what do you think creativity is?

Will you please give me an example of an idea or project that you worked on that you felt was especially creative? What was that like? How did you know it was creative?

What, if anything, drives you to be creative in the work that you do? Please discuss with me what the different types of drivers might be

How do you assess whether a creative idea is worth pursuing or not?

Do you spend time elaborating ideas? What is that process like?

## Additional Questions (if time)

What kinds of feedback, if any, do you get about your work? From whom? How often? What sources of feedback do you find the most valuable?

What attracted you to [company]? In general, what do you think attracts people to [company]?

What, if anything, does [company] do to promote creativity among workers – individually and/or in teams (e.g., culture, incentives, other resources, physical environment, etc.)?

What role, if any, do leaders play in the creative productivity and/or persistence of people at [company]?

## Final interview protocol: Discovery Center

Job overview

What is your current role? What group are in you?What attracted you to DC?What are the main projects you're working on right now? What timelines are typically involved?

## Persistence

How important is persistence in your projects? (If they've mentioned importance of persistence: Assuming persistence is important...)

Are there points where persistence is detrimental?

[if persistence can be detrimental] How do you balance between being persistent and knowing when to quit?

Please walk me through how you know if an idea or solution is worth pursuing or continuing with?

Alternatively, how do you know when it is time to pull the plug on a project or an idea? What factors go into that decision?

Several people I've talked to have discussed the "go/no go" decision when working on projects or experiments. How do go/no go decisions work? What is that process like?

Are there ever conflicts or disagreements over a go/no go decision? How does that get resolved?

Can you give me any examples or share any stories with me of previous go/no go decisions and how you got there?
Research operating plans (ROPs) seem to be pretty important to evaluating a project's ongoing progress. How long do you plan for when making an ROP?

How much flexibility do you feel like you have in your ROP? Can you give me an example where a project changed or shifted over time?

How detailed do you make the plans? how often do you update them? We've talked about persistence generally; do you think about persistence differently when it's in relation to a task vs. an entire project? in other words, does persistence differ when you're working on a task vs. considering how you will persist in relation to an entire project?

### Motivation & meaning

What do you see as the purpose of your work at DC?

Given the challenges involved in drug discovery, what helps you persist in your projects? Can you give me any examples from [focal project]?

What role, if any, do your colleagues or teammates play in helping you persist? In what ways, if any, has your work been impacted by the pandemic?

What, if anything, do you find meaningful or worthwhile about your work right now?

(optional) In what ways, if any, does your organization try to promote persistence? (optional) Thinking generally, what's motivating you on your projects right now? Does your motivation change over time? If so how?

#### Letting go, idea attachment

Can you tell me about a time when you had to let go of a creative idea or project? How does that impact you?

Does the reason a project is stopped matter? E.g. strategic vs. scientific reasons How did you learn to let go/manage your attachment to your projects? When projects are put on a shelf, do you ever return to them? How and when?

### Progress

Thinking about the projects you're working on right now, do you feel like you're making progress?

How do you assess if you're making progress or not?

Is the way you assess your progress shaped by others? and if so how?

Have there been periods where you feel you aren't making progress? how do you stay engaged during those times?

### Failures & setbacks

What are the main setbacks you experience in your work?

How do you deal with them?

Are some setbacks more problematic than others? If so, in what ways? [getting at different types of setbacks]

Can you give me any examples?

#### Additional questions (if time)

Thinking about [focal project], are there points that have felt more or less creative to you? Can you give me any examples?

Are there stages of a project you enjoy more than others? Which ones?

# Final interview protocol: Startups

Job overview

What is your current position in the organization? How long have you been in that job? At the organization?

Why did you take this job? What attracted you to [company]?

Which of your projects (things you're working on right now) do you feel best represents creative work on a long-term project?

What timelines are typically involved?

# Persistence

How important is persistence in your projects? (If they've mentioned importance of persistence: Assuming persistence is important...)

Are there points in your projects when persistence is especially beneficial? Are there points where persistence is detrimental?

Please walk me through how you know if an idea or solution is worth pursuing?

Alternatively, how do you know when it is time to pull the plug on a project or an idea? What factors go into that decision?

Are there ever disagreements about whether a project or idea should be stopped? How do you handle those?

Can you give me any examples?

### Motivation & meaning

What helps you persist? Can you give a specific example?

Can you give me any examples from [focal project]?

What role, if any, do your colleagues or teammates play in how you persist on [focal project]?

Can you give me any examples?

In what ways, if any, has collaboration with your teammates been impacted by the pandemic?

[if challenges] how are you dealing with those?

How are you connecting with other people on the project? When and how do you reach out to your teammates for help or support?

(optional) In what ways, if any, does your organization try to promote persistence? What motivates you to do the work on [focal project(s)] right now?

Does your motivation change over time? If so how?

(optional) What, if anything, do you find meaningful or worthwhile about your work right now?

Letting go, idea attachment

We talked about knowing when to persist or quit with a project or idea. Can you tell me about a time when you had to let go of a creative idea? How does that impact you? When projects are put on a shelf, do you ever return to them? How and when?

# Progress

Thinking about [focal project] do you feel like you're making progress right now? How do you assess that?

How would you describe the progress you've made so far? (*prompt: linear, steady, up and down, etc.*)

Thinking about [focal project], are there points that have felt more or less creative to you? Can you give me any examples?

*If project is ongoing:* How much potential do you see in the project now? *If project is nearer to the end:* how does your assessment of the project now compare to how you felt at the beginning?

# Failures & setbacks

What are the main setbacks you experience in your work? How do you deal with them? Are some setbacks more problematic than others? If so, in what ways? [getting at different types of setbacks]

Can you give me any examples from [focal project(s)]? How have you handled them?

# **Biweekly Survey**

Thanks for checking in!

For the following questions, please reflect on your work over <u>the past two weeks</u>. All responses are confidential and will be kept anonymous under the terms of Boston College's Institutional Review Board (IRB).

# Open-ended responses

In one or two sentences, please describe the project you are currently spending most of your time on.

In the last two weeks, have you decided to stop (permanently or temporarily) developing an idea in the face of a challenge or obstacle? If so, how did you make this decision?

In the last two weeks, have you decided to keep working on an idea despite facing challenges? What challenges did you face? What made you want to keep going?

In general, how do you feel about your primary project right now? Have those feelings changed over the past two weeks, and if so, how?

# Quantitative measures

Thinking over the past two weeks, please indicate your level of agreement with the following statements (1 = strongly disagree, 5 = strongly agree):

The work I have done is worthwhile.

I generated novel, but feasible ideas to achieve goals or objectives.

I pursued ideas related to ongoing projects, rather than developing new ideas.

I abandoned an idea or solution because of challenges or setbacks.

I persevered in solving a problem despite challenges or obstacles.